Community Profile and Livelihood Baseline Assesment

Owia

St. Vincent and the Grenadines

Canada

Food and Agriculture Organization of the United Nations

Acknowledgements

The Government of St. Vincent and the Grenadines would like to thank the funding project partners specifically the European Union (EU) and the Caribbean Development Bank (CDB) – Caribbean Disaster Risk Reduction Fund (CDRRF). Thanks also to the other contributing partners including the Food and Agriculture Organization of the United Nations (FAO) and Social Development Commission (SDC) of Jamaica and Social Development Department Livelihood Based Assessment (LBA) participants from the British Virgin Islands (BVI).

The success of this community profile and Livelihood Baseline Assessment (LBA) can only be attributed to the many individuals who contributed their valuable input toward the preparation of the document. Many thanks also to the residents as primary stakeholders within the community of Owia for their support, encouragement, and constructive criticisms in making this profile a success. Also, the community leaders who participated in the focus group discussion and accompanied the facilitators are the engagement the wider community in discussions across various locations.

Special thanks, to the Ministry of National Mobilisation, Social Development, Local Government, Gender Affairs, Family Affairs, Persons with Disabilities and Non-Governmental Organisations and its hard-working team of officers who worked tirelessly under adverse weather conditions to gather the primary data and complied the draft documents without which the profile development would not have been possible. It is also imperative to note the support from the Ministry of Agriculture, Forestry, Fisheries, Rural Transformation, the National Emergency Management Organisation as well as the Basic Needs Trust Fund office.

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Executive Summary

Pre-disaster information is always a key resource in post disaster response (which includes post disaster assessments). When disaster strikes, it is critical to know how many people are likely to have been affected by the event and how. This requires knowledge of the demographic breakdown of the population and the vulnerability of different people to the disaster. Vulnerability will determine how badly they will be affected, how quickly they can be expected to recover and what kinds of assistance they are likely to need.

In many instances however, pre-disaster planning focuses on immediate response and action to protect human life and infrastructure, but without giving sufficient attention to damage and loss to livelihoods. Yet in the post-disaster period, if people are to recover, they need to restore their livelihoods as quickly as possible. This can only happen if detailed and quantitative information has been collected in advance of potential disasters so that livelihood based contingency plans, can be created and planned for.

In 2019, the Livelihood Based Assessment and Contingency Planning approach was applied in St. Vincent and the Grenadines to provide pre-disaster livelihood information for eleven communities involved in the Volcano Ready Communities in St. Vincent and the Grenadines (VRC in SVG) project. The LBA for Owia was conducted during the week of September 30th – October 4th 2019. Twenty-four persons participated in the LBA exercise.

Owia is a Village in the most Northern part of Saint Vincent and the Grenadines. Owia is partly a coastal community on the northern side of the islands that is accessible by sea and land. It is approximately 8 miles from Georgetown. The community is one of farming and fishing. The original village was located in the area now known as Bottom town, where almost half of the Owia population still reside. Owia consists of three adjacent settlements, namely Point, Barracks, and Sandy Bay.

Owia lies within the Sandy Bay Census Division. At the time of 2012 Census, the population of the entire Sandy Bay Census Division was 2,576 persons of whom 1,374 were males and 1,232 females 2,576. In Owia there is a total of one thousand, one hundred and forty one persons living in the area, six hundred and five males (605) and five hundred and thirty six females (536). The male to female ratio is 1.12 representing marginally more males than females.

Chapter 3 provides an overview of the socio-demographic profile of Owia as well as its spatial and locational situation. Chapter 4 provides an overview of its governance structure. Chapter 5 presents an economic overview of the community.

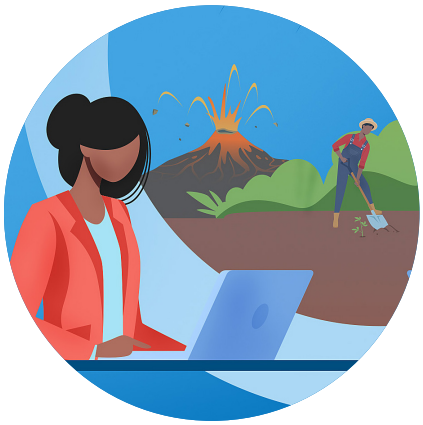
Chapter 6 is a profile of the main hazards that impact the community most directly while Chapter 7 outlines the impact of the April 2021 volcanic eruption.

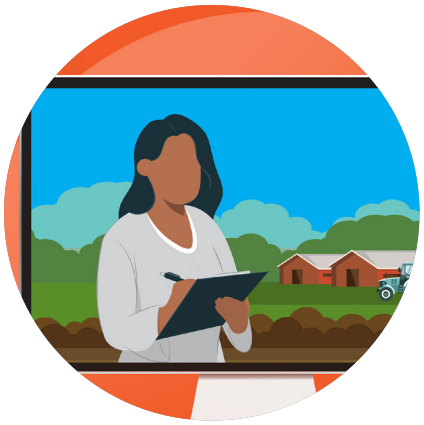
In Chapter 8, the outcome of the Livelihood Baseline Assessment is detailed and includes a profile of community livelihoods and resources. The focus is primarily on agricultural livelihoods. Chapter 9 looks at the type of coping strategies that are employed to deal with hazard impacts on agricultural livelihoods.

Chapter 10 outlines the key response typologies and contingency measures that should be put in place in the event of any disaster.

The Annexes present the damage and loss cost estimates for the agricultural assets, should a disaster occur, as well as the sources of information that were consulted.

Table of Contents





Acronyms

BMC	Borrowing Member Countries
BVI	British Virgin Islands
CARDI	Caribbean Agricultural Research & Development Institute
CARIFORUM	Caribbean Forum
CBO	Community Based Organisation
CC	Climate Change
CCA	Climate Change Adaptation
CCR	Community Climate Resilience
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CCRS	Community Climate Resilience Specialist
CCVA	Community Climate Vulnerability Assessment
CD	Census Division
CDO	Community Development Organisation
CDB	Caribbean Development Bank
CDERA	Caribbean Disaster Emergency Response Agency
GDP	Gross Domestic Product
CDRRF	Community Disaster Risk Reduction Fund
CDS	Community Development Specialist (CDRRF)
CDS	Community Development Supervisor (SVG)
CES	Community Engagement Survey
CEWS	Community Early Warning System
CHARIM	Caribbean Handbook on Risk Information Management
CP	Community Profile
CPA	Country Poverty Assessment
CS	Climate Smart
CVA	Climate Vulnerability Assessment
CWSA	Central Water and Sewerage Authority
DDC	District Disaster Committees
DaLA	Damage and Loss Assessment
DLA	Detailed Livelihood Assessment
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
ECLAC	Economic Commission for Latin America and the Caribbean
ED	Enumeration Division
EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
FUFC	Fancy United Farmers Cooperative
GAD	Gender Affairs Division
GBV	Gender Based Violence
GEF	Global Environmental Fund
GIS	Geographic Information System

GOSVG	Government of St. Vincent and the Grenadines
GPS	Global Positioning System
HH	Household
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IICA	International Institute for Cooperation on Agriculture
ILIA	Initial Livelihood Impact Assessment
ILO	International Labor Organization
IWCAM	Integrated Watersheds and Coastal Areas Management project
J-CCCP	Japan-Caribbean Climate Change Program
LAS	Livelihood Assessment Specialist
LAT	Livelihood Assessment Toolkit
LBA	Livelihood Baseline Assessment
LGBTQ	Lesbian, Gay, Bi-Sexual, Trans, Queer
LPG	Liquified Petroleum Gas
M&E	Monitoring and Evaluation
MMI	Modified Mercalli Intensity
MoA	Ministry of Agriculture
MoNM	Ministry of National Mobilisation
NDVI	National Difference Vegetation Index
NEMO	National Emergency Management Organization
NGO	Non-Governmental Organization
NVEP	National Volcanic Emergency Plan
OECS	Organisation of Eastern Caribbean States
PAD	Project Appraisal Document
PM	Project Manager
PVC	Polyvinyl Chloride
RC	Red Cross
RCCVA	Rapid Community Climate Vulnerability Assessment
RDVRP	Regional Disaster Vulnerability and Reduction Project
RR	Risk Reduction
SAP	Social Assistance Programme
SD	Sustainable Development
SDC	Social Development Commission
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SMART	Specific, Measurable, Achievable, Realistic, Time-bound
SRC	Seismic Research Centre
STREVA	Strengthening Resilience in Volcanic Areas
SVG	St. Vincent and the Grenadines
UN	United Nations
UNFPA	United Nations Population Fund
UNISR	United Nations Office for Disaster Risk Reduction
UWI	University of the West Indies
VCA	Vulnerability and Capacity Assessment
VINLEC	St. Vincent Electricity Company
VRCinSVG	Volcano Ready Communities in St. Vincent and the Grenadines
VRCP	Volcano Ready Communities Project
WAD	Women's Affairs Division

1 Introduction

1.1 THE NEED FOR A LIVELIHOOD BASELINE AND CONTINGENCY PLAN

Pre-disaster information is always a key resource in post disaster response (which includes post disaster assessments). When disaster strikes, it is critical to know how many people are likely to have been affected and how. This requires knowledge of the demographic breakdown of the population and the vulnerability of different people to the disaster. Vulnerability will determine how badly they will be affected, how quickly they can be expected to recover and what kinds of assistance they are likely to need.

In many instances however, pre-disaster planning focuses on immediate response and action to protect human life and infrastructure, but without giving sufficient attention to damage and loss to livelihoods. Yet in the post-disaster period, if people are to recover, they need to restore their livelihoods as quickly as possible. This can only happen if detailed and quantitative information has been collected in advance of potential disasters so that livelihood based contingency plans, can be created and planned for.

In 2019, the Community Disaster Risk Reduction Fund (CDRRF) of the Caribbean Development Bank (CDB) partnered with the Food and Agriculture Organization of the United Nations (FAO) to introduce Borrowing Member Countries (BMC) in the region to the Livelihood Baseline Assessment (LBA) process which was pioneered by FAO and the International Labour Organisation (ILO).

The Livelihood Assessment Tool-kit[1] provides well-defined guidelines for the preparation of baselines that can be used to:

- analyse and respond to the impacts of disasters on the livelihoods;
- develop and update contingency plans.

[1] *The Livelihood Assessment Tool-kit* was published by the Food and Agriculture Organisation of the United Nations and the International Labour Organisation in April 2009.

In March 2019, a one-week training and capacity building session was held in Belize and introduced persons from Belize, British Virgin Islands, Jamaica and St. Vincent and the Grenadines on the use of the LBA methodology for their own planning purposes.

1.2 OBJECTIVES OF THE LBA PROCESS

The objectives of the LBA approach are:

a) To make it possible for countries to compare the livelihood context and activities for residents in the communities and local economies before and after a disaster

b) To establish a robust basis for making estimates of the impact of disasters on livelihoods, in particular vulnerable groups, that can feed into various appeals for aid required for reconstruction and rehabilitation of the sector(s) affected.

c) To provide a reliable basis for immediate post-disaster assessments including the initial Livelihood Impact Appraisal (Volume 3 of the Toolkit) and the more in-depth detailed Livelihood Assessment of the impact of disasters on livelihoods and identify opportunities and recovery capacities at the local, community and household levels (Volume 4).

1.3 THE LBA PROCESS IN ST. VINCENT & THE GRENADINES

Following the February 2019 capacity building, a total of eleven (11) Community Profiles and Livelihood Assessment reports were prepared in St. Vincent & the Grenadines. These communities included:

1. Colonaire
2. Chateaubelair
3. Rose Hall
4. Fitz Hughes
5. Fancy
6. Owia

7. Magum and Overland
8. Park Hill
9. Sandy Bay
10. South Rivers and
11. Spring Village

This report presents the findings that resulted from the Livelihood Baseline Assessment (LBA) and Community Profile (CP) process that was conducted for the community of ***Owia***, St. Vincent & and the Grenadines.

2 Methodology

The Community Profile (CP) and Livelihood Baseline Assessment (LBA) for Owia was compiled in October 2019 for Fancy using both qualitative and quantitative data collection methods utilizing observation sheets and informal interviews. Prior to this the residents were engaged in an assessment of the community's main livelihoods using a community wide base approach focus group session. This focus group was conducted in April 2019. The assessments included an examination of the hazards that affect the community, the impact of these natural and man-made hazards on livelihoods in the community, as well as existing coping strategies and desired response interventions in the event of a disaster.

For the community profile sections, data were gathered from government reports and data-sets made available to the public.

The LBA component was compiled using the Livelihood Assessment Toolkit developed by the International Labour Organisation (ILO) and the Food and Agriculture Organization of the United Nations (FAO) and which provided guidelines on documenting the exiting vulnerabilities of each community, the main livelihood activities, the projected impact of various hazards on livelihoods and contingency planning. Community representatives and external stakeholders also provided reviews and validation of the information presented in the document.

2.1 PRIMARY SOURCES

Field work for the livelihood assessment was conducted in October 2019 and included a focus group discussion, a transect walk for field observations and a livelihood baseline survey Responses from focus group discussion were used to generate the following tools:

- Livelihood profile
- Hazard calendar
- Seasonal calendar
- Coping Strategies Inventory
- Response Typology Matrix

A convenience sample was also utilized to collect data from residents regarding the impact of natural hazards on their livelihoods and coping strategies. Data were collected and analysed using the KOBO Toolbox[2] application. Responses from the livelihood baseline assessment survey were analysed and presented separately. Data from a Community Engagement Survey (CES) conducted in Fancy in 2018 utilized a sample size of 50 residents was also used to triangulate the findings from the LBA and CP exercise. This data was collected and analysed utilizing Excel and SPSS.

2.2 SECONDARY SOURCES

Secondary data were reviewed in order to provide the environmental, social and economic context of the community. Sources reviewed included the 2012 Population and Housing Census, 2007/2008 Survey of Living Conditions and Hazards maps provided by the National Emergency Management Organisation (NEMO) and the Physical Planning Unit.

Additionally, qualitative information was also obtained from both the preliminary Rapid Community Climate Vulnerability Assessment (RCCVA) that was conducted in 2016 and the detailed RCCVA that was completed in 2020.

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[2] KoBo Toolbox is a free open-source tool for mobile data collection. It allows users to collect data in the field using mobile devices such as mobile phones or tablets, as well as with paper or computers.

It allows for faster data collection because data does not need to be transcribed from paper to computers before it can be analysed. Some analyses can be applied within minutes of the data being collected It is more accurate. Enumeration errors are minimised because of the data validation that can occur in real time as data is collected. Transcription errors are entirely eliminated It is optimised for humanitarian work. It also works offline and is easy to use (requires no technical knowledge to manage and enumerators can be trained within minutes. If all else fails, paper forms can be used as a backup and integrated with other data. (Source: https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/unhcr_kobo_guidelines_may2016.pdf)

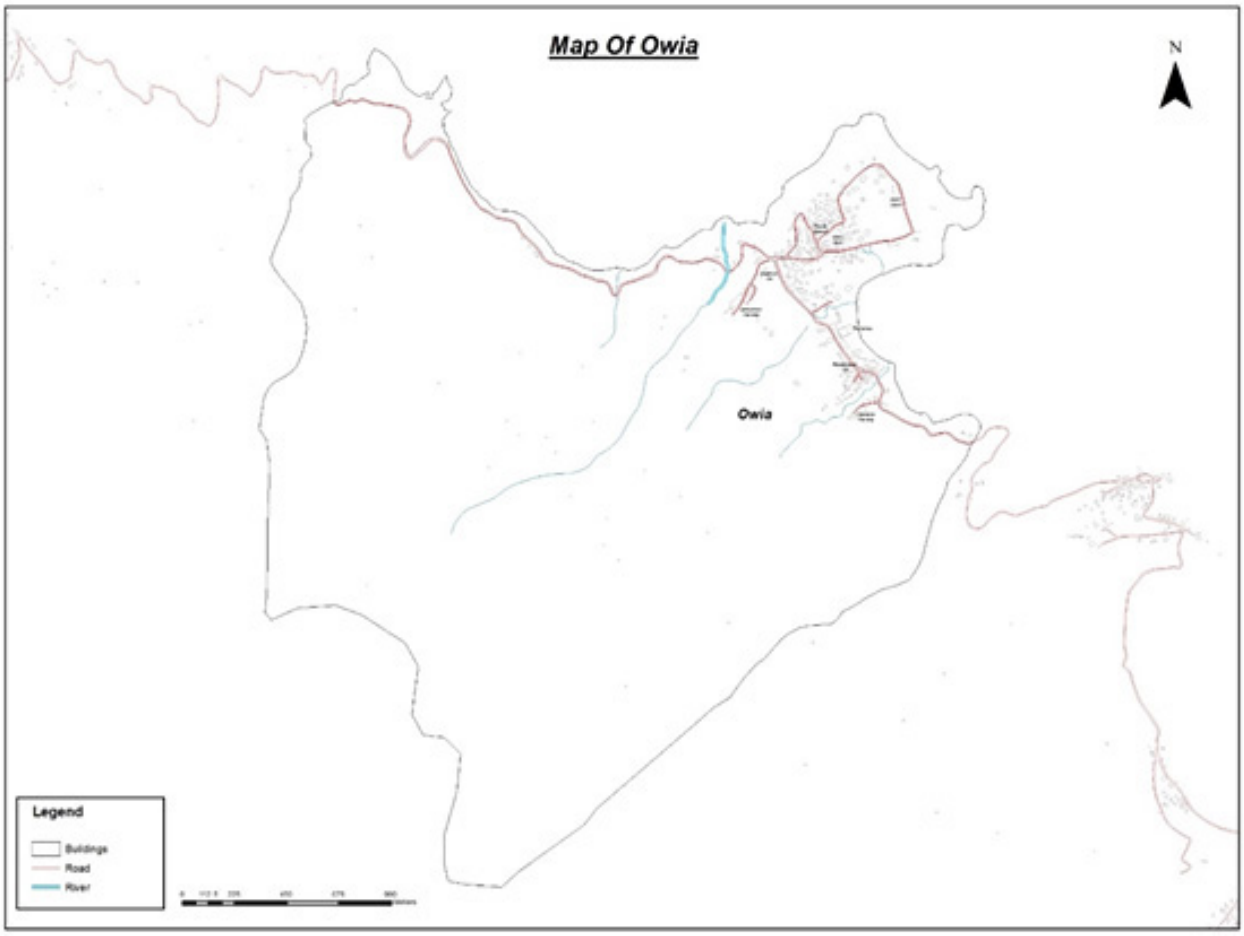
3 Description of the Community

3.1 LOCATIONAL DATA

Owia is a Village in the most Northern part of Saint Vincent and the Grenadines. Owia is partly a coastal community on the northern side of the islands that is accessible by sea and land. It is approximately 8 miles from Georgetown. The community is one of farming and fishing. The original village was located in the area now known as Bottom town, where almost half of the Owia population still reside. Owia consists of three adjacent settlements, namely Point, Barracks, and Sandy Bay.

Owia was one of the main areas where the war between the British and the Black Carib (Garifuna) was fought during the period 1769 – 1775. It was the centre of communication for the French. During the war the Caribs were driven more by a desire for liberty than for profit. Sadly, they were portrayed at best as a misled, simple people, and at worst as traitors to the enemy. It was the belief that the French and Caribs had an amicable relationship and their connection with the French caused them to be branded as a dangerous people. However, the Carib got little assistance from the Frenchmen during the war.[3]

Figure 1: Map of the community of Owia *(Source: GIS Unit, Physical Planning Division, Ministry of Transportation, Works, Lands and Physical Planning, Kingstown)*



[3] https://www.gipsvginc.org/history.html

3.1.1. GUNPOWDER MAGAZINE

One of the island's military forts was established in Owia by the British in 1773. It was used to store weapons. The fort was strategically located at the top of the hill in Owia. Many artifacts from the war remained there until they were taken out and are now lodged at the museum. The remnant of an old gun was placed at the Magazine when it was restored in 2013 by the Basic Needs Trust Fund (BNTF) through the Owia Heritage Organisation Inc. with funding from the Caribbean Development Bank (CDB).

