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PREFACE

EXECUTIVE SUMMARY

NATURAL HAZARD MITIGATION POLICY AND PLAN

1.0 INTRODUCTION

1.1 General Background

The *Natural Hazard Mitigation Policy and Plan* hereinafter called *The Plan*, presents proactive approaches for reducing the vulnerability of the Federation of St Kitts and Nevis to natural hazards through enhancing the capacity for mitigation and influencing the practice of mitigation activities.

The Plan forms part of a broader programme of support from the United States Agency for International Development (USAID) through its USAID-Jamaica/Caribbean Regional Programme (USAID-J/CAR), which has established a programme in response to the damage from Hurricane Georges which struck the Federation in September 1998. Implementation of the programme for disaster mitigation capacity building, referred to as the *Post-Georges Disaster Mitigation (PGDM) Programme* has been undertaken by the Organisation of American States (OAS).

1.2 Legal Framework

The National Disaster Management Act of St Christopher and Nevis, No. 5 of 1998 governs activities relating to disaster management (including mitigation). Legislation governing physical planning and development policies of which the main one is the *Development Control and Planning Act (2000)* also has implications for disaster mitigation.

Other pieces of legislation specific to Nevis with development related objectives are – (a) the *Nevis Zoning Plan Ordinance 1991* and (b) the *Nevis Housing and Land Development Corporation Act 1988 (1984 Act amended)*.

Another formal policy document guiding disaster management activities is the *National Disaster Plan*, but that Plan is largely response-oriented.

1.3 Aereal Extent Of The Plan

The Plan covers the geographic area of St Kitts and Nevis.

1.4 Historical Background

Over the years, the islands of St Kitts and Nevis have been struck by a number of natural hazards. These hazards have on occasion caused damage of varying degrees to infrastructure including buildings and roads, the natural environment including beaches, as well as inflicted personal injury and sometimes loss of life. Such damage and personal injury have ultimately been seen as detrimental to the economy.

Both islands have experienced damage from storms (including hurricanes) earthquakes and floods. They are also exposed to volcanic activity. St Kitts (only) has been faced with significant damage from inland erosion, while Nevis to a larger extent in comparison to St Kitts, has suffered from severe periods of drought. The frequency of hurricanes striking the islands has increased within the last twelve years with major ones causing extensive damage in 1989, 1995, 1998 and 1999. Major earthquakes were experienced in 1961, 1974 and 1985 and 1988. Severe flooding occurred in 1987 and 1998.

1.5 Scope and Purpose

Global-warming has been affecting global climate change such that past weather patterns may no longer be used as a reliable indicator of future weather patterns. The climate change phenomenon, the damage experienced from natural hazards and the high costs associated with recovery, have all indicated a need for a proactive approach to disaster management.

The Plan therefore presents mitigation *Strategies, Policies and Programmes* (SP&P' s) towards: -

- I. Developing integrated approaches which govern the initial development and re-development process so as to reduce vulnerability to natural hazards.***
- II. Increasing public understanding of the need, and options for hazard mitigation.***

1.6 Mission

Bearing in mind the need to ensure a vibrant economy which is as resilient as possible in the face of natural disasters, the **Natural Hazard Mitigation Policy and Plan for St Kitts and Nevis** seeks to foster -

- (a) an environment supportive of proper building and land use practices for sustainable development*
- (b) effective co-ordination among agencies and institutions involved in guiding and directing development, and*
- (c) community consciousness and commitment to carrying out disaster mitigation practices .*

1.7 Institutional Framework for Plan Preparation

Overall responsibility for overseeing the programme resides in the OAS *PGDM Programme* Technical Co-ordinator, who is attached to the *OAS Unit of Sustainable Development and Environment* of the OAS office in Washington D.C. USA.

The *PGDM Guidance Committee* comprising representatives from the public and private sectors, and chaired by the Director of the St Kitts-Nevis OAS office, was set up at the local level for co-ordinating the *PGDM* programme including activities relating to the preparation of *The Plan*.

