

PAPUA NEW GUINEA (PNG)
NATIONAL SUMMARY REPORT
I D N D R

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P a p u a N e w G u i n e a

SECTION A: PROFILE

(This section contains relevant basic information about your country.
Please complete and check the information already included.)

1. Composition of National Committee (Focal Point):

(Please list the names of the institutions represented and indicate in the brackets the number of members for each group)

- * **Ministries [1]**
Department of Village Services and Provincial Affairs.
- * **Non-Governmental Organizations [2]**
 - PNG Red Cross
 - Melanesian Council of Churches
- * **Academic & Research Institutions [1]**
 - University of Papua New Guinea
- * **Media [1]**
 - National Broadcasting Commission
- * **Private Sector [1]**
 - Chamber of Commerce
- * **Insurance []**
- * **Public Services (e.g. meteorological, etc) [9]**
 - Department of Prime Minister and National Executive Council

- Department of Defence
- PNG Constabulary - Royal Police
- Department of Finance and Planning
- Department of Health
- Department of Foreign Affairs and Trade
- Department of Minerals and Energy
- Department of Civil Aviation
- Department of Works and Supply

* Others []

2. Internal organization of the National Committee

(Please describe hierarchy, responsibilities, coordination and cooperation mechanisms in natural disaster reduction activities.)

- * The National Disaster and Emergency Services is the main organization that directs and coordinates disaster related activities. Apart from the National Disaster Committee, there is also a Provincial Disaster Committee. The Director General is the Chief Executive at the National Level (also Chairman of the National IDNDR Committee) and the Head of the Provincial Department is the Chief of the Provincial Disaster Committee. The functions of the National and Provincial Disaster Committees are stipulated in Section 6 and Section 12 of the Disaster Management Act. The main tasks of the National Disaster Committee is to supervise the National State of Preparedness for emergencies and the Provincial Committee is to assess liaise develop and prepare emergency plans for the provinces.

3. Prevailing hazards

Type	Location	Affected Population
Volcano	East New Britain Province Madang	70,000 12,000
Earthquake (landslides)	Madang Province Morobe Province	50,000 100,000
Flood	Chimbu Province Western Highlands Province	30,000 30,000
Cyclone	Milne Bay	70,000
Drought	Western/Central/Highlands	200,000
Tsunami, frost, fire, epidemics various		Total population

(Please attach additional information if necessary)

4. Recent natural disasters

Type	Location	Affected Population	Losses
Earthquake (landslides)	Madang/Morobe provinces	7,600	lives, houses, gardens
Cyclone 1993/94	Milne Bay Province	7,000	lives, infrastructure/houses
Flood 1993	West New Britain Province Chimbu Province Western Highlands Province	50,000	infrastructure, food, gardens
Volcano 1993	Madang Province	5,000	food, gardens

5. National socio-economic conditions

- * Population: 3,607,954 (1990)
- Gross-National Product (GNP): KINA 3487.6 Million (1991) Development
- Per-Capita Income: KINA 907.00

6. Availability of assistance to other countries in the field of natural disaster reduction.

(Please list potential resources, scientific expertise, technology, etc.)

- * Department of Minerals and Energy provides:
 - Geological Services
 - Seismological Services
 - Volcanological Services and Observatory
- * Department of Civil Aviation provides:
 - National Weather Services

Note: The National Disaster and Emergency Services does not directly control resources and expertise but may call upon expertise in the other Government Department to provide assistance and advice.

7. International assistance required for natural disaster reduction

(Please indicate requirements for scientific expertise, technology, resources etc.)

- * Update and improve communications facilities throughout the country.
- * Update and improve monitoring facilities throughout the country.
- * Construction of 4 strategically placed warehouses for essential equipment (for mitigation activities) and relief supplies i.e. Bailey bridges.
- * Supply and maintain Bailey bridges for standby emergency purposes.
- * Provide training opportunities for Disaster Manager/Officer on basic management, human resource management, planning and resource allocation and personnel management including public relations.
- * Provide assistance for developing national and provincial disaster plans.
- * Provide assistance to develop and effective organizational structure.
- * Review existing legislation.
- * Provide assistance for the development of data bases.