Figure 2: Gunpowder Magazine

3.1.2. BLOODY BRIDGE

This area is located between Espanol Point and Rouges Hill. The last bloody battle of the Caribs between the British was fought there. Basically the British ambushed the Caribs when they saw them first coming down the side of the valley.

3.2 NATURE OF COMMUNITY (CULTURE, TRADITIONS)

Owia is primarily an agricultural community. Owia is traditionally know for its cultivation of sweet potatoes and arrowroot. The by-product of arrowroot; starch is mainly exported. The waste product of the starch – Madungo is used to make a gluten free flat bread, called Madungo bakes. It is also used to make fungi, dumplings and a stiffening agent or starch for fabric. Madungo bakes are very popular during the Month of March, as March 14th is celebrated locally as National Heroes Day and October 27th Independence Day. During the Christmas season, Owia Point comes alive with many Christmas activities and events such as "Nine Mornings"[4] , as well as decorative street lighting activities.

3.3 NATURAL RESOURCES (RIVERS, FORESTS, FARMING LANDS)

Located in Owia is the Owia Salt Pond, a natural ocean fed swimming pool which was formed following an eruption of the La Soufriere Volcano by the cooling of the lava flow by the waters. It was established as a national park over twelve (12) years ago. Other natural and cultural heritage sites in Owia include trails, a waterfall, rivers, beaches and farm lands. These natural resources are used both for recreational and economic purposes.

[4] Nine Mornings is a unique Vincentian festivity associated with the Christmas season. Nine Mornings before Christmas, Vincentians awake in the early hours of the morning and partake in a range of activities, among them sea baths, dances (or in local parlance, fetes), bicycle riding and street concerts. The origins of this festival are clouded in some mystery, although the original tradition relates it to the 'novena' of the Catholic Church on the nine days before Christmas. It is believed that after the early morning church services of the Catholics, worshippers began walking the streets, while others went for sea baths. From this the popular Nine Mornings festivity emerged. Although popular opinion has this practice as starting during the period of slavery, it was more likely to have been a post-emancipation practice. http://www.gov.vc/index.php/nine-mornings

Figure 3: Owia Salt Pond

Due to its location in what can be considered the volcano hazard area, the soil in Owia, like in other northern communities, is very fertile. As such, one of the most important resources in Owia are its farming lands.

All of the natural resources found within the communities on mainland St. Vincent are located in watersheds. A watershed is defined as the land area that drains to a stream, wetland, lake or sea. It is the sloping land area over which water from rainfall flows downhill to the coast. On mainland St. Vincent there are sixteen (16) watersheds (Figure 4) with forests that protect them. These forests are important to protecting terrestrial biodiversity and marine biodiversity through reduced soil erosion. Four (4) of these watersheds are considered to be the key ones as a result of the contribution they make to the socio-economic development of the country (Figure 5).

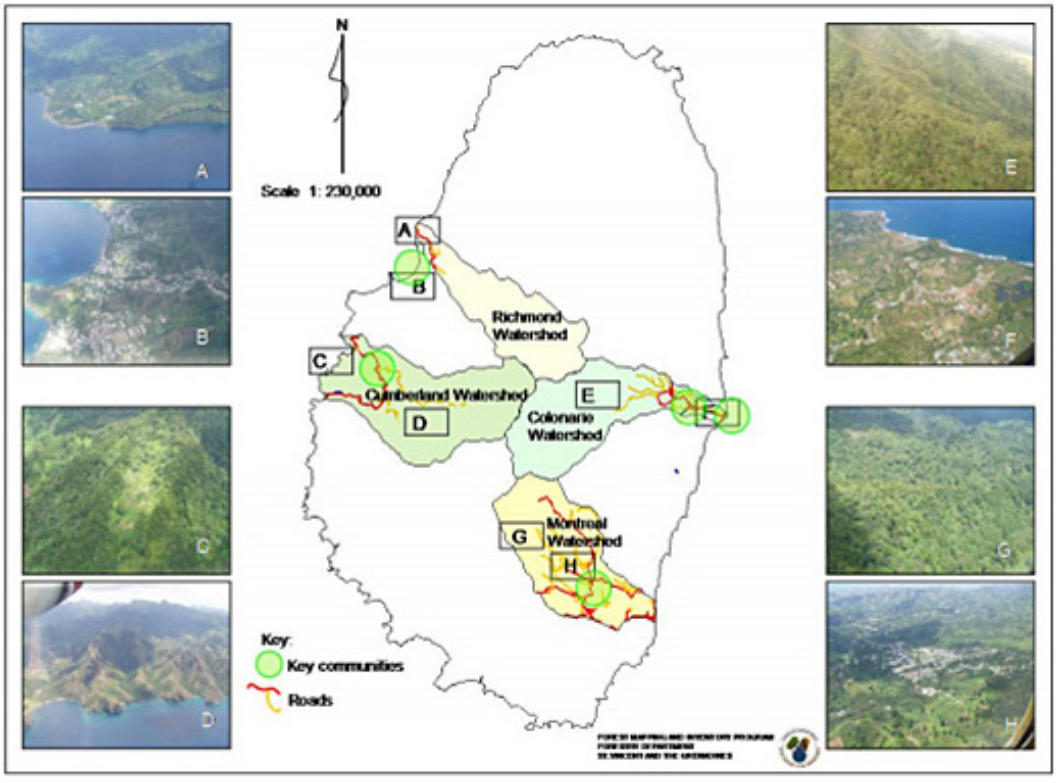
Figure 4: The Sixteen (16) Watersheds of Saint Vincent *(Source: GEF-IWCAM, No Date).*

Most of the watersheds on St. Vincent run from the centre of the island all the way to the coast and provide 100% of the water supply to the mainland to support our existence in addition to providing habitat for flora and fauna. The flora found in these watersheds include “coconuts breadfruit, bananas and aroids for food, forest species provide homes for birds and other wildlife; others provide stabilization to the land, are used for traditional medicines, fuel, ornamentals, craft and construction purposes” (Lennie. D. Adams, 2013).

The fauna found in these watersheds include “birds (whistling warblers, parrots, black hawks swift and wren), reptiles (black snakes, lizards and Congo snakes). Others like pigs, cattle, small ruminants, fowls are domesticated and iguanas, tattoo, crustaceans and mullets are hunted and harvested for food (Lennie. D. Adams, 2013). The specific numbers of flora and fauna that has been identified on St. Vincent are as follows “more than 1,150 species of flowering plants, 163 species of ferns, 4 species of amphibians, 16 species of reptiles, 111 species of birds, and 15 species of mammals” (Draft SPCR SVG 2011).

Watersheds are therefore very important to the health and well-being of Vincentians. Three (3) of the main areas in a watershed are the streams and lakes, land and coasts. The free fresh water they provide is used to sustain several sectors in St. Vincent and the Grenadines, such as, Water, Tourism, Health, Agriculture, Fisheries, Energy, and Critical Infrastructure. Most of the watersheds are located in forest reserves (see map below). All of the Central Water and Sewage Authority’s (CWSAs) catchment areas and the St. Vincent Electricity Services Limited (VINLEC) Hydro-power stations are located in watersheds. Within recent years however, the watersheds have been under threat as a result of climate related events and human actions. In recent years, mudslides resulting from hazard events and also due to increased and poor farming techniques have occurred within the watersheds. Additionally, there continues to be an issue of pollution resulting from the location of pig pens on river banks.

Figure 5: Key watersheds and communities in St. Vincent *(Source: Forestry Dept. 2005).*



The Forestry Department, the National Parks Authority and the CWSA are responsible for managing the forests specifically regarding conservation and protection.

The possibility of the current water supply on the mainland drying up is considered to be quite low; as a result, alternatives such as desalination and drilling for underground water are not given serious consideration.

Over the past ten (10) or more years, attempts have been made to put an integrated water resource management system in place to protect terrestrial and marine ecosystems, with limited success. Additionally, efforts have been made to involve communities in activities such as mapping hotspots in watersheds and monitoring the level of land degradation and water quality (GEF-IWCAM, No Date).

Figure 6: Protected Areas on Mainland St. Vincent *(Source: GEF-IWCAM, No Date).*

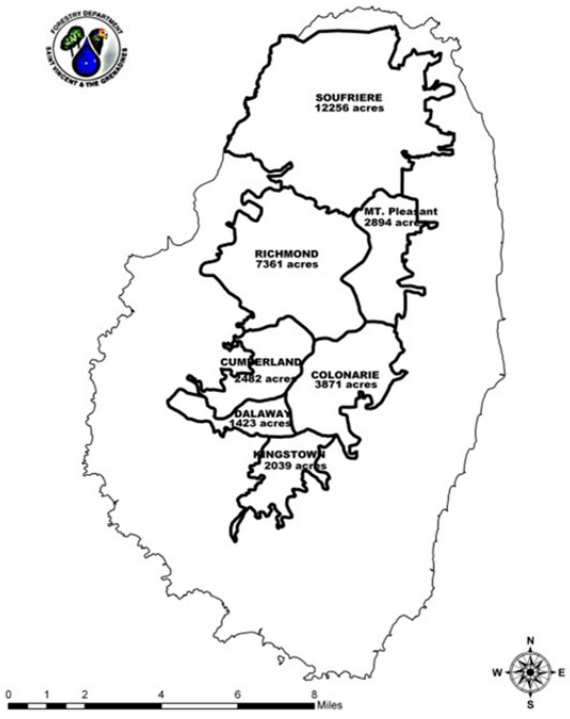


Table 1: Water Statistics for SVG (Source: FAO 2005, GOSVG 2002)

	M^3
Total surface water	120,000,000
Storage capacity	5,000,000
Consumption patterns	
Government institutions	1,600,000
Domestic	5,300,000
Unaccounted for water	1,800,000
Leakages	500,000

These key watersheds provide 120,000,000 cu.m/yr. of the country's total surface water to meet the varying demands (see Table 1).

Figure 7: Rainfall Map of the Island of St.Vincent *(Source: Joyette, 2006).*

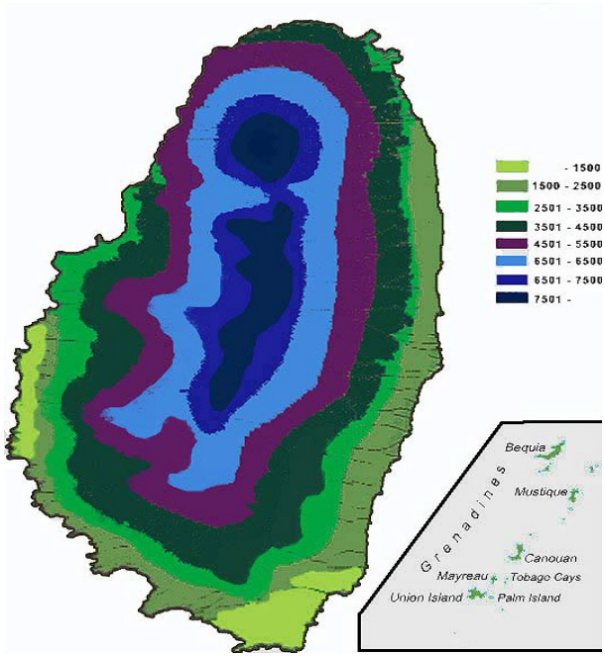
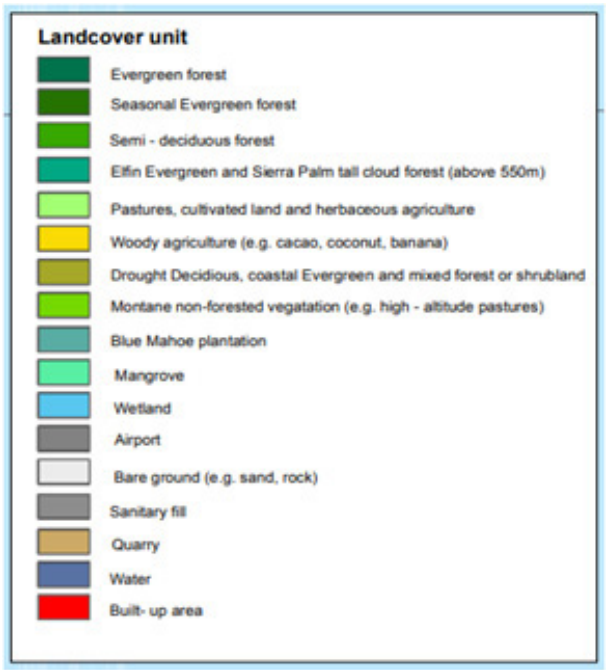


Figure 8: Land Use and Distribution in Owia
(Source: Westen, C.J. and Sijmons, Koert. 2016)



3.4 LAND USE AND DISTRIBUTION

Figure 8 illustrates that lands in Owia consists of forests, pastures, cultivated land, and herbaceous agriculture. There is a vast amount of cultivated land south of the main road which traverses through the community. The built-up or residential areas are concentrated mainly in the centre of the community.

3.5 POPULATION AND AGE STRUCTURE

It's important to note that the community of Owia falls within the Sandy Bay Census Division as shown in Figure 9.

Figure 9: Map of mainland St.Vincent by Census Division (*Source: N/A)*

The population of the Sandy Bay Census Division according to the Population and Housing Census done in 2012 was Two Thousand, five hundred and seventy six (2,576) persons comprising of one thousand, three hundred and seventy four (1,374) males and one thousand , two hundred and thirty two (1,232) females 2,576. In Owia there is a total of one thousand, one hundred and forty one persons living in the area, six hundred and five males (605) and five hundred and thirty six females (536). The male to female ratio is 1.12 representing marginally more males than females.

Table 2: Estimated Population in Sandy Bay by Census Division (*Source: 2012 Census)*

			2012				2001				Intercensal Change			
			H/H	Population			H/H	Population			H/H	Population		
ED #	Old ED #	ED Name		M	F	T		M	F	T		M	F	T
08010	08010	Sandy Bay (1)	56	103	138	241	63	135	134	269	-10	-35	-5	-40
08020	08020	Sandy Bay (2)	75	169	134	303	71	194	160	354	4	-25	-26	-51
08030	08030	Sandy Bay (3)	45	108	81	189	48	124	91	215	-3	-16	-10	-26
08040	08040	Sandy Bay (4)	55	104	108	212	73	187	164	351	-18	-83	-56	-139
08051	08051	Old Sandy Bay and Point	62	119	115	234	56	129	107	236	6	-10	8	-2
08052	08052	Old Sandy Bay and Owia (1)	123	289	258	547	96	264	217	481	27	23	39	62
08053	08053	Old Sandy Bay and Owia (2)	96	197	163	360	80	206	184	390	16	-9	-21	-30
08060	08060	Fancy	150	255	235	490	135	269	240	509	15	-18	-7	-25
TOTAL			**662**	**1344**	**1232**	**2576**	**622**	**1508**	**1297**	**2805**	**37**	**-173**	**-78**	**-251**

Examination of the population of the administrative division Sandy Bay Census Division showed that approximately 42.15 of the population was 24 years and under, and children (0-14 years) accounted for 27.24%, while adolescents in the age group (10-14) has the highest percentage in the population that is 10.30%. The elderly population, above 65 years of age, was 9.93% and the percentage of the working age persons (15-64 years) was 62.82%.

Age Dependency ratio, which establishes the number of dependents (children and elderly persons) per 100 persons in the working age population (14-65) was calculated at 59.16%, consistent with the dependency ratio across St. Vincent and the Grenadines.

Table 3: Population Distribution by age, Sandy Bay Division

First Year Age Group up to Age 85+	Sex		
	Male	Female	Total
0 - 4	4.28%	4.40%	8.67%
5 - 9	4.01%	4.26%	8.27%
10 - 14	5.66%	4.64%	10.30%
15 -19	4.00%	4.66%	8.66%
20 - 24	3.49%	2.76%	6.25%
25 - 29	4.04%	3.05%	7.09%
30 - 34	4.10%	3.79%	7.90%
35 - 39	4.16%	3.43%	7.58%
40 - 44	3.11%	3.45%	6.55%
45 - 49	3.59%	2.72%	6.31%
50 - 54	2.73%	2.45%	5.17%
55 - 59	1.88%	1.84%	3.71%
60 - 64	1.92%	1.68%	3.60%
65 - 69	1.64%	1.77%	3.41%
70 - 74	1.68%	1.16%	2.84%
75 - 79	0.72%	0.64%	1.36%
80 - 84	0.36%	0.71%	1.07%
85+	0.44%	0.81%	1.25%
Total	**51.78%**	**48.22%**	**100.00%**

3.6 HOUSEHOLD SIZE

Average age of household size in the administrative division of Sandy Bay of Owia is a part, was 3.9 persons per household, comparable to the national average of 3.0 persons per household nationally.

3.7 HOUSEHOLD HEADS

Household heads were 52.04% male and 47.95% female with a male to female ratio of 1.08.

3.8 UNION STATUS

Approximately 22.41% of household heads in the division were married and living with spouse and another 18.17% living in a common law union. While (22.93%) percent were not presently in a union and another 13.58% never had a spouse or common-law partner.

3.9 EDUCATION

There are two (2) educational Institutions in Owia, one early development or pre-school and one primary school. The nearest secondary school which is easily accessible to children is the Sandy Bay Secondary School. A daily subsidized school bus service is accessible to students from the community desirous of attending each school.

Table 4: Union Status of Household Heads, Sandy Bay Division

Present Union Status	Counts	Average	%
Never had a spouse or common-law partner	255	28.37	13.58%
Married and living with spouse	420	55.34	22.41%
Common Law Union	341	39.66	18.17%
Visiting partner	403	32.24	21.50%
Not in a Union	430	45.96	22.93%
Not Stated	27	37.43	1.41%
Total and Average	**1874**	**41.46**	**100.00%**

Table 5: Educational Institutions, Sandy Bay Division

Name of Primary School	Enrolment	Number of Girls	Number of Boys	Number of Teachers	Pupil/ Teacher Ratio
Fancy Preschool	10			3	3
Owia Early Childhood Centre (preschool)	20			4	5
Fancy Government School (Primary)	60	36	24	7	9
Owia Government School (Primary)	129	60	69	8	16
Sandy Bay Gospel Chapel	36			4	9
Sandy Pearl Preschool	22			4	6
Sandy Bay Government School (Primary)	292	143	149	19	15
Sandy Bay Secondary	245	105	140	20	12

3.10 HOUSING QUALITY

The housing condition is fair with an average of 72% being concrete and 28% being wooden structures.

3.11 HEALTH

In Owia there is one Government clinic, it is a concrete structure. The clinic is staffed with a resident staff nurse, a nursing assistant, a community health aid and a Yes Worker, there is a District Medical Officer who visit the clinic once per week, every Monday.

Table 6: Health Care Facilities in Owia

Name of Facility	Services offered	Condition of Building
Owia Clinic	**Primary health care services:** Blood pressure checks Diabetes testing Pap smear Swabs Counselling Adolescent and Diabetic coordination Ante- Natal and Post-Natal Care Family Planning Care for the elderly	Good

3.11.1. NUTRITION SERVICES (CHILDREN AGE 5+)

For the period 2017/18, approximately ninety seven percent (73.64%) of students attending the Owia Government School benefitted from the services offered by the School Feeding Programme.

Table 7: Percentage of students benefitting from the school feeding programme in primary schools 2017/18. (*Source: SVG Educational Statistical Digest 2017/18)*

School	Enrolment	Benefitting	% benefitting
Owia Government	129	95	73.64

3.12 SANITATION

Garbage collection is once per week with little to no haphazard garbage dumping. The Vector Control Unit within the Ministry of Health patrols the area routinely for vectors.

Moreover, where sewage is concern about 90% of the residents have indoor/sewer toilets and 8% have outside toilet or latrine and the remaining 2% does not have any toilet at all.

3.13 PUBLIC INFRASTRUCTURE (CONDITION OF ROADS, BRIDGES, DRAINS; LIGHTING, ETC.)

There is inadequate and unscheduled public transportation.

