

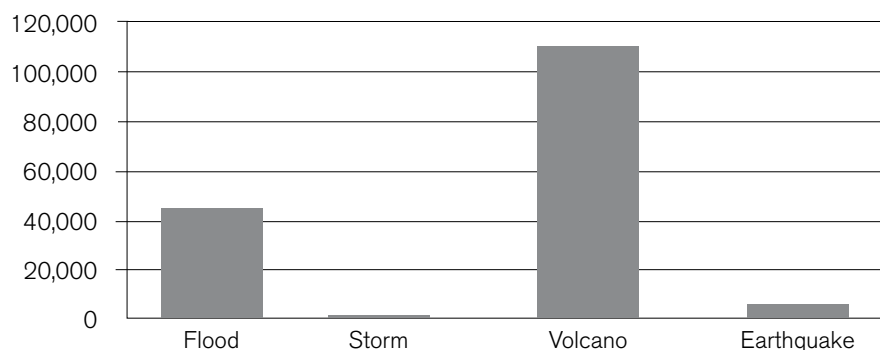
# PAPUA NEW GUINEA

To prepare this Country DRM Note, consultations were undertaken with members of the World Bank Country Team, the National Disaster Committee, the Department of Mineral Policy and Geohazards Management, the National Weather Service, the Department of Environment and Conservation and other key donors in the region.

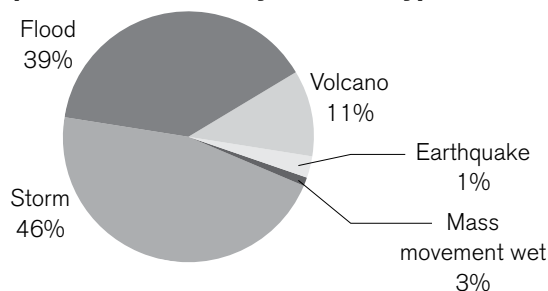
## 1. DISASTER RISK PROFILE

**Papua New Guinea is prone to earthquakes, volcanic eruptions, tsunamis, cyclones, river and coastal flooding, landslides and drought.** It is ranked 54<sup>th</sup> among countries most exposed to multiple hazards based on land area, according to the World Bank’s *Natural Disaster Hotspot* study.

**Economic Damages by Disaster Type (1000s US\$)**



**% Population Affected by Disaster Type**



Source: "EM-DAT: The OFDA/CRED International Disaster Database"

**COUNTRIES MOST EXPOSED TO MULTIPLE HAZARDS (Top 60 based on land area with 2 or more hazards)**

1. St. Kitts and Nevis
2. Macao, China
5. Taiwan, China
10. Guatemala
15. Somalia
18. Cayman Islands
20. Japan
25. Chile
28. Tajikistan
30. Madagascar
35. Mexico
40. Swaziland
45. Lesotho
50. Dominica
<b>54. PAPUA NEW GUINEA</b>
55. Jamaica
60. Armenia

**Large parts of the country are extremely isolated.** Most parts of the Highlands were not accessed by outsiders until the 1930s and many settlements are still inaccessible except by very difficult overland routes. The capital city is still not connected by road to most of the country and the range of communication, including radio, is extremely limited, increasing the inhabitants’ vulnerability.

## MAJOR NATURAL HAZARDS

Like its neighboring Pacific states, Papua New Guinea is prone to natural-caused disasters including earthquakes, volcanic eruptions, tsunamis, cyclones, river flooding and coastal erosion, landslides, droughts and frost. It ranks in the top 6 countries with the highest percentage of population exposed to earthquake hazards and has the highest percentage of population exposed to severe volcanic risk. Given its topography, high seismicity and high annual rainfall, the country ranked highest in terms of landslide hazard profiles according to the World Bank Hotspot study.

