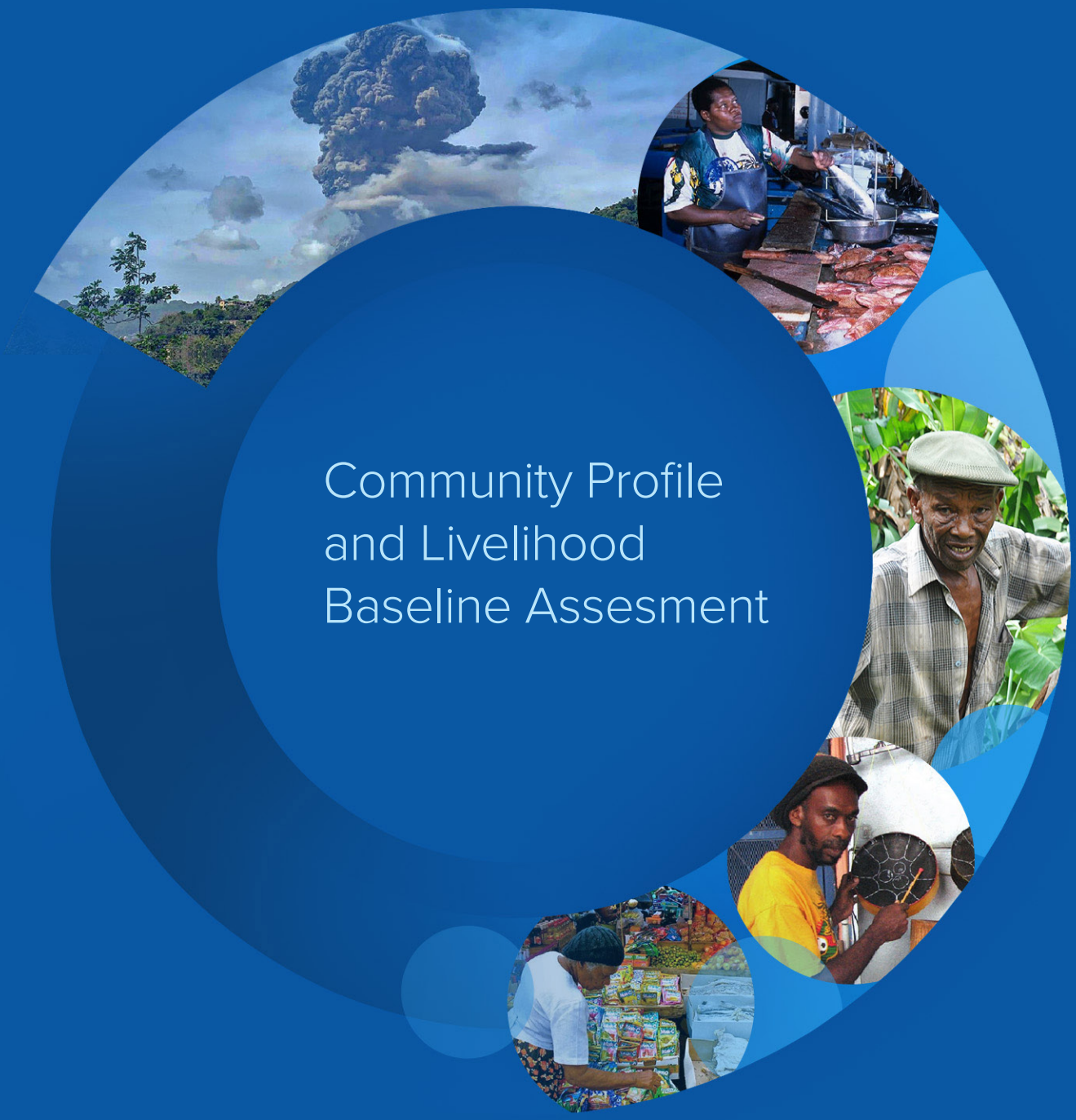

Community Profile
and Livelihood
Baseline Assesment

Overland and Magum

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 communities of Overland and Magum 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 likely 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.

Overland is located 13° 18'50"N 061° 07'45" W in the parish of Charlotte, the largest parish in St. Vincent and the Grenadines. Both communities are located north of the island. They are mainly farming communities with strong cultural heritage and traditions.

According to the 2012 Housing and Population Census, the community of Overland had a total of four hundred and forty-eight (448) households and a population of fourteen hundred and forty (1440) persons. The surrounding communities which include Magum had a total of one hundred and six (106) households, and a population of three hundred and twenty-six (326). Data related to the wider Georgetown Census Division were used to indicate the social realities of the communities.

Chapter 3 provides an overview of the socio-demographic profile of Overland and Magum 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.

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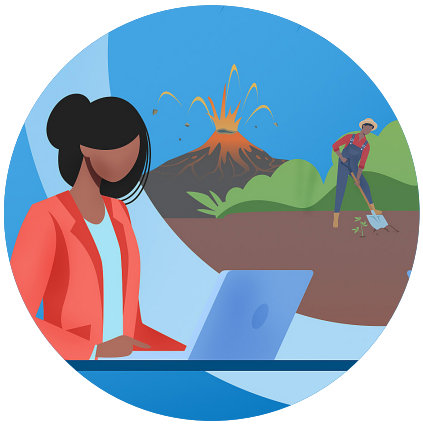

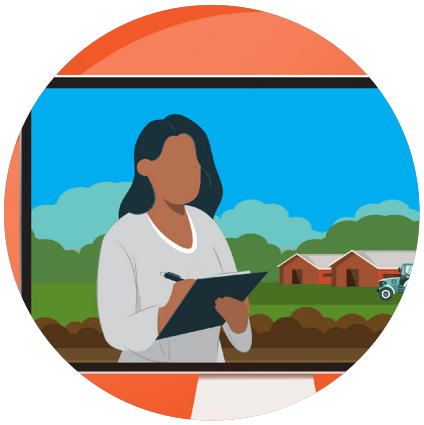

Acronyms

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 ***Overland and Magum***, St. Vincent & and the Grenadines.