Based on observations from the Transect exercise conducted in the community during the LBA exercise, it is clear that there are poor infrastructure in the community including poor roads and improper drainage. Moreover, there are some areas in Owia that are without street lights.

3.14 SOCIAL SERVICES

There are various social services present in the Owia community which include the following: Community Centre, Churches, Schools, Health centre, Recreational facilities and so on as see in Table 8.

Table 8: Social Services in Owia

Types	Name of facility	Number	Location	Condition
Cemeteries	Owia Cemetery	1	Owia	Good
Churches	Owia Seventh Day Adventist	8	Owia	Good
	International Pentecostal Assemblies			
	Hope Baptist			
	Owia Anglican Church			
	Church of Christ			
	Bethel Assembly			
	Maranatha Baptist Church			
	Owia Spiritual Batptist			
Community Centre	Owia Community Centre	1	Owia	Very poor
Pre-School	Owia Government Early Childhood Centre	1	Owia	Very Good
Primary School	Owia Government School	1	Owia	Good
Health Centre	Owia Clinic	1	Owia	Good
Libraries	None			
Parks/ Heritage /Tour Site	Salt Pond Recreation Park	1	Owia	Very Good
Playing Fields	Salt Pond Recreational Park	1	Owia	Very Good
Police Station	Owia Police Station	1	Owia	Fair
Post Office	Sandy Bay Post Office	1	Sandy Bay	Good

3.15 CRIME & PUBLIC SAFETY

Praedial Larceny is the major crime affecting the community of Owia, however, there is frequent police patrol in the community.

3.16 DEVELOPMENTAL CHALLENGES

Residents identified the following issues as the main challenges impacting the Owia community

- High Unemployment/Underemployment
- High number of School dropouts (25% of Boys; 10% of girls)
- High incidence of Teenage Pregnancy
- Pollution and sargassum seaweed
- Poor infrastructure –roads, drains
- Mosquito infection

When the 2016 RCCVA was conducted, the main challenges facing the communities reportedly included:

1. Marketing of agricultural produce (farmers are primarily dependent on (Traffickers[5])
2. Land space and tenure - access to arable land are limited in most of the proposed communities,
3. Pest & Plant disease: Farmers indicated that they had experienced an increase in the frequency of pests and plant disease,
4. Drought and heavy rains: Drought was identified as 'silent' stressor while the increased frequency of heavy rain is a major concern,
5. Extension service: Farmers expressed the need for improvement in extension services to their communities,
6. Quality of seeds and planting material.
7. Praedial Larceny,
8. Landslides,
9. Social cohesion: strong but formal groups are relatively weak.

[5] Persons who buy and sell produce for sale within the island and sell to other islands in the OECS.

4 Governance Profile

4.1 POLITICAL DIRECTORATE

Constituency:
North Windward
Parliamentary Representative:
Montgomery Daniel
(from 2001 to present)

4.2 SOCIAL/CIVIC ORGANISATIONS

Table 9 shows the number and type of social and civic organisations in Owia.

Table 9: Social/Civic Organisations

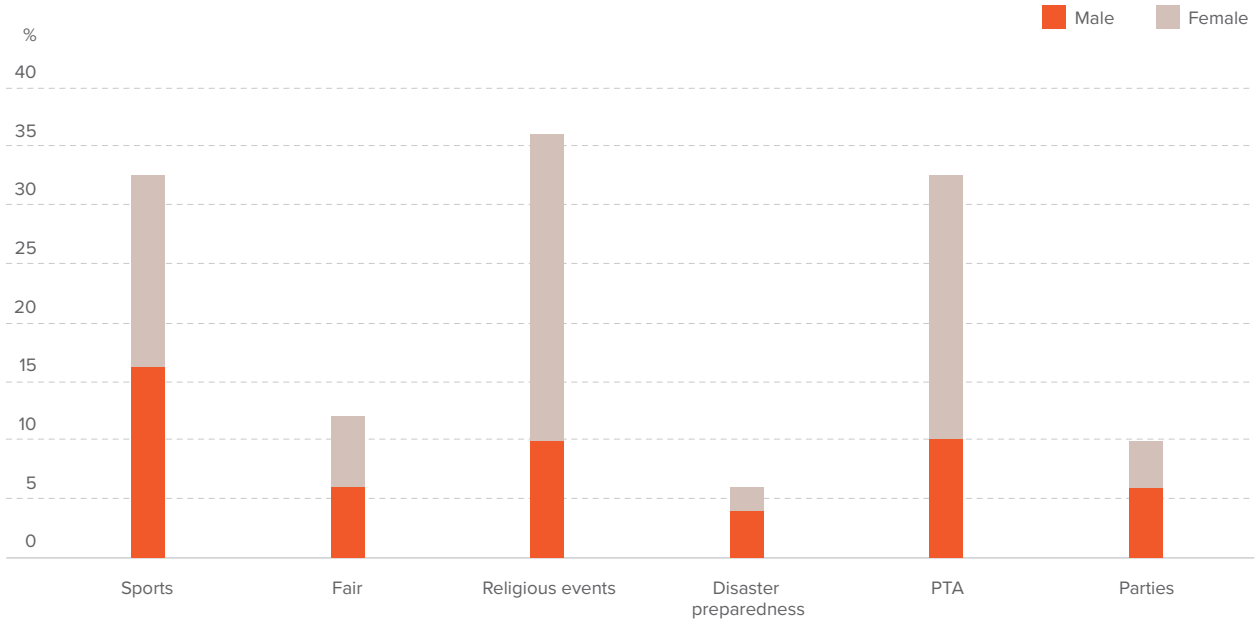
Name of Group	Vision	Mission	Objectives
Point Massive Group	An active, diverse Point Massive Group with strong leaders and dedicated individuals who will ensure the sustainability of the community's culture and other socio-economic participation	To build a vibrant innovative Point Massive Group who would ensure inclusion and participation of community members for long-lasting cultural initiatives and community development.	To maintain spectacular community lighting and Nine Mornings Activities for all to enjoy. To distribute 50 food packages to 50 elderly persons in the Owia Community by December 2020.
Owia Heritage Organisation, Owia Sports			
Owia/Point Partnership Group			
Cultural Organisation and Point Massive.			

4.3 COMMUNITY ENGAGEMENT

Information obtained from the 2018 Community Engagement Survey (CES) revealed that Twenty (20%) of residents play an active roll through membership in a community group.

The activities most commonly attended by residents are religious events (36%), Sport events (32.6%) and PTA meetings (32.6%) as seen in Figure 10.

Figure 10: CDRRF: Community Engagement Survey (CES) Results 2018



5 Economic Profile

Information obtained from the CDRRF Community Engagement Survey 2018 showed that Fifty-six (50%) of respondents stated they were unemployed (Figure 11). Twenty (20%) are employed in a combination of activities such as craft, trade and elementary occupations such as mechanic, painter and housekeeper, whereas less than 10% of thee residents are professionals.

The other forms of employment are fishing and farming.

5.1 OCCUPATION & SKILLS

Table 10 shows the number of farmers, sex, age group and number of livestock farmer registered in Owia.

5.2 FINANCIAL SERVICES

It is not known what type of financial services exist in the community.

Figure 11: Types of employment in Owia *(Source: 2018 CES)*

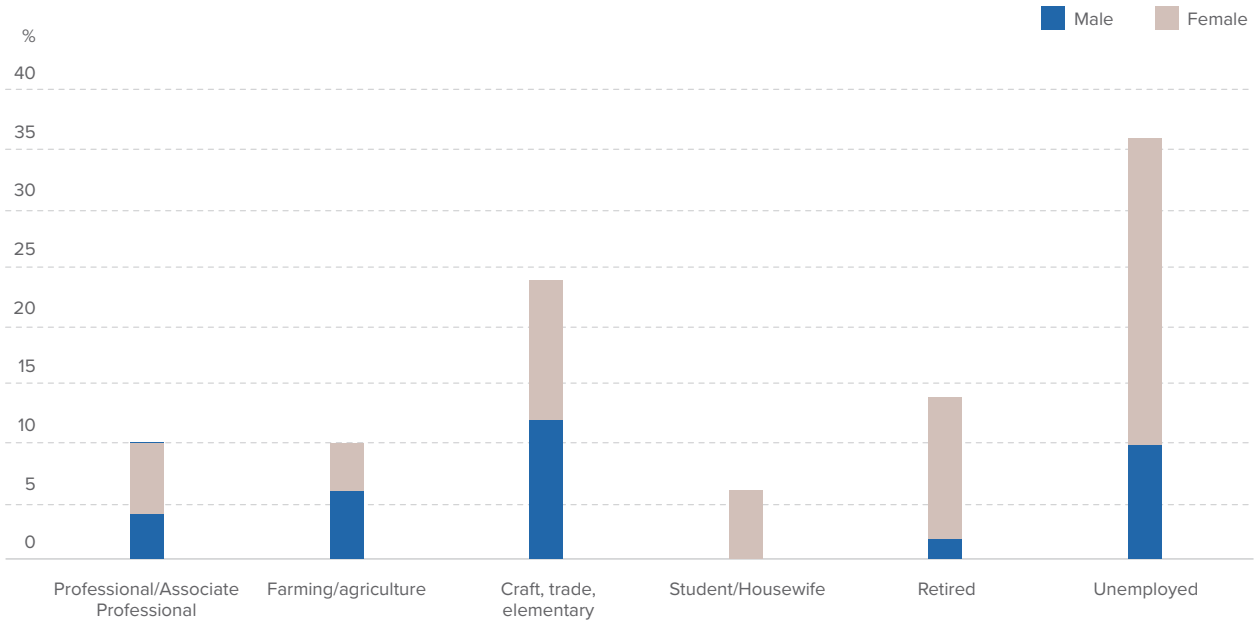


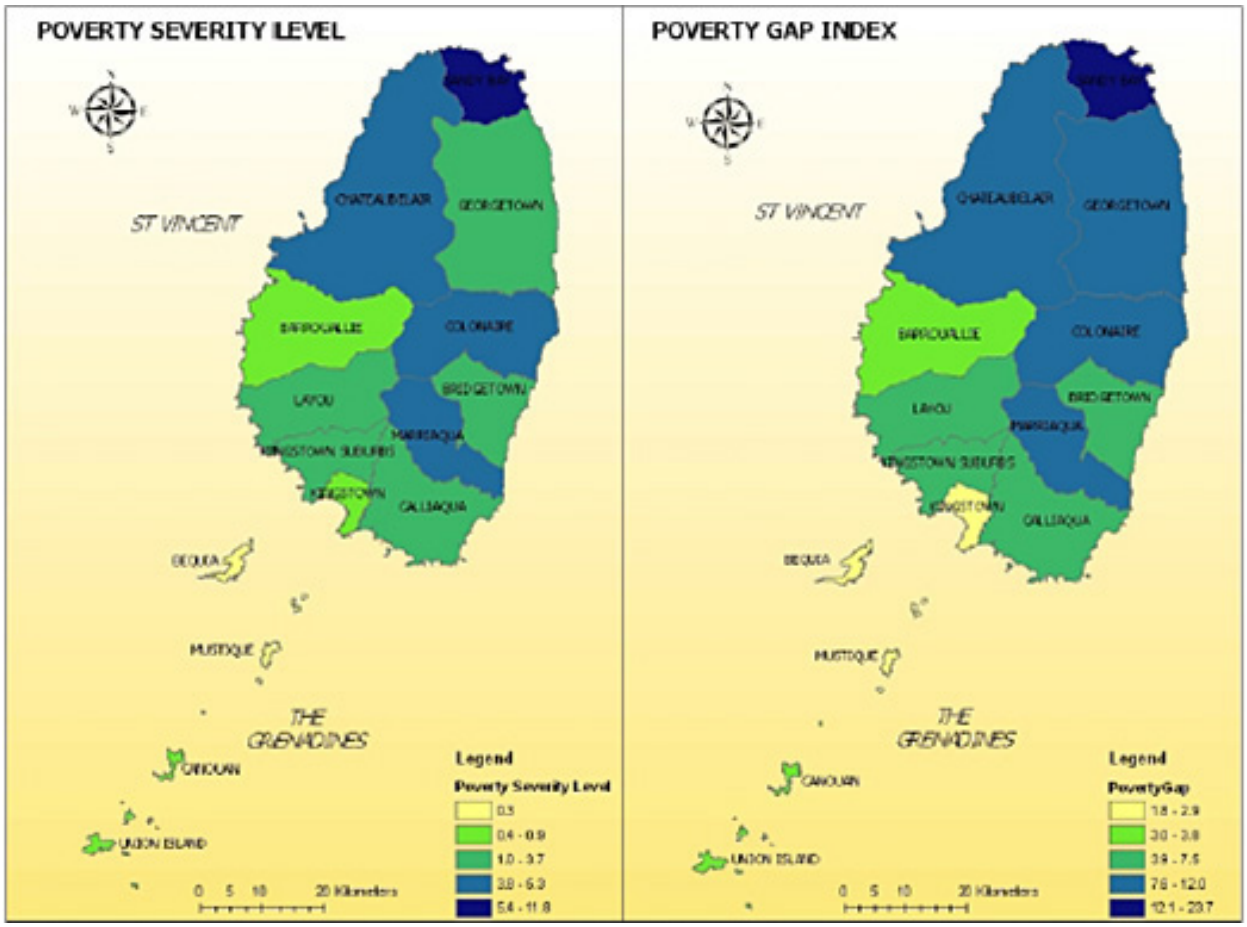
Table 10: Number and Type of Farmers in Owia

Type	Number
Total Registered Farmers	163
Male	96
Female	67
Youth farmers	21
Livestock	83

5.3 POVERTY LEVELS

Figure 12 (below) from the Survey of Living Conditions/Country Poverty Assessment (KAIRI, 2007/2008) shows that Owia experiences the highest level of poverty ranking in the island.

Figure 12: Poverty Levels by Census District *(Source: Kairi, 2007/2008)*



6 Vulnerability and Hazard Profile

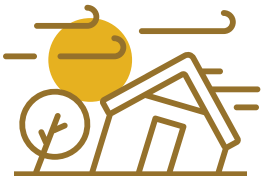
St. Vincent is exposed to high levels of risk to meteorological (high wind, extreme rainfall, hurricanes, and drought) and geophysical (earthquakes, volcanic eruptions, tsunamis) hazards, which have significant negative impacts on economic development, fiscal stability, and communities. Some of these natural hazards are being exacerbated by the adverse impacts of climate change, which put increased stress on coastal investments, national infrastructure, water availability, and livelihoods, especially of the poor and vulnerable groups. Of the disasters regularly affecting SVG, hydro-meteorological (hydromet) events occur most frequently and represent a significant source of average annual losses, which from 1996 to 2015 were estimated to be around 1.2 percent of GDP (ranked 16th globally) (Kreft et al. 2015). The trough in December 2013 resulted in extensive physical damage and economic losses estimated at approximately US$108.4 million (15 percent of GDP). The trough hit at a time when SVG was just showing signs of recovery from the global financial crisis, and the natural disasters exerted further strain on an already challenging fiscal context.

The island of St Vincent lies in the hurricane belt, and is susceptible to both strong windstorms and heavy rains. Two-thirds of the island is forested (FAO, 2010). As noted in the 2013 Caribbean Catastrophe Risk Insurance Facility (CCRISF) report on the St Vincent and the Grenadines, the SVG islands are prone to moderate levels of a variety of hazards.

The islands lie towards the southern end of the main Atlantic hurricane belt although the complex topography can increase the risk for stronger winds, heavy rains and landslides.

The low-lying Grenadines are exposed to storm surge and wave hazards. Earthquake hazards are moderate, but there are significant volcanic hazards from both the Soufrière volcano on St Vincent and from Kick 'Em Jenny in the southern Grenadines, which is also a potential tsunami source. St Vincent and the Grenadines has limited economic diversity, with tourism important in the Grenadines where there is moderate exposure to wave and storm surge hazards.

Since bananas are the main export product from St Vincent, all farming is prone to the impact from high winds and heavy rain. Landslides commonly hamper communications on the island. Several volcanic eruptions in the past 2 centuries have killed many people and devastated areas in the north of the island. While this report is being finalized, St. Vincent and the Grenadines is experiencing a series of explosive volcanic eruptions.



6.1 HURRICANES

Although St Vincent lies quite far south in the Lesser Antilles, hurricanes are still common, and the rugged topography of the island and low-lying nature of the Grenadines makes the impact of even moderate hurricanes potentially serious. Hurricanes Janet (1955), Allen (1980), Hurricane Lenny (1999), and Hurricane Tomas (2010). produced severe hurricane winds (greater than 110 mph) on St Vincent, although damage reports for these events are not available.

6.2 FLOODING

The islands are also vulnerable to flash flooding. The extreme topography coupled with short (6 km) distances from the coast to the center mountain ridge creates a hydraulic system where stream concentration times are short (nominally 30 minutes). High rainfall, such as rain associated with a thunderstorm, quickly concentrates in stream channels, promoting rapid flooding. In this type of system, early warning of an actual flood event cannot be accomplished by monitoring stream levels because once they rise, it is too late. Any warning would need to be based on rainfall observations to trigger an alert.

6.3 LANDSLIDES, STORM SURGE AND DROUGHT

The Caribbean Handbook on Risk Information Management[6] (CHARIM) also notes that Landslides, particularly on the larger islands, are a significant hazard and the risk is increased during the seasonal rains. Coastal flooding is a major concern particularly relating to storm surge and high wave action. The Grenadines are more susceptible to drought.

Given its geographic location, small land mass, and topography, the entire nation is highly vulnerable to natural disasters. Because of its volcanic origin, steep slopes dominate the islands' landscape and tilted volcanic layers define the geology and soils (De Graff 1988, cited in Westen, C.J. and Sijmons, Koert. 2016). It has more than 40 rivers and tributaries, which originate in the central mountains and discharge to the Caribbean Sea or the Atlantic Ocean (DLN Consultants 2006).

The combination of tropical temperatures and abundant rainfall leads to slope instabilities and the high potential for landslides. In 1988, De Graff produced an analysis of landslide susceptibility (Figure 14) and during the study identified about 475 landslides, covering about 1 percent of the country's surface. The most common type of landslides in SVG are debris avalanches, which are defined as rapid movements of an unconfined mass of soil and rock falls. Depending on the topography, another common type of landslide is debris flow, for which the movement of debris is confined to a channel. In SVG, debris flow is usually associated with river channels in the mountainous sections of the country. Debris flows can travel long distances, particularly when river flooding has occurred. They approach quickly and exhibit a considerable destructive force. Volcanic eruptions have affected the country in 1789, 1812, 1902, 1971, and 1979 and again in 2021. With the on-going eruption of La Soufriere, the combination of rainwater, debris and volcanic ash can form into lahar and can continue to pose as significant risks for months or even years to come.