## RECENT DISASTERS

In 1994 the capital of East New Britain was rendered non-functional due to a twin-volcanic eruptions from Tavurvur and Vulcan mountains. As a result, they moved the capital to Kokopo including the airstrip and the resettlement scheme for the affected population. Between June 1997- February 1998 an El Nino influenced drought affected over 3,158,861 (70%) of the total population surveyed from the nation's total population of 4.5 million in that year. Most Papua New Guineans were immensely affected in the areas of food, water, education, economy, health and nutrition, agriculture and cultural practices. The National Disaster Centre's conservative estimate can put the total amount between PNGK81.0 million and PNGK85.0 million was used directly and indirectly for the drought, frost relief efforts by all concerned stakeholders. A total of eight disease outbreaks were reported but the National Department of Health does not have on deaths directly or associated with drought impact. In 1998, three 10 to 15 meter high tsunami waves devastated coastal villages in the Aitape-Sissano coastal area. In 2007, the island was hit by cyclone Gruba and in 2009, a landslide on a major highway paralyzed trade and transportation. Around 40 percent of PNG's population lives in poverty, that is, on less than **US \$1** a day, increasing their vulnerability to natural disasters.

### Examples of cost of disasters in PNG (5 years – 1997–2002)

CALAMITIES	POPULATION AFFECTED		COST (PNGK)
	Total Affected	Killed	
Volcanic Activities (4)	46,358		4,058,870
Floods (22)	480,517		13,709,423
Landslides (22)	19,707	128	1,090,000
Sea Rise (1)	3,227		620,000
Famine (1)	2,000		200,000
Earthquakes (4)	221,285	2	18,674,000
Cyclone (1)	158,780		4,960,760
Drought & Frost	3,158,861	?	85,000,000
Disease Outbreak (2)	196	11	
Hailstorm (3)	2,259		250,000
Tsunami (1)	12,427	3,210	31,000,000
Chemical Spill (1)	750		46,000
Kerosene Explosion (1)	39	5	35,826
<b>Total: (63)</b>	<b>4,106,406</b>	<b>3,356</b>	<b>K158,844,879</b>

Source: PNG NDCen

Capital	Port Moresby
Languages	English, Tok Pisin, and Motu (official)
Independence	16 September 1975 (from the Australian-administered UN trusteeship)
Area	total: 462,840 sq km land: 452,860 sq km water: 9,980 sq km
Land Use	arable land: 0.49% permanent crops: 1.4% other: 98.11% (2005)
Government	constitutional parliamentary democracy and a Commonwealth realm
Population	6,057,263 (2009 est.)
GDP	\$2,200 (2008 est. – per capita)
HDI	149th
Terrain	mostly mountains with coastal lowlands and rolling foothills
Climate	tropical; northwest monsoon (December to March), southeast monsoon (May to October); slight seasonal temperature variation
Natural resources	gold, copper, silver, natural gas, timber, oil, fisheries
Main development partners	Australia, Japan, EC, New Zealand, the United States, The United Kingdom, the World Bank, UN agencies, ADB

The World Fact Book, World Bank Country Reports

## 2. DISASTER RISK MANAGEMENT FRAMEWORK

**Papua New Guinea was among the first counties to adopt the Hyogo Framework for Action in November 2005, but has been unable to integrate the actions into its national development priorities.** The Disaster Management Plan, in place since 1987, is considered outdated and not relevant to contemporary best practices. The current operational document for response management is the 2003 National and Provincial Disaster and Risk Management Handbook. The *Papua New Guinea Disaster Risk Reduction and Disaster Management National Framework for Action 2005–2015* is still in draft form and has not yet been adopted by the GoPNG. However various partners and stakeholders like UNDP (PNG) and the University of Papua New Guinea have been aligning their work plans and teachings based on this Framework.

**The National Disaster Centre (NDC) within the Department of Provincial and Local Government Affairs was established by an Act of Parliament to coordinate rapid responses to the impacts of natural disasters.** However, the NDC is not fully effective within the government and lacks sufficient budget, human resources and government backing. The NDC has embraced the whole of hazard approach through the principles of the totality of disaster management through Disaster Management Cycle where it spells out the importance of before disaster, during disaster and post disaster management. That was why PNG Mitigation Policy was established in later 2003.