The *PGDM Guidance Committee* reports to the *National Disaster Mitigation Council* which (through its Chairperson, the Deputy Prime Minister) reports to Cabinet.

Various consultants have been contracted by the OAS to work on different aspects of the *PGDM* programme relating to Hazard Vulnerability Assessment, Geographic Information System, Plan Development and Writing.

The *Plan writer* who is a member of the *PGDM Guidance Committee* is given guidance by that committee as a body, and by individual members depending on the member's area of expertise.

The plan covers a ten-year period and is expected to be reviewed periodically within that time frame for maintaining relevance.

1.8 Methodology

Bearing in mind the need for rationalisation of various functions relating to Development Planning and Disaster Management as well as collaboration among the various players and agencies, *The Plan* has been developed as a broad-based consultative effort of the stakeholders who it is designed to serve.

The *PGDM Programme Guidance Committee* provided direction for writing *The Plan*. Information was also received from consultations held with the different stakeholders including representatives from the public and private sectors as well as the general public.

The Plan took into account existing legislation and policy documents which have implications for disaster mitigation. The findings and recommendations of consultants contracted by the OAS, specialists in the priority hazards, have also been included in *The Plan*. Workshops (attended by representatives from various public and private sector agencies) which were aimed at giving guidance on the workplan (for preparing *The Plan*) and in particular on identifying priority natural hazards, critical facilities and data needs for the hazard mapping exercise, have also informed *The Plan*.

2.0 HAZARD AND VULNERABILITY ASSESSMENT

2.1 Hazard Identification and Prioritisation

The following priority hazards were identified during a formal prioritisation exercise to be of critical importance to St. Kitts and Nevis:

- (i) *Wind*
- (ii) *Drought (Nevis only)*
- (iii) *Storm Surge*
- (iv) *Volcano*
- (v) *Floods*
- (vi) *Ground Shaking*
- (vii) *Coastal Erosion and*
- (viii) *Inland Erosion (St. Kitts only).*

Volcano and *Ground Shaking* are however, not addressed by *The Plan* as the Seismic Research Unit in Trinidad & Tobago is currently conducting research with respect to these hazards.

2.2 Hazard Analysis and Vulnerability Assessment

For the priority hazards identified, Hazard Vulnerability Zone Maps and detailed reports¹ were developed by various consultants specialising in the respective hazards. Recommendations made by the consultants for enhancing mitigation with regard to the identified hazards have been included in the proposed programmes and policies of *The Plan*.

Vulnerability of critical facilities was also examined with the following facilities identified as being critical:

- i. Facilities which were used as Emergency Shelters
- ii. Hospitals and Clinics
- iii. Government Administrative Buildings
- iv. Airports, Sea Ports and Bridges
- v. Power, Water and Telecommunication Installations
- vi. Oil and Gas Facilities
- vii. Protective Services

To assess the vulnerability of the critical facilities identified, critical vulnerability scores were developed for each of the facilities, based on a vulnerability assessment process developed by Dr Cassandra Rogers, consultant in the area of hazard management.

Hazard maps were superimposed over maps showing the location of critical facilities, facilitating identification of the locational risk of the facility.

A Facility Vulnerability Score was considered high if it was more than 50% of the highest score attained for a listed facility.

¹ See detailed reports and maps at <http://www.oas.org/pgdm>

2.2.1 Hazard Analysis and Vulnerability Assessment - St Kitts

A number of facilities with relatively high vulnerability to *wind* were located in the Basseterre, Cayon and Sandy Point areas. These included the respective high schools and hospitals.

With regard to *Inland Erosion* vulnerable areas were found to be spread around the island, with a greater concentration towards the south. Facilities affected included water intakes and some emergency shelters.