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[6] http://www.charim.net/stvincent/information

Figure 13: Soil erosion map of St. Vincent. *(Source; Government of SVG 2011.)*

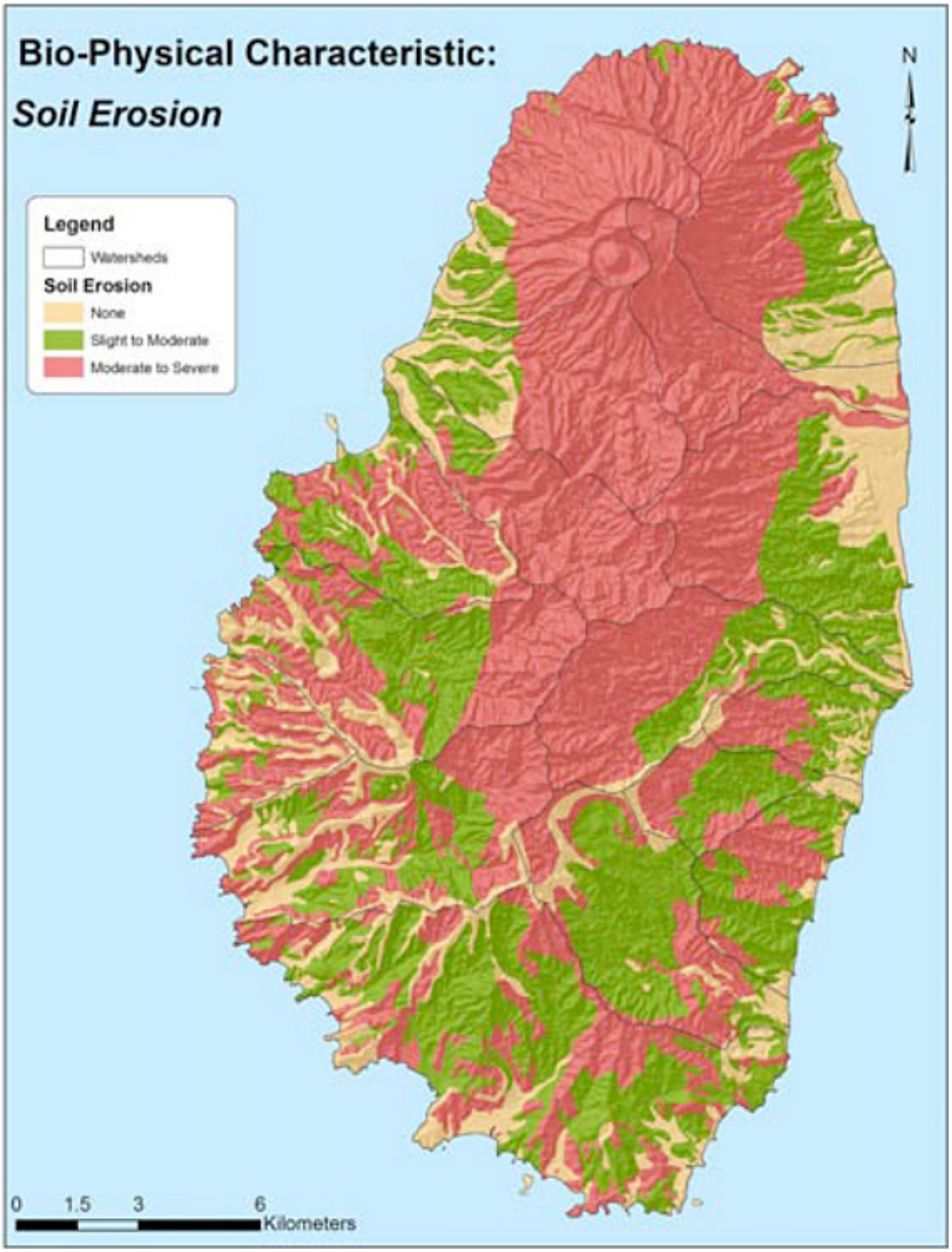
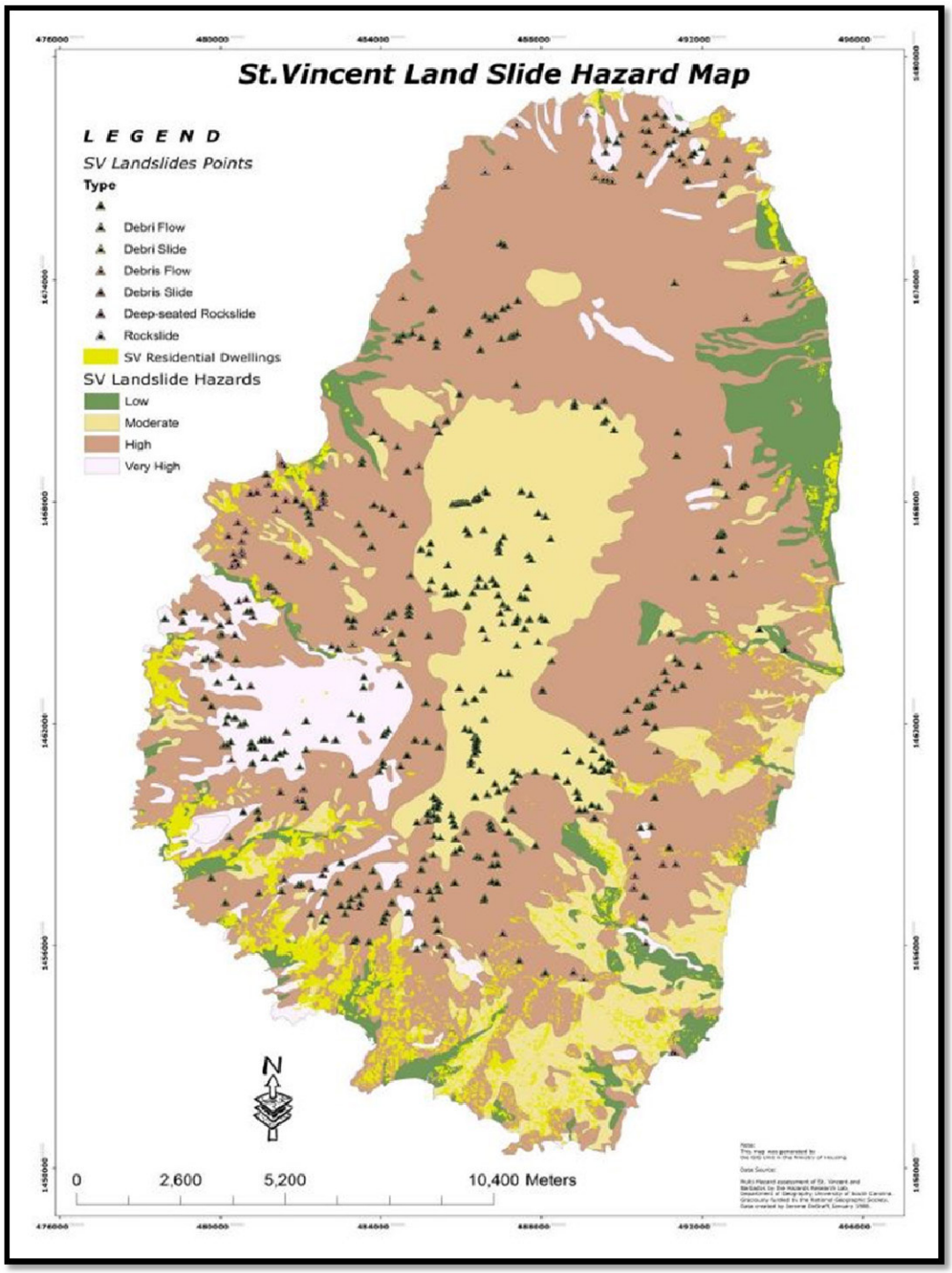


Figure 14: Landslide Hazard Map – St. Vincent *(Source, cited in Joslyn, 2008)*



6.4 EARTHQUAKES

An earthquake is the sudden release of stored energy in the earth crust. Most earthquakes occur along a fracture within the earth, called a fault. The shaking caused by this sudden shift is often very small, but occasionally large earthquakes produce very strong ground shaking. It is this strong shaking and its consequences – ground failure, landslides, liquefaction – that results in damaged buildings and structures and often results in negative impacts on the economy. Earthquake magnitude and intensity are measured on two different scales, the Richter Magnitude scale for source magnitude (the amount of energy released by the event) and the Modified Mercalli Intensity[7] (MMI) scale for the amount of shaking felt at a specific place on the ground.

St Vincent and the Grenadines lie in a relatively quiet zone of the Lesser Antilles island arc. Earthquakes are more common to both the north and south. However, there are four instances of shaking intensity (MMI[8]) at category VII or VIII (potentially damaging) in the past 200 years, although actual damage reports for these events are not readily available (See Figure 17). Prior the current set of eruptions, the last major volcanic eruptions, in 1979 and 1902, produced felt earthquakes as well as more devastating explosions and pyroclastic flows in valleys around the north of the island.

Figure 15: Mercalli Intensity Scale Categories *(Source: https://alltechinc.blogspot.com/2031/10/understanding-intensity-scale-and-sense.html)*

I. Instrumental
Not felt by many people unless in favorable conditions

II. Weak
Felt only by a few people at best, especially on the upper floors of buildings. Delicately suspended objects may swing.

III. Slight
Fell quite noticeably by people indoors, especially on the upper floors of buildings. Many to do not recognise it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.

IV. Moderate
Felt indoors by many people, outdoors by a few people during the day. At night, some awakened.

V. Rather Strong
Felt outside by most, may not be felt by some people in non-favourable conditions. Dishes and windows may break and large bells will ring. Vibrations like train passing close to house.

VI. Strong
Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken; books fall off shelves; some havy furniture moved or overturned; a few instances of fallen plaster. Damage slight.

VII. Very Strong
Difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well-built orginary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by people driving motor cars.

VIII. Destructive
Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly builts structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.

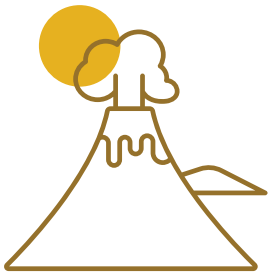
IX. Violent
General panic; damage considerable in poorly designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

X. Intense
Some well build wooden structures destroyed; most masonry and frame structures destroyed with foundation. Rails bent.

XI. Extreme
Few, if any masonry structures remain standing. Bridges destroyed. Rails bent greatly.

XII. Cataclysmic
Total destruction - everything is destroyed. Lines of sight and level distorted. Objects thrown into the air. The ground moves in waves or ripples. Large amounts of rock move position. Landscape altered, or leveled by several meters. In some cases, even the routes of rivers are changes.

[7] Modified Mercalli Intensity scale
[8] Modified Mercalli Intensity Scale developed from Giuseppe Mercalli's Mercalli intensity scale of 1902, is a seismic intensity scale used for measuring the intensity of shaking produced by an earthquake. It measures the effects of an earthquake at a given location, distinguished from the earthquake's inherent force or strength as measured by seismic magnitude scales (such as the "Mw" magnitude usually reported for an earthquake). While shaking is caused by the seismic energy released by an earthquake, earthquakes differ in how much of their energy is radiated as seismic waves. Deeper earthquakes also have less interaction with the surface, and their energy is spread out across a larger volume. Shaking intensity is localized, generally diminishing with distance from the earthquake's epicenter, but can be amplified in sedimentary basins and certain kinds of unconsolidated soils. https://en.wikipedia.org/wiki/Modified_Mercalli_intensity_scale



6.5 VOLCANIC HAZARDS

According to the Seismic Research Center (SRC) of the University of the West Indies (UWI), there are 19 active volcanoes in the Eastern Caribbean with every island from Grenada to Saba directly exposed to volcanic eruption threats. The islands of Grenada, St. Vincent, St. Lucia, Martinique, Dominica, Guadeloupe, Montserrat, Nevis, St. Kitts, St. Eustatius and Saba have active volcanic centres. On the other hand, non-volcanic islands such as Anguilla, Antigua, Barbuda, Barbados, British Virgin Islands, most of the Grenadines and Trinidad & Tobago are close to volcanic islands and are also exposed to volcanic hazards such as severe ash fall and volcanically-generated tsunamis.

St. Vincent and the Grenadines is located in the southern section of a chain of volcanic islands which comprise the Lesser Antilles. It is an archipelagic State that forms part of the Windward Islands in the Southern part of the Caribbean and is surrounded by St Lucia to the North, Barbados to the East and Grenada to the South. The state covers a total land area of approximately 150.3 square miles (388 sq. km.) and a larger marine area including a shallow coastal shelf encompassing an area of approximately 690 square miles. The main island of Saint Vincent is 28 kilometers long and 15 kilometers wide. (source: SVG National Volcano Emergency Plan, 2021).

Topographically, St. Vincent is mainly defined by a backbone of volcanic mountains that stretch much of its length and rise northwards to an elevation of approximately 1,220 m above mean sea level where the La Soufriere volcano is located. The Soufriere is a strata-volcano, with an open summit crater of 1.6 km in diameter. Volcanologists have noted that volcanic activity can be quiet and effusive or violent and explosive, and the length of time that an eruptive episode persists can vary from a few minutes to weeks, months or even decades (source: SVG National Volcano Emergency Plan, 2021).

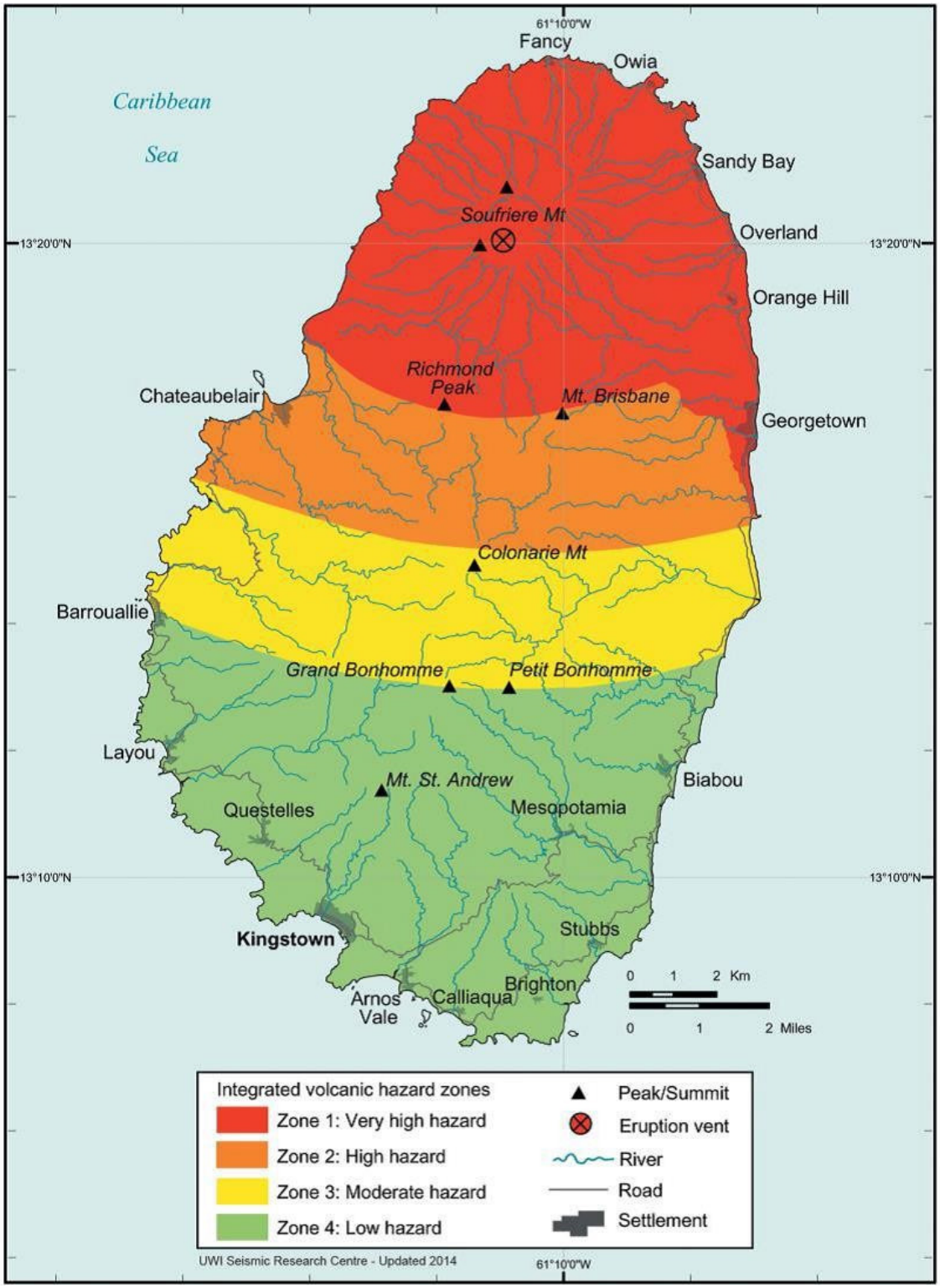
Figure 16 shows the various volcanic hazard zones for the whole island of St. Vincent and shows that Owia, which is in the Sandy Bay Census Division, is in the Red Zone.

In 1994, Robertson described volcanic vulnerability as a "measure of the susceptibility to loss expected due to a particular volcanic event. It is a measure of the possible magnitude of losses expected from a particular volcanic event (UNDRO, 1982)". Alexander (1991, cited in Robertson 1994), presented a conceptual equation for vulnerability in which it is a function of four factors:

- risk amplification (results of bad construction practice);
- risk mitigation (due to good construction practice);
- risk perception and an indirect cultural factor.

The Soufrière volcano, whose steep sides, poorly-consolidated bedrock and incised ravines (or 'gutters', Nanton, 2017, cited in Pyle, et.al. 2018) present a suite of ongoing hazards during periods of both quiescence and unrest (e.g. from sediment-charged flash floods and landslides).

Figure 16: Volcanic Hazard Zones *(Source: NEMO 2021)*



As described by Pyle et.al., (2018), the summit of the Soufrière comprises a complex of intersecting craters of different ages, suggesting that it has experienced repeated eruptions during its history, most recently in 2021. In addition to 2021 activity, there have been at least five eruptions since 1718, which mean that St Vincent is – by this measure – the most active subaerial volcano in the Caribbean. Eruptions over the past 300 years have occurred against the backdrop of an evolving social, economic and political environment.

According to Robertson (1994), throughout its recorded history (post-1718), the Soufriere volcano has exhibited two contrasting styles of activity, a quiet, effusive versus a violent explosive style. Examination of the stratigraphy suggest that activity during the pre-historic period varied only slightly, with one major period of very cataclysmic Plinian type activity (Rowley, 1978a; Sigurdsson, 1981; Robertson, 1992 – cited in Roberston, 1994).

6.5.1. DIFFERENT TYPES OF VOLCANIC HAZARDS

The 2021 draft St. Vincent and the Grenadines: Volcano Emergency Plan and Standard Operating Procedures identifies the different types of primary volcanic hazards as follows:

- Pyroclastic flows and surges from dome collapses
- Pyroclastic flows and surges from the collapse of the crater walls
- Pyroclastic flows and surges from explosive column collapse
- Lateral Blasts Explosions with ash and rock fallout
- Mudflows or Lahars

Table 11: Effect of the 1979 volcanic eruption on some aspects of the human and natural resources of St. Vincent and the Grenadines. *(Source: Robertson 1994)*

Human and natural resource affected	Costs (USD)
Maintenance of evacuees housed in evacuation camps	39,507 per day
Maintenance of evacuees housed outside evacutation camps	5,269 per day
Operation of public transport involved in the evacuation exercise	3,160
Rehabilitation of schools, community centres and churce buildings used as evacuation camps	79,013
Repairs to the national housing stock	2,130,069
Repairs to the national road network	4,213,994
Rehabilitation of agriculture	2,129,646
Damage to the main crop (bananas)	50-60% loss of entire crop

Table 12 presents these hazards and the types of impacts they can be expected to cause.

Table 12: La Soufriere Volcano Impact Matrix *(Source: NEMO 2021)*

Hazard	Area Affected (Radial distance from vent, km)	Immediate Risk	Ongoing Risk	Anticipated Loss	Mitigation	Recovery Period following Cessation of Activitty
Earthquake*	5-8km	Low	Low	Small	Not applicable	Not applicable
Lava flows and domes*	1-3km	High	Low	High	Moderate	Several months to years
Pyroclastic flows and surges*	5-7km	High	High	Extreme	None	Several weeks to several months
Mudflows*	5.10km	High	High	High	None	Several weeks to several months
Ballistic projectiles*	1-5km	Moderate	Moderate	Moderate	Minor	1 week to several months
Airfall Tephra*	1 to >10km	Moderate	Moderate	Low to Moderate	Moderate	1 week to several months
Volcanic gases	1-3km	Moderate	Moderate	Low	Minor to Moderate	Not applicable
Phreatic explosions	<4km	Moderate	Low	Low	None	Several weeks to several months
Landslides*	5-8km	Moderate	High	Moderate		Several weeks to several months
Laterally directed blasts and structural collapse	5-8km	Low	Low	High		Several weeks to several months
Lightning*	<7km	Low	Low	Low	None	Days to weeks
Tsunami	5 to >10km	Low	Low	Low	Moderate	Up to 1 – 2 days

*Events which are likely to be repeated over a period of time (days, weeks to months) following the initial event

The secondary volcanic hazards are:

- Ruptured water lines which can lead to flooding.
- Fires
- Contamination of water supply
- Respiratory ailments due to dust
- Visibility issues due to dust
- Ash clouds can contribute to airport closures.