## 3. ACTIVITIES UNDER THE HYOGO FRAMEWORK OF ACTION

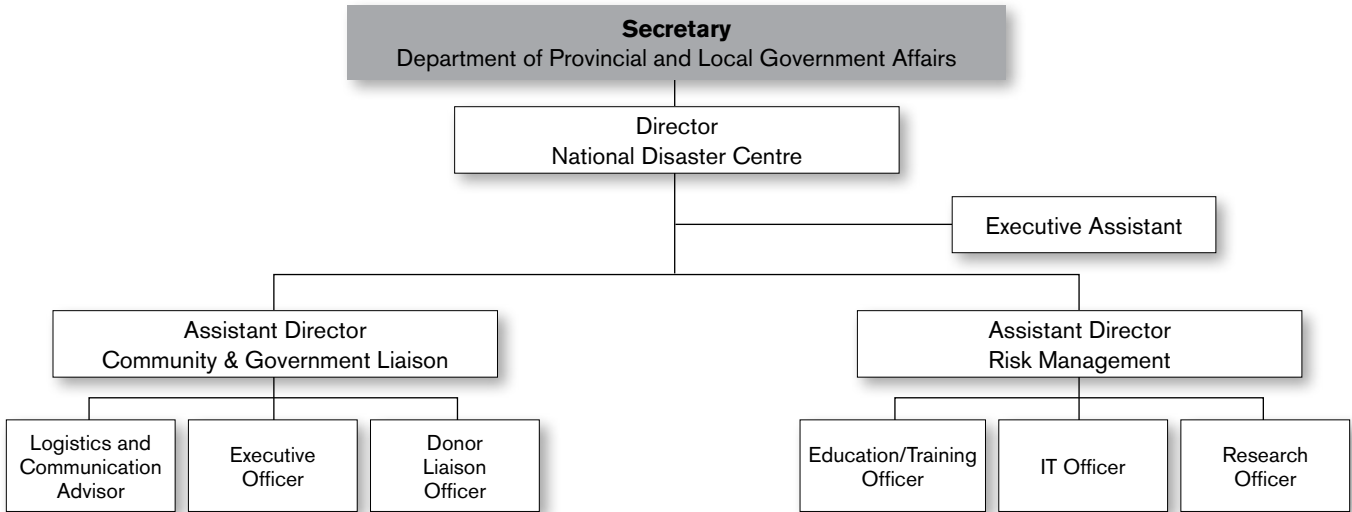
**HFA Priority # 1: Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation**

THE NATIONAL DRM AGENCY

**The national agency responsible for DRM is the National Disaster Centre (NDC) within the Department of Provincial and Local Government Affairs.** The NDC is the implementing arm of the National Disaster Committee. While the NDC is tasked with coordinating all disaster risk reduction activities, in reality the budget, human resources

and government commitment to this center are insufficient to undertake risk reduction activities. Members of the National Disaster Committee include the Commander of the Department of Defense and Police Commissioner and the department heads for Finance, Defense, Works and Supply Matters, Health, Foreign Affairs and Trade and Provincial and Local Governments.

**Organization Structure of NDC**



Source: ADRC

A parallel body called the Disaster Management Team has been established by donors and stakeholders and has recently provided disaster response coordination. The DMT is chaired by UNDP.

**DRM LEGISLATION**

**The Disaster Management Plan has been in place since 1987 and is in need of updating.** The current operational document for response management is the 2003 National and Provincial Disaster and Risk Management Handbook and the Draft Papua New Guinea Disaster Risk Reduction and Disaster Management National Framework for Action 2005–2015.

**The National Disaster Management Act of 1984 (amended in 1987) is the country’s DRM law and focuses only on preparedness and response arrangements during disasters.** A National Disaster Mitigation Policy was prepared and approved by the National Executive Council in November in 2003 and launched in early 2004. The Policy would have created the National Environment and Disaster Mitigation Authority whose responsibilities would have included not only disaster management but environment and disaster mitigation as well.

**DRM AT THE SUB-NATIONAL LEVEL**

**The draft National Framework for action cites a lack of capacity for disaster risk reduction at the provincial level.** The draft Framework also mentions plans to integrate DRM into provincial level planning and budgeting and include disaster risk assessments into investment decisions at the community level. The NDM Act provides for the establishment of Provincial Disaster Committees which should be responsible for preparing emergency plans for the provinces and coordinate relief operations. UNDP has identified this and an opportunity for action in their future programming.

**According to a World Bank draft assessment of DRM in Papua New Guinea, only four of the 19 provinces have active disaster management arrangements.** While there is reasonable awareness among provinces, there is

an extreme shortfall in resources to implement disaster risk management activities at the sub-national level, and focus is solely on response rather than preparedness or mitigation. As well as a lack of budgetary resources, there is a lack of human resource capacity to create sub-national disaster action plans.