Areas which are significantly affected by *Storm Surge* lie largely along the south-western seafront in particular and the *stretch along Parsons to Saddlers* as well as *Brimstone Hill to Old Road*. Facilities which show high vulnerability to *Storm Surge* lie along the waterfront of the Basseterre area, and include *the Arrival area of Port Zante, the Pelican Mall and the Robert L Bradshaw Building (which houses the Social Security Board)*.

North-east Basseterre shows high vulnerability to *Flood*, in particular areas alongside the College Street Ghaut, the Basseterre waterfront, and Pond Road. Critical facilities affected included the *Police Training Complex and buildings which are used as Emergency shelters*.

Sections of the road along the Atlantic coast have relatively high vulnerability to *Coastal Erosion*. In particular, the *stretches of road along Parsons to Saddlers and Brimstone Hill to Old Road*, are vulnerable to coastal erosion. These areas are also highly vulnerable to storm surge.

2.2.2 Hazard Analysis and Vulnerability Assessment - Nevis

There are a number of facilities on the eastern side of the island with relatively high vulnerability to *Wind*. These include *churches and educational facilities which are also used as Emergency Shelters*. Of particularly high vulnerability also, are the *Community Centres at Hickman and Hard Times and the Grove Park Pavilion in Charlestown*.

Vulnerability to *Drought* is spread throughout the island, with the greatest vulnerability towards the south and south-east section of the island. The Charlestown *water zone* and the *Butlers/Manning water zone* in particular are high-risk areas.

Areas along the north-eastern to south-eastern seafront and the respective port facilities have relatively high vulnerability to *Storm Surge*.

Facilities with high vulnerability to *Flood* are concentrated in the Charlestown area. Infrastructure of high vulnerability include the *Stoney Grove to Charlestown road* and the *Newcastle International Airport*.

Sections of the western coastline have relatively high vulnerability to *Coastal Erosion*. Infrastructure which has high vulnerability includes the *Stoney Grove to Charlestown road area* and the *ports of Charlestown and Long Point*.

3.0 ANALYSIS AND EVALUATION OF EXISTING SYSTEMS

3.1 Capability Assessment

Responses to questionnaires sent to Government Departments/Agencies gave an indication of their capability to carry out disaster mitigation (damage-prevention or damage-reducing) activities. With relatively minor exceptions, the responses generally revealed similar strengths and weaknesses existing for the Departments/Agencies in St Kitts and Nevis.

3.1.1 St Kitts and Nevis

Institutional

The Departments/Agencies from St Kitts which responded, indicated that generally, they were involved in all four (4) aspects of disaster management, namely,

- (i) *Preparation*,
- (ii) *Response*,
- (iii) *Recovery and Reconstruction*, and
- (iv) *Mitigation*. Mitigation activities, however, appeared to be limited.

Legal

Legislation for facilitating mitigation activities was cited as being in place for some departments/agencies while others indicated that there is a need for legislation. In some instances the legislation needed to be reviewed, and/or regulations developed for facilitating enforcement.

Political

All of the departments/agencies noted that there is awareness of and interest in the need for disaster management practices (including mitigation) by their respective Ministry.

Financial

According to the respondents, funding support for mitigation is either non-existent or inadequate.

Technical

The various departments/agencies indicated that there is need for enhancing their technical capability for dealing with mitigation activities. The Ministry of Education (Nevis) indicated that there is no technical capability within its administration.

3.2 Mitigation Opportunity Analysis

For St Kitts as well as Nevis, the analysis revealed that legislative support for mitigation activities needs be reviewed towards providing adequate legislative powers for carrying out mitigation activities. The need also exists for enhancing the capacity for mitigation through additional funding as well as technical training. In this regard, opportunities must be sought for enhancing the legal, financing, and technical capabilities of the departments/agencies.

