STATUS OF HAZARD MAPS VULNERABILITY ASSESSMENTS AND DIGITAL MAPS

SURINAME COUNTRY REPORT

THE CARIBBEAN DISASTER EMERGENCY RESPONSE AGENCY (CDERA)

October 2003

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Preface

From 2002 – 2005, the Caribbean Disaster Emergency Response Agency (CDERA) is implementing two major regional initiatives which are designed to reduce vulnerability to natural and technological hazards. These are the Japanese International Cooperation Agency (JICA) supported Caribbean Disaster Management (CADM) Project and the Canadian International Development Agency (CIDA) supported; Organization of American States executed Caribbean Hazard Mitigation Capacity Building Programme (CHAMP). The hazard mitigation planning component of the latter is being implemented in close collaboration with the Caribbean Development Bank's Disaster Mitigation Facility for the Caribbean. Hazard maps, vulnerability assessment studies, and digital maps are critical inputs to both initiatives.

This survey reviewed the status of these thematic activities in sixteen (16) CDERA Participating States, Haiti, Martinique, Suriname and Puerto Rico over the period August – October 2003. The objectives of the Survey were as follows:

1. To determine the status of hazard maps and vulnerability assessment studies and their use in the socio-economic planning and management of the Caribbean.
2. To determine critical success factors, gaps and best practices in the preparation and use of hazard maps and vulnerability assessment studies in the Caribbean.
3. To compile a database of hazard maps, vulnerability assessment reports, and digital maps available in the Caribbean.

Hazards considered under the survey included natural hazards such as floods, hurricanes, landslides, coastal disasters (surge, wave, and erosion), earthquakes, and volcanic eruptions as well as technological hazards. The types of vulnerability assessment considered were structural, economic, and human assessments.

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Status of Hazard Map, Vulnerability Assessments and Digital Maps in the Caribbean: Suriname

1.0 Introduction

1.1 Physical and socio-economic background

Suriname is located in Northern South America, bordering the North Atlantic Ocean, between French Guiana and Guyana. Its geographic coordinates are 4° 00' N, 56° 00' W. Juliana Top, 1,230 m, is the country's highest point. The country's total area is 163,270 sq km.

The country's climate is tropical and is moderated by trade winds. Suriname's terrain is mostly rolling hills and a narrow coastal plain with swamps. Its natural resources are numerous. They are timber, hydropower, fish, kaolin, shrimp, bauxite, gold, and small amounts of nickel, copper, platinum, iron ore.

Less than one percent of the land is arable land; permanent crops account for 0.06% and 99.57% of the land is used for other purposes. According to 2001 estimates, the services sector makes a 65% contribution to Gross Domestic Product (GDP), the industry sector contributes 22%, and agriculture is the lowest with 13%. The primary industries are bauxite and gold mining, alumina production, oil, lumbering, food processing, and fishing.

Suriname's labour force comprises 100,000 persons. Its unemployment rate, according to 2000 estimates was 17%. The 2002 estimates showed that about 70% of the nation's population lives below the poverty line.

Census estimates for July 2003 showed that 435,449 persons lived in the country. Further, population growth of 0.37% is expected in 2003. Suriname's literacy rate is impressive. Ninety-three percent of its population over 15 years of age can read and write. http://www.cia.gov/cia/publications/factbook/geos/ns.html.

1.2 Major Disaster Issues Confronting the Country

The major hazards which affect Suriname are drought, fire, and potential flooding of the hydroelectric dam. The recent 1997/1998 ENSO event has caused the second most severe drought in a 100-year record. Drying up of brackish-water lagoons, freshwater swamps and rainforest creeks was observed during El Niño-related droughts (Mol Jan H., et al, 2000).

The low-lying nature of the coast and the existence of reclaimed lands mean that Suriname is constantly battling against coastal erosion. Areas such as Coronie have lost 5 to 7 km off a 50-km stretch of coastline.

Human induced problems such as deforestation and water pollution also threatens the sustainability of the country. The increase in the export of timber has led to deforestation. Industrial activities have resulted in the pollution of inland waterways. The exploitation of gold and minerals has adversely affected the environment. Gold and mineral mining has resulted in deforestation, erosion, the silting up of waterways and cyanide and mercury water pollution. The disposal of untreated industrial waste into the Saramacca Canal or the Suriname River is an issue of concern as is the disposal of chemical waste products on regular dumping sites. The pollution of the Suriname River is worsened by faulty septic tanks that drain directly into the river. Development has also led to other issues, which need to be addressed. These include air pollution and the illegal dumping of garbage in the city of Paramaribo.

Table 1 provides the particulars of hazard maps that have been produced for Suriname.

Table 1 – Hazard Maps for Suriname

Type	***Purpose***	***Coverage***	***Scale***	***Date produced***	***Primary sources***	***Author***
Seismic	To map Horizontal Ground Acceleration; Expected Maximum Mercalli Intensity; and Horizontal Ground Velocity	Northern part of the country	0.25º grid resolution	1999	OAS/USDE/CDMP	Seismic Research Unit

2.0 Hazard Mapping Initiatives

The team was informed that no one is aware if hazard mapping has been undertaken in recent times in Suriname. However, the need for hazard mapping was strongly expressed by persons who attended the workshop/meeting organized by the National Disaster Office.