Volcanic threats to livelihoods include:

- Livestock farming
- Arable farming
- Traditional farming
- Nature tourism (Waterfalls, Ecology)
- Beekeeping
- Major impact to critical facilities such as healthcare
- Major impact to factories and small businesses
- Fishing industry (Restricted access to sea, damage to jetties and inability to access fish storage locations)

Prior to the 2021 eruption, Roberston (1994) suggested that the 1979 eruption already had huge impact on human and economic life and forced major adaptation in the patterns of human life and activity on the island of St. Vincent. But he also noted that population growth and increasingly limited options means that people would continue to live in and develop areas of high risk from eruptions at the Soufriere volcano. “Future volcanic eruptions should therefore be expected to have a greater effect socially, than has been the case in the past,” Robertson suggested.

The social impact of past eruptions, such as the 1979 eruption, have varied from disruption of family life due to evacuation and relocation, to migration of entire families to foreign countries. In addition, mental and emotional stress was placed upon the evacuated population who were accustomed to more expansive personal space. The social impacts have varied from disruption of family life due to evacuation and relocation, to migration of entire families to foreign countries. In addition, mental and emotional stress was placed upon the evacuated population who were accustomed to more expansive personal space.

Fortunately, even prior to the 2021 eruption, as Robertson noted in 1994, “the Soufriere volcano features prominently in the minds of most Vincentians” The degree to which this affects their actions varies largely with their economic status, recollection of past events, proximity to the volcano and knowledge of volcanic processes. The manner in which the volcanic threat is perceived is well illustrated by the fact that during all of the historic eruptions, people living within the areas of highest risk (north of the Rabacca and Wallibou rivers), begun moving away from the volcano prior to any formal evacuation exercise ordered by the governing authorities.

In 2021, the Soufriere volcano erupted once again. The impacts, damages and losses are discussed in the next section on vulnerability and risk.

6.6 HAZARD VULNERABILITY PROFILE OF OWIA

A hazard is defined as a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Fancy has several environmental challenges that continue to be a daily threat to the natural assets of the community. If these are not urgently addressed, they will continue to negatively affect the environment within the community. Some of the environmental challenges that Fancy face are landslides, flooding, hurricanes, droughts, pests and diseases, too, farmers also shared that they are prone to predators, stray dogs in particular, that would eat their animals.

Owia is also located squarely in the La Soufriere Volcano Hazard Zone as well as being located in the severe zone for Landslide Hazards (see Figures 14 and 16 above).

Landslides, storm surges and flooding were the three main natural hazards cited by residents shown in Table 13. Flooding was identified as the predominant hazard as the flooding and storm surges normally occur during the hurricane season. The overall impact of the flooding, especially when accompanied by landslides was seen as significant given the loss of homes and crops. Although the volcano last erupted in 1979, it is still seen as a potential threat to the community as older residents recall the disruptions it caused to families and livelihoods then.

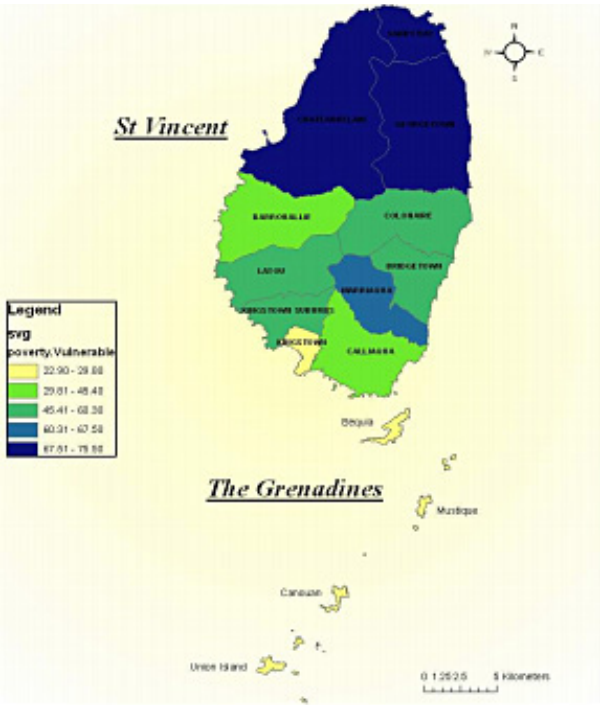
It is important to note that residents of Owia also saw volcanic eruptions as a serious hazard, even though the LBA was done prior to the 2021 eruption.

Table 13: Owia Hazard Matrix

Hazard	Year	Season (When)	Location	Economic and Financial Losses (1-5)	Number of persons affected (1-5)	Overall Impact on lives and livelihoods
Landslides	Yearly	Oct-Nov	Cross Side Narrny Gutter	2	4	• Loss of livestock • Blockage of the roads
Flooding	2013-2016	• Dec 2013 • Nov 2016	Bottom Town	5	5	• Loss of livestock • damage to properties • Food Spoilage • loss of water • Road Blockage
Storm Surge	Yearly	Once every three months	• RockGutter • Bottom Town • Fisheries	4 5	1 4	• One tub of clothing washed away
Volcano	Once every forty Years	April 1979	• Island • Happy Hill • High Woods			• Loss of forest • damage to homes • soil enrichment • Rock Formation

1 minor ------ 5 extreme

Figure 17: Vulnerability by Census Division *(Kairi, 2007/2008)*



6.7 VOLCANO READY PROJECT AND REDUCING VULNERABILITY

The Volcano-ready Communities Project in St. Vincent, which is financed by the CDRRF and is being implemented by the Seismic Research Centre (SRC), University of the West Indies, St. Augustine, Trinidad and Tobago. This project seeks to reduce vulnerability to the multi-hazard environment of the Soufriere Volcano through a combination of activities designed to enhance community early warning procedures, increase adaptive capacities, strengthen awareness, and enhance response capacities. The Project comprises four components which seek to increase the resilience of the 12 communities in St. Vincent and the Grenadines to volcanic and other natural hazard events and climate change. The communities have been grouped into two and they are (a) Windward communities comprising Fancy, Owia, Sandy Bay, Overland and Big Level, South Rivers, Park Hill, Colonaire, and (b) Leeward communities comprising Fitz Hughes, Chateaubelair, Rose Hall, and Spring Village.

The project consists of three (3) main components:

Component 1
Increased Community Volcano and Other Natural Hazard Readiness;

Component 2
Increased Knowledge and Awareness of Volcano and Multi-Hazards Risk Reduction and Climate Change Impacts in the Beneficiary Communities; and

Component 3
Enhanced Adaptive Capacity. A fourth component covers project management and administration.CDRRF Volcano Ready Project

The proposed project is a solid example of effective partnership engagement and coordination. Strong partnerships with Red Cross and Community Development are particularly worth noting. Even though the initial consultation with the communities was over a year ago, all the communities visited during the Rapid Community Climate Vulnerability Assessment (RCCVA) mission were aware and in support of the proposed initiative.

When the RCCVA was conducted in 2016, it was evident that NEMO had a strong working relationship with the proposed communities and a detailed understanding of the social and environmental challenges. Relationships with a broad range of stakeholders in government, civil society, and the private sector ensure a holistic approach to the implementation of the project. This collaborative approach will also facilitate the sharing of knowledge and skills which could lead to greater impacts.

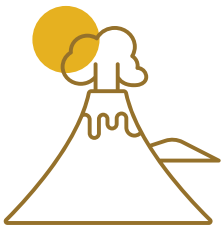
To also seek to effectively incorporate climate change in the proposed initiative, it will be important to broaden the focus from the volcanic hazards to the "volcanic environment" in general. . In other words, to determine how the presence of the volcano creates other hazards that can interact with or be exacerbated by climate-related hazards.. For example, due to the steep slopes, landslides and rates of flooding could increase under future changes in climate. The focus should be on building general resilience of the targeted communities rather than trying to build resilience to a specific hazard. The rationale is that increasing the resilience of particular parts of a community to specific disturbances may result in resilience lost in other ways.

6.7.1. FINDINGS FROM THE 2016 RAPID COMMUNITY CLIMATE VULNERABILITY ASSESSMENT (RCCVA)

During the focus group discussions (FGD) held in September 2016 across the Volcano Ready Communities, the participants identified agriculture as the most predominant livelihood activity in their communities. Problems were identified such as poor access to markets that limit income security at all times, and thereby undermine resilience in the face of hazards. Unemployment and constrained livelihood opportunities in the north of the island are therefore accentuating underlying vulnerability to disasters. Addressing the high level of uncertainty and problems related to agriculture will be key to resilience-building efforts at the community level. Other livelihoods are also under pressure as unemployment is widespread in these communities.

6.7.1.1. Finding 1

The consensus from the focus group discussions is that disaster impacts generally affect women more or in a worse way. In Fancy, the female farmers have organized themselves into a group (Fancy Ladies) to offset negative impacts on their livelihoods. Women are particularly involved with livestock production (sheep, goats, pigs). It will be important to consider these gender dynamics during the implementation of the project.



6.7.1.2. Finding 2

While La Soufriere Volcano is a hazard that can have a direct impact on the entire island as well as in the neighbouring islands, the proposed communities are also exposed to floods, hurricanes, droughts, landslides and coastal erosion. These are also major concerns. The most recurrent events are hurricanes and tropical storms. Given the island's topography, the types of construction and the places where these have been built, frequently in unstable hill areas, rain and wind often cause severe damages to buildings, infrastructure and agriculture. Landslide is also a major challenge facing the communities due to the steep topography, friable soils, and localized rainfall events. The situation is amplified in some areas by poor construction and land management practices which often lead to increased sedimentation and degradation of the marine environment. The proposed multi-hazard approach will ensure that a holistic approach is taken to reduce exposure to multiple stressors and shocks.

6.7.1.3. Finding 3

During the focus group discussions, the participants indicated the use of savings as the most typical coping strategy. Strong support from community members was also cited as a key coping strategy. The recovery process, or what people do after a hazardous event has impacted their household, seems to be based

on a combination of factors: continuing with daily routines and activities, accessing assistance from the state, and using their savings or relying on their families and friends. The fact that the island is prone to the impact of multiple hazards means that recovering is made more difficult by the possibility that another hazard might impact soon after. For example, after the eruption in 1979, Hurricane Allan struck the island in 1980 and caused a lot of damage to crops that had been recently planted. Other problems, such as plant disease also impact farmers.

6.7.1.4. Finding 4

The main challenges facing the communities include:

- Marketing of agricultural produce (farmers are primarily dependent on Traffickers[9])
- Land space and tenure - access to arable land are limited in most of the proposed communities
- Pest & Plant disease: Farmers indicated that they had experienced an increase in the frequency of pests and plant disease
- Drought and heavy rains: Drought was identified as 'silent' stressor while the increased frequency of heavy rain is a major concern
- Extension service: Farmers expressed the need for improvement in extension services to their communities
- Quality of seeds and planting material:
- Praedial Larceny
- Landslides
- Social cohesion: strong but formal groups are relatively weak

6.7.1.5. Finding 5

The success of the Community Early Warning Systems (CEWS) will be dependent on the strength of the community groups. While groups exist in most of the proposed communities, their capacities are limited and will need strengthening to effectively support the implementation. Of particular importance will be the building of awareness of local income-generating opportunities. In general, the communities are not sufficiently informed about national plans for coping with geologic hazards and do not have adequate resources, training and information with which to mitigate their impact. Building community adaptive capacity to volcanic eruptions can be tricky. The indicators and outcomes should be revised to focus on the volcanic environment in general and to capture and address the multi-hazard risks facing the targeted communities.

[9] Traffickers" are not to be confused with illegal trafficking. This term is the popular term to define persons who are legally allowed to buy and sell produce. In other countries, they are sometimes referred to as "higglers".

7 The 2021 Volcanic Eruption

In December, 2020, the La Soufriere Volcano became active once again and on April 9th 2021 it erupted explosively.

The explosive volcanic activity prompted mass evacuation of persons from communities in the red and orange zones (Figure 18) – the northeast and northwest of the island. Numerous farmers were been displaced from their communities and relocated to southern communities.

Late in April 2021, once the eruptions had subsided enough for Damage and Loss Assessments Teams (DaLAT) to formed and assessments to be conducted of the infrastructure and crop damage, Detailed Agriculture Damage Assessment (DADA) reports were prepared. This LBA report includes the data and information that were collected from these preliminary reports.

The Eruption precipitated a mass evacuation from communities in the northeast and northwest of the country with over 13,000 persons moving from the hazard zones to public and private dwelling within the safer zones in the south of the country. Numerous farmers have been displaced from their communities and relocated to southern communities in the process. Extensive acreages of crops have been lost or damaged as a direct and or indirect consequence of the eruptions or from secondary reasons related to the abandonment of the crops and free roaming animals let loose by farmers before they evacuated.

The eruptions both directly and indirectly affected agriculture, forestry, fishing and agriculture infrastructure throughout the country resulting in damages and losses ranging from as low as 7% in the Green Zone to 100% in a substantial number of commodities in the Red and Orange Zones.

Table 14 summarizes the estimated damage and loss by sectors. However, the Assessment team have suggested that while their preliminary report estimated a loss of $54,000,000 (USD $20,000,000) in general agriculture infrastructure, “the full extent of the damage and loss will need to be comprehensively assessed and may result in much higher estimates.”

With respect to the livestock sector, the damage and loss was initially estimated to be low as farmers were advised to let their animals loose. However, “with the limited availability of feed and water in a highly ash contaminated environment, the prediction was that indirect losses in animals will increase ranging from 10 to 30 percent due to health and other complications.” Overall, the preliminary DADA report indicates the estimated value of total damage and loss sustained by the crops, livestock, apiculture, fisheries and forestry sectors is $142,628,402.00.

A further cropland damage assessment done on April 26 2021 by Ghosh et.al., and employed Normalized Difference Vegetation Index (NDVI)[10] analysis to assess the magnitude of ash damage to crop and vegetative cover and found that the changes in NDVI values are much higher in the surrounding areas of the volcano.

[10] Normalised Difference Vegetation Index (NDVI) “quantifies vegetation by measuring the difference between near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs) https://gisgeography.com/ndvi-normalized-difference-vegetation-index/

Table 14: Crop Damage and Loss Assessment

Crop type	Acrenge in production	Yield/acre (lbs)	Expected Yield (Lbs)	Estimated Damage (acrenge)	Cost of Production/ acre	Estimated total Value of damage	Farm gate price/Lb	Total Value of Losses	Estimated total Damage and Loss EC$	Estimated total Damage and Loss US$
Arrowroot	98	9,000	882,000	98	$5,700.00	$558,600.00	$1.00	$882,000.00	1,440,600.00	533,555.56
Asparagus	5	8,000	40,000	0.2	$3,705.00	$741.00	$10.00	$16,000.00	16,741.00	6,200.37
Beet	1.5	4,000	6,000	0.5	$4,268.00	$2,134.00	$1.00	$2,000.00	4,134.00	1,531.11
Broccolli	1.5	7,000	10,500	1	$7,245.00	$7,245.00	$4.00	$28,000.00	35,245.00	13,053.70
Cabbage	20	12,000	240,000	12	$7,065.00	$84,780.00	$2.00	$288,000.00	372,780.00	138,066.67
Carrots	60	8,000	480,000	54	$7,685.00	$414,990.00	$2.50	$1,080,000.00	1,494,990.00	553,700.00
Cassava	80	25,000	2,000,000	68	$7,532.00	$512,176.00	$0.90	$1,530,000.00	2,042,176.00	756,361.48
Cauliflower	11	9,000	99,000	6	$6,885.00	$41,310.00	$6.00	$324,000.00	365,310.00	135,300.00
Celery	3	6,000	18,000	3	$6,073.00	$18,219.00	$3.25	$58,500.00	76,719.00	28,414.44
Chive	66	8,000	528,000	59	$8,054.00	$475,186.00	$1.75	$826,000.00	1,301,186.00	481,920.74
Corn	48	12,000	576,000	7	$4,783.00	$33,481.00	$1.50	$126,000.00	159,481.00	59,067.04
Cucumber	35	18,000	630,000	35	$6,336.00	$221,760.00	$1.00	$630,000.00	$51,760.00	315,466.67
Dasheen	400	14,000	5,600,000	100	$4,166.00	$416,600.00	$0.80	$1,120,000.00	1,536,600.00	569,111.11
Eddoes	550	11,000	6,050,000	138	$4,100.00	$565,800.00	$1.00	$1,518,000.00	2,083,800.00	771,777.78
Eggplant	6	15,000	90,000	6	$6,853.00	$41,118.00	$2.00	$180,000.00	221,118.00	$1,895.56
Flavour pepper	8	15,000	120,000	1	$9,342.00	$9,342.00	$2.50	$37,500.00	46,842.00	17,348.89
Ginger	120	20,000	2,400,000	11	$8,320.00	$91,520.00	$3.00	$660,000.00	751,520.00	278,340.74
Hot Pepper	5	15,000	75,000	1.5	$8,922.00	$13,383.00	$3.00	$67,500.00	$0,883.00	29,956.67
Lettuce	8	3,000	24,000	8	$7,712.00	$61,696.00	$3.50	$84,000.00	145,696.00	53,961.48
Melons	8	20,000	160,000	8	$6,416.00	$51,328.00	$3.00	$480,000.00	531,328.00	196,788.15
Ochro	12	6,000	72,000	1	$5,206.00	$5,206.00	$2.00	$12,000.00	17,206.00	6,372.59
Parsley	2	4,000	8,000	2	$6,277.00	$12,554.00	$6.75	$54,000.00	66,554.00	24,649.63
Pak-choi	3	12,000	36,000	3	$5,955.00	$17,865.00	$2.00	$72,000.00	$9,865.00	33,283.33
Peanut	32	3,000	96,000	22	$5,525.00	$121,550.00	$8.00	$528,000.00	649,550.00	240,574.07
Pigeons Peas	20	10,000	200,000	14	$4,914.00	$68,796.00	$7.00	$980,000.00	1,048,796.00	388,442.96
Pumpkins	13	10,000	130,000	13	$5,039.00	$65,507.00	$1.00	$130,000.00	195,507.00	72,410.00
Radish	1	8,000	4,000	0.5	$4,268.00	$2,134.00	$3.50	$14,000.00	16,134.00	5,975.56
Sorrel	8	5,000	40,000	6	$5,198.00	$31,188.00	$3.00	$90,000.00	121,188.00	44,884.44
Squash	5	15,000	75,000	5	$5,303.00	$26,515.00	$3.16	$237,000.00	263,515.00	97,598.15
String Beans	8	5,000	40,000	4	$4,478.00	$17,912.00	$2.20	$44,000.00	61,912.00	22,930.37
Sweet Pepper	55	7,000	385,000	33	$5,683.00	$187,539.00	$4.00	$924,000.00	1,111,539.00	411,681.11
S Potatoes	100	8,000	800,000	80	$2,965.00	$237,200.00	$1.50	$960,000.00	1,197,200.00	443,407.41
Tannia	150	9,000	1,350,000	45	$5,983.00	$269,235.00	$2.50	$1,012,500.00	1,281,735.00	474,716.67
Tomatoes	73	15,000	1,095,000	66	$11,417.00	$753,522.00	$3.00	$2,970,000.00	3,723,522.00	1,379,082.22
Turmeric	8	34,000	272,000	4	$10,043.00	$40,172.00	$1.50	$204,000.00	244,172.00	90,434.07
Water Melons	15	20,000	300,000	15	$6,416.00	$96,240.00	$2.20	$660,000.00	756,240.00	280,088.89
Other Yam	8	12,000	96,000	7	$7,883.00	$55,181.00	$4.00	$336,000.00	391,181.00	144,881.85
P Yam	40	8,000	320,000	36	$9,879.00	$355,644.00	$4.00	$1,152,000.00	1,507,644.00	558,386.67
White Yam	110	12,000	1,320,000	99	$7,883.00	$780,417.00	$4.00	$4,752,000.00	5,532,417.00	2,049,043.33
Yellow Yam	8	8,000	64,000	7	$8,159.00	$57,113.00	$4.00	$224,000.00	281,113.00	104,115.93
Avocado	123	9,000	1,104,000	49	$2,209.00	$108,241.00	$0.80	$705,600.00	$13,841.00	301,422.59
Banana	593	20,000	11,854,800	534	$11,340.00	$6,055,560.00	$0.92	$9,525,600.00	15,881,160.00	5,881,911.11
Breadfruit	137	24,500	3,352,000	55	$1,889.00	$103,895.00	$2.00	$5,390,000.00	5,493,895.00	2,034,775.93
Breadnut	14	15,000	211,800	6	$1,889.00	$11,334.00	$3.00	$540,000.00	551,334.00	204,197.78
Carambola	15	9,000	135,000	6	$2,268.00	$13,608.00	$2.00	$216,000.00	229,608.00	$5,040.00
Christophene	12	2,000	24,000	6	$2,851.00	$17,106.00	$1.96	$23,520.00	40,626.00	15,046.67
Clove	4	8,000	28,000	1	$1,900.00	$1,900.00	$25.00	$40,000.00	401,900.00	148,851.85
Cocoa	540	5,000	2,700,000	405	$2,500.00	$1,012,500.00	$1.50	$6,075,000.00	7,087,500.00	2,625,000.00
Coconut	1500	15,000	22,500,000	1350	$1,689.00	$2,280,150.00	$0.50	$20,250,000.00	22,530,150.00	$,344,500.00
Golden apple	116	21,000	2,437,000	17	$2,209.00	$37,553.00	$1.00	$714,000.00	751,553.00	278,352.96
Grapefruit	10	20,000	200,000	1	$2,028.00	$2,028.00	$1.00	$40,000.00	42,028.00	15,565.93
Guava	24	24,000	576,000	5	$2,099.00	$10,495.00	$1.00	$240,000.00	250,495.00	92,775.93
Jujubee	5	24,000	112,686	3	$2,268.00	$6,804.00	$3.00	$432,000.00	438,804.00	162,520.00
Lemon	5	18,500	93,848	0.5	$1,288.00	$644.00	$2.50	$46,250.00	46,894.00	17,368.15
Limes	12	18,500	222,000	2	$1,288.00	$2,576.00	$4.00	$296,000.00	298,576.00	110,583.70
Mandarine	2	16,000	27,615	0.2	$1,288.00	$257.60	$1.00	$6,400.00	6,657.60	2,465.78
Mangoes	400	17,500	7,000,000	80	$1,969.00	$157,520.00	$0.50	$1,400,000.00	1,557,520.00	576,859.26
Nutmeg	40	800	32,000	4	$1,900.00	$7,600.00	$3.50	$22,400.00	30,000.00	11,111.11
Orange	15	27,000	405,000	1.5	$2,367.00	$3,550.50	$1.00	$81,000.00	$4,550.50	31,315.00
Passion Fruit	10	8,000	80,000	10	$2,841.00	$28,410.00	$2.50	$200,000.00	228,410.00	$4,596.30
Pawpaw	8	15,000	120,000	4	$5,334.00	$21,336.00	$2.00	$120,000.00	141,336.00	52,346.67
Pineapple	30	15,000	450,000	27	$7,098.00	$191,646.00	$8.00	$3,240,000.00	3,431,646.00	1,270,980.00
Plantain	700	30,000	21,000,000	595	$8,092.00	$4,814,740.00	$1.00	$17,850,000.00	22,664,740.00	$,394,348.15
Sapodilla	2	18,000	36,000	0.2	$1,900.00	$380.00	$2.00	$14,400.00	14,780.00	5,474.07
Soursop	14	20,000	287,000	2	$1,914.00	$3,828.00	$1.20	$96,000.00	99,828.00	36,973.33
Sugarapple	8	12,000	91,000	1	$1,914.00	$1,914.00	$1.00	$24,000.00	25,914.00	9,597.78
Tangerine	5	16,000	74,000	0.5	$1,288.00	$644.00	$1.00	$16,000.00	16,644.00	6,164.44
Waxapple	10	20,000	200,000	2	$1,900.00	$3,800.00	$1.00	$80,000.00	$3,800.00	31,037.04
TOTAL CULTIVATED	6,556.4					$21,722,919.10		$93,637,170.00	115,360,089.10	42,725,958.93
Notes										
163 acres of arrowroot planted. 65 acres (40 %) of arrowroot was harvested before the eruption and is concidered as the value of starch loss.										
15,000 coconuts/acre is estimated as 45,000 lbs										