2 Methodology

The Community Profile (CP) and Livelihood Baseline Assessment (LBA) for Overland and Magum was compiled in October 2019 using both qualitative and quantitative data collection methods (such as 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 affected 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 published government reports and data-sets.

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 during the hours of 8am and 4pm October 1st, 2019 using a convenience sample of residents of the community. Forty (40) persons participated in the survey -, twenty-six (26) females and fourteen (14) males. 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 Overland and Magum 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

Overland is located 13° 18'50"N 061° 07'45" W in the parish of Charlotte. Charlotte is the largest parish in St. Vincent and the Grenadines, it is situated on the eastern coast of the Island and has an area of 149 km. Charlotte has the longest coastline of all the parishes therefore it is accessible by both land and sea. Overland is a coastal village bounded by Sandy Bay to the North and Orange Hill to the South.

3.2 HISTORY/HISTORICAL DEVELOPMENT

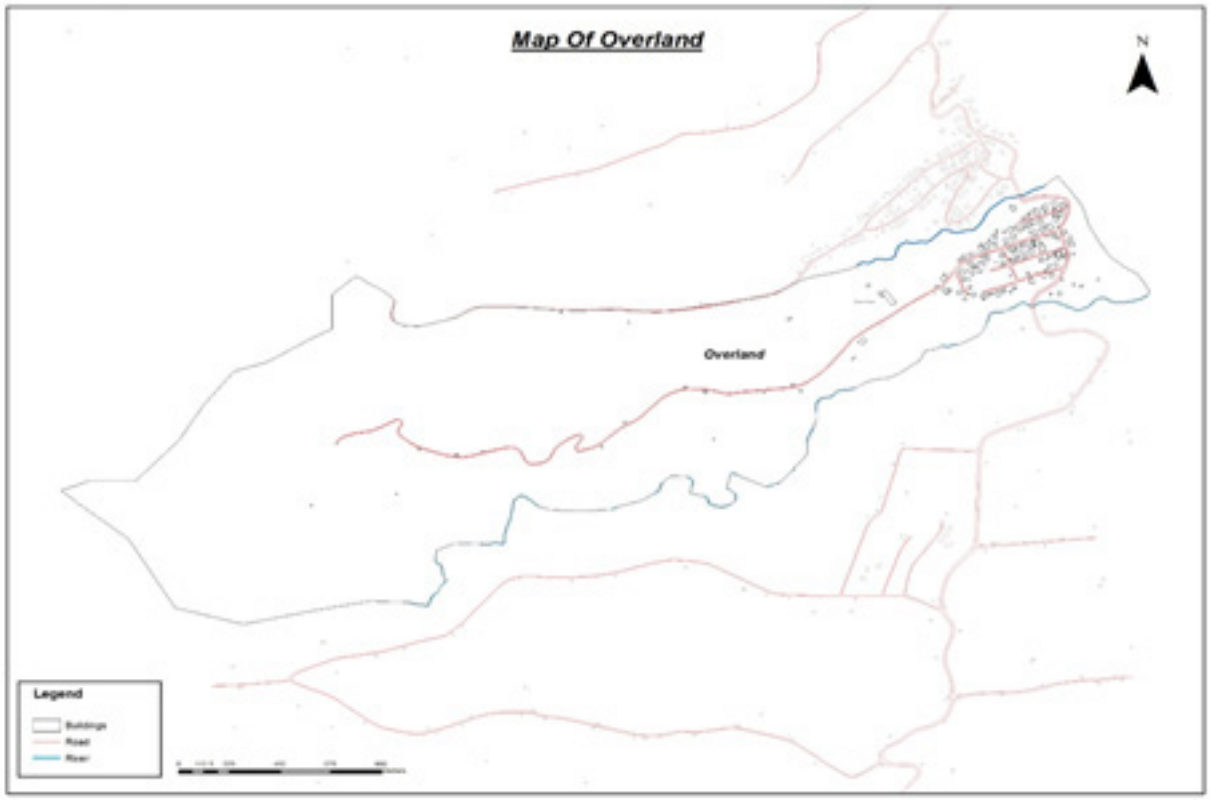
The communities of Overland and Magum developed from the original estate that was established in the 19th century and owned by the Barnard's. Arrowroot, Cassava and banana were the main crops grown. After the closure of the Arrowroot factory in the mid-1960s, these lands were purchased by the government, with funding from the United Kingdom. Most of the lands were then leased to the persons that worked on the estate. The workers were given two lots of land, one to build a dwelling home on and another lot for their firstborn child.

Overland is a small farming community that is separated by a river. To the right of the river is the small community of Magum. At present, Bananas, eddoes, Tannia, plantains, watermelons, Pepper along with arrowroot are the crops produced in the area.

3.3 NATURE OF COMMUNITY (CULTURE, TRADITIONS)

Overland is a peaceful small community in the North Windward region. Traditionally, men gathered at the village shop on Friday nights after they were paid, to

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



drink, laugh and socialize. There was little violence in the community. Smoking was rare but alcoholic beverages were commonly enjoyed.

