



Government of Saint Lucia

Water Management Plan for Drought Conditions

*Modelled upon
Drought Response Plan of US Department of Natural Resources: June 1993*

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Approved by Cabinet Conclusion 1151/2009



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SECTION I: OVERVIEW

SECTION I: OVERVIEW

1. INTRODUCTION

The Water and Sewerage Company [WASCO] is a government owned company mandated by law to develop and manage the water supply and sewerage services in Saint Lucia.

Twenty-nine (29) surface water sources (rivers) supply the island of Saint Lucia. It is estimated that the total available water resource (after runoff) is of the order of 7 billion gallons per year (or about 20 mgd). Though it would appear that the available source is adequate to meet the demands of the population, the capacity and design of the island's water supply infrastructure are inadequate to satisfy the increasing demands of the public. Currently only a small proportion of the consuming public receives a 24-hour supply of potable water. Water outages occur on a regular basis, and most consumers have installed water storage tanks. [SOURCE: <http://www.cepis.ops-oms.org/enwww/eva2000/StaLucia/informe/inf-02.htm>]

There are two (2) sewerage systems in Saint Lucia. The first is a primary sewage collection and disposal system in the city of Castries, which serves approximately 15% of the greater Castries population and covers the business area, and the second is a sewerage system which includes collection, treatment and disposal and is located in Rodney Bay, to the north of the island and serves primarily residential areas and hotels. There is also one (1) sludge and septage treatment plant at Union. Currently the Rodney Bay treatment system is underutilized, and is running only 40% capacity. In total the plant serves a population of 3000-4000. Treated effluent from the system is discharged via an earth drain to a ravine which leads to the ocean on the East Coast of Saint Lucia.

The majority of residents and establishments in Saint Lucia utilize individual on-site systems (pit latrines, septic tanks and soak aways) for sewage treatment and disposal. Grey water is generally discharged to open drains and has the potential to spread disease since it contains fecal coliforms.

The Water and Sewerage Company has had proposals developed for the extension of the Castries system, to include a treatment plant, however the project is on hold indefinitely as the Company strives to become financially stable as mandated by the Government. [SOURCE: <http://www.cepis.ops-oms.org/enwww/eva2000/StaLucia/informe/inf-02.htm>]

Saint Lucia is viewed as a water rich island; the drought conditions in 2001 reminded us that Saint Lucia is susceptible to drought. The fact that drought conditions will reoccur in Saint Lucia is the reason for the Water Management Plan for Drought Conditions. This plan provides a framework for preparing for and responding to future droughts to minimize conflicts and negative impacts on Saint Lucia's natural resources and economy.

2. ASSUMPTIONS

1. That WASCO is the lead responder to Drought situations.
2. A large scale Drought emergency will result in increased demands for/on personnel at WASCO
3. That the Government of Saint Lucia shall respond to a National Disaster.
4. That Emergencies in Saint Lucia may be categorised in two ways:
 - Those that are preceded by a build-up [slow onset] period, which can provide WASCO and NEMO with advance warnings, which is used to facilitate timely and effective activation of national arrangements
 - Other emergencies occur with little or no advance warning thus requiring mobilization and almost instant commitment of resources, with prompt support from the Government of Saint Lucia just prior to or after the onset of such emergencies

3. STATUTORY AUTHORITY

Disaster Management Act No 30 of 2006

Section 11(3) -- The National Disaster Response Plan shall include – (a) procedures for, mitigation of, response to and recovery from emergencies and disasters by public officers, Ministries and Departments of Government, statutory bodies, local government units, and persons or organization volunteer or are required by law to perform functions related to the mitigation of, preparedness for response to and recovery and recovery from emergencies and disaster in Saint Lucia.

Water & Sewerage Services Act No. 14 of 2005

Division 3 Emergencies

Section 10-1 Where on the advice of the agency the Minister is satisfied that by reason of an exceptional shortage of rain, or contamination of water, a serious deficiency of supplies of water exists or is threatened, the Minister shall forthwith, by Order published in the Gazette, in at least two newspapers in the general weekly circulation in Saint Lucia and by any other media declare a water-related emergency ...

Employees [Occupational Health and Safety] Act No. 10 of 1985

Part II Section 3 (d) -- Every employer shall – provide information, training and supervision necessary to ensure the protection of his employees against risk of accident and injury to health arising from their employment.

Police Ordinance No. 30 of 1965

Part IV Section 22 (1) -- It shall be the duty of the Force to take lawful measures for –

(m) Assisting in the protection of life and property in cases of fire, hurricane. Earthquake, flood and other disasters

4. THE PLAN

This Emergency Response Plan is a guide for Member Agencies of NEMO into the way a Drought shall be handled.

Every Agency Member is to be aware of the existence of this plan and is to be fully knowledgeable of their roles and responsibilities in any disaster as set out in the Standing Operating Procedures [SOP].

This plan shall be stored in an area where every Agency Member has easy access to. Should a disaster occur during the absence of the Head, Staff should have easy recourse to the plan.

The plan is to be renewed annually by the Task Force with a revised copy being submitted to the Director NEMO no later than March 31st of that year.