SECTION B: STRATEGIES AND ACTIVITIES

(This section deals with current or planned strategies and activities)

1. Steps towards achieving the 3 main Decade targets

(a) Comprehensive national assessments of risks from natural hazards, with these assessments taken into account in development plans;

- * The National Disaster Management Plan was developed as a result of previous natural disasters and to prepare for potential disasters. The National Disaster Committee is now considering a review of that plan.

(b) Mitigation plans at national and/or local levels, involving long-term prevention and preparedness and community awareness; and

- * The National Disaster Plan contains strategies and measures to take in care of disasters. The main activity is Public Awareness through the media on the education system. These campaigns are run before and during the disasters season.

Assistance is needed to develop:

- Hazard and risk assessments
- Development of plans for disasters
- Identification of disaster mitigation/prevention projects
- Community based projects.

(c) Ready access to global, regional, national and local warning systems and broad dissemination of warnings.

- * PNG Department of Minerals and Energy provides:
 - Geological services
 - Seismological services
 - Volcanological services and observatory
- * PNG Department of Civil Aviation provides:
 - Meteorological services
 - Australian maritime rescue and coordinating centre
 - Australian geological survey organization (Australian Seismological Centre) - Information on effects of all major worldwide earthquakes and South Pacific regional earthquakes
 - US Pacific Tsunami Warning Centre - tsunami warnings for Pacific Ocean
 - US Navy - cyclone warnings and advisories
 - NADI Meteorological Centre Fiji

2. Present national plan for natural disaster reduction

a) Time span covered:

- * The National Disaster Management Plan was adopted in 1987 as the "National Emergency Plan of the National Executive Council" as stipulated in Section (5) of the Disaster Management Act.

The Plan is always in force and under continual review.

b) Agencies, institutions and organizations involved:

- * The National Disaster and Emergency Services and Papua New Guinea government Departments and agencies.

c) Implementing agencies:

National Disaster and Emergency Services.

d) Funds available for implementation:

Virtually no funding is available for natural disaster reduction activities. Currently 1,000,000 Kina has been made available for disaster relief assistance in 1994. 70% of this budget has been requested for disaster relief activities in just 18 days of 1994.

3. Legislation introduced and enacted in relation to natural disaster reduction

- * Disaster Management Act 1994.

4. Disaster mitigation activities completed or underway:

a) *Identification of hazard zones: hazard assessment*

Title of project: Identification of Papua New Guinea earthquake zones.

Status: Ongoing.

Participating institutions in the country and/or on the international level:

PNG Department of Mining and Petroleum
Geological Survey, Geophysical Observatory

Costs of project: US\$ 50,000 for consultancy fund, computer hardware and software.

Sources of funding: Nil.

Implementing agencies: Geophysical Observatory (Principal Seismologist)

Address (telephone and fax-number) of the agency in charge:

Geophysical Observatory
Department of Mining and Petroleum
Private Mail Bag
Port Moresby Post Office
Papua New Guinea
Tel: (675) 21 45 00
Fax: (675) 21 39 76

Title of project: Landslide Hazard Mapping and Mitigation Programme.

Status:

The Geological Survey Division (GSPNC) of the Department of Mining and Petroleum has recently started a programme of landslide hazard mapping across Papua New Guinea. The purpose of the work is to provide landslide and associated hazard and vulnerability maps at a regional scale which will be of use to various government bodies and statutory authorities for planning of infrastructure and for disaster mitigation purposes. It will enable the establishment of an interactive geographical information database for long term planning, updating and monitoring purposes.

Participating institutions in the country and/or on the international level:

Geological Survey Division
Department of Mining and Petroleum
Papua New Guinea
Technical assistance given by British Geological Survey

Costs of project: Set up cost K153900. The programme is already in place but additional funds are required to enable acceleration of the programme in order that results can be obtained within a time frame that will benefit affected people.