Figure 18 shows that the entire region was affected after the eruption and clearly shows that the “changes in NDVI values are much higher in the surrounding areas of the volcano.”

Figure 18: Vegetation changes (NDVI) using Sentinel 2 after April 10th 2021 (left: Jan1-Apr9 and Right: Apr10-Apr26)

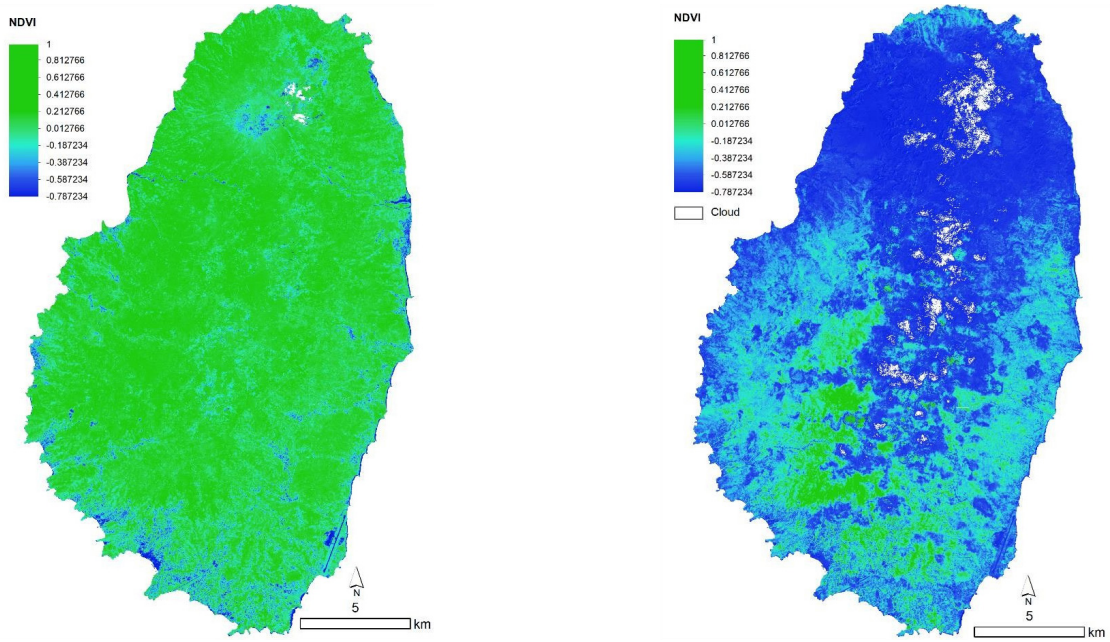
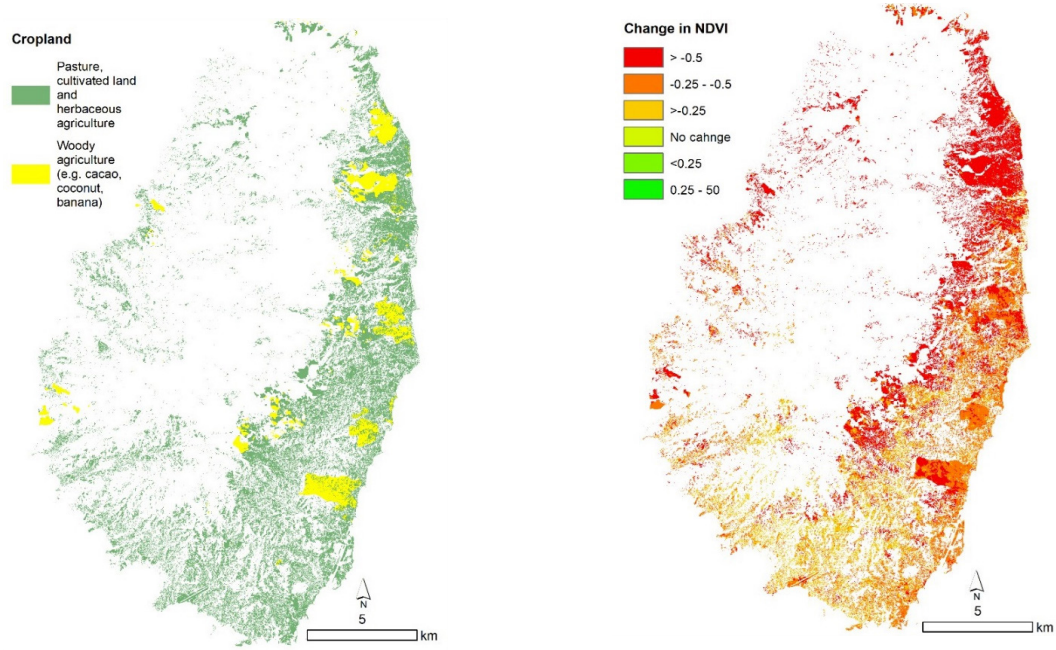


Figure 19 illustrates type of damage and changes in NDVI for specific types of land cover, including pasture, crops, and woody agriculture (tree crops).

Figure 19: NDVI Changes after 10th of April over the cropland area (left: Cropland, Right: NDVI change)



The NDVI analysis estimated that a total of 43% of all the cultivated lands in the island were severely impacted (roughly 3200 hectares), while 3000 hectares were partly affected and only 0.6% of lands were not affected.

Tables 15 and 16 provide further detailed estimated area of damage and the types of changes in vegetation and crop land in each of the hazard zones.

Table 15: Impacted cultivated land (ha) in Saint-Vincent Islands based on land cover, vegetation changes (NDVI), by hazard zones, land cover and administrative units

Hazard	Admin Units	Pasture, cultivated land and herbaceous agriculture	Woody agriculture (e.g. cacao, coconut, banana)	Impacted cultivated land (cropland)				
				Total	High	Medium	Low	No change
Red	Charlotte	1089.45	347.16	1436.61	1234.18	170.19	25.68	1.68
Red	Saint David	223.16	16.78	239.94	226.65	7.92	0.99	0.12
Orange	Charlotte	484.35	132.89	617.23	388.92	213.50	13.37	0.31
Orange	Saint David	196.55	6.28	202.83	138.05	56.54	6.52	0.06
Orange	Saint Patrick	5.21	0.00	5.21	2.77	1.87	0.33	-
Yellow	Charlotte	1017.34	127.19	1144.53	499.00	557.64	81.00	2.11
Yellow	Saint Andrew	1.19	0.00	1.19	0.30	0.27	0.45	0.01
Yellow	Saint David	7.58	0.00	7.58	2.81	4.03	0.43	0.04
Yellow	Saint Patrick	141.49	0.14	141.64	48.15	76.63	15.60	0.18
Green	Charlotte	1038.32	401.21	1439.53	448.07	795.65	184.73	6.12
Green	Saint Andrew	454.53	0.07	454.60	53.07	206.40	187.11	6.56
Green	Saint George	1680.96	4.06	1685.02	150.03	840.51	677.19	26.90
Green	Saint Patrick	83.37	56.65	140.02	48.39	73.63	15.53	0.67
	Total	**6424**	**1092**	**7516**	**3240**	**3005**	**1209**	**45**

Table 16: Impact severity (%) on cultivated land based on vegetation (NDVI) changes, administrative units and hazard zones

Hazard zones	Admin Units	Negative changes (based on NDVI) in cultivated areas (cropland)			
		High <-0.5	Medium -0.5 to -0.25	Low <-0.25	No change
Red	Charlotte	85.91	11.85	1.79	0.12
Red	Saint David	94.46	3.30	0.41	0.05
Orange	Charlotte	63.01	34.59	2.17	0.05
Orange	Saint David	68.06	27.88	3.21	0.03
Orange	Saint Patrick	53.26	35.89	6.42	-
Yellow	Charlotte	43.60	48.72	7.08	0.18
Yellow	Saint Andrew	25.62	22.31	38.01	0.83
Yellow	Saint David	37.10	53.18	5.71	0.52
Yellow	Saint Patrick	34.00	54.10	11.01	0.12
Green	Charlotte	31.13	55.27	12.83	0.48
Green	Saint Andrew	11.67	45.40	41.16	1.44
Green	Saint George	8.90	49.88	40.19	1.6
Green	Saint Patrick	34.56	52.58	11.09	0.48

Table 17: Total Effect of Volcanic Eruption to the Agriculture Sector

Category	Crops	Apiculture	Livestock	Forestry	Fisheries	Infrastructure	Grand Total EC$	Grand Total US$
Damage	21,722,919	116,500	447,662	20,832,500	423,947	54,000	43,597,528	16,147,232.59
Loss	93,637,170	110,250	522,243		4,815,211		99,084,874	36,698,101.48
Total	**115,360,089**	**226,750**	**969,905**	**20,832,500**	**5,239,158**	**54,000**	**142,682,402**	**52,851,334.07**

The Damage and Loss Assessment Team included officials from the Ministry Agriculture Planning Unit, Forestry, Fisheries, Extension and Advisory, Animal Health and Production Division, Banana Services Division, Inter American Institute for Cooperation Agriculture, Caribbean Agricultural Research and Development Institute (CARDI) and Food and Agriculture Organisation of the United Nations (FAO).

Figure 20: Map of St. Vincent Showing Agricultural Districts and Hazard Zones

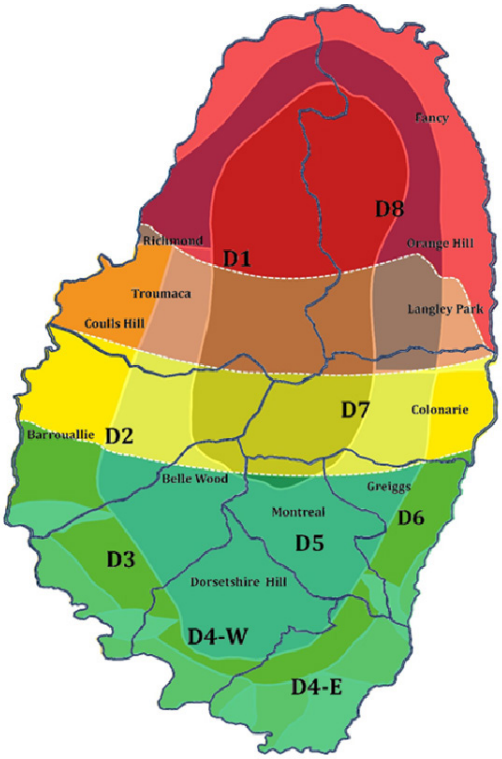


Figure 20 Composite map of St Vincent including Agro-ecological zones (CARDI), Agricultural Regions and Districts (MAFFRTIL) and Volcanic Hazard Zones (UWI SRC). Layers and overlays put together by Colville King, Diversification Officer MAFFRTIL, April 2021.

The National Emergency Management Organization (NEMO) reported that a total of 13,303 persons[11] were evacuated. Of these persons, approximately 2875 were registered farmers and 278 were fisherfolk who were dislocated from the red and orange zones (Table 19). Additionally, some farmers and fishers from the Yellow Zone, especially on the leeward side, were evacuated.

Table 18: Farmers Disaggregated by Hazard Zones

Zones	Total numbers of registered farmers	Total number registered fishers	Total by zone
Red	1850	125	1975
Orange	1023	153	1176
Yellow	2569	2	2571
Green	4996	1468	6464
	10,438	**1,748**	**12,186**

Figure 20 is a map of St Vincent showing the Hazard Zones and Agricultural Districts and a table showing the demographic distribution of registered farmers and fishers. Table 19 shows the distribution of farmers according to the different Hazard Zones.

A mixed methodology was employed to conduct the DADA and included *"field visits, telephone and personal interviews, the use of data from the Ministry and other institutions, review of past damage assessment documents and statistics from MAFFRTIL and the Ministry of Finance and Economic Planning."*

Crop loss was calculated using the acreages affected multiplied by the expected yield foregone multiplied by the market price. Loss calculations for tree crops were done using the extended period of 24 months since recovery for this commodity group will take 2 to 3 years before full recovery.

[11] National Emergency Management Organization update, dated April 19, 2021

Validation of these estimates was made using further resources and information from FAO, IICA and CARDI, as well as national statistics.

Livestock damage was calculated based on field visits and reports on deaths of animals and damage estimated using market values by type of animal. Losses were calculated based on production and farm gate prices.

Fisheries damage was calculated based on the estimated market value and repair costs to vessels, equipment and facilities affected. Fisheries losses were calculated based on two sets of variables (i) estimation based on vessels damaged (ii) an estimated 30% of the total fish landings for 2020.

Damage and loss in the forestry sector was not easily quantifiable due to the nature of the forestry ecosystem and services. Notwithstanding, observation and reports were used to estimate the damage done to plantation, primary and secondary forest. An estimate was made on the total number of acres of plantation and natural forest damaged and calculated using a multiplier.

The infrastructure estimation was done using visual observations from field visits and estimates of costs for damages.

7.1 CROP LOSS

The DADA provides detailed estimates for each of the main crops grown (primarily arrowroot, vegetables, root crops, bananas and plantains, and tree crops). Table 20 shows these DaLA estimates in detail.

7.2 APICULTURE

The DADA report found that country's "thriving apiculture industry" (with 713 hives) was not severely impacted since less than 10 percent of the hives are located in the red and orange zones. The total damage was estimated at $116,500.00 and loss amounted to $110,250.00.

7.3 LIVESTOCK

However, the extensive loss of vegetation (pasture and other forage on which to graze animals) in the red and orange zones will further exacerbate preliminary estimated livestock losses which were determined to be at least $447,662.00 in the red and orange zones with an overall estimated loss $522,243.00. Even if farmers can get their livestock to safe zones, there are significant costs "associated with the protection, feeding and veterinary support of these livestock and their relocation to the areas."

The estimated livestock farmers affected in the red and orange zones is 1,233.

The affected animal population in the red zone for small ruminants is 4990, cattle 684 and approximately 400 pigs. More losses are expected as a result of respiratory and dietary issues and other complications.