5. RELATED DOCUMENTS

This plan is a “stand alone” document that may be activated to support hazard management plans. Other documents related to this plan are:

1. Water and Sewage Company Continuity of Operations Plan [to be written]
2. Emergency Response Plan for the Water Supply System [to be completed]
3. Ministry of Agriculture Disaster Plan [to be completed]
4. Ministry of Health Disaster Plan [to be completed]
5. Fire Service Disaster Plan [to be completed]
6. Hospitality Crisis Management Unit Plan
7. Environmental Health Disaster Response Plan [to be approved]
8. Gros Islet Polyclinic Disaster Response Plan [to be approved]
9. Health Centre Disaster Plans [to be completed]
10. Caribbean Environmental Health Institute [CEHI] Continuity of Operations Plan [to be completed]
11. National Water Policy

6. LIMITATIONS

This plan is limited to the coordination of the Water and Sewerage Service responses to actual or potential major events.

The National Emergency Management Organisation [NEMO] must be notified of any MAJOR activations. This is necessary to allow for the rapid coordination of resources should the incident escalate to a level requiring National mobilisation.

7. TRAINING

It is recognized that to achieve the capacity and competency that will allow staff to function smoothly during a response, training must be an ongoing component of professional development. The following subjects shall be presented, but by no means is limited to:

1. Introduction to Disaster Management [IDM]
2. Emergency Operations Centre Management
3. Incident Command System [ICS]
4. Telecommunications
5. Initial Damage Assessment [IDA]
6. First Aid / CPR
7. Fire Preparedness

Where appropriate it shall be the responsibility of Agencies to ensure that said training is incorporated into its annual training program.

8. MEMBERSHIP

Membership of the Drought Task Force includes but is not confined to the following:

1. Water and Sewerage Commission – Chair
2. General Manager - Water Bottling Companies
 - a. Barbay Ltd.
 - b. Caribbean Springs Ltd.
 - c. Lé Andres Springs
 - d. Paradise Springs
 - e. Piton Farms Mineral Water Co.
 - f. St Lucia Springs
3. Water Companies
 - a. Managing Director - Water and Sewerage Company [WASCO]
4. Executive Director - SLHTA
5. Executive Director - Manufacturing Association
6. Executive Director - Chamber of Commerce
7. Director - Saint Lucia Met Services
8. Chief Medical Officer
9. Chief – Agricultural Services [together with Chief Forestry Division]
10. Chief - Environmental Health Department
11. Chief – Water Resources Management Unit
12. Commissioner of Police
13. Chief Fire Officer
14. Fire Service - Divisional Officer [South]
15. Rep - Ministry of Commerce
16. Rep - Ministry of Tourism
17. Rep - Ministry of Physical Development
18. Rep - Ministry of Public Utilities
19. Executive Director - Caribbean Environmental Health Institute [CEHI]
20. Director - NEMO

Disaster Management is a 24 hour vocation and members may be called upon without notice to render service.

9. DISASTER CYCLE

The Disaster Cycle comprises of the following elements:

BEFORE

1. Prevention
2. Mitigation
3. Preparedness

DURING

1. DISASTER OCCURS

AFTER

1. Response
2. Reconstruction / Recovery
3. Rehabilitation / Rebuilding



10. DISASTER MANAGEMENT IN SAINT LUCIA

It is understood by WASCO and the Government of Saint Lucia [GOSL] that the disaster cycle lends itself to a comprehensive approach to disaster management, whether within this organisation or at a National Level. As such it is recognised that there are various frameworks to facilitate having our Agency prepared and by extension the Nation.

10.1 COMPREHENSIVE DISASTER MANAGEMENT

Comprehensive Disaster Management [CDM] was conceptualised by the Caribbean Disaster Emergency Response Agency [CDERA] as a new direction for disaster management for the 21st century. It moves away from the relief and response mode to a comprehensive approach which takes disaster and mitigation considerations into account during project planning and development. It also expands the partners to include economic, social, and environmental planners, architects, engineers, and health professionals among others. [CDERA Press Release of Feb 27, 2004]

In pursuit of its key objective of integrating CDM into its development planning process, WASCO intends to weave CDM practices into its corporate life through the effective realisation of the recommended Intermediate Results [IR].

GOAL			
Regional Sustainable Development enhanced through Comprehensive Disaster Management			
PURPOSE			
<i>To strengthen regional, national and community level capacity for mitigation, management, and coordinated response to natural and technological hazards, and the effects of climate change.</i>			
OUTCOME 1: Enhanced institutional support for CDM Program implementation at national and regional levels	OUTCOME 2: An effective mechanism and programme for management of comprehensive disaster	OUTCOME 3: Disaster Risk Management has been mainstreamed at national levels and incorporated into key sectors of national economies (including tourism, health, agriculture and nutrition)	OUTCOME 4: Enhanced community resilience in CDERA states/ territories to mitigate and respond to the adverse effects of climate change and disasters

10.2 ST. GEORGES DECLARATION OF PRINCIPLES

It is understood that as a tool to achievement of the CDM Strategy it is this Agency's undertaking to support Principle Nine of the St. Georges Declaration of Principles for Environmental Sustainability in the Organization of Eastern Caribbean States [OECS].

Where each member state agrees to:

1. Establish at the community, national and regional levels appropriate and relevant integrated frameworks to prevent, prepare for, respond to, recover from and mitigate the causes and impacts of natural phenomena on the environment and to prevent man made disasters;
2. Exchange information with each other, relating to the experiences and lessons to be learnt from the causes and impacts of natural and man made hazards and phenomena on its environment.

10.3 SIDS+10

As a participant at the Caribbean Ministerial Meeting on the Programme of Action for the Sustainable Development of Caribbean Small Island States held in Barbados, 10 - 14 November 1997, Saint Lucia agreed to a number of initiatives in the area of Disaster Management. This included to:

Provide adequate resources to National Disaster Organisations to equip them to satisfy the requirements outlined in Article 14 of the CDERA Inter-governmental Agreement, thus in effect strengthening the national and regional disaster preparedness mechanism.