Through the years the village was known for winning steel pan music competitions. During the Christmas season in particular, they practiced "house to house serenading" with music and singing. Homeowners would in turn, offer cakes and ginger beer or, some would offer yam and corned fish with natural chocolate. Men and women of the community danced the traditional Quadrille, especially on moonlit nights. Other activities popular in the community were ring games, kite flying, skipping rope and marbles.

Villagers ate what they grew. Their diets consisted mainly of ground provisions, green leafy vegetables and herbs (such as chive, mint, and thyme). They used little to no salt or sugar. The villagers had lands where they planted crops for subsistence living and for sale at the market. Donkeys were the main mode of transportation throughout the village as there were no paved roads. However, there was one converted truck/bus used for transportation. Villagers were materially poor but lived at peace with laughter, a strong community spirit and sharing whatever little they earned.

"Flambeaus" and "lanterns" were commonly used in the community for lighting before access to electricity. The village received electricity in the late 1980s or early 90s and slowly development began to take place. For five consecutive years during 1992 to 1995, Overland won the Best Village competition. It was known for its strong aesthetics and clean surroundings, painted stones, flowering plants with a few erected bill boards. The men of the village worked on plantation Estates at Orange Hill. They would plow the fields while some women cleaned for sowing crops of sugarcane and coconut. They also tended livestock. However, most women traditionally were housewives while the men worked.

The 1979 eruption of La Soufriere forced many of the village natives to migrate inland and overseas. Some homes were relocated and remained so up to today. Many families (Portuguese) descent settled in Brazil, Panama, and Guadeloupe.

3.4 NATURAL RESOURCES (RIVERS, FORESTS, FARMING LANDS)

Overland is nestled in an area with mountainous terrain in the back of the community. These areas are used as farming lands by the villagers. There is also a small area that is located at the interior of the Overland village next to the primary school that is well kept and is used as a recreational garden. However, the community is also in close proximity to one of the island's deadliest rivers, the Rabacca Dry River. This river, which flows directly from the volcano is usually dry, but very powerful when flowing. It is accessible by land and sea.

In the Overland community there are two rivers. There is a river that runs through an area called Noel. This river has found its exit route on the main road that goes over into the village of Noel, and has caused some significant damage.

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 2) 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 3).

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).

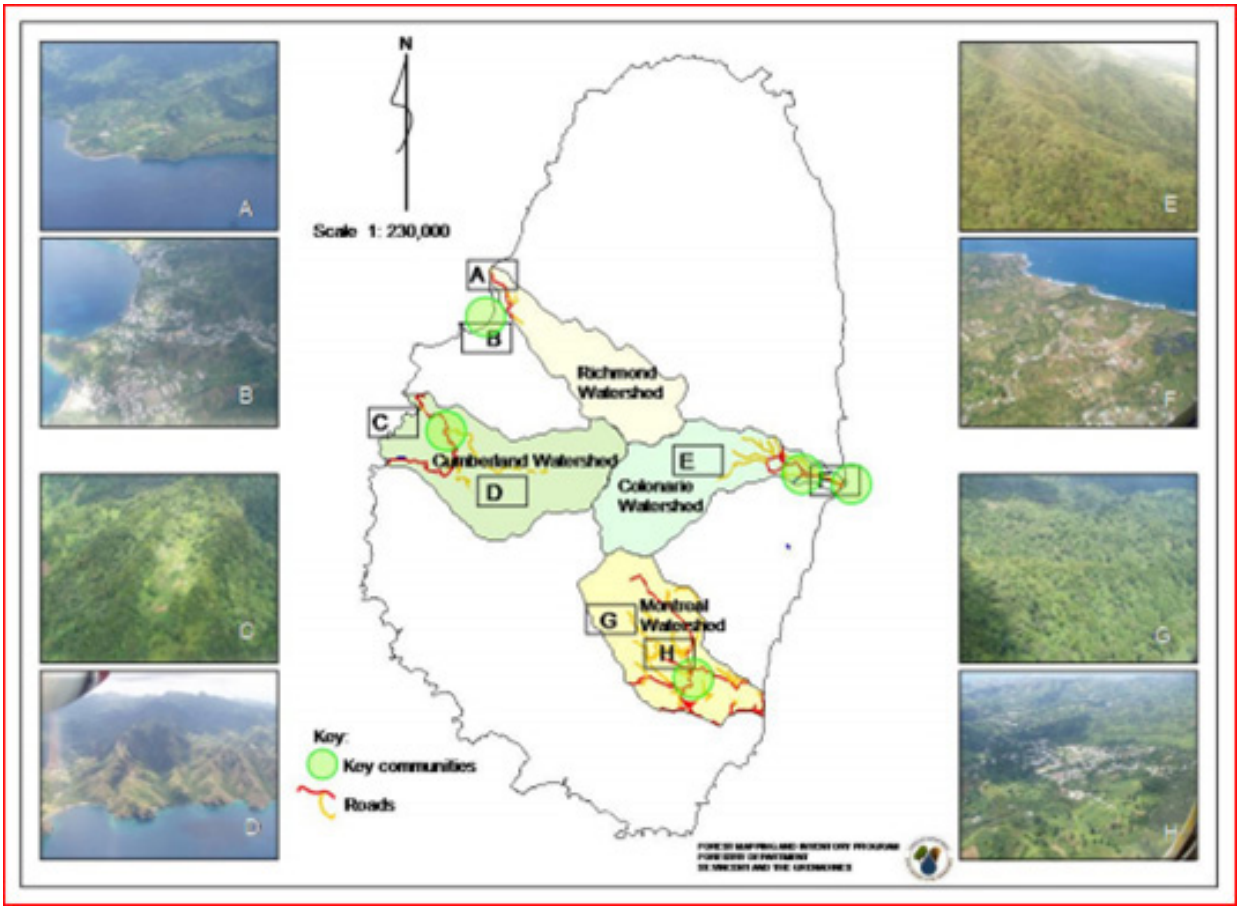
Figure 2: The Sixteen (16) Watersheds of Saint Vincent *(Source: GEF-IWCAM, No Date).*