4.0 PLAN FORMULATION

4.1 Plan Goals

The goals of *The Plan* are as follows:

- ***Goal I: To create and continually improve a disaster-resistant environment by reduction of vulnerability to natural hazards.***

- ***Goal II: To improve the national capability to manage the impact of natural hazards.***
- ***Goal III: To develop public awareness of natural hazards and their potential impacts.***
- ***Goal IV: To increase, encourage, and promote effective mitigation practices.***
- ***Goal V : To reduce the impact of natural hazards on life and property.***

4.2 Strategies, Policies, Programmes for attaining Goals and Objectives

The objectives of *The Plan* are outlined under each goal (re-) stated below. The *Strategies, Policies and Programmes* to be carried out for addressing mitigation activities relative to the identified hazards for achieving the identified objectives and goals are as follows:

4.2.1 Goal I: To create and continually improve a disaster-resistant environment by reduction of vulnerability to natural hazards

4.2.1.1 Objective i. Develop Legislative Framework to encourage orderly management of development

- a) Pass Development Control Planning Act for Nevis and Development Control and Planning Regulations for St Kitts and Nevis.
- b) Review existing incentives to hotels to incorporate mitigation issues.
- c) Put systems in place for periodic review and update of legislation, regulations and policies.

4.2.1.2 Objective ii. Create a Planning process that provides an environment for the management of development such that vulnerability to natural hazards is reduced.

- a) Produce Local Area plans taking into account mitigation planning.
- b) Produce a new Land Use Map for St Kitts & Nevis taking into account the restructuring of the St Kitts Sugar Manufacturing Corporation (SSMC).
- c) Develop Local Area plans and guidelines for areas that are prone to disaster.
- d) Monitor climate change for informing Land use and Development plans.

4.2.1.3 Objective iii. Ensure that the natural environment is maintained and preserved in order to reduce the impact of natural hazards.

- a) Re-establish and re-activate the National Conservation and Environment Protection Commission.
- b) Ensure that Environmental Impact Assessments (EIA's) are a requirement for all new developments
- c) Develop and or enforce specific regulations for preserving the environment, e.g relating to sand mining, natural waterways.
- d) Develop an environment management plan incorporating scientific monitoring of various sectors of the environment.

4.2.1.4 Objective iv. Ensure that mitigation planning is integrated into the institutional framework

- a) Utilise Geographic Information System (GIS) & hazard maps produced under this project when considering Environmental Impact Assessments.
- b) Integrate hazard mitigation planning into Land Use and Development planning.
- c) Put systems in place to facilitate co-ordination and collaboration among the various departments/agencies which have responsibilities for planning and development.

4.2.1.5 Objective v. Develop a database which facilitates the continuing collection, analysis & provision of information, supportive of disaster mitigation activities

- a) Upgrade the existing GIS data base for St Kitts & Nevis and provide integrated networking facilities across sectors e.g. Intranet GIS . The data base should be aimed ultimately at including all buildings in St Kitts & Nevis

4.2.2 Goal II: To improve the national capability to manage the impact of natural hazards

4.2.2.1 Objective i. Review existing organisations as well as upgrade and or establish new organisations to undertake mitigation activities

- a) Construct a new Emergency Operating Centre for NEMA.
- b) Maintain and /or retrofit existing emergency shelters in compliance with the Building Code
- c) Review Disaster Management Office staffing and other resources to ensure that adequate capacity exists for undertaking mitigation.
- d) Increase the capability of the Building Inspectorate.
- e) Ensure that the Planning Offices of St Kitts & Nevis are adequately equipped to address mitigation issues.
- f) Enforce the Building Code especially with respect to the qualifications of (building, plumbing, electrical etc.) contractors.
- g) The essential services – Ministry of Communications, Works & Public Utilities (water, electricity, and Public Works) and the National Radio should be adequately staffed, equipped and funded to carry out their vital mitigation tasks.