WASCO shall cooperate with the National Emergency Management Organisation to ensure the national disaster preparedness mechanism functions efficiently and to capacity.

10.4 UNITED NATIONS MILLENNIUM GOALS

Together with over one hundred and fifty Heads of State from around the world Saint Lucia adopted the United Nations Millennium Declaration, parts IV and VI within the deceleration refer to Disaster Management and state:

IV. Protecting our common environment

23. (4) To intensify cooperation to reduce the number and effects of natural and man-made disasters.

VI. Protecting the vulnerable

26. We will spare no effort to ensure that children and all civilian populations that suffer disproportionately the consequences of natural disasters, genocide, armed conflicts and other humanitarian emergencies are given every assistance and protection so that they can resume normal life as soon as possible.

11 SITUATION

Disasters actually result from three (3) types -- or combinations -- of incidents, caused by:

- Natural or cataclysmic events (*e.g., earthquakes, fires, floods and storms*);
- Human behavior (*e.g., robberies, bomb threats, acts of arson, hostage events or transportation strikes*); and
- Technological breakdowns (*e.g., power outages, computer crashes and virus attacks*).

Hazard analysis and experience have confirmed that Saint Lucia is at risk from numerous hazards, both natural and technological:

- Meteorological Hazard: Hurricanes, Tropical Wave, Tropical Storm, Storm Surge, Flooding, Land Slides, Drought
- Seismic/Volcanic Hazard: Volcanic Eruption, Earthquake, Tsunami [Marine and land based]

- Technological: Fire, Explosion, Hazardous Material Spill, Mass Poisoning, Pollution, Civil Unrest
- Other: Plague, Mass Causality, Epidemic Outbreak, Dam Failure, Office Violence, Terrorism, Bomb Threat/Explosion, Utility Failure

SECTION 2: BACKGROUND

I. BACKGROUND

From January 2001 and continuing throughout the dry season, Saint Lucia experienced extremely dry conditions. On 28th May 2001 the Prime Minister of Saint Lucia addressed the Nation as the Drought deepened and the Water Company implemented very strict water allocation schedules.

II. DEFINITION OF DROUGHT

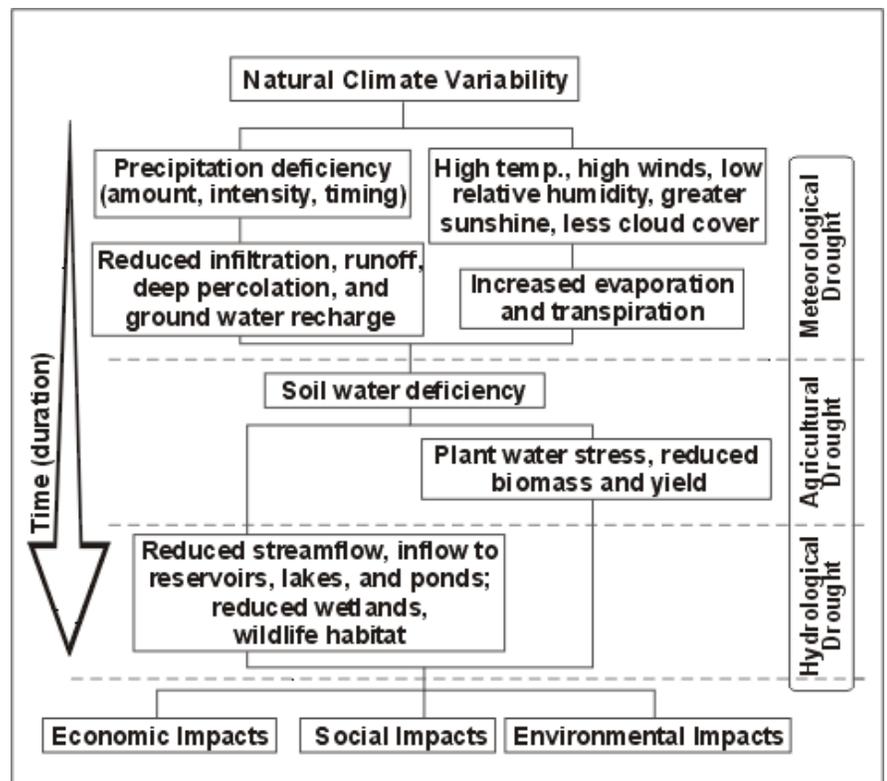
Drought is a relative term and is most often a consequence of rainfall deficiency, resulting in a lack of water for some activity or group. Drought may however, be considered under three definitions (*Kumar V. and Panu U. 1997; White D.H. 1998*):

Agricultural – reduction in available water at critical times, for crop or pasture production;

Meteorological – lack of rainfall; and

Hydrological – reduction in available water from the surface (streams, dams and rivers) and sub-surface (groundwater)

In Saint Lucia it is usually the assessment of ‘agricultural drought’ that is used to characterise a drought event, where the quantity and timing of rains throughout the growing season determines their effectiveness and value to dry land agricultural producers.



[SOURCE: <http://www.affa.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060B0A06289> and <http://www.drmonline.net/drmlibrary/droughtsaintlucia/index.htm#WhatIsDrought>]

III. Ongoing Management Activities

WASCO has primary responsibility for the provision of water supply services, which includes the abstraction, treatment and distribution. The company is also responsible for water allocation and overall management that become increasingly important and visible during drought periods. Ongoing water quantity management programs make it possible for WASCO to take actions to manage water shortages during drought periods. These programs include monitoring of the resource, regulation of water use, resolution of user conflicts, water allocation planning, emergency and conservation planning, information and technical assistance, and a limited role in water supply development.