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 (Figure 4). 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 3: 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 4: Protected Areas on Mainland St. Vincent *(Source: GEF-IWCAM, No Date).*

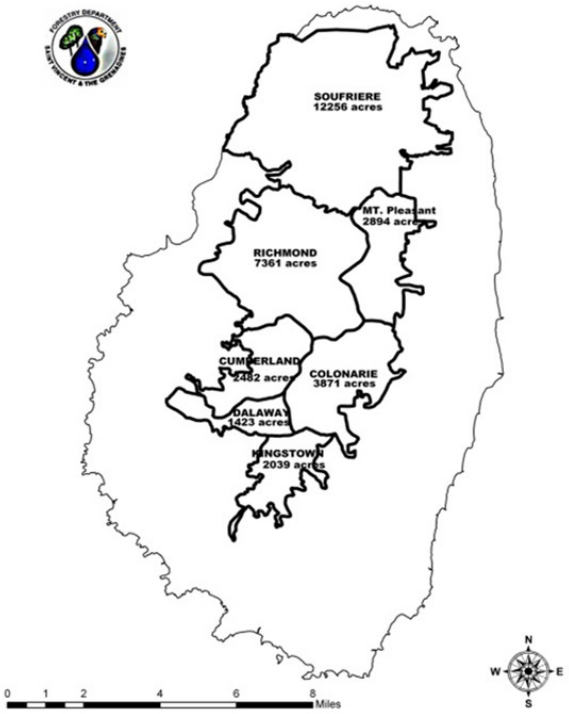
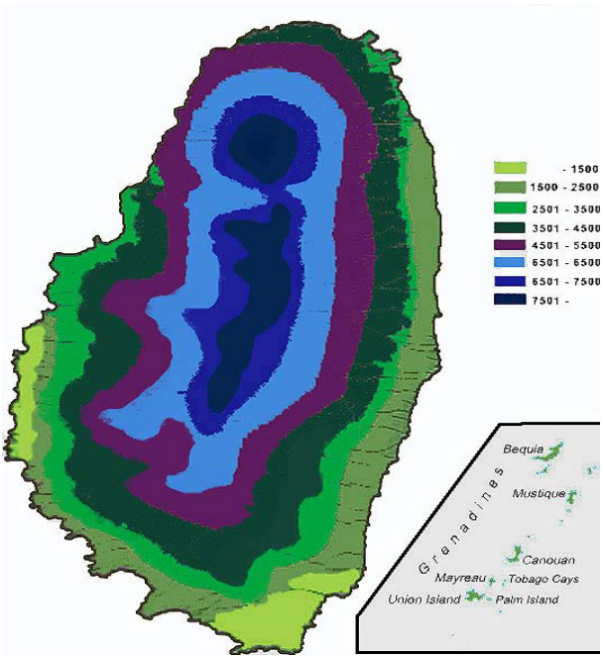


Table 1: Water Statistics for SVG (Source: FAO 2005, GOSVG 2002)

