

# **Disaster Management in Vanuatu**

## **A Case Study**

***11.491 Disaster Vulnerability, and Resilience***

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# **Outline**

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## **PART 1: Technology-based approach (Hazard focus)**

- 1. Introduction to Vanuatu**
- 2. Probabilistic hazard assessment**
- 3. Multi-Risk database**
- 4. Preparedness – an example**

## **PART 2: Community-based approach (Vulnerability focus)**

- 1. Community vulnerability survey**
- 2. Institutional appraisal**
- 3. Community workshop**
- 4. Community Risk Seminar**
- 5. Participation – a success story?!**

# Part I: Vanuatu – a Small Island State

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**Group of 83 small islands  
located in the South  
West Pacific**

**Capital:** Port Vila

**Inhabitants:** ~ 200 000

## **Seismic Hazards:**

- Earthquakes
- Volcanoes (red triangles)
- Tsunamis

## **Meteorological Hazards:**

- Cyclons (Hurricanes)
- Floods
- Landslides

# Five things everyone should know about Earthquakes...

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- 1. There are more of them than you might think!** No wonder – the earth is in constant motion!
- 2. The Magnitude Scales are logarithmic in Energy** (+1 in scale  $\approx$   $\times 30$  in Energy) !
- 3. Earthquakes cannot be predicted** (for longer than about 10 s) !
- 4. Major earthquakes have been registered globally since 1964 !**
- 5. 90% of the annual release of seismic energy occurs in the Circum Pacific !**

**Why do hazard assessments primarily focus on seismic catastrophes (or floods) ?!**

## **Modeling versus Monitoring**

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**Real-time monitoring of meteorological catastrophes is done via satellite. Because modeling of meteorological catastrophes usually focuses on loss estimates for insurers, it is less relevant for disaster managers.**

Assessing seismic hazard is like doing weather forecasts without being able to look at the sky...

# Probabilistic Seismic Hazard Assessments

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## How does it work?!

**Step 1:** Statistical analysis of the earthquake catalogue (Seismicity Model)

**Step 2:** Inclusion of soil conditions to describe the ground motion caused by earthquakes (Attenuation Model)

The Global Seismic Hazard Assessment Programme (GSHAP) calculated a rough estimate of Peak Ground Acceleration worldwide (Vanuatu is enlarged)

# So what is it good for?!

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## Results

- ♦ **Development of building codes**
- ♦ **Identification of solid structures (buildings, bridges, etc.) that are most likely to collapse**
- ♦ **Long Term Emergency Planning**

## Limitations

- ♦ **No predictions are possible! The outcome of the analysis is strictly probabilistic!**
- ♦ **The results depend strongly on the quality of the available data**

⇒ **Particularly powerful for big industrialized cities characterised by a high material and settlement density !**

Is it possible to cover all hazards at once?!

## Focusing on urban areas: All-Hazard Databases

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**The “Pacific Cities Project”:** Building a database which is supposed to contain all relevant information for the assessments of all hazard in seven major cities in the South West Pacific.

### **Layered data structure:**

- 1.1. Buildings and  
Infrastructure
- 1.2. Earthquake Hazard  
Zonation  
(Microzonation)
3. Orthophotograph
4. Geology
5. Physiography and  
Bathymetry (digital  
terrain model)

# Modeling versus Bookkeeping

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The data layers in the Pacific Citites Database fulfill two purposes:

- 1. Modeling (i.e. the digital terrain model) and**
- 2. Bookkeeping (i.e. buildings and infrastructure)**

## **Tsunami hazard map for Mele**

The colour shadings indicate the expected maximum water depth (in meters).

# Cyclon preparedness – an example

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A traditional cottage on one of the northern islands....



# Cyclon preparedness – an example

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... being prepared for a hurricane ...



# Cyclon preparedness – an example

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.... How efficient was the approach?



## Part II: The Participatory Approach to Risk

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The Project on *Disaster Risk-Management in Marginal Communities of Port Vila, Vanuatu*, aims to:

“improve the security, quality of life and opportunities of peri-urban dwellers in high-risk areas of marginal land around Port Vila, by developing and implementing together with **all stakeholders**, a disaster risk-management process, which will serve as a pilot model for replication elsewhere in the Pacific”.

The project was realized in two communities: Mele, Maat and Blacksands

This project was implemented by **SOPAC (South Pacific Applied Geoscience Commission)** and funded by **UK DFID (United Kingdom Department of International Development)**.

Responsible Consultants:

Dr. Susanne Schmall and Dr. Graham Shorten



# Project Design

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1. **Community Vulnerability Survey** with household interviews and an infrastructure assessment
2. **Institutional appraisal** of local organisations
3. **Community Risk Mitigation Planning Workshops** in the peri-urban communities of Mele, Maat and Blacksands
4. **Community Risk Seminar** to bring all stakeholders together in a common venture



# Community Vulnerability Survey

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The Community Vulnerability Survey consists of

1. Household interviews, and
2. Infrastructure assessments

The objective is to identify:

- ♦ Perceived risk
- ♦ Current management strategies (individual and collective)
- ♦ Social development
- ♦ Priorities for action

# Priority areas as identified through the study

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**The following areas were identified to have the highest priority**

1. Water supply
2. Solid waste management
3. Food security
4. Drainage provisions
5. Community Disaster Management
6. Settlement Development Plan
7. Housing and construction
8. Relocation



Broadening support and raising awareness...

# Institutional Appraisal of local organizations

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## **Purpose of the institutional appraisal:**

- ♦ Raise awareness,
- ♦ Seek technical advice
- ♦ Establish contact with possible implementers
- ♦ Get support of local decision makers

# Community Mitigation Planning Workshop

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During the Vulnerability Assessment Survey several people (especially in Blacksands) complained about “... ongoing disaster surveys and meetings without changing anything. The meetings promised improvements that haven’t been met yet.”

## **Agenda for the three days of workshop in the communities:**

1. Presentation of the survey results by the consultants
2. Formation of working groups for the identified priority areas
3. Discuss ideas for project proposals
4. Vote for representatives to attend the Risk Seminar

# Community Risk Seminar

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Two days conference including all stakeholders during which the community's suggestions for future disaster management projects are discussed.

**Objective:** Finalize concrete project proposals

**Participants:**

- ♦ Community representatives
- ♦ Local government
- ♦ Donors
- ♦ NGOs
- ♦ Technical experts
- ♦ Private Sector
- ♦ Consultants

# References

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There are numerous reports on Vanuatu, available in the **Virtual Library at SOPAC** (rf. [www.sopac.org](http://www.sopac.org)). The Pacific Cities Project was also implemented by SOPAC. Only selected aspects of the project have been published (such as the Microzonation study in cooperation with Dr. Marc Regnier from the **Institut de Recherche pour le Développement, IRD**)

The presented project was led by **Dr. Susanne Schmall** and **Dr. Graham Shorten**

The probabilistic seismic hazard assessment has been carried out in cooperation with the **GeoForschungsZentrum in Potsdam** (Suckale et al. 2004)