IV. Monitoring of Hydrologic Conditions

Continuous monitoring of hydrologic conditions is necessary to identify and track drought conditions. Actual measurements of precipitation, stream flow, ground water levels, and water use are all essential to understanding and characterizing drought.

These activities are undertaken by the Saint Lucia Met Serves and the Hydrological Department of the Ministry of Agriculture. Under the new Act, the Water Resource Management Agency has overall responsibility to manage the water resources. It is expected that once this agency is fully functional these activities will fall under their purview as they are responsible for issue water abstraction licenses and permits.

IV Regulation of Water Abstraction

To ensure the availability of this source for future generations the Ministry of Agriculture through the Water Resource Management Agency is expected to manage water use to avoid over- abstraction.

Surface water abstraction is generally discouraged for irrigation purposes because the highest demand for irrigation coincides with periods when surface water levels are low. Surface water abstraction is subject to suspension during periods of low water levels to protect in stream flow and higher priority water uses. It is important for persons abstracting water who rely on surface water for consumptive uses, such as crop irrigation, have a contingency water supply.

VI. Emergency and Conservation Planning

Public water consumers, serving more than 1,000 people should have an emergency and conservation plan.

These plans will address procedures to be taken during periods of limited water supplies. WASCO is willing to work with agencies to develop guidelines for plan development.

VII. Information and Technical Assistance

In addition to the Saint Lucia Met Services, the Hydrological Department of the Ministry of Agriculture is also a source of data on precipitation, stream flow and ground water levels.

WASCO will also provide general advice and technical assistance to individuals and communities facing water supply emergencies, and provide general advice and information on water conservation techniques.

VIII. Water Supply Development

Development of water supply systems is the responsibility of WASCO.

On March 22, 2003 on the occasion of World Water Day in a Statement by the Minister responsible for public utilities listed some developments in the Water Sector:

Our commitment to providing the public with a sustainable, affordable and good quality supply of water is evidenced by the numerous interventions by Government, viz:

- i. the coporatization of WASA to WASCO;
- ii. the introduction of new legislation to govern the water sector;
- iii. the establishment of a Regulatory Commission and the consequent development of regulations;
- iv. the formulation of a National Water Policy, which is in the process of being reviewed by the Cabinet of Ministers;
- v. the aggressive and uncompromising pursuit of Universal Service thanks to the intervention of agencies such as the Poverty Reduction Fund and the Basic Needs Trust Fund, and
- vi. the high level of investment in storage and distribution infrastructure, such as the 20' pipeline project and the numerous infrastructural components of the 5th Water Project.

SECTION III: DROUGHT RESPONSE ACTIONS

The Agency Drought Coordination Matrix shown on the last page identifies specific actions to be taken by various agencies in a staged response to decreasing water supply in Saint Lucia.

1. Convening the Drought Task Force

The Drought Task Force will be convened by the Managing Director of WASCO when the Country enters a drought watch (as defined in the Drought Matrix) to provide coordination and communication between agencies and institutions affected by drought and to provide a central information source for the news media.

The Drought Task Force also could be called together at other times as needed to serve as a forum for discussion of drought management plans and policies. In cases of more localized drought conditions, the Managing Director may bring appropriate parties together on to the Drought Task Force as needed.

2. Intensification of Monitoring and Assistance

In drought periods the Managing Director WASCO will shift Division priorities and reassign staff as needed to support Drought Task Force activities, intensify monitoring efforts, provide for increased communication with water appropriators, and effectively respond to increased water use conflicts and requests for advice and technical assistance. This may involve conducting emergency hydrogeologic and geophysical investigations for a community with an emergency water supply problem.

3. Dissemination of Information to the Public

WASCO will take the lead role in communicating the extent and intensity of drought conditions to the public. WASCO staff will prepare summary data and public service announcements to convey accurate and timely information on drought conditions across Saint Lucia.

4. Implementation of Mandatory Restrictions

Water & Sewage Act No. 14 of 2005

Division 3 Emergencies

Section 10-1 Where on the advice of the agency the Minister is satisfied that by reason of an exceptional shortage of rain, or contamination of water, a serious deficiency of supplies of water exists or is threatened, the Minister shall forthwith, by Order published in the Gazette, in at least two newspapers in the general weekly circulation in Saint Lucia and by any other media declare a water-related emergency ...

5. Activation of the National Emergency Response Mechanism

A major situation, which threatens population centres, will require that WASCO receives support for its control and management. This will be coordinated by the National Emergency Operations Centre (NEOC). The decision to advise the NEMO Secretariat of the need for additional support will be made by the Chairman of the Drought Task Force in consultation with the Permanent Secretary – Ministry of Public Utilities.

The Chairman of the Drought Task Force will complete a Situation Report Form for the Director NEMO. (Appendix 1)

The Director NEMO in consultation with the Chairman of the Drought Task Force and the Cabinet Secretary, will decide on activation of this Plan and if necessary, the NEOC.

The NEOC, once activated, will coordinate response, request additional resources and ensure adequate support to WASCO functions. The Drought Task Force will retain operational control of operations.

If the NEOC is not activated, NEMO Secretariat will perform the coordination function.

Once the NEOC is activated all Standing Operating Procedures shall come into effect.