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

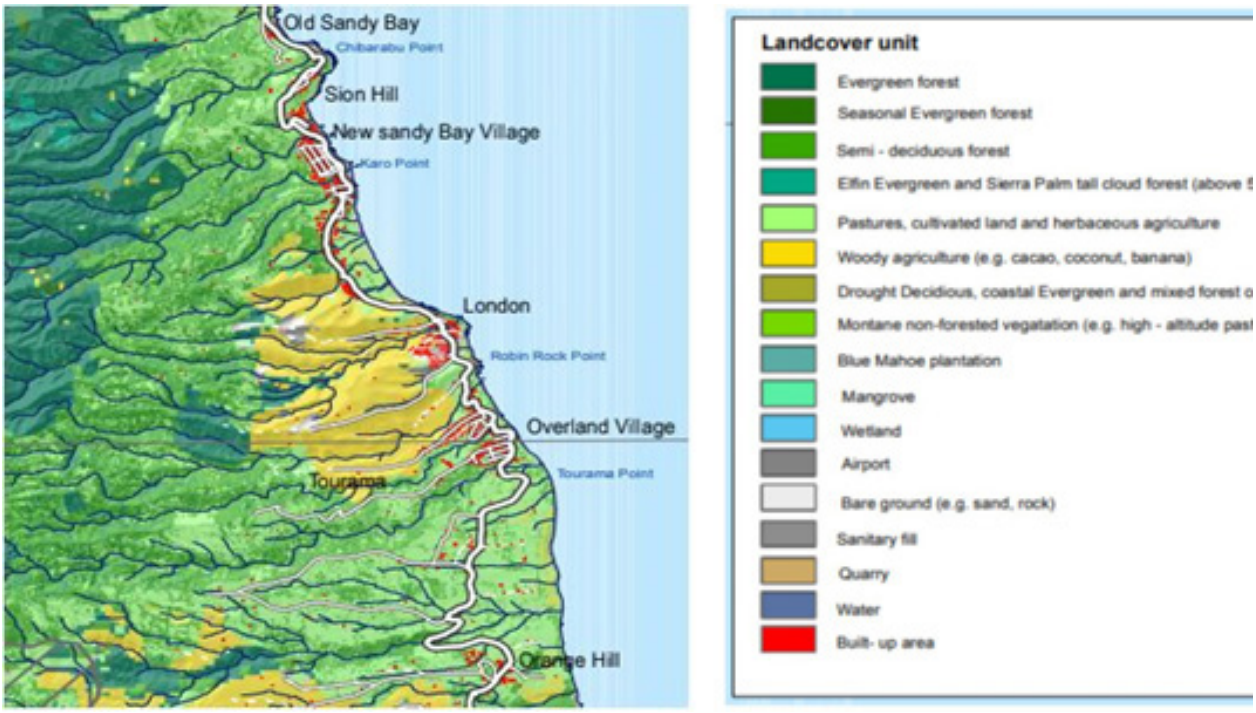


Overland has several environmental challenges that continue to be a daily threat to the natural assets of the community. If these are not urgently addressed they will continue to negatively affect the environment within the community. Some of the environmental challenges that Overland faces are landslides, 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. Overland is also located squarely in the La Soufriere Volcano Hazard Zone as well as being located in the severe zone for Landslide Hazards. These hazards are also are discussed later in the document.

3.5 LAND USE AND DISTRIBUTION

Figure 6 illustrates that lands in Overland and Magum consists of woody agriculture, forests, pastures, cultivated land, and herbaceous agriculture. There is a vast amount of woody agricultural lands with coconut and banana plants. The built-up or residential areas are concentrated a little inland mainly to the west of the main road which passes through the community.

Figure 6: Land Use and Distribution in Overland and Magum *(Source: Westen, C.J. and Sijmons, Koert. 2016).*



3.6 POPULATION AND AGE STRUCTURE

It's important to note that the community of Overland and Magum falls within the Sandy Bay Census Division as shown in Figure 7.

The communities of Overland and Magum are found in the Georgetown Census Division. According to the 2012 Housing and Population Census, the community of Overland had a total of four hundred and forty-eight (448) households and a population of fourteen hundred and forty (1440) persons. The surrounding communities which include Magum had a total of one hundred and six (106) households, and a population of three hundred and twenty-six (326).

Figure 7: Map of mainland St.Vincent by Census Division (*Source: N/A)*

Table 2: Population of Overland and Magum by 2012 Census Division

	H/H	Population		
		Males	Females	Total
*Waterloo, Orange Hill and Tourama	106	180	146	326
Overland and Big Level	342	734	706	1440
TOTAL	**448**	**914**	**852**	**1766**

3.7 AGE AND SEX DISTRIBUTION OF THE POPULATION

The population of Overland and Magum are all English speaking. Average age of the population is 31 years compared to 33 years nationally. Census data show that males in the census division outnumber females accounting for 51.3% of the population. Approximately 44.8% of the population is under 24 years, and children (0-14 years) account for 26.6%.

Table 3: Age and Sex by 2012 Census Division *(Source: 2012 Population Census)*

Age Cohort	% Male	% Female	% Total
0-4	4.7	4.6	9.3
5-9	4.0	3.9	7.9
10-14	5.1	4.3	9.4
15-19	5.1	4.7	9.8
20-24	3.9	4.5	8.4
25-29	4.0	3.7	7.7
30-34	3.3	3.6	6.9
35-39	4.1	3.4	7.5
40-44	2.9	2.6	5.5
45-49	3.6	3.0	6.5
50-54	2.6	2.4	5.0
55-59	2.2	1.9	4.1
60-64	1.7	1.6	3.3
65+	4.2	4.6	8.8
Total	**51.3**	**48.7**	**100.0**

3.7.1. CHILD AND OLD AGE DEPENDENCY RATIO

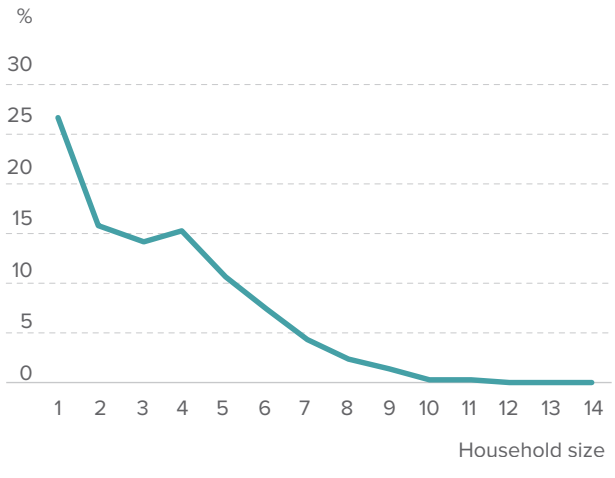
Persons of working age in the division (age 15-64) accounted for 64.6%. The child dependency ratio for the division, defined as the number of children per hundred people of working age, was estimated at 43.4.

The elderly (persons 65 and over), accounted for only 8.8% of the population, and those 85 over, 1.0%. The Old Age Dependency Ratio for the division was calculated at 14 elderly persons per 100 working age persons. Together these indicators form the Age Dependency Ratio (ADR), a measure of the potential economic and social burden placed on working age population. ADR for the division was calculated at 55 dependents per 100 working age persons.

3.8 HOUSEHOLD SIZE

The average household size in the Georgetown administrative division was 3.2 persons, marginally higher than the national average of 3.0 persons per household. Household size ranged from 1 to 14 members. Single person households accounted for 28.6%, 2-4 member households accounted for 45.5% and households with five or more members accounted for 26%.