Sources of funding: Current funding is given by the PNG government but falls far short of requirements preventing full implementation of project due to lack of satellite imagery data, hardware and image enhancement software. Additional sources of funding are currently being sought.

Implementing agencies:

Geological Survey Division
Department of Mining and Petroleum

Address (telephone and fax-number) of the agency in charge:

Geological Survey Division
Department of Mining and Petroleum
Private Mail Bag
Port Moresby Post Office
Papua New Guinea
Tel: (675) 21 24 22
Fax: (675) 21 13 60

Title of project: Catchment Mapping

Aim Desk-top study involving the identification of all the streams and rivers in Papua New Guinea, aimed at identifying flood hazard zones.

Status: Project proposal currently being discussed with PNG Department of Finance & Planning for possible funding from external sources.

Participating institutions in the country and/or on the international level:

- (i) Bureau of Water Resources, Papua New Guinea
- (ii) CSIRO, Australia
- (iii) Department of Agriculture (Land Use & Research) Papua New Guinea

Costs of project: US\$ 1.0 million

Money to be used for: (a) Reconnaissance Surveys
(b) Purchase of drawing and other stationary items
(c) Computer software/hardware
(d) Satellite Imagery/Maps

Sources of funding: To be sought from both the Papua New Guinea government and from external sources

Implementing agencies: Bureau of Water Resources

Address (telephone and fax-number) of the agency in charge:

Bureau of Water Resources
P.O. Box 6580
Boroko, PNG
Tel: (675) 230 166
Fax: (675) 231 240

b) *Monitoring, prediction and warning*

Title of project: German Seismic Project

Status:

- * Deployment of a digital seismic network in Papua New Guinea, by the Department of Mining and Petroleum, Geological Survey, Geophysical Observatory.

Participating institutions in the country and/or on the international level:

- * a) Geophysical Observatory
- b) German Government until mid 1994

Costs of project: US\$ 100,000 1 year

Sources of funding: The German Government is ceasing further funding. However, further funding is required to complete the project.

Implementing agencies: Geophysical Observatory (Dr. H. Letz, Project Officer)

Address (telephone and fax-number) of the agency in charge:

Geophysical Observatory
Department of Mining and Petroleum
Private Mail Bag
Port Moresby Post Office
Papua New Guinea
Tel: (675) 21 45 00
Fax: (675) 21 39 76

Title of project: Expansion and Upgrading of Hydrometric Network

Aim: Install hydrometeorological stations at areas subjected to intense rainfall, runoff and floods

Status: Project proposal currently being discussed with PNG Department of Finance and Planning for possible and funding by external donor agencies.

Participating institutions in the country and/or on the international level:

- (i) Bureau of Water Resources, Papua New Guinea

Costs of project: US\$ 10.0 million over 5 years

Note: Bureau of Water Resources has 100 rainfall and river flow monitoring stations. The US\$ 10.0 m will be to use to help expand the hydrometric network to over 350 stations, as recommended by WMO.

Sources of funding: To be sought from both the Papua New Guinea government, and from external donor agencies.

Implementing agencies: Bureau of Water Resources

Address (telephone and fax-number) of the agency in charge:

Bureau of Water Resources
Department of Energy Development
P.O. Box 6580
Boroko, PNG
Tel: (675) 23 01 66
Fax: (675) 23 12 40

c) *Short-term Protective measures and preparedness*

Title of project:

Status:

Participating institutions in the country and/or on the international level:

Costs of project:

Sources of funding:

Implementing agencies:

Address (telephone and fax-number) of the agency in charge:

d) *Long-term preventive measures*

Title of project: Formulation of a National Flood Warning and Mitigation Plan.

Aim: To form a Scientific Investigation team that will aim at formulating a national flood warning plan, legislation and carry out investigations.