6. Declaration of a Water Deficiency Disaster

The Prime Minister is empowered to declare an Emergency/Disaster by executive order.

If ordered, WASCO may adopt and enforce emergency water conservation restrictions that limit lawn sprinkling, vehicle washing, golf course and park irrigation, and other nonessential uses.

The Managing Director will recommend to the Prime Minister when a critical Water Deficiency Emergency should be declared. The recommendation will be based on consultations with the Drought Task Force. A Water Deficiency Emergency may be imposed Island wide or on a geographic basis based on the extent of deficient hydrologic conditions.

8. Agency Drought Coordination Matrix

Condition and Program Phase	National Actions by Water and Sewerage Commission	Water Suppliers [e.g. Bottling Companies]	Industrial and Manufacturing	Agricultural, Hospitality & Other Private Sector Groups
<p>1. NORMAL CONDITIONS:</p> <ul style="list-style-type: none"> ▪ Water quantity is adequate for normal purposes; water quality is acceptable under normal management. ▪ Normal releases from reservoirs. ▪ Normal precip/weather pattern/Hydrologic conditions. 	<ul style="list-style-type: none"> • Develop precipitation, stream flow, ground water, and water quality monitoring programs. • Conduct water studies and coordinate recommended actions. • Assist water suppliers and Government in developing emergency water management plans of establishments. • Establish continuous water public education program. • Promote the capture and use of roof water. • Emergency planning is needed in a generic sense. 	<ul style="list-style-type: none"> • Develop Emergency Water Management Plans. • Develop additional storage and treatment facilities, evaluate distribution system. • Adopt standby rates, other necessary • Ordinances and Codes, and establish mutual aid agreements, interconnections, conservation education, etc. 	<ul style="list-style-type: none"> • Develop Individual Emergency Water Management Plans. • Develop additional wastewater storage. • Develop alternative water storage, and conservation measures. • Purchase standby equipment and install permanent equipment as necessary for recycling. • Engage in the use of water conservation devices. 	<ul style="list-style-type: none"> • Develop emergency water management plans. • Evaluate need for irrigation. • Enlarge ponds, purchase tanks, drill wells, install conservation devices and livestock water tanks, etc. • Evaluate agricultural water use and find where conservation could be used. • Evaluate domestic water use and install water saving devices, etc., to reduce stress on supply source.

Condition and Program Phase	National Actions	Water Suppliers [e.g. Bottling Companies]	Industrial and Manufacturing	Agricultural, Hospitality & Other Private Sector Groups
<p>2. DROUGHT WATCH:</p> <ul style="list-style-type: none"> ▪ Lower than normal precipitation, declining stream flows and surface water levels. ▪ Alert from Met Services. ▪ Lower than normal levels at the JC Dam. 	<ul style="list-style-type: none"> • “Drought task force” initial meeting (see agency list). • Intensify selected monitoring activities. • Start initiates an awareness program via media, etc. 	<ul style="list-style-type: none"> • Monitor water sources and daily water use for specific purposes and anticipate user demand. • Monitor potential conflicts and problems. 	<ul style="list-style-type: none"> • Monitor water source and daily water use for specific purpose and anticipated demand. • Monitor water quality. 	<ul style="list-style-type: none"> • Monitor water sources and daily water use for specific purposes and anticipate demand.

Condition and Program Phase	National Actions	Water Suppliers [e.g. Bottling Companies]	Industrial and Manufacturing	Agricultural, Hospitality & Other Private Sector Groups
<p>3. DROUGHT WARNING</p> <ul style="list-style-type: none"> • Water quantities/water quality deteriorating or conflicts among users. • Agency/utilities appeal to public for voluntary conservation. • Public awareness program. • Closely monitor drought indicators. • Monitor 30, 60, 90 day weather and precipitation projections. • ENFORCEMENT OF LAWS 	<ul style="list-style-type: none"> ▪ More frequent “task force” meetings to exchange water supply and water quality data and discuss actions. ▪ Monitor systems and users having past problems and monitor plan implementation. ▪ Respond to local and individual appeals for assistance. ▪ WASCO issues orders to water suppliers. ▪ Public information about conditions. ▪ Public water conservation education. ▪ Health Information distributed. 	<ul style="list-style-type: none"> ▪ Implement “conservation” phase at plan triggering point. Potential conservation measures include curtailment of outside uses, education, and pricing. ▪ If conservation goal is not obtained, implement restrictions. ▪ Notify WASCO of progress and conflicts. 	<ul style="list-style-type: none"> • Institute re-cycling, cut back production, store wastewater, alter production schedule per emergency industrial water management plan during a drought. • Notify WASCO of progress and conflicts. 	<ul style="list-style-type: none"> • Continue conservation of domestic supplies. • Notify Task Force of source conflicts. • Implement water conservation measures for agricultural uses. • Notify WASCO of progress and conflicts.

Condition and Program Phase	National Actions	Water Suppliers [e.g. Bottling Companies]	Industrial and Manufacturing	Agricultural, Hospitality & Other Private Sector Groups
<p>4. RESTRICTION PHASE:</p> <ul style="list-style-type: none"> • Insufficient supplies to meet all demands. • Allocation suspensions taking place. • Continued decline in water supply and/or water quality. • Utilize drought indicators. • Utilize Met Service 30, 60, 90 day precipitation projections. 	<ul style="list-style-type: none"> ▪ Minister responsible for Utilities declares a Water Related Emergency under the Water and Sewerage Act No. 14 of 2005. ▪ Same responses as in Conservation ▪ Phase and implementation of mandatory restrictions. ▪ Consider emergency releases from reservoirs above the low flow plans. ▪ ENFORCEMENT OF LAWS 	<p>Implement “restrictions” phase at plan triggering point. Restrictions could include banning of some outdoor water uses, capita quotas, cut-backs to non-residential users. Notify Task Force of source conflicts.</p>	<ul style="list-style-type: none"> • Institute additional cut-backs in production, storage of wastewater, or changes in production schedule, etc., per emergency industrial mgmt. plan or Commissioner’s orders for suspensions. • Notify WASCO of progress and conflicts. 	<ul style="list-style-type: none"> • Same responses as in Conservation Phase. • Follow WASCO allocation restrictions on irrigation. • Notify WASCO of progress and conflicts.