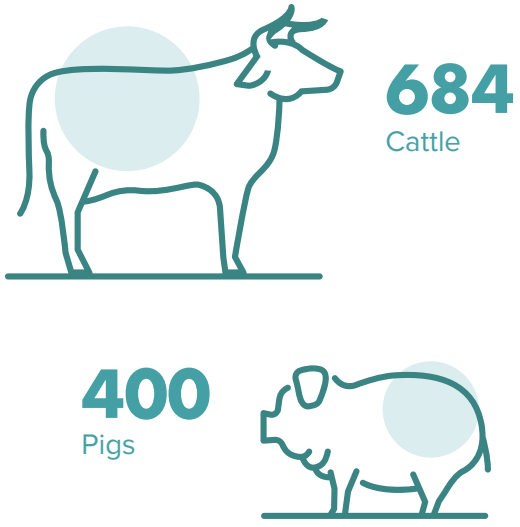


Table 19: Livestock Damage and Loss

DAMAGES						LOSSES			
PRIVATE				PUBLIC		PRIVATE			PUBLIC
Commodity	No. of animals lost	Value of animals	Infrastructure damage value	No. of animals lost	Value of animals	Items	Infrastructure damage value	Farmgate loss	Production loss Apr-Dec
Poulty	2872	$59,720.00	$89,550.00	0	$0.00	Pens	$10,000.00	$304,875.00	$0.00
Sheep	45	$26,000.00	$32,000.00	9	$3,250.00	Guttering	$3,000.00	$13,020.00	$11,620.00
Goat	90	$52,320.00	$4,704.00	8	$13,200.00	Fencing	$2,950.00	$28,040.00	$20,600.00
Pig	59	$45,725.00	$22,308.00	10	$850.00	Forage bank	$12,585.00	$57,520.00	$37,708.00
Cattle	17	$63,500.00	$6,000.00	0	$0.00			$42,560.00	$6,300.00
TOTAL	**3083**	**$247,265.00**	**$154,562.00**	**27**	**$17,300.00**		**$28,535.00**	**$446,015.00**	**$76,228.00**

Table 20: Livestock Infrastructure Damage and Loss

PRIVATE			PUBLIC	TOTAL	XCD	USD
DAMAGE	No. of Animals	3083	27	3110		
	Value of Animals	$247,265.00	$17,300.00	$264,565.00	$447,662.00	$164,769.41
LOSS	Infrastructure damage value	$154,562.00	$28,535.00	$183,097.00		
	Farmgate Loss	$446,015.00	0	$446,015.00	$522,243.00	$192,220.18
	Production loss Apr- Dec	$69,648.00	$6,580.00	$76,228.00		
	TOTAL	**$917,490.00**	**$52,415.00**		**$969,905.00**	**$356,989.58**

7.4 FISHERIES

The DADA reports that the fishery sector in the red, orange and yellow zones has been significantly impacted. Approximately 800 fishers have been affected among which 278 relocated.

The number of vessels damaged were reduced as the MAFFRIL provided prior advice to fishers to safeguard their vessels. It was reported that seven (7) vessels with their engines and other equipment have been damaged.

As a result, the preliminary estimated damage and loss for fisheries is $5,017,060.00 with $361,850.00 representing damages and losses of $4,655,210 (loss on fish landing, damaged vessels and aquaculture). International export of fisheries products also ceased due to the closure of the airport. The quantification of such loss is still to be determined.

Table 21: Summary of Fisheries Sector Damage

Number	Type/length	Boat	Engine HP	Beach Seine Net	Buoys / Fishing gears and auxillaries	Oars	Damage	Loss	Total
1			27,000.00				27,000.00	-	27,000.00
1	Pirogue 26ft	40,000.00	38,000.00				78,000.00	147,000.00	225,000.00
1	Double Ender 28ft + Beach Seine Net	20.000.00		35,000.00		800	55,800.00	324,000.00	379,800.00
3	Double Ender 14 (support boat) ft (x3)	13,000.00	-			300	13,300.00	147,000.00	160,300.00
1	Double Ender 11ft	5,000.00	-				5,000.00	36,750.00	41,760.00
1	Bow and Stern 13ft	20,000.00	15,800.00				35,800.00	73,500.00	109,300.00
1	Deck Boat 30ft	100,000.00	38,000.00		8,950.00		146,950.00	122,500.00	269,450.00
	Total	**198,000.00**	**91,800.00**	**35,000.00**	**8,950.00**	**1,100.00**	**361,850.00**	**850,860.00**	**1,212,600.00**

Table 22: Fish Landing loss

Fish landing weight	Fish Price ($)	Fish value
559,636	7.00	$3,804,460

7.5 FORESTRY

The DADA estimated that "established plantations and the natural forest suffered in excess of 65% damage in the Red, Orange and Yellow zones. The estimated damage is $56,247,750."

Table 23: Forestry Damage

Forest area	Location	Cultivated area/ no. of trees/ stands (before disaster) Acres	Damaged/ Affected area/ no. of trees	Repair Cost (where applicable)	Replacement Cost (where applicable)	Ecosystem service value	Est. Value of Damage (USD$)
Standing timber Plantation Forest		569.47	No. Trees/ acre 200	Salvage/ Rehabilitation	Planting		
Red & Orange zone		76.25	76.25/ 15,250	76,250.00	381,250.00		$457,500.00
Yellow and Green		493.22	98,644	nil	nil		
Forest Access roads	Cumberland Perseverance Rabacca			10 miles	Tractor		
Natural Forest	Central	31,500	20,475			Wildlife, watershed	$20,475,000.00
Upper Montane		10,500	Destroyed	Monitoring	Protection		
Montane							
Coastal							
Total		**43,165.94**					**$20,832,500.00 (XCD $56,247,750.00)**

7.6 AGRICULTURE INFRASTRUCTURE

Substantial damage was done to agricultural infrastructure in the Red and Orange zones, since most of the agricultural investments were in this area (Agricultural Biotechnology Center, arrowroot and cassava factories, fisheries complex, CARDI Field Station, Ministry of Agriculture Livestock Centre, Langley Park Palletisation Centre, and Perseverance Agricultural Station).

At the time the preliminary DADA was completed, the information on the extent of damage and loss to private sector infrastructure (shade houses, farm sheds, animals housing and equipment) were not yet fully assessed. However, it was very clear that "roadways in agricultural areas in the red and orange zones as well as a number of bridges and feeder roads" were affected. The damage to the bridges and roads was an indirect result of erosion due to heavy rains, lahars and pyroclastic flows, clogged streams and rivers due to fallen trees and vegetation.

The DADA recommendations include: "urgent attention to avoid catastrophic outcomes" such as flowing down stream and river pathways as was experienced in December 2013. The figure of $54,000,000 was quoted in the preliminary report however, from qualitative reports provided the extent of the damage maybe more. Given the extreme flooding that also later occurred in late April 2021, further damage to agricultural infrastructure will need to be documented.

Table 24 presents and inventory of both public and private agricultural infrastructure and shows which assets are located in Sandy Bay Division which includes Fancy and what damage was noted during the DADA.

Table 24: List of General Agriculture Infrastructure

Location	Name Public	Name Private	Volcanic Zone	Impact	Proposed Relocation
Owia	Owia Fisheries Complex		Red	Ash accumlation	Not Applicable (NA)
	Arrowroot Factory		Red	Destroyed	No relocation recommended
Orange Hill	Orange Hill Agricultural Training Institute		Red	Ash accumulation	NA
	Apiaries ATI		Red	Total collapse	Botanical Gardens
	Irrigation Unit		Red	Ash accumulation	Recommend to be moved to acquired lands in South Union
	Orange Hill Biotechnology Centre		Red	Total green house collapse	Montreal Green House Park
Rabacca Farms	Rabacca Livestock Station		Red	Partial damage	Montreal Green House Park
CARDI Field Station	Rabacca Farms		Red	Partial damage	Montreal Green House Park
Langley Park	Langley Park Palletization Centre		Red	Ash accumulation	No relocation recommended Assistance in rebuilding, no relocation
Langley Park		Little Nut	Red	Total collapse of installation	No relocation recommended
Perserverance	Perserverance Agriculture Station		Red	Total green house collapse	No relocation recommended
Perserverance		Hadley Cocoa Drying Facility	Red	Ash accumulation	No relocation recommended
Congo Valley		Congo Valley Mountain Top	Orange	Ash accumulation, disruption of water	No relocation recommended
Mt. Young		Mt. Young ALCO Hatchery	Orange	Death of chicks	No relocation recommended
Byera		Mt. William Estate	Orange	Ash accumulation	No relocation recommended
Three Rivers	Three Rivers Agriculture Station		Yellow	Ash collection	No relocation recommended
New Grounds	New Grounds Nursery		Yellow	Ash collection	No relocation recommended
Montreal Garden	Montreal Green House Park		Green	In good condition	No relocation recommended
Dumbarton Garden	Dumbarton Agriculture station		Green	In good condition	No relocation recommended
La Croix	La Croix Palletization Centre		Green	In good condition	No relocation recommended
Rivulet	Rivulet Cannabis Authority		Green	In good condition	No relocation recommended
Rivulet	Research and Development		Green	In good condition	No relocation recommended
Kingstown	Kingstown: MAFFRTIL head office		Green	In good condition	No relocation recommended
Kingstown	Plant Quarantine Port		Green	In good condition	No relocation recommended
Kingstown	Aviary Old Montrose		Green	In good condition	No relocation recommended
Kingstown	Fisheries Division Headquarters		Green	In good condition	No relocation recommended
Campden Park	Plant Protection Unit head office		Green	In good condition	No relocation recommended
Campden Park	Bureau of Standards		Green	In good condition	No relocation recommended
Campden Park		East Caribbean Feed Mills	Green	In good condition	No relocation recommended
Campden Park		East Caribbean Flour Mill	Green	In good condition	No relocation recommended
Rillian	Taiwan technical Mission Pembrook		Green	In good condition	No relocation recommended
Peters Hope	Peters Hope Germ Plasm		Green	In good condition	No relocation recommended
Barrouaillie	Barrouaillie Fisheries Complex		Green	In good condition	No relocation recommended
Walliabou	Walliabou Agriculture Station		Yellow	In good condition	No relocation recommended
Belle Isle	Research and Development Plot at Belle Isle		Yellow	Ash accumulation	No relocation recommended
Belmont	Belmont Livestock Station		Orange	Partial damage	No relocation recommended
Chateaubelair	Chateubelair Fisheries Complex		Orange	Ash accumulation	No relocation recommended
Richmond		Richmond Vale Academy	Red	Ash accumulation	No relocation recommended

7.7 VULNERABLE GROUPS

According to the United Nations[12] appeal, most vulnerable groups Vulnerable groups in Saint Vincent and the Grenadines will be disproportionately affected by the eruption, with a long and difficult road to recovery ahead of them. High-risk groups include poor and vulnerable households, single female-headed households with children and dependents, pregnant women and girls, farmers and fisherfolk, people living with disabilities, as well as those living with HIV/AIDS, the LGBTQ[13] community, youth (aged 15-29) and children, especially those under five, and the elderly. Poverty is perhaps the broadest cross-cutting issue affecting vulnerable groups.

Prior to the eruption of La Soufrière, poverty was already expected to worsen significantly due to the impact of COVID-19 on livelihoods, projected to increase from 30.2 per cent to 38.5-43.8 per cent, while severe poverty was expected to jump from 2.9 per cent pre-pandemic to 11.9 per cent significantly diminishing the resilience of affected people to recover from this crisis.

Tourism and agriculture are the backbone of the Vincentian economy, making workers in these sectors particularly vulnerable during the current emergency, especially women and youth. Unemployment disproportionately affects women (30.1%) and youth (ages 15-29), for whom joblessness is twice the national rate. Some of the poorest and most vulnerable populations, many of whom are dependent on agriculture and fisheries, reside in high-risk communities that have suffered losses and damages to housing, crops, livestock as well as the tools and equipment they depend on for their livelihoods. Those dependent on these sectors will be displaced from their source of livelihood, beyond the immediate short-term, as the sector's recovery could take months, if not years.

The current volcanic eruption appears to be far worse than what has happened in previous years. Several communities have had to be completely evacuated from the island entirely and are now on cruise ships waiting indefinitely to return once the volcanic activity has ceased.

But the eruption has also produced excessive amounts of ash across the entire island and as far afield as Barbados and other islands. More importantly, the ash has been so have that it has disrupted electricity supply, completely covered crops, stressed livestock, weighed down and snapped trees, and very importantly contaminated the island's water supply.

Farmers[14] in St Vincent's breadbasket region are already counting thousands of dollars in losses after the decimation of their crops from the erupting La Soufriere volcano's ashfall.

Without water, livestock cannot be kept alive and crops cannot be salvaged.

7.8 LINKS/INTERACTION WITH COVID-19

The eruption of La Soufrière comes as Saint Vincent and the Grenadines is recovering from its largest COVID-19 surge amid the pandemic, and the region's worst Dengue outbreak in recent history. La Soufrière is likely continue to erupt in the coming weeks and maybe even months. The long-term effects of a protracted eruption on agriculture and tourism, which are the mainstays of the Vincentian economy and contribute about half of the Gross Domestic Product (GDP), will further exacerbate the already devastating socioeconomic impact of COVID-19. It will also reduce capacity for recovery and erode hard-earned development gains.

[12] United Nations. April 2021. UN Global Funding Appeal. Explosive Eruption of Soufriere Volcano: St. Vincent
[13] Lesbian, Gay, Bi-Sexual, Trans, Queer
[14] Smith, Kareem. Farmers dig out from tonnes of ash, face uncertain future. Barbados Today. April 17, 2021. https://barbadostoday.bb/2021/04/17/farmers-dig-out-from-tonnes-of-volcanic-ash-face-uncertain-future/

8 Livelihood Assessment and Contingency Planning

Livelihood assessment data are collected in advance about the normal emergency appeal timetable and other elements of the Livelihood of the population in an area likely to be affected by a hazard.

Livelihoods consist of the capabilities, assets (both material and social resources), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, and provide net benefits to other livelihoods locally and more widely, both now and in the future, while not undermining the natural resource base (*The Livelihood Assessment Tool-Kit*).

To plan for and evaluate the possible impact hazards may have on the livelihoods within a community, an understanding of the types of livelihoods present, the sources needed, the susceptibility of these livelihoods to hazards (natural and man-made) and the existing and required response mechanisms is needed.

8.1 LIVELIHOOD ASSETS

Documentation of livelihood assets is very critical to any contingency planning. It is especially important to document the physical, natural and human resource assets that exist in case they are damaged or lost in any particular disaster.

Focus group participants in Owia identified three (3) main types of livelihood categories which included Farmers, Labourers and Service providers.

8.2 SEASONAL CALENDARS

Seasonal calendars indicate what type of livelihoods are taking place at any particular time of the year. This illustrates livelihood activities in a year without a hazard and the changes or coping strategies employed when there is a hazard event over the course of a year.

The Seasonal Calendar shows livelihood activities in a year without a hazard and the changes or coping strategies employed when there is a hazard event over the course of a year.

Table 26: Colonaire: Livelihood Assessment Matrix

Activities	Skills Needed	Tools & Equipment Needed	Natural Resources
Farming • Root crops • Cassava • Yam • Tannia • Eddoes • Arrowroot • Sweet potato	• Knowledge of tools • Knowledge of seasons, soil type, when to reap, weeding, growing period	• Cutlass • Spray Can • Fertilizer • Water Boots	• Land • Sunlight • Water
Fishing • Fishing • Seine fishing • Diving • Line fishing	• Knowledge of tools, types of bait, seasons of fish, location of fish, weather condition, navigation, swimming.	• Fish line, hooks, nylon, baits, boats, fish gun, air tank, seine, fish pots, fin, diving glass, pump, gas, oil.	• Water • Fish
Public Sector Teachers Nurses	• Training	• Vehicle, oil, gas	• Light • Land

Table 26 Seasonal Calendar shows livelihood activities over a period of time, where a number of hazards had occurred in different areas of Owia.

Table 26: Owia Seasonal Calendar – Normal and Hazard Year

Description of Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Comments
Farming:													
• Arrowroot	P_1 P_2 H/S	P H/S	P H/S	P H/S	P H/S								
• Cassava	P	P H	P S				P	P					
• Sweet Potato	H_2	H_2	H_2/S							P			
• Tannia				P					H				
• Eddoe			H_1	P_2					H_2	P_1			
• Peanut	P_2	P_2	P_2	H/S	S								
Fishing Seine								F S					Storm Surge: Nets lost due to high seas or tide and takes time to replace.
Diving				F S	F S	F S	F S	F S					
Line Fishing							F S	F S					
Public Sector:													
Teacher	W	W	W	B	W	W	B	B	W	W	W	B	Flooding: Affected schools due to the lack of water.

HURRICANE SEASON

Key: H= Harvesting; H/S = Harvest in hazard season; P_1 = Plant in normal Year; P_2= Planting in abnormal Year; W=Work; S=Sell; F=Fishing; B=Break

9 Coping Strategies

Understanding how people cope with various hazards and disasters is critical to knowing how to plan and support them. People may have both positive and negative coping strategies. For contingency planning, it is important to find measures to support the positive coping strategies, while finding alternative measures of support to mitigate against the negative coping strategies.

Negative coping strategies for example might include selling all livelihood assets, selling livestock, using all of one's savings, taking children out of school, and so on.

According to Owia residents, the main strategies used by the residents to cope with fallout from the hazards are replanting of different crops that can be harvested quicker or at any given time to give them a greater turn over in the income and more time with their families. Whilst these strategies help them to cope they also threaten negative effects such as ahigh loss of income due to rodents and market flooding. The public sector would vary depends on the occupation which could either be more or less time at home.

Table 27: Coping Strategies in Owia

Likely Climate Impact	Positive Impact	Negative Impact
Peanuts	• they harvest quickly(faster income) • multiple harvesting time	• loss of income due to rodent • need more effort to produce • more costly to maintain
Sweet potato	• reaping in scarce time would result in good price for the produce • faster turn over • rejected potato still usable	• loss of income due to rodents • market flooding would lead to lower cost price
Arrowroot	• Less labour	• No income
Public sector	• More time home	• Loss of time for students.

10 Response and Recovery Typologies

With respect to the 2021 Volcanic Eruption, the DADA reports that have been completed identify both a number of short-term and long-term types of responses that should be implemented both at community and institutional levels. These are presented here:

10.1 IMMEDIATE RESPONSE NEEDS (NEXT 3 TO 6 MONTHS)

- Protection of the public and private livelihoods assets in the red and orange zones (livestock, planting materials, tools/equipment, in-vitro facilities, etc.)
- Income support to farmers, fishers and farm workers.
- Initiative to make food readily available and accessible (to reduce food and nutrition insecurity).
- Policy on loan moratorium for farmers with financial institutions to reduce foreclosure.
- Infrastructure to support relocation of farm and farm assets.
- Identification of lands to relocate farmers (a land bank approach).
- Program to engage farmers, youth and women in initiatives at the evacuation centres.
- Procurement of planting materials, genetic stock for crop and livestock
- Clearing of rivers and streams especially in the upper watersheds in red and orange zones.
- Establishment of crop and livestock support systems.

10.2 MEDIUM TO LONG TERM RECOVERY AND REHABILITATION NEEDS (NEXT 6 TO 12 MONTHS)

- A comprehensive plan for recovery and rebuilding of a modern, competitive agricultural sector
- Farm relocation
- Introduction of technology and innovation
- Incentive program to encourage young people into farming.
- Policy support for incentives, infrastructure, information and intelligence to build a modern agriculture sector.

10.3 RESPONSE TYPOLOGIES IDENTIFIED FOR OWIA

While individuals employ their own responsive coping strategies, external interventions are usually required for the effective and efficient restoration of livelihoods. In the event of a hurricane and/or storm surge, possible responses include the replacement of equipment for economic purposes and dwellings for Shelter. Quick and easy access to loans is another are that can be facilitated by providers to aid in the recovery process. Table 28 shows the typical type of response typologies that residents of Owia indicated would be necessary for different livelihood components.

Table 28: Owia Response Typology

Type of Response Needed	Geographical Area	# of Households likely to be affected	Required quantity (US$)	Duration	Cost (US$)	Responsibility
Replacement cost of plant material: Sweet Potato Tannia Eddoes	Bottom Town	 33 32 25	 14,520 plants @$0.37x12 ac 4,840 plants @$0.74x9 ac 11,616 plants @$0.74x7 ac	 One-off One-off One-off	 64,469 32,234 60,171	Min. of Agri.
Cost of production per acre*: Sweet Potato Tannia Eddoes	Bottom Town	 33 32 25	 12 acres (ac)@$1,098 9 acres (ac)@$2,216 7 acres (ac)@$1,519		 13,176 19,944 10,633	Min. of Agri.
Flooding Cleaning of homes	Bottom Town	 20				BRAGSA
Support for house repairs	Bottom Town	20	$925.93 per structure	One-off	18,519	Min. of Housing
Rental Assistance	Bottom Town	10	222.22 per month	6 months	2,222	Min. of National Mobil.
Interim assistance benefit	Bottom Town	20	184.19 Per month	9 months	33,154	Min. of National Mobil.
Basic amenities & disaster relief	Bottom Town	20	444.44	One-off	8,889	Ministry of National Mobilisation
Uniform assistance	Bottom Town	75	$55.56 per student	One-off	4,167	Min. of National Mobil.
Meals & transport subsidy	Bottom Town	75	$66.67 per student	9 months	45,002	Min. of National Mobil.
Livestock	Cross Side	50%	13	1-3 months	$1,040 - $3,120	Min. of Agri.
Livestock	Bottom town	100%		3 months	$1,040 - $3,120	Min. of Agri.
Livestock	Narrny Gutter	50% - 100%		3 months	$1,040 - $3,120	Min. of Agri.