Status:

Currently in inception phase, with discussion already held with the Papua New Guinea National Disaster and Emergency Services Department.

Participating institutions in the country and/or on the international level:

- (i) Bureau of Water Resources, Papua New Guinea
- (ii) Geological Survey (DMP) of Papua New Guinea
- (iii) University of Papua New Guinea
- (iv) University of Technology, Papua New Guinea

Costs of project: US\$ 2.5 million over 3 years.

Money to be used by 4-5 different organizations for research, meetings, surveys on flooding problems in Papua New Guinea.

Sources of funding:

To be sought from both the Papua New Guinea Government, and also from external donor agencies in PNG.

Implementing agencies:

- (i) Bureau of Water Resources, PNG
- (ii) Geological Survey, PNG
- (iii) University of Technology, PNG

Address (telephone and fax-number) of the agency in charge:

Bureau of Water Resources
Department of Energy Development
P.O. Box 6580
Boroko
Tel: (675) 23 01 66
Fax: (675) 23 12 40

e) *Land-use and risk management*

Title of project: Landslide and associated hazard Vulnerability Mapping for PNG

Status:

New Project. This project will follow closely behind the geological hazard mapping programme and identifies the communities and infrastructure affected by landslides and associated hazard indicating degree of risk and consequences of disaster.

Participating institutions in the country and/or on the international level:

Geological Survey Division
Department of Mining and Petroleum
Papua New Guinea

Costs of project: K 50,000

Sources of funding:

Limited funding by Papua New Guinea Government
Additional funding sources required.

Implementing agencies:

Geological Survey Division
Provincial Government
National Disaster Emergency Services

Address (telephone and fax-number) of the agency in charge:

Geological Survey Division
Department of Mining and Petroleum
Private Mail Bag
Port Moresby Post Office
Papua New Guinea
Tel: (675) 21 24 22
Fax: (675) 21 13 60

f) *Public education and information*

Title of project: Landslide Hazard Awareness and Mitigation Programme "Living with Landslides"

Status:

Has already been implemented on a local scale to enable people displaced by the October 1993 landslide to return to traditional lands. It is envisaged that a national awareness programme will be carried out to inform people of action to take if a landslide should occur and to be able to reduce the likelihood of landslide occurring through better agricultural practice etc.

Participating institutions in the country and/or on the international level:

Geological Survey Division
Department of Mining and Petroleum
Papua New Guinea

Costs of project: K 95,000

The main costs associated with the programme will be publication costs and distribution.

Sources of funding: Funding to date provided by the Papua New Guinea government, insufficient funds for bulk publication. Additional funding is therefore sought.

Implementing agencies:

Geological Survey Division - Production

Provincial Government - Distribution
National Disaster Emergency Services - Distribution

Address (telephone and fax-number) of the agency in charge:

Geological Survey Division
Department of Mining and Petroleum
Private Mail Bag
Port Moresby Post Office
Papua New Guinea
Tel: (675) 21 24 22
Fax: (675) 21 13 60

5. Plans to fully achieve Decade targets by the end of 1999

(As in 4 above, for each area of activity [i.e., hazard zoning/assessment, monitoring, preparedness, etc] please indicate as applicable, the project title, the participating institutions in the country and/or on the international level, the costs of projects, the sources of funding and the implementing agencies.)

Proposal for enhances monitoring of Ulawun, a decade volcano in Papua New Guinea (see attached document).

SECTION C: INTERACTIONS

(This section focuses on international involvement in the IDNDR.)

1. Publications on IDNDR-related subjects:

(E.g. manuals, brochures, bulletins and other publications of relevance to IDNDR. Please mention title, author/institution, place and year of publication)

2. IDNDR meetings and conferences held or planned:

(Please indicate, date, location, organizing agency, national and international participation.)

- 1) Papua New Guinea participated in the South West Pacific Regional meeting of International Decade for Natural Disaster Reduction.
Date: 25-26 August 1993.
Location: Vanuatu
Organizing Agency: Australian IDNDR Coordination Committee
- 2) A meeting is planned for May 1994.