Condition and Program Phase	National Actions	Water Suppliers [e.g. Bottling Companies]	Industrial and Manufacturing	Agricultural, Hospitality & Other Private Sector Groups
<p>5. EMERGENCY PHASE:</p> <ul style="list-style-type: none"> ▪ Severe water supply or water quality problems. ▪ Highest priority water supplies not being met. ▪ Threatened or actual power “brownouts”. ▪ Start monitoring of drought indicators. ▪ Continuing monitoring of weather. 	<ul style="list-style-type: none"> ▪ Prime Minister responds to critical situations by declaring a Disaster in the Water Sector under the Disaster Preparedness and Response Act No. 30 of 2006 ▪ NEMO implements emergency operations plan. ▪ WASCO mediates conflicts. ▪ Implement emergency releases from reservoirs above low flow plans. ▪ Install desalination plant. 	<ul style="list-style-type: none"> ▪ Provide bottled water and sanitation supplies to users. ▪ Make hospitals, firefighting, etc., priority. ▪ Initiate hauling of water. ▪ Comply with NEMO/Supply Management Committee Orders 	<ul style="list-style-type: none"> ▪ Comply with Prime Minister’s Emergency Declarations ▪ Coordinate emergency action with NEMO. ▪ Implement hauling water for sanitation, domestic uses. ▪ Comply with NEMO/Supply Management Committee Orders ▪ Install desalination plant. 	<ul style="list-style-type: none"> ▪ Comply with Prime Minister’s Emergency Declarations ▪ Request assistance in obtaining water for domestic purposes, and in supporting livestock. ▪ Implement hauling water, etc., in cooperation with NEMO/Supply Management Committee Orders ▪ Install desalination plant.

SECTION IV: MAPS

Drought Susceptibility Map:

The map was produced under the Government of Saint Lucia Disaster Management Project II.

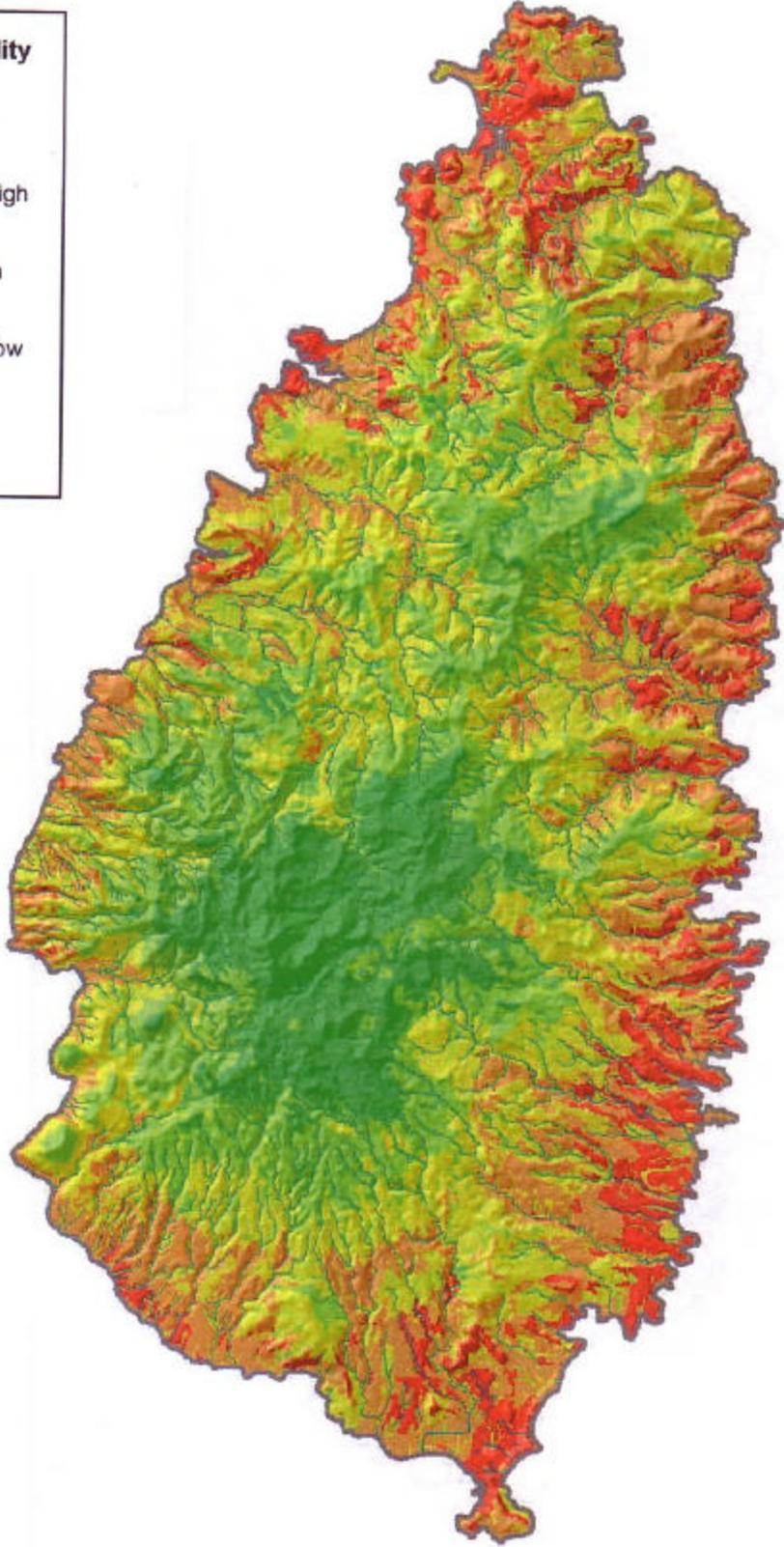
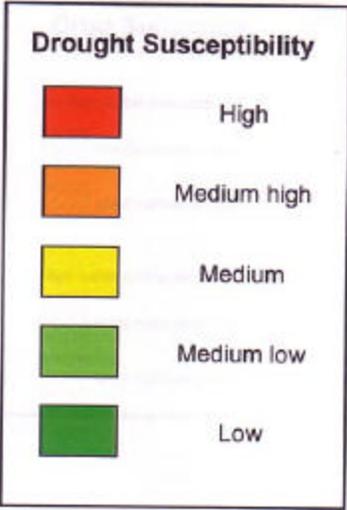
The elaboration of the drought susceptibility map is based on:

- Annual water balance
- Flow accumulation
- Mean annual temperature
- Soil drainage and
- Moisture supply capacity

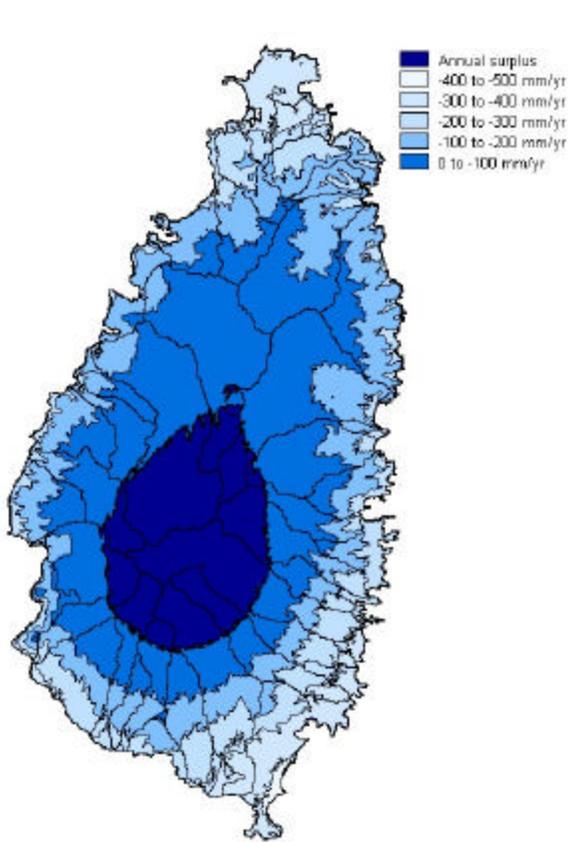
It is recommended that the drought susceptibility map be used for land use planning.

All other maps in this section were produced by Dr. Christopher Cox (rainfall surfaces modelled using a geo-statistical procedure using mean monthly rainfall incorporating elevation, and evapotranspiration modelled using the FAO Penman-Monteith method) and could be subject to further modification upon improvement in data capture.

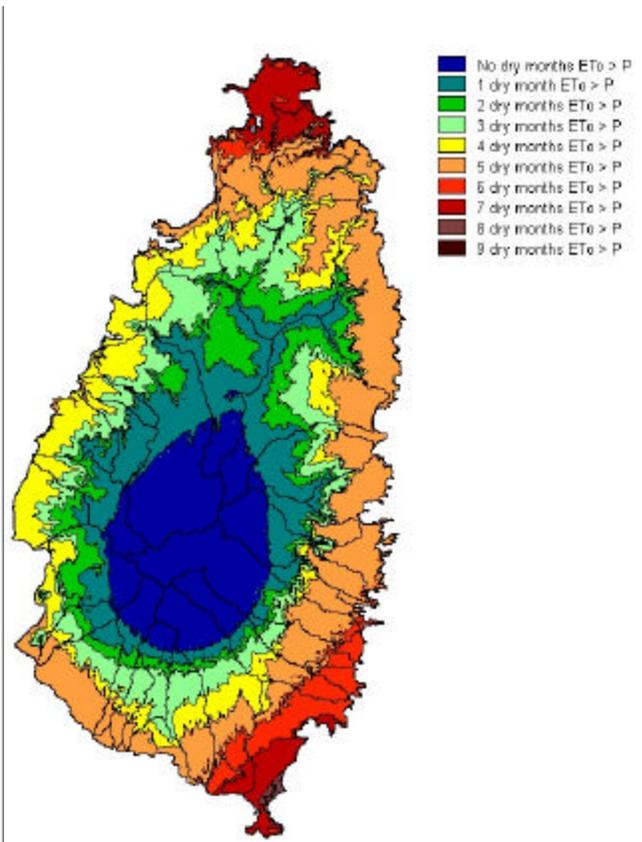
The Maps are reproduced with the permission of Dr. Christopher Cox “Integrated Watershed Management Planning for St. Lucia” Ph.D Thesis, McGill University, Montréal, Canada, 2003.