4.2.3 Goal III: To develop public awareness of natural hazards and their potential impacts

4.2.3.1 Objective i. Provide communities with information relating to natural hazards in St Kitts & Nevis, the impacts of those hazards and the vulnerability of communities to those impacts

- a) Publicise *The Plan*.
- b) Develop and plan periodic awareness programmes/activities to enhance mitigation practices and also develop a Community Contingency Plan specific to each community.
- c) Encourage the introduction of hazard mitigation awareness activities in Community and National Festivals.
- d) Develop mitigation awareness programmes to empower Non-Governmental Organisations (NGO' s), community-based organisations, Festival Committees and other cultural and social groups.

4.2.3.2 Objective ii. Increase public knowledge and awareness of mitigation practices.

- a) Hold public meetings/fora/workshops to make the public more aware of mitigation practices.

4.2.4 Goal IV: To increase, encourage, and promote effective mitigation practices

4.2.4.1 Objective i. Develop incentive programmes which will encourage mitigation activities to reduce vulnerability

- a) Encourage the formation of a private sector committee among stakeholders e.g Banks, Insurance Companies, Mortgage Companies and underwriters to develop mitigation criteria which can assist in decision-making .
- b) Provide incentives to small business and entrepreneurs including farmers and fishermen who adopt mitigation practices in their loan and development application.

4.2.4.2 Objective ii. Disseminate information supportive of mitigation practices

- a) Publicise the Building Code and Guidelines, and aggressively advertise the procurement / availability to the construction sector
- b) Disseminate brochures, fliers and multi-media products to raise awareness of mitigation.

4.2.4.3 Objective iii. Develop Technical Training Programmes

- (a) Facilitate and develop Training in Disaster Mitigation

4.2.4.4 Objective iv. Increase awareness of disaster mitigation practices in the education sector, through the development of school curricula which incorporate such practices.

- a) Hold workshops to sensitise teachers to mitigation practices.
- b) Carry out programmes (which reflect support for mitigation practices) in schools.

4.2.5 Goal V : To reduce the impact of natural hazards on life and property

4.2.5.1 Objective i. Empower communities to take a proactive role in the reduction of the impact of natural hazards on life and property

- a) Ensure that the public is aware of the Shelter Management Policy.
- b) Hold simulation exercises periodically, for handling emergencies.
- c) Offer programmes relating to disaster planning by families and stress management.

4.2.5.2 Objective ii. Reduce personal injury and loss of life as well as damage to existing and future development.

- a) Distribution lines for essential services (e.g. electricity) should be laid sub-surface

5.0 PHASING AND IMPLEMENTATION

5.1 Phasing

This ten-year plan is subject to review at least within the next five years. The phasing of projects which would be identified by the respective Ministries/Agencies under the various programmes would be carried out in accordance with the overall plans and annual budgetary process of that Ministry/Agency.

5.1.1 Immediate Next Steps

The way forward for implementation of *The Plan* requires an orderly approach which may be executed in the following steps:-

- 1. Present *The Plan* to all Government Departments/Agencies.**
- 2. Publicise *The Plan*.**
- 3. Prioritise the strategies, policies and programmes to be undertaken.**
The National Disaster Mitigation Council would need to guide the setting of the priorities.
- 4. Identify projects to be carried out based on the prioritised strategies, policies and programmes.**
- 5. Prioritise the projects identified.**

6. Identify the resources (human and material) and other requirements (e.g additional studies/research to be undertaken) which would be required for execution of the project.
7. Identify the Government Departments/Agencies which have responsibility for implementation of specific projects.
8. Identify the projects which would require collaboration among Departments/Agencies, and specify those Departments/Agencies.
9. Agree on an approach/system for facilitating collaboration among agencies specified in #8, above.
10. For each project, agree on a time-frame for expected commencement and completion of that project.
11. Identify milestones for ensuring that the project is on track.
12. Develop a '*Phased Implementation Schedule*' based on the aforementioned.