3. Current or planned partnerships and cooperation related to IDNDR with other countries

(Please indicate Governments, National Committees, Institutions or Organizations involved.)

Australian IDNDR Coordination Committee.

SECTION D: EVALUATION

(This section analyses national progress and outlines possible improvement.)

1. Overall evaluation of national disaster mitigation programmes including, but not limited to, those initiated after IDNDR and achievements up to now

(Please elaborate on whether the targets set by the National Committee, if any, the national disaster mitigation plans or other IDNDR activities have been met. If not, please indicate reasons.)

In the Vanuatu meeting proposals were made for the following to be in place by 1995:

- * A new Act of Parliament
- * A new Organization
- * A comprehensive training programme
- * A new NGO related Programme

Consultation with other Government Agencies and Non-Governmental Organizations is under way to meet the above objectives by 1995.

PROPOSAL FOR ENHANCED MONITORING OF ULAWUN, A DECADE VOLCANO IN PAPUA NEW GUINEA

SUMMARY

Rabaul Volcano Observatory (RVO) is requesting funding to enhance its monitoring of Ulawun, a volcano that has been recognized internationally as being of importance in assessing volcanic hazards. This monitoring will help safeguard the lives and property of many local people in the event of an eruption. It will also help forewarn of a large-scale catastrophic eruption which will have much more widespread effects.

The proposed programme is costed at K700,000 for a three-year period. Most of the funding is required to purchase equipment which will continue to function beyond the lifetime of the project.

INTRODUCTION

Ulawun is one of the most active volcanoes in Papua New Guinea. It is an imposing structure which rises to about 2300 m above sea level: the highest of the major volcanoes in the Bismarck Volcanic Arc that stretches for over 1000 km between Rabaul and Wewak.

In the last hundred years, there have been between 15 and 18 eruptions at Ulawun, most of them apparently mild. The most recent eruptions, between 1970 and 1980, are probably the strongest in its recorded history: that in 1980 devastated an area of about 20 sq.km. The topography of Ulawun indicates that, prior to historical records, there has been a much wider variation in the size and type of eruption, from a number of different sites. Most of the activity has been constructive but there is evidence of at least one large-scale collapse of the edifice. A large number of people would be affected by a major eruption or collapse of Ulawun. The latter would produce a large-scale avalanche that might generate a tsunami ("tidal wave") affecting coastal areas throughout the Bismarck Sea.

In order to assess the risk to people and property from eruptions at Ulawun, it is important to determine the internal structure of the volcano and its structural integrity. This requires accurate monitoring of the spatial distribution of earthquakes and patterns of ground deformation, during both eruptions and periods of quiescence. The worst-case scenario for Ulawun is a large-scale collapse. It is highly likely that such an event will be forewarned by changes in the distribution and character of earthquakes and in the deformation patterns.

Scientific monitoring of Ulawun commenced in the 1970s but has been fairly rudimentary. Seismic activity is monitored using only a single seismometer. This allows calculation of only primitive information, such as the rate of earthquake occurrence and approximate magnitudes, but not earthquake locations. Ground-deformation measurements at Ulawun have not been a success, due to insufficient accuracy of the standard surveying techniques used. The aim of the programme proposed here is to improve both monitoring methods. This is an important first step towards a better understanding of Ulawun, greatly improving our position to mitigate potential volcanic disasters.

DECADE VOLCANO PROGRAMME

Ulawun has been recognized by the international scientific community as suitable for

intensive study as a Decade Volcano during the 1990s, the International Decade of Natural Disaster Reduction (IDNDR). It is one of seven such volcanoes identified in undeveloped countries. The nomination of a volcano is meant to assist research groups to obtain funding for their work.