Figure 8: Distribution of Households by Size - Census Division (2012)



Houses in the division had an average of 3.2 bedrooms. Single person households contained, on average, 2.7 bedrooms and large households, with eight or more persons, had an average of 3.9 bedrooms.

Table 4: Average no. of Bedrooms by Household Size – Census Division

	Household size	Average number of bedrooms
	1	2.7
	2	3.1
	3	3.2
	4	3.4
	5	3.4
	6	3.6
	7	4.0
	8+	3.9
Average household size	**3.2**	**3.2**

3.9 AGE CATEGORY AND UNION STATUS OF HOUSEHOLD HEADS

The majority of household heads in the division were 30 years and older. Forty point four percent (40.4%) were in the 45-64 age category, 29.5% in the 30-44 age category and 21.4% were 65 years and over. As it relates to union status, only 16.6% of household heads in the division were married and living spouse according to the Housing and Population Census, 2012. Another 18.3% lived together in a common law union, while 32.4% were not in a union, and 16.5% never had a spouse or common law partner.

Table 5: Age Category and Union Status of Households Heads – Census Division

Age category	%	Union Status	%
Under 15	-	Never had a spouse or common-law partner	16.5
15 - 29	8.7	Married and living with spouse	16.6
30 - 44	29.5	Common Law Union	18.3
45 - 64	40.4	Visiting partner	16.1
65 +	21.4	Not in a Union	32.4
		Not stated	0.2

3.10 EDUCATIONAL ATTAINMENT

3.10.1. ENROLMENT

The Tourama/Overland Primary School is the only educational institution in the Overland area. There are no Secondary schools within the village. The nearest secondary school is the Sandy Bay Secondary school. A daily subsidized school bus service is accessible to students from Overland, Magum and the other surrounding areas to commute to and from these schools.

In 2012, approximately 27.6% of the population of this Census Division was enrolled in full or part-time education. Institution types ranged from nursery to tertiary and adult learning institutions.

Table 6: Enrolment at Educational Institutions in Proximity to Overland/Magum
(Source: Education Statistical Digest SVG 2017/2018)

Type	Description	Enrolment	Number of Teachers	Pupil/ Teacher Ratio
Primary	Tourama Government School	95	11	9
	Georgetown Government School	216	21	10
	Disckson Methodist School	74	7	11
	Pamelus Burke Primary	158	13	12
	Langley Park Government	365	16	23
Secondary	Sandy Bay Secondary	245	20	12
	Georgetown Secondary	458	34	13

Table 7: Enrolment in Educational Institutions – Census District

Type of Institution	Enrolled
Day care/Nursery	3
Pre-School	183
Special Education	12
Primary School	749
Secondary	578
Technical/Vocational	13
Professional	1
Community College	67
University	53
Adult Education	11
Other	5
Not Stated	147
Total	**1 824**

3.10.2. EDUCATIONAL ATTAINMENT

Data from the 2012 Housing and Population Census shows a highlevel completion rate of primary education for adults 18 and over in the division (90.7%). Completion rates for secondary and tertiary education however were much lower at 38.8% and 2.7% respectively. Notably there were higher levels of completion rates of secondary education among the youngest age group (18-24).

This trend was also repeated among household heads in the division. Eighty-eight point three (88.3%) percent of household heads had completed primary education, but only 25.0% had completed secondary education. A smaller proportion (2.8%) accessed and completed tertiary education.

Figure 9: Educational Attainment by age and sex – Census Division (Educational Digest 2017/2018)

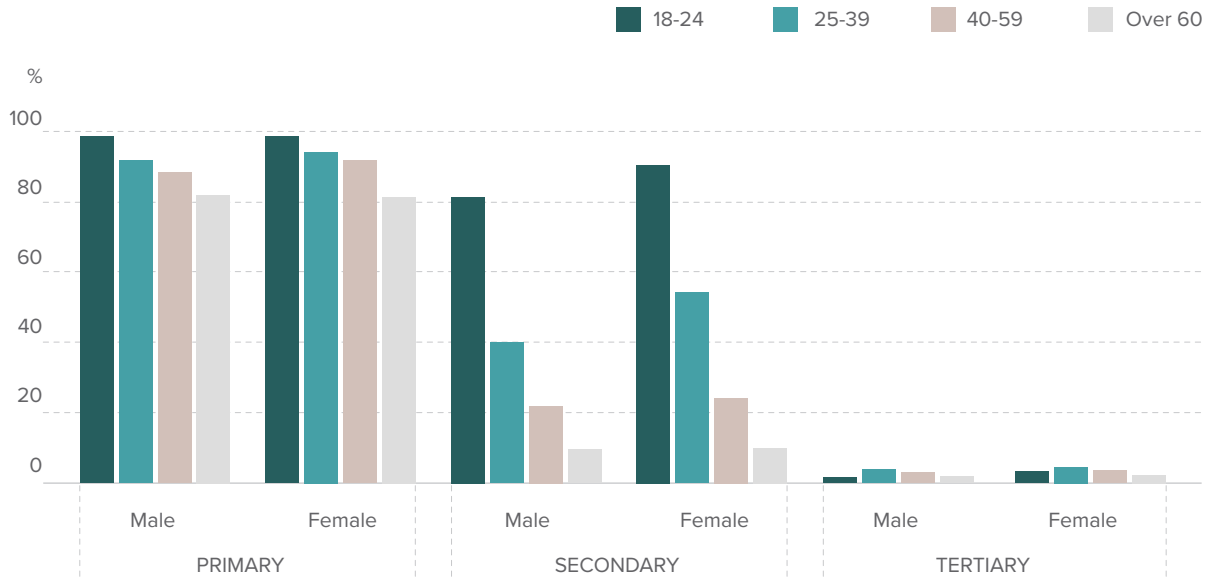
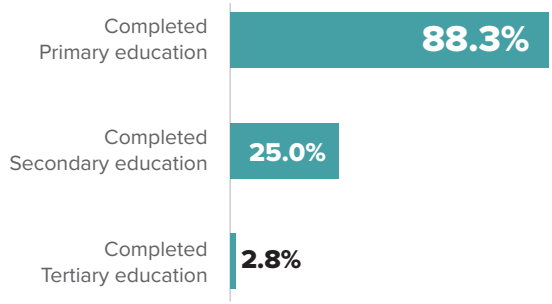