#### DRM IN THE POVERTY REDUCTION STRATEGY

**Disaster Risk Reduction is not explicitly identified in the Government Medium Term Development Strategy (MTDS) 2005–2010** and there are no coordinated disaster risk reduction initiatives in current sector budgets. The MTDS noted that previous national strategies had failed due to political instability, weak institutional capacity and lack of ownership and commitment.

#### DISASTER RISK MANAGEMENT IN THE COUNTRY PARTNERSHIP STRATEGY

The World Bank Interim Strategy note for Papua New Guinea (2005) notes the country's vulnerability to natural hazards.

#### INTERMINISTERIAL INVOLVEMENT IN DRM

The other ministries and agencies which should play a role in DRM include:

- The Department of Mineral Policy and Geohazards Management which is responsible for seismology, volcanology and geotechnical issues
- The National Weather Service which operates observation networks and provides local forecasting
- The Water Resource Management Branch within the Department of Environment and Conservation which is responsible for water resources
- Members of the National Disaster Committee, who include the Commander of the Department of Defense and Police Commissioner and the Departmental heads for Finance, Defense, Works and Supply Matters, Health, Foreign Affairs and Trade; Provincial and Local Government.

There is reportedly weak coordination amongst agencies on disaster risk reduction and minimal sharing of information.

#### CLIMATE CHANGE AND DISASTER RISK MANAGEMENT

**The agency responsible for climate change adaptation is the Greenhouse unit within the Department of Environment and Conservation.** However, a Climate Change Office is in the process of being established and will directly report to the Prime Minister's Office.

### **HFA Priority # 2: Identify, assess and monitor disaster risks and enhance early warning**

#### NATIONAL, REGIONAL AND LOCAL SECTORAL RISK ASSESSMENTS

**While there is significant historical data available, there is a lack of national, regional and local sectoral risk assessment in Papua New Guinea.** There is little government focus on risk and vulnerability assessment and tools for analysis and monitoring are not available. Papua New Guinea does however have some limited volcanic risk mapping according to their 2005 reporting on progress made towards commitments under the Hyogo Framework.

#### EARLY WARNING SYSTEMS AND FORECASTING

**The newly-formed Department of Mineral Policy and Geohazards Management (DMPGM)** addresses seismology (9 staff), volcanology (16 staff) and geotechnical issues (7 staff all vacant). The department inherits the policy and geohazard management functions from the previous Department of Mining following the formation of the Mineral Resource Authority (MRA) in early in 2008.

**In the mid 80's there was a seismic network of 16 stations with both seismographs and accelerographs.** The system has gradually run down and is now ineffective according to a recent World Bank assessment study. There is an EU funding proposal to install six to ten new seismographs to resurrect a monitoring and assessment capacity. Adding accelerographs to these proposed installations would provide capacity for identifying potential areas of high impact. The last major magnitude 8 earthquake was in the New Ireland region in 2000. Parts of New Britain, New Ireland and Bougainville demonstrate some of the highest seismic hazard potential in the world.

**The Geotechnical unit covers landslides and slope stability, erosion (including coastal) and tsunamis.** This unit is severely depleted but makes use of MRA staff for emergency situations. Landslide potential is high over large areas, given the combination of PNG's steep mountain ranges, volcanism, high seismicity and high annual rainfall. According to Geoscience Australia (2008), three of the world's largest landslides recorded in the last 120 year have occurred in PNG. In the Highlands area, intensified land use due to increasing population and increasing climate variability are adding to the problem.

**The Papua New Guinea National Weather Service (NWS) sits within the Department of Transport.** In recent years, its staffing has been decreased from 107 positions to 66. The Service operates three observation networks. There is a network of 14 synoptic weather stations with data continuously contributing to the regional and international weather systems (including the Pacific Islands Climate Prediction Project) through Melbourne. This network is very coarse and provides only limited detail for local forecasting. Responses are thus mainly reactive, rather than being based on predictive information. A rainfall network of 57 gauges is operated through volunteers providing monthly records of 24 hour rainfall. This network used to comprise of 1000 stations, but now its usefulness for monitoring rainfall trends across a country of highly complex terrain is seriously compromised. Finally there is a four station synoptic network including measuring sea level and temperature, as part of the Pacific Island Climate Prediction Programme. There is also a Manus Island SEAFRAME station for sea level and climate monitoring.