**Estimated annual water deficit distribution
(watershed boundaries superimposed).**



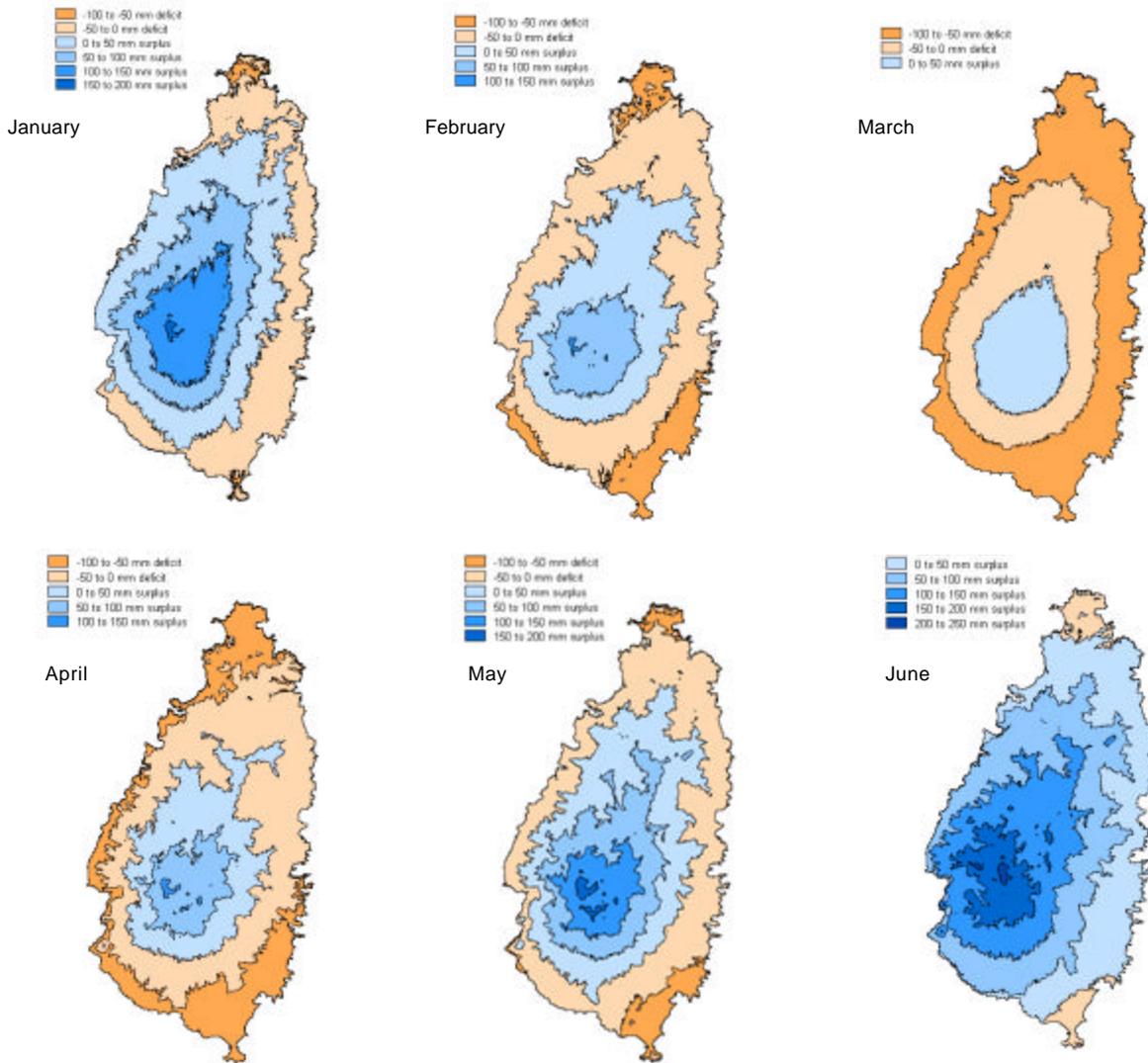
(a) Annual cumulative moisture deficit



(b) Number of dry months (ET_o > P)

Extent of deficit zones could be expanded (migrate inland) with climate change

Serious implications for rain-fed agriculture and food security



Appendix 1– Situation Report

Taken from the *Belize National Hazard Management Plan - Structural Fire Response Plan*

SITUATION REPORT	[use additional paper as needed]
1. DATE:	TIME:
2. EVENT:	
3. DEATHS.....	INJURIES.....
4. RESPONSE ACTIONS TAKEN: (Since last report)	
5. PERSONNEL, EQUIPMENT DEPLOYED:	
6. COMMUNITIES THEATENED:	
7. ANY APPARENT THREATS:	
8. NEED FOR EVACUATION	(Y) (N)
8A. APPROXIMATE NO. OF PERSONS:	
9. SPECIAL POPULATION NEEDS:	
10. ADDITIONAL RESOURCES NEEDED IN PRIORITY ORDER:	
11. COMMENTS on need for activating NEOC	
SGD.....	DATE..... TIME.....
CHAIRMAN DROUGHT TASK FORCE	

Appendix 2 – Web Resources

http://www.westgov.org/wga/initiatives/drought2.htm	Drought Initiatives
http://www.cdera.org	Caribbean Disaster Emergency Response Agency
http://geocities.com/slunemo/	National Emergency Management Organisation