Figure 10: Educational attainment of Heads of Households – Census Division (Educational Digest 2017/2018)

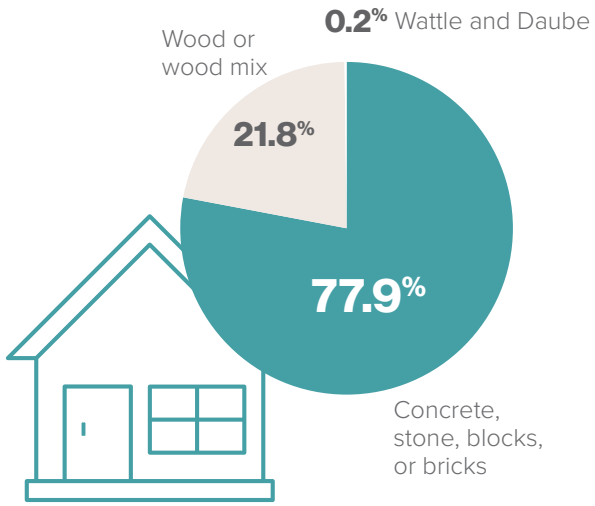


3.11 HOUSING QUALITY

The houses in the Overland and Magum communities are constructed mainly of a combination of concrete and wood. The houses are in a good to fair condition with some structures in need of minor repairs and a facelift. Only a few dwellings are in poor physical condition. Transect walks and observations revealed that close to 70% of the houses are wall structures and wooden (board, plywood), while original structures account for 30% of the homes.

Data from the wider Georgetown division follow a similar trend. Seventy-seven point nine percent (77.9%) of homes were constructed with blocks, concrete, stone or bricks, and 21.8% constructed with wood only, or mixed with galvanize, block and concrete. A small number in the division were constructed from poor materials (wattle and daube) (0.2%).

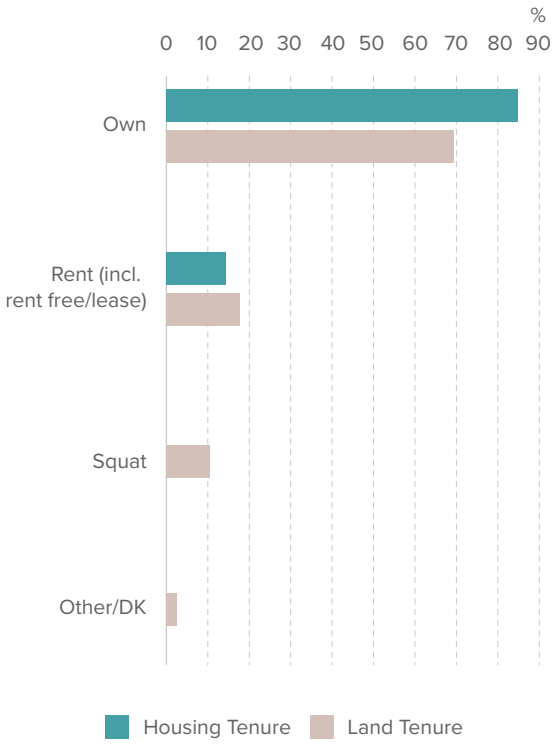
Figure 11: Main Material of Outer Walls



3.11.1. HOUSING AND LAND TENURE

The majority of households (83.8%) occupied their own homes while 16.7% occupied homes that were rented (including non-paying) or leased. A smaller proportion of households (62.9%) in the division own the land on which their homes reside. Twenty-two point five percent (22.5%) occupy via a rent or lease and 11.5% via capture.

Figure 12: Housing and Land Tenure – Census Division (2012 Population Census)

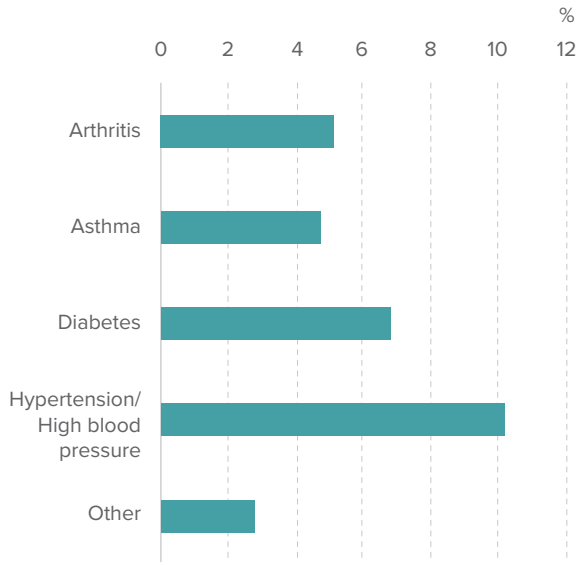


3.12 HEALTH & SANITATION

3.12.1. HEALTH

Twenty-four point four percent (24.4%) of the population of Georgetown division reported at least one health condition in 2012, and 6.6% reported suffering with two or more illnesses. Chronic conditions commonly faced by residents in this location were hypertension/ High blood pressure (10.2%), diabetes, diabetes 6.8% and arthritis 5.1%. Other conditions commonly faced include asthma, sickle cell, heart disease and stroke.