2.1 Methods of preparation and distribution

2.1.1 Seismic Hazard Maps

A search on the Internet revealed that seismic hazard maps were prepared for the northern part of Suriname for the CDMP Hazard Mapping and Vulnerability Assessment workshop in 1999. These maps showed seismic hazard maps of Horizontal Ground Acceleration, Expected Maximum Mercalli Intensity and Horizontal Ground Velocity for Suriname. The maps were prepared using types and intensities of earthquakes, distribution of faults, thrusts and volcanoes in the region. Recurrence models were

used to determine how future earthquakes would occur. All this information was combined to produce expected earthquake spectra that showed how amplitude would vary with frequency. Maps of ground acceleration, ground velocity and Modified Mercalli Intensities for Suriname, done at a scale of 0.1º grid resolution, are posted at:
URL: http://www.oas.org/en/cdmp/document/seismap/trinidad.htm

Source of this information:
URL: http://www.oas.org/en/cdmp/hazmap/Grenada/atwell.htm#Introduction

2.2 Users and uses

The seismic hazard maps are intended to be used for developing earthquake resistant designs; determining how soils will react during an earthquake event; for microzonation; public education; informing disaster emergency management and land use planning.

2.3 Current condition and limitations

No information was available on the current condition and limitations of the seismic hazard maps.

3.0 Vulnerability Assessment Studies

Table 2 shows the details of vulnerability assessment study undertaken in the country.

Table 2 – Vulnerability Assessment Study for Suriname

Type	***Purpose***	***Coverage***	***Date produced***	***Primary source***	***Author***
Economic and human	To assess the impact of sea level rise	Coastal regions	1999	Meteorological Services	C. Beckar, M. Amatali, and S. Naipal

3.1 Methods of preparation and distribution

This study examined the effect of one metre rise in mean sea level over the coastal region of Suriname. It was the first such study in the country and was undertaken through collaboration among the following agencies: Meteorological Services, Ministry of Public Works, and Institute for Environmental Studies of the **Vrye** University in Amsterdam. The details of the methodology and vulnerability assessment categories were not available. The project report is in hardcopy format and it is not well distributed.

3.2 Users and uses

The study is currently being used by Government for planning purposes; the University of Suriname for research purposes; and by Consultants for general development planning information.

3.3 Current condition and limitations

The major limitation of this study is the non-availability of detailed elevation data.

3.4 Respondent

Respondent to the vulnerability assessment section of the questionnaire was:

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Ministry of Public Works
Suriname
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4.0 Digital Maps

Table 3 shows details of digital data themes available in the country.

Table 3 – Digital Maps Available in Suriname

Theme	*Input scale*	*Year produced*	*Coverage*	*Format*	*Datum*	*Projection*	*Primary source*
Agriculture potentials	1:500,000	2003	National	AutoCAD	Zanderij International	Sur TM	National Planning Office
Gold mining potentials							
Vegetation	1:1,500,000	1988	National	Shapefiles	WGS 84	Sur TM / UTM	
Geology							
Rainfall							
Relief							
Rivers	1:500,000	1977	National	Shapefiles	WGS 84	Sur TM / UTM	Central Bureau of Aerial Mapping
Topography	1:50,000	1973	Coastal and urban regions	Geo Tiffs			
Topography	1:20,000	1974	Nassau Area	Shapefiles			
Roads	1:25,000	2003	Paramaribo and Coastal regions				
Soils	1:500,000	1977	National	Shapefiles	WGS 84	Sur TM / UTM	Dept. of Soil Survey
Aerial Photos	1:25,000	2000	Paramaribo	Geo Tiffs	WGS 84	Sur TM	Min. of Public Works and Maritime Authority
Land use	1:250,000	1998	Coastal plains	Shapefiles	WGS 84	Sur TM	Hydraulic Research Division
Soils	1:250,000						
Geology	1:250,000						
Rivers	1:250,000						
Roads	1:100,000						
Rainfall	1:750,000						
Population	1:750,000						

Sur TM: Suriname Transverse Mercator
UTM: Universal Transverse Mercator
WGS: World Geodetic System

5.0 Conclusions and Remarks

There is dire need for hazard mapping and vulnerability assessment studies in Suriname. The country has no record of previous works done in these areas and would be glad to receive help from regional and international development agencies. Fire, drought, and flooding of the hydroelectric dam are major hazards threat to the country.

Reference

Mol Jan H., Resida Dorothy, Ramlal Joyce S., and Becker Cor R. (2000) **"**Effects of El Niño-related Drought on Freshwater and Brackish-water Fishes in Suriname, South America" **Environmental Biology of Fishes** 59 (4) p. 353-469 December 2000

Appendix 1: Persons who attended the meeting of October 21, 2003

Name	*Agency*	*Tel. No./Fax. No*	*Email*
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