Declaration of the IDNDR was made in response to worldwide concern about the impact of natural disasters. Its purpose is to promote work dedicated to reducing the effects of the disasters. Of all the IDNDR programmes submitted, the International Council of Scientific Unions (ICSU) decided to give the highest priority to the proposal "Reducing Volcanic Disasters in the 1990s" and the concept of "Decade Volcano" projects involving in-depth multidisciplinary studies to mitigate volcanic hazards.

ULAWUM PROGRAMME

PVO propose a programme for Ulawun involving the deployment of monitoring equipment which will run continuously, providing data on earthquake locations and ground deformation.

Earthquakes can be located with sufficient accuracy if they are recorded at six or more separate seismic stations. However, some earthquakes may not be large enough to be recorded throughout a network and a total of 10 stations is needed to adequately monitor Ulawun and nearby Bamus, a volcano which is known to produce earthquakes whose signals can be hard to distinguish from Ulawun earthquakes. RVO has already made a start on this project, deploying three 3-component sensors at Ulawun in mid-1992. An additional seven portable stations and a computer-based data-acquisition system are required to upgrade the network to the required status.

it would seem that only small changes in ground deformation are associated with eruptions at Ulawun, and that these are not detectable using conventional surveying methods. The advent of the satellite-base Global Positioning System (GPS) offers an increase in the accuracy for the fixing of points in space which can be utilized in volcano surveying. It is believed that GPS surveying will allow ground deformation at Ulawun to be monitored for the first time. Two separate programmes are planned. The first will use three permanent GPS receivers on the flanks of the volcano. These will be used to continuously monitor for the very small changes in altitude and position which are expected before and during a "normal" eruption. The second programme will use a mobile GPS receiver to survey a much larger area on an occasional basis. The aim of this is to detect any large scale deformation which may be indicative of collapse.

TIMING AND DURATION OF THE PROGRAMME

The Ulawun Decade Volcano Programme should start as early as possible - mid 1994 at the latest. An early start increases the time span of valuable "baseline" data collected before the next eruption. This will enable volcanologists to make better-informed decisions about the timing, course and magnitude of eruptions. If the next eruption is similar in size to historical Ulawun eruptions - that is, not catastrophic - the monitoring of the eruption will also be useful. This will provide data on what constitutes "normal" eruptive dynamics at Ulawun, and will help refine predictions of the expected activity leading up to and occurring during a major, catastrophic, eruption.

The proposed monitoring programme at Ulawun has a duration of three years. Judging by the frequency of historical eruptions, there will be a good chance of an eruption during this

period.

Progress reports to the project sponsors will be prepared annually. A final report will be prepared at the end of the three-year period.

COSTS

The majority of the funding sought is for the purchase of equipment and the field work expenses for its deployment. After deployment, funds are only needed for repairs and maintenance, the periodic GPS survey of the area around Ulawun, and a 2-monthly check of the seismic stations. RVO will meet all staff costs associated with this project. Most of the funding will therefore be needed at the start of the project. The equipment will continue to function after completion of the project.

**THE COST ESTIMATES BELOW ARE BASED ON LATE
1993 MANUFACTURERS PRICES**

Equipment	no.	unit cost (K)	cost (K)
1. Seismic Monitoring Equipment			
Portable seismic network and analysis system	1		228,000
Sundry equipment			23,000
2. Ground Deformation Monitoring Equipment			
Dual frequency GPS receivers	4	80,000	320,000
GPS module field kit	1	10,000	10,000
VHF radio communication system	2	2,500	5,000
Data processing computer	1	5,000	5,000
Modem	2	1,000	2,000
Solar power systems	3	2,000	6,000
Other items, building materials etc.			5,000
Software, inc development			
3. Deployment			
Helicopter hire (hours)	100	850	85,000
Field expenses/Travel			15,000
4. Annual GPS Survey			
Helicopter hire (hours)	20	850	17,000
Field expenses/Travel			5,000
5. 2-monthly Seismic Check			
Helicopter hire (hours)	40	850	34,000
TOTAL COST (K)			770,000

January 1994