5.2 Responsibility for Implementation

The Government Departments/Agencies are responsible for implementing and enabling (where the private sector is involved) the implementation of *The Plan*. The National Emergency Management Agency under the guidance of the National Disaster Mitigation Council is responsible for monitoring implementation of *The Plan*. Accordingly, a mitigation officer should be appointed to NEMA to assist with monitoring.

6.0 EVALUATION, MONITORING AND UPDATING

The Plan would be monitored, and updated periodically, with continued evaluation of the effectiveness of the strategies, policies and programmes, as well as the respective projects developed. Periodic reports would be submitted to the National Disaster Mitigation Council on the implementation of *The Plan*.

GLOSSARY

Capability Assessment

A determination of the jurisdiction's ability to deal with identified hazards and to identify shortfalls in capability.

Development Standards

Site planning, building and engineering standards which are applied to development proposals to achieve conformity with established land use policy, building codes and other regulations.

Disaster Management

Group of activities performed to manage a potential or existing disaster.

Disaster Mitigation

Medium and long-term actions taken prior to the occurrence of a disaster event to reduce or eliminate the adverse effects of the disaster.

Disaster State See *States of Social Behaviour*

Emergency State See *States of Social Behaviour*

Hazard

The event itself or the probability of the event.

Hazard Assessment

The process of estimating the probability of the occurrence of potentially damaging phenomena of given magnitudes within a specified period of time.

Land Use

The broad types of uses that are permitted within specified areas.

Mitigation Opportunity Analysis

An examination and assessment of all areas of planning and development activities in order to identify mitigation opportunities.

Normal State See *States of Social Behaviour*

Recovery State See *States of Social Behaviour*

Risk

A measure of the expected losses due to a hazard event of a particular magnitude occurring in a given area over a specific time period.

States of Social Behaviour**Disaster State**

Demand on human and material resources due to a hazard which exceeds response capability.

Emergency State

Sudden increase in demand of human and material resources due to the impact or threat of an impact by a hazard.

Normal State

Normal societal behaviour; partial or total fulfillment of society's needs.

Recovery State

Society recovers from event and approaches the pre-disaster state.

Sustainable Development

A process of social, economic, political and environmental change through which the best use is made of all available resources so that present needs are met without compromising the ability of future generations to meet their own needs.

Given the reality of limited resources, sustainable development (of a project) also assumes that infrastructural support and resources will be integrated and utilised in a manner so that the need for ongoing infusion of new external resources is not necessary for continuity (of the project).

Vulnerability

The extent to which a community, structure, service or geographic area is likely to be damaged or disrupted by the impact of a particular hazard.

Zoning

The detailing of the use and intensity of development for specified parcels of land.

ACRONYMS AND ABBREVIATIONS

EIA's	-	Environmental Impact Assessments
EWS	-	Early Warning System
GIS	-	Geographic Information System
J/CAR	-	Jamaica/ Caribbean Regional Programme
NCEPA	-	National Conservation and Environment Protection Act
NEMA	-	National Emergency Management Agency
NGO's	-	Non-Governmental Organisations
OAS	-	Organization of American States
PGDM	-	Post-Georges Disaster Mitigation
PPD	-	Physical Planning Department
SKB	-	St.Kitts, Basseterre
SP&P	-	Strategies, Polices and Programmes
USA	-	United States of America
USAID	-	United States Agency for International Development-
Adeq.	-	Adequate
Amend.	-	Amendment
Cap.	-	Capability
Com.	-	Communication
Dev.	-	Develop
Develop.	-	Development
Environ.	-	Environment
Esp.	-	Especially
Extens.	-	Extensive
Fin.	-	Financial
Int.	-	Interest
Involv.	-	Involved
Legis	-	Legislation
Mgt.	-	Management
Min.	-	Ministry
Mitig.	-	Mitigation
Ordinan.	-	Ordinance
Pol.	-	Police
Prep.	-	Preparation
Prov.	-	Provision
Reconstruc	-	Reconstruction
Tech.	-	Technical
Train.	-	Training