Figure 13: Chronic Diseases by Census Division – 2012 Population Census



3.12.2. HEALTH CARE INSTITUTIONS

There is one (1) Health Clinic that serves the entire community. This clinic is housed in a building that was formerly a church. The closest hospital is the newly built Modern Medical Diagnostic Complex, which is approximately (9Km) or about fifteen (15 minutes) from Overland.

Table 8: Health Care Institutions – Census Division

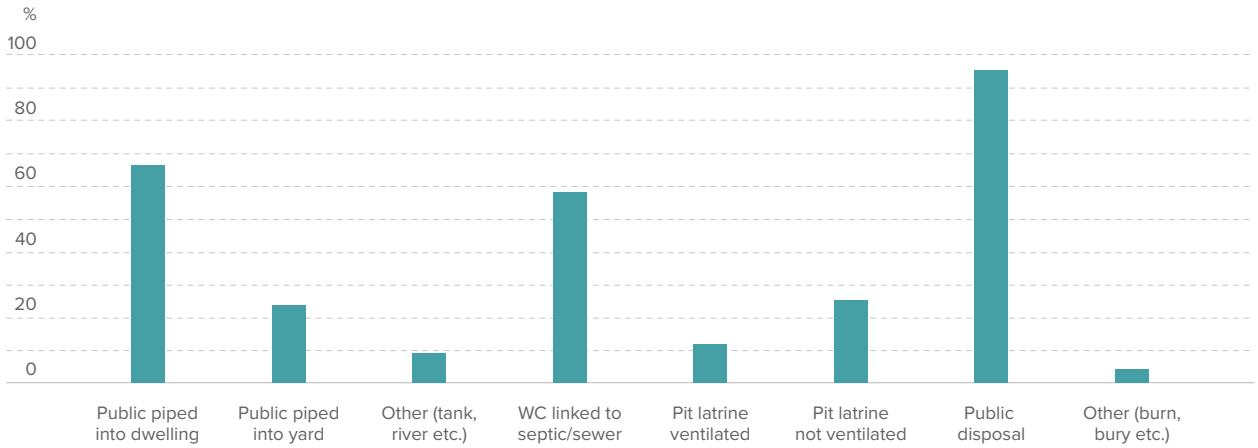
Facility	Service Offered	Condition of Building
Overland Clinic	General Medical Attention	Poor
Georgetown Modern Medical Complex	General, Specialised and Diagnostic Medical Care	Excellent (New)

3.12.3. SANITATION

General sanitation in the Overland and Magum communities is through water closets and a few pit latrines. Fifty-eight point seven percent (58.7%) of households in the division have water closets linked to a septic tank or sewer, 12.3% use a ventilated improved pit latrine and 25.4% use a non-ventilated latrine. Water supply source is mainly through public piped into dwelling (66.6%) or into yard (24.1%). Some villagers make use of the river as a water source.

Garbage disposal in these two communities is not a problem. The villages have a reputation for cleanliness and are holders of the best kept village competition for five consecutive years 1992-1995. Garbage is collected every Monday throughout the communities by the solid waste department of the Central Waters and Sewerage Authority and 95.6% of household dispose of garbage through the public disposal system.

Figure 14: Water Source, Toilet Facilities & Garbage Disposal by Census Division (2012 Population Census)



3.13 SOCIAL SERVICES

For the period 2017/18, approximately ninety-seven percent (96.81%) of students attending the Tourama Primary School benefitted from the services offered by the School Feeding Programme.

Table 9: Students Benefitting From School Feeding Programme – Census Division SVG Educational Statistical Digest 2017/18

Facility	School Feeding Enrollment	No. of Students benefiting	% Benefiting
Tourama Primary School	95	95	100

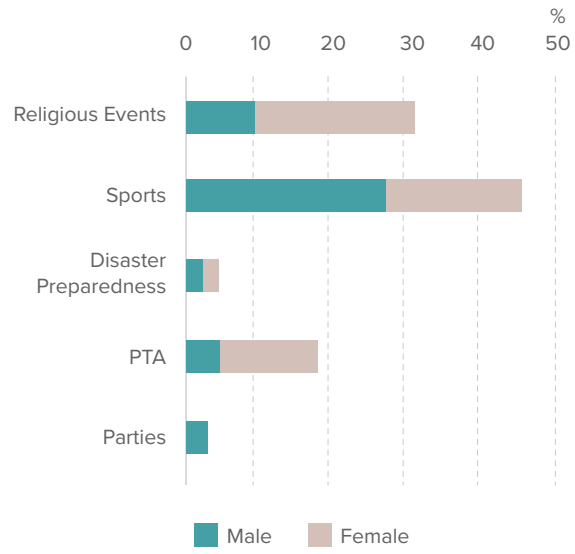
3.14 CRIME AND PUBLIC SAFETY AND OTHER COMMUNITY ISSUES

In the Magum and Overland communities there is little to no criminal activity, as persons try to be their brother's keeper. In a survey conducted in October 2018 in the community, farmers have not complained of any praedial larceny of neither crops nor animals. There are no overgrown trees and there is one derelict building close to the road.

3.15 METHODS OF COMMUNITY ENGAGEMENT