**Overall, the NWS feels its monitoring network is falling below a credible level.** Staff consider the existing data systems inadequate for detailed trend analyses. They say there is little ability to identify local climate change trends. Increasing climate variability (the threat of droughts and other extreme events) linked to the annual direction of the Southern oscillation is becoming a major concern for the service.

**The Water Resource Management Branch (WRMB) sits within the Department for Environment and Conservation (DEC) and is responsible for the management of national water resources under the Environment Act 2000.** The WRMB undertakes river monitoring and the allocation of ground water resources. The branch is not adequately equipped to carry out these functions.

**The WRMB reported that over the past 10 years, river monitoring stations have been reduced from 130 stations to less than 10 and that the national network was effectively closed.** In March 2008 only one station on the Ramu River was fully effective and two stations were to be reopened. Additionally, all four stations on the Laloki catchment were supposed to be reopened by mid 2008 and a new station is to be constructed on the Goldie River. Some four to six Representative Regional Stations will be required as part of the Pacific HYCOS project. A hydrological strengthening study undertaken in the late 1990's recommended a credible system of 72 stations was required nationally.

**Although the historical record of hydrological monitoring in PNG is strong and goes back to the 1960's with an emphasis on hydro-power project investigation, data digitizing, database development and analysis and catchment mapping capability is deficient.** WRMB reported that flood records have not been analyzed since 1997 and low flow records do not exist to contribute to understanding potential drought conditions.

### **HFA Priority # 3: Use of knowledge, innovation, and education to build a culture of safety and resilience at all levels**

#### EDUCATION AND TRAINING

**There are courses on disaster risk reduction and hazard assessment at the University of Papua New Guinea, but these courses have not established strong links with the government.** Other institutions such as the National Agriculture Research Institute and the National Fisheries Institute are undertaking climate related hazard work in food and water security.

#### AWARENESS RAISING

**Fostering public awareness about natural hazards is the responsibility of the National Disaster Awareness and Preparedness Committee.** The committee was formed in 1999, building on the lessons learned from the 1997/8 drought and the Aitape Tsunami in July 1998, to prepare provincial baseline data. However, meetings of the committee have apparently lapsed recently. A World Bank assessment of disaster risk reduction in Papua New Guinea found the overall level of awareness about natural hazards was high amongst the departments and provinces. However the study found there was a general sense that resources and skills available were inadequate to deal with natural disasters and little appreciation that they would impact a sector's activity or an individual's "job".

### **HFA Priority # 4: Reduction of the underlying risk factors (reduction of exposure and vulnerability and increase of resilience)**

#### ENVIRONMENTAL AND NATURAL RESOURCE MANAGEMENT

**The rapidly growing rural population is placing increased stress on land and water resources and increasing the population's exposure to hazards.** However, the country has adopted the Environmental Act in 2000, which aims to regulate the environmental impact of development and protects national water resources.

#### LAND USE PLANNING

**The Physical Planning Act (1989) administered by the Department of Lands provides a strong enabling tool for managing land use to reduce natural hazard risk.** It is applicable to both alienated and customary land. In fact 97 percent of PNG land is customary with 3 percent alienated. The Physical Planning Act has been applied to just 2 percent of customary land which is subject to a government lease and on-lease for development purposes. Where land is subject to physical planning, it is a requirement that both environmental and hazard issues be addressed.

**A recent World Bank Assessment noted that mainstreaming of risk reduction into development planning is not occurring.** For example, while land use legislation requires consideration of hazards and environmental impacts, these inputs are not sought from the government hazard agencies or DEC in national or provincial land-use planning considerations.

**The Department of Works advises that consultants to make their own interpretation of design parameters often without reference to local hazard information.** The WRM branch of DEC noted they have not been approached by infrastructure consultants for hydrological data in the past two years. There are reports of new road developments being washed out by rainstorms or landslides – even donor funded projects which are specified to be risk and climate resilient. In the provinces it is reported that design manuals are not used.

## **HFA Priority # 5: Disaster preparedness, recovery and reconstruction at national, regional, and local levels**

### RISK FINANCING

**The Disaster Management Act mandates that the Provincial Government will bear the cost of the first K15,000 (US \$5,400) for disaster relief and any amount over K15,000 and up to K100,000 (US \$36,220) will be split between the National and Provincial Governments.** Any amounts above K100,000 shall be borne by the National Government. When reporting on progress made toward commitments under the Hyogo Framework in 2005, Papua Guinea noted that there was a budget available for disaster risk reduction activities. However, this budget is not readily available. Most Provinces have not readily taken the DRM in proactive way to prepare themselves for the onset of natural calamities because they still regard the DRM as the functions of the National Government. Once the draft DM Act is reviewed by end 2009, hopefully this should be corrected and provincial governments will take leading roles through planning and budgeting for any minor disaster in the province.