*Cost of production per acre includes: labour operations (clearing, digging, planting, weeding, fertilizer application, moulding and harvesting); materials (herbicide, fungicide, insecticide, fertilizer, tools, other); other costs (transportation, land lease).

11 Annexes

ANNEX 1 - MINISTRY OF AGRICULTURE, INDUSTRY AND LABOUR COMPENSATION LIST FOR AGRICULTURAL CROPS AND LIVESTOCK (2019)

Agriculture Region and District	No. of crops	Name of cash crop	Acres	Average number of farmers per crop	Plants per acre	Expected Yield (XCD$)	Growing Duration (months)	Value at stage in mid of hurricane season (XCD$)	Value (XCD$)	75% dependent on crop grown above grown (XCD$)	55% dependent on crop grown underground	Justification
					CHATEAUBELAIR*							
REGION ONE District 1	1	Ginger	2	16	21,780	20,000	9	$2.00 per plant	87,120		47,916	Roots and tubers are more like to be affected by flash floods as a result of run-off water from heavy rains
	2	Eddoes	1	28	11,616	11,000	6	$2.00 per plant	23,232		12,778	
Leeward	3	Dasheen	1	6	7,260	14,000	7	$2.00 per plant	14,520		7,986	
					FITZ HUGHES							
District 1	1	Eddoes	2	15	11,616	11,000	6	$2.00 per plant	46,464		25,555	
	2	Ginger	1	11	21,780	20,000	10	$0.10per sq. ft.	4,356		2,396	
	3	Sweet Potatoes	1	14	14,520	7,000	4	$1.00 per plant	14,520		7,986	
					ROSE HALL							
District 1	1	Carrots	7	60	264,000	8,000	3/4	$0.10per sq. ft.	30,492		16,771	Flash floods
	2	Tomatoes	6	90	21,780	15,000	3	$2.00 per plant	174,240	130,680		Plant like to be damaged/ destroyed by heavy rains and high winds
	3	Cabbages	3-4	90	14,520	12,000	3	$0.30 per plant	14,810		8,146	Flash flood, heavy rains and drought
					SPRING VILLAGE							
District 1	1	Eddoes	30	134	11,616	11,000	6	$2.00 per plant	696,960		383,328	
	2	Sweet potatoes	14	103	14,520	8,000	4	$1.00 per plant	406,560		223,608	
	3	Corn	7	93	9,680	25,000	3/4	$2.00 per plant	67,760	50,820		Plants are likely to be damaged by high winds

*Hurricane intensifies in the latter half of the season and costs were based on this trend and period estimate for growth

Agriculture Region and District	No. of crops	Name of cash crop	Acres	Average number of farmers per crop	Plants per acre	Expected Yield (XCD$)	Growing Duration (months)	Value at stage in mid of hurricane season (XCD$)	Value (XCD$)	75% dependent on crop grown above grown (XCD$)	55% dependent on crop grown underground	Justification
COLONARIE												
REGION THREE District 7	1	Plantain	4	12	1,210	30,000	11	$12.00 per plant	58,080	43,560		Plants are likely to be damaged/ destroyed by high winds
	2	Sweet Potatoes	7	23	14,520	8,000	4	$1.00 per plant	101,640		55,902	
Windward	3	Yams	4	7	4,840	12,000	9	$5.00 per plant	96,800		53,240	
	4	Bananas	50	18	680	20,000	9	$10.00 per plant	340,000	255,000		
FANCY												
District 7	1	Sweet Potatoes	5	20	14,520	8,000	4	$1.00 per plant	72,600		39,930	
	2	Groundnuts	3	16	87,120	3,000	4	$0.10 per sq. ft.	13,068		7,187	
	3	Eddoes	3	15	11,616	11,000	6	$2.00 per plant	69,696		38,333	
PARK HILL												
District 7	1	Yams (Portuguese)	7	18	2,723	20,000	7	$5.00 per hole	95,305		52,418	Extensive dry periods can result in produce smaller in size or loss of plantlets due to the heat. The method of calculation can apply for loss during a drought.
	2	Sweet Potatoes	5	17	14,520	8,000	4	$1.00 per plant	72,600		39,930	
	3	Dasheen	2	7	7,260	14,000	7	$2.00 per plant	29,040		15,972	
OWIA												
District 8	1	Sweet Potatoes	12	33	14,520	8,000	4	$1.00 per plant	174,240		95,832	
	2	Tannia	9	32	4,840	9,000	9	$2.00 per plant	87,120		47,916	
	3	Eddoes	7	25	11,616	11,000	6	$2.00 per plant	162,624		89,443	

Agriculture Region and District	No. of crops	Name of cash crop	Acres	Average number of farmers per crop	Plants per acre	Expected Yield (XCD$)	Growing Duration (months)	Value at stage in mid of hurricane season (XCD$)	Value (XCD$)	75% dependent on crop grown above grown (XCD$)	55% dependent on crop grown underground	Justification
OVERLAND AND MAGNUM												
District 8	1	Sweet Potatoes	12	47	14,520	8,000	4	$1.00 per plant	174,240		95,832	
	2	Tannia	9.5	43	4,840	9,000	9	$2.00 per plant	91,960		50,578	
	3	Eddoes	5	29	11,616	11,000	6	$2.00 per plant	116,160		63,888	
SANDY BAY												
District 8	1	Tannia	23	73	4,840	9,000	9	$2.00 per plant	222,640		122,452	
	2	Sweet Potatoes	22	77	14,520	8,000	4	$1.00 per plant	319,440		175,692	
	3	Eddoes	9.3	39	11,616	11,000	6	$2.00 per plant	216,058		118,832	
SOUTH RIVERS												
District 7	1	Dasheen	8	24	7,260	14,000	7	$2.00 per plant	116,160		63,888	
	2	Sweet Potatoes	14	37	14,520	8,000	4	$1.00 per plant	203,280		111,804	
	3	Eddoes	5	18	11,616	11,000	6	$2.00 per plant	116,160		63,888	

Please note that agriculture regions 1 and 3 tend to be severely affected by hurricanes and other natural disasters. Both regions are in the north of the country and experience a greater intensity of wind and heavy rainfall.

Livestock	Cost per animal	Infrastructure cost		
Sheep	300	$35/sq. ft.	roof $8/sq	8800/sq. ft. fencing
Goat	300	$35/sq.ft.	roof $8/sq	8800/sq. ft. fencing
Pigs	450	$35/sq.ft.	roof $8/sq	
Cattle Female	3000			
Cattle Male	4000			
Poultry Boiler	1.25			
Poultry Layer	4.25			
Peak layers	20			
Pre Peak	10			

A 20 ft. x 10 f.t pig pen (10 years plus and dilapidated was valued at $2,500)

ANNEX 2 – MINISTRY OF NATIONAL MOBILISATION - SERVICES OFFERED UNDER THE SOCIAL ASSISTANCE PROGRAMME (XCD$)

BACKGROUND

The Ministry of National Mobilisation etc. is charged with the national portfolio of providing social protection to vulnerable households through the Public Assistance Programme guided by the Public Assistance Act. Due to societal changes during the past two (2) decades, additional types of monthly and emergency assistance were added to compliment the traditional services. The following are some of the services currently being offered under this programme:

1. Uniform Assistance ($100&150/student once per year).
2. Rental Assistance ($400-$600/person per month for six months).
3. School fees & Exam Fees ($200/student).
4. Meals & Transport Subsidy ($180/student per month).
5. Basic Amenities & Disaster Relief ($250&$1200/person (one-off assistance).
6. Interim Assistance Benefit ($500/family for nine (9) months).
7. Medical & Funeral ($2000/person (one-off assistance).

ANNEX 3 MINISTRY OF AGRICULTURE, INDUSTRY AND LABOUR – COMPENSATION LIST FOR AGRICULTURAL AND FORESTRY CROPS

FIELD CROPS	COSTS (XCD$)	FIELD CROPS	COSTS (XCD$)
Arrowroot	10 cents per sq. ft.	Grasses (cultivated)	5 cents per sq. ft.
Bananas	$3.00 per plant up to 3 months $6.00 per plant at medium stage $10.00 per plant if bearing	Ground Nuts	10 cents per sq. ft.
		Yams (Portuguese)	$3.00 per hole when young $5.00 per hole if matured
Plantain	$4.00 per plant up to 3 months $7.00 per plant at medium stage $12.00 per plant if bearing	Dominic	$2.00 per hole when young $4.00 per hole if matured
MaughFaugh Baugh	$1.00 per plant up to 3 months $3.00 per plant at medium stage $6.00 per plant if bearing	Water	$1.00 per hole when young
		White	$3.00 per hole if matured
Grindy	$3.00 per plant up to 3 months $6.00 per plant at medium stage $9.00 per plant if bearing	Bascombe	75 cents per hole when young
		Others	$2.00 per hole if matured
Sugar Cane	$1.00 per hole	Sweet Potatoes	25 cents per hole when young $1.00 per hole if matured
Cassava	30 cents per hole up to 3 months $2.00 per plant when matured	Ochro	25 cents per hole when young $1.00 per hole if matured
Corn	15 cents per hole up to 3 months $2.00 per plant when matured	Ginger	10 cents per sq. ft.
Pigeon Peas	$1.00 per hole in pure stand $6.00 per isolated tree	Sorrel	15 cents per hole when young 25 cents per hole if matured
Cotton	60 cents per hole up to 2 months $2.00 per plant if bearing	Tobacco	50 cents per hole up to 3 months
		Pineapple	$1.75 per hole up to 3 months $3.50 per hole up to 3 months $7.50 per hole up to 3
Eddoes	50 cents per hole up to 3 months $2.00 per plant if matured		
Tannia	50 cents per hole up to 3 months $2.00 per plant if matured	Dasheen	50 cents per hole up to 3 months $2.00 per plant if matured

GREEN VEGETABLES	COSTS (XCD$)	GREEN VEGETABLES	COSTS (XCD$)
Beans	10 cents per hole non flowering 25 cents per hole if bearing	Lettuce	20 cents per hole for young plants $1.00 per plant if bearing
Beets	10 cents per hole	Pepper (Hot or Sweet)	25 cents - 50 cents for young plants $1.00 per plant if bearing
Cabbage	25 cents per hole when immature $2.00 per plant when matured	Tomato	10 cents – 50 cents per young plant non flowering $1.50 - $2.50 per plant if bearing
Carrots	10 cents per sq. ft.		
Cauliflower	25 cents per plant when immature $1.00 - $2.00 per plant when matured	Pumpkin	10 cents -50 cents per hole when immature $5.00 per hole if bearing
Christophene	$1.00 per hole when immature $5.00 per hole if bearing	Passionfruit	$1.00 per non bearing vine $5.00 per vine if bearing
Cucumber	10 cents per plant when immature $2.00 per plant if bearing	Black Pepper	$1.00 per plant not bearing $5.00 per plant if bearing
Egg Plant	10 cents - 50 cents per plant when immature $2.00 per plant if bearing	Pineapples	$1.75 up to 3 months $3.50 up to 6 months $7.50 up to and over 12 months

FOREST CROPS (XCD$)

SPECIES	BEARING TREES	DAMAGED OVER 10 YRS	DAMAGED OVER 5-10 YRS	DAMAGED 0-5 YRS
Mahogany	$140.00	$80.00	$45.00	$35.00
Teak	$140.00	$80.00	$45.00	$35.00
Red Cedar	$140.00	$80.00	$45.00	$35.00
White Cedar	$140.00	$80.00	$45.00	$35.00
Cype	$140.00	$80.00	$45.00	$35.00
Honduras Mahogany	$100.00	$60.00	$30.00	$20.00
W.I Mahogany	$100.00	$60.00	$30.00	$20.00
Blue Maho	$100.00	$60.00	$30.00	$20.00
Galba	$100.00	$60.00	$30.00	$20.00
Pinus Caribbean	$100.00	$60.00	$30.00	$20.00
Angeline	$100.00	$60.00	$30.00	$20.00
Bamboo	$100.00	$60.00	$30.00	$20.00

ORCHARD TREES AND PERMANENT CROPS (XCD$)

SPECIES	BEARING TREES	DAMAGED OVER 10 YRS	DAMAGED OVER 5-10 YRS	DAMAGED 0-5 YRS
Breadfruit	$120.00	$60.00	$45.00	$45.00
Breadnut	$90.00	$50.00	$30.00	$25.00
Cocoa	$80.00	$60.00	$45.00	$35.00
Coconut	$100.00	$70.00	$60.00	$45.00
Coffee	$45.00	$35.00	$30.00	$15.00
Cashew	$50.00	$45.00	$30.00	$15.00
Custard Apple	$15.00	$10.00	$8.00	$6.00
Golden Apple	$75.00	$50.00	$30.00	$20.00
Sugar Apple	-	$15.00	$8.00	$6.00
Guava	$40.00	$30.00	$20.00	$10.00
Mango (other)	$70.00	$45.00	$30.00	$15.00
Mango (grafted)	$120.00	$60.00	$45.00	$35.00
Mammie Apple	$56.00	$40.00	$30.00	$15.00
Nutmeg	$120.00	$90.00	$60.00	$35.00
Pawpaw	$30.00	$20.00	$10.00	$5.00
Plum	$70.00	$50.00	$30.00	$15.00
Plumrose	$50.00	$35.00	$25.00	$15.00
Sapodilla	$70.00	$50.00	$30.00	$15.00
Pear (Avocado)	$90.00	$60.00	$45.00	$30.00
Grapefruit	$90.00	$60.00	$45.00	$30.00
Orange	$90.00	$60.00	$45.00	$30.00
Tangerine	$90.00	$60.00	$45.00	$30.00
Ortanique	$90.00	$60.00	$45.00	$30.00
Lime	$90.00	$60.00	$45.00	$30.00
Soursop	$50.00	$40.00	$30.00	$15.00
Clove	$70.00	$50.00	$40.00	$30.00
Cinnamon	$70.00	$50.00	$40.00	$30.00
Mauby	$50.00	$40.00	$30.00	$15.00

ANNEX 4 – COST OF PRODUCTION

Source: Ministry of Agriculture, Industry and Labour, SVG.

CROP: Ginger **VARIETY:** Jamaican **ACREAGE:** One (1) Acre **DATE:** 7/10/2018

ITEMS	UNITS	RATE($)	NO,	COST($)
LABOUR OPERATIONS				
Land clearing (Cutlass & Clean) / spraying	M/day	40.00	12	480.00
Ranging	M/day	40.00	15	600.00
Gathering / preparation of planting material	M/day	40.00	5	200.00
Chopping holes and planting	M/day	40.00	6	240.00
Weeding manually (X 2) & Moulding(X 1)	M/day	40.00	28	1120.00
Fertilising - Band application (X 3)	M/day	40.00	4	160.00
Harvesting (pull, cut, wash, dry, bag)	M/day	40.00	30	1200.00
Heading out of field	M/day	40.00	20	800.00
Subtotal				**$ 4,800.00**
MATERIALS				
Planting Materials ()	Lbs	1.50	3000	4500.00
Grammoxone & pre-emergent	Gal			205.00
Fertiliser (NPK)	Sack	65.00	12	780.00
Tools(e.g.) Spray can Fork, Hoe, Cutlass, File		665.00	1	665.00
Other(Bags)		1.00	200	200.00
Subtotal				**$ 6,350.00**
OTHER COSTS				
Land charges (Lease)	Acre	500.00	1	500.00
Transportation		300.00		300.00
Supervision				
Interest on loans (9 - 11%)				
Depreciation on tools & equipment				
Other				
Subtotal				**$ 800.00**
Total cost of production				**$ 11,950.00**
Total cost per unit of output($/Lb)				**$ 0.60**
ASSUMPTIONS				
a) Plant spacing	1 X 3 Within Row X Between Row (Ft)			
b) Plant density	14,520 plants per acre			
c) Marketable yields	20,000 Lbs			
d) Losses & main cause	Negligible.(Due nematode)			
e) Maturation Period	10 Months			
f) Price per unit yield - Farmgate :				

CROP: Eddoe **VARIETY:** Black **ACREAGE:** One (1) Acre **DATE:** 31/12/2014

ITEMS	UNITS	RATE($)	NO,	COST($)
LABOUR OPERATIONS				
Land clearing --Spraying/Cleaning	M/day	40.00	2	80.00
Digging Holes	M/day	40.00	15	600.00
Gathering and preparing plant material	M/day	40.00	4	160.00
Planting (Including heading and dropping)	M/day	40.00	8	320.00
Weed control (herbicide)(X2)	M/day	40.00	3	120.00
Fertiliser application (X 2)	M/day	40.00	4	160.00
Moulding (x1)	M/day	40.00	12	480.00
Harvesting (incl. Sort & heading)	M/day	40.00	12	480.00
Heading out of field	M/day	40.00	8	320.00
Subtotal				**$ 2,720.00**
MATERIALS				
Planting materials (Slips)				
Herbicide -(Grammaxone)	Gal.	136.00	2	180.00
Fertiliser (types) N.P.K.	sack	100.00	9	900.00
Tools(e.g.) Fork, Hoe, Cutlass, File, Spray can				
Other (e.g.) Boxes, bags				
Subtotal				**$ 1,080.00**
OTHER COSTS				
Land charges (Lease/ Rent/ Share)	Acre			
Transportation				300.00
Supervision				
Subtotal				**$ 300.00**
Total cost of production				**$ 4,100.00**
Total cost per unit of output($/Lb)				**$ 0.37**
ASSUMPTIONS				
a) Plant spacing	2 X 3 Within Row X Between Row (ft)			
b) Plant density	7,260 plants per acre (plants/acre)			
c) Marketable yields(lbs)	11,000			
d) Losses (Rejects & Spoils)	Negligible			
e) Maturation Period	6 Months			
f) Price per unit yield - Farmgate :	$0.75/Lb			

CROP: Dasheen **VARIETY:** Upland **ACREAGE:** One (1) Acre **DATE:** 31/12/2014

ITEMS	UNITS	RATE($)	NO,	COST($)
LABOUR OPERATIONS				
Land clearing --Spraying/Cleaning	M/day	40.00	2	80.00
Digging Holes	M/day	40.00	15	600.00
Gathering and preparing plant material	M/day	40.00	3	120.00
Planting (Including heading and dropping)	M/day	40.00	5	200.00
Weed control (herbicide)(X2)	M/day	40.00	3	120.00
Fertiliser application (X 2)	M/day	40.00	4	160.00
Moulding (x1)	M/day	40.00	12	480.00
Harvesting (incl. Sort & heading)	M/day	40.00	12	480.00
Heading out of field	M/day	40.00	8	320.00
Subtotal				**$ 2,560.00**
MATERIALS				
Planting materials (Slips)				0.00
Herbicide -(Grammaxone /Touchdown)	Gal.	170. /136	2	306.00
Fertiliser (types) N.P.K.	sack	100.00	10	1,000.00
Tools(e.g.) Fork, Hoe, Cutlass, File, Spray can				
Other (e.g.) Boxes, bags				
Subtotal				**$ 1,306.00**
OTHER COSTS				
Land charges (Lease/ Rent/ Share)	Acre			
Transportation				300.00
Supervision				
Subtotal				**$ 300.00**
Total cost of production				**$ 4,166.00**
Total cost per unit of output($/Lb)				**$ 0.30**
ASSUMPTIONS				
a) Plant spacing	2.5 X 3 Within Row X Between Row (ft)			
b) Plant density	5,800 plants per acre (plants/acre)			
c) Marketable yields(lbs)	14,000			
d) Losses (Rejects & Spoils)	Negligible			
e) Maturation Period	8Months			
f) Price per unit yield - Farmgate :	$.60/Lb			

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