**While disaster response appears to be under resourced given the potential economic losses which could be caused by natural disaster, disaster risk reduction activities have no standing budget at all.** Papua New Guinea was one of the countries covered in the World Bank's Pacific Catastrophe Risk Financing Initiative Feasibility Study where they found the worst single year loss in Papua New Guinea was equivalent to 2.7 percent of the country's GDP.

### EMERGENCY MANAGEMENT

**The National Disaster Centre is in charge of emergency response in the country.** According to a recent UNDP study, emergency response capacity is improving in Papua New Guinea and institutional restructuring is underway to improve the response time and coordination of the Emergency Services. Though there were initiatives to combine the National Disaster Service, the Fire Service and the Ambulance Service under one agency and to have it come under a proposed National Disaster and Emergency Authority which will sit under the Ministry of Defense, that initiative has been shelved pending the outcome of the improvement the current PNG disaster management protocols.. The protocol is now wit the Government to consider.

#### 4. KEY DONOR ENGAGEMENTS

Existing Projects with Donors and International Financial Institutions	Funding Agency/ International Partners	Allocated Budget and Period (US\$)	HFA Activity Area(s)
<i>Pacific Catastrophe Risk Pool Feasibility Study</i> (The Cook Islands, Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu)	World Bank	2008–present US \$400,000	1,2,5
<i>Sustainable Management Through Reduced Risk from Disasters and Climate</i> (Fiji, Kiribati, Marshall Islands, Papua New Guinea, Solomon Islands, Timor-Leste, and Vanuatu )	World Bank	2008–present US \$1,9 million	2,3,4,5
Support for DRM in PNG	AUSAID	2009–2012 US \$7.4 million	1, 2, 3,4,5
<i>Pacific Islands Disaster Assistance Program (PDAP)</i> (The Cook Islands, Fiji, Kiribati, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Federated States of Micronesia and the Republic of the Marshall Islands)	USAID/OFDA	1995–present US \$571,307	5
Department of Environmental Conservation (DEC) Capacity Building Project	UNDP	US \$300,000 2006-2012	1,4
Disaster Risk Management	UNDP	2009	1,2,3,4
EDF 9 B Envelope – Upgrading monitoring and early warning systems	European Union	3.2 million euro	2
<i>Pacific Islands Climate Prediction Project</i> (The Cook Islands, Fiji, Kiribati, Niue, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu and Papua New Guinea)	AUSAID and the Australian Bureau of Meteorology	2004–present AUS \$5.5 million	2
<i>South Pacific Sea Level and Climate Monitoring Project</i> (The Cook Islands, Federated States of Micronesia Fiji, Kiribati, Marshall Islands, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu)	AUSAID	1991–2010	2,5

#### 5. GLOBAL FACILITY FOR DISASTER REDUCTION AND RECOVERY (GFDRR): ACTION PLAN

Due to the weak policy and institutional frameworks currently evident in Papua New Guinea, opportunities for investment have been restricted to those which:

- contribute to reducing actual risk
- contribute to building on existing in-country capacity
- are supported by, or contribute to, or inform sector risk reduction policy frameworks within country priority activities.
- Have a reasonably strong chance of receiving government commitment and partnership

<b>Indicative Program for GFDRR Funding</b> <i>(Projects and engagement areas being considered for GFDRR funding)</i>	<b>Implementing Agency/ International Partners</b>	<b>Indicative Budget and Period (US\$)</b>	<b>HFA Activity Area(s)</b>
<p><b>Develop a Coordinated Hazard Policy and Integrated Spatial Hazard Risk Information and Mapping System for PNG (National Scale)</b></p> <p><i>Priority activities</i></p> <p>(1) Provide (Technical Adviser TA) support to hazard departments to:</p> <ul style="list-style-type: none"> <li>• Establish a coordinated government policy on the collection and storage of hazard data, the development of vulnerability, risk and trend information and its presentation and sharing across sectors for planning and development purposes</li> <li>• Assess needs and develop an integrated spatial database with analysis tools and mapping capability</li> <li>• Identify requirements and acquire appropriate map and image bases for hazard mapping and land use management purposes for urban, rural, coastal and highland applications</li> <li>• Enter existing and historical datasets across all hazards and develop initial vulnerability and risk information</li> <li>• Enhance seismometer network installation (EU funded) with installation of accelerogram equipment.</li> </ul> <p><b>Capacity Building on National Disaster Centre &amp; Key agencies in the areas of:</b></p> <ul style="list-style-type: none"> <li>• Finance Management</li> <li>• GIS and Remote Sensing Skills for Hazard Mapping and Risk Management (national scale)</li> <li>• DRR Trainings for provinces and communities</li> </ul> <p><b>Conduct Hazard Maps, Digitizing and Spatial Information on Drought, Frost, Coastal Erosion Plus Awareness in view of Predicted Mega Drought in 2012 (local scale embedded into local planning and regulatory tools)</b></p> <ul style="list-style-type: none"> <li>• Drought Vulnerability Map</li> <li>• Bush Fire Vulnerability Map</li> <li>• Water/River Cataachment Map</li> <li>• Food Security Information</li> <li>• Training</li> <li>• Awareness Information through media and stakeholders</li> </ul>	<p>Min of Mineral Policy and Geohazards Management with Geohazards Division, National Weather Service, Water Resource Management Branch, National Mapping Bureau, DL&amp;PP, DEC, NDC</p> <p>NDC</p> <p>NARI, DAL, NDC, DEC, Geohazard Office, NMBureau, NS Actors</p>	<p>2009–2011 US \$550,000</p> <p>US \$550,000</p> <p>US \$1,500,000</p>	<p>2</p> <p>1, 5</p> <p>1, 5</p> <p>2, 3, 4, 5</p>
<p><b>Total budget request</b></p>		<p><b>US \$2,600,000</b></p>	

## 6. BIBLIOGRAPHY

AUSAID Country Brief Papua New Guinea 2009.

Bettencourt, Sofia, Richard Croad, Paul Freeman, John Hay, Roger Jones, Peter King, Padma Lal, Alan Mearns, Geoff Miller, Idah Pswarayi-Riddihough, Alf Simpson, Nakibae Teuatabo, Ulric Tritz, Maarten Van Aalst 'Not If, But When: Adapting to Natural Hazards in the Pacific Island Region' The World Bank. 2005.

Dilley, Max, Robert S. Chen, Uwe Deichmann, Arthur L. Lerner-Lam, and Margaret Arnold 'Natural Disaster Hotspots; A Global Risk Analysis' World Bank 2005.

EM-DAT: OFDA/CRED International Disaster Database, Catholic University of Louvain, Brussels, Belgium 2009.

Framework for Action 2005-2015: An Investment for Sustainable Development in the Pacific Island Countries Disaster Risk Reduction and Disaster Management; Building the Resilience of Nations and Communities to Disasters.

Hyogo Framework for Action 2005-2015: I S D R International Strategy for Disaster Reduction

Priorities and Action Agenda 2006-2015 Supplementary for Mainstreaming Disaster Risk Reduction and Disaster Management.

IBRD Interim Strategy Note for Papua New Guinea 2005.

Sikivou Moses. "What Do Pacific Developing Member Countries Want from Catastrophe Insurance," Pacific Islands Applied Geoscience Commission, National Catastrophe Risk Insurance Mechanisms for Asia and the Pacific, November 4-5, 2008, Tokyo, Japan.

Papua New Guinea Disaster Management Act 1984.

Papua New Guinea Environmental Planning Act 1978.

Papua New Guinea Australia Development Cooperation Strategy 2006-2010.

UNDP. Human Development Index. 2007.

UNDP. Gaps and Opportunities for DRM Programming in Papua New Guinea 2009.

UNISDR. Living with Risk: A Global Review of Disaster Reduction Initiatives 2002.

UNISDR. Accessed 3/20/09 < <http://www.unisdr.org/eng/mdgs-drr/national-reports/Papua-New-Guinea-report.pdf>>.

The World Bank (Draft) Pacific Catastrophe Risk Financing Initiative 2009.

The World Fact Book 2009.

The World Bank Draft Country Assessment Report Papua New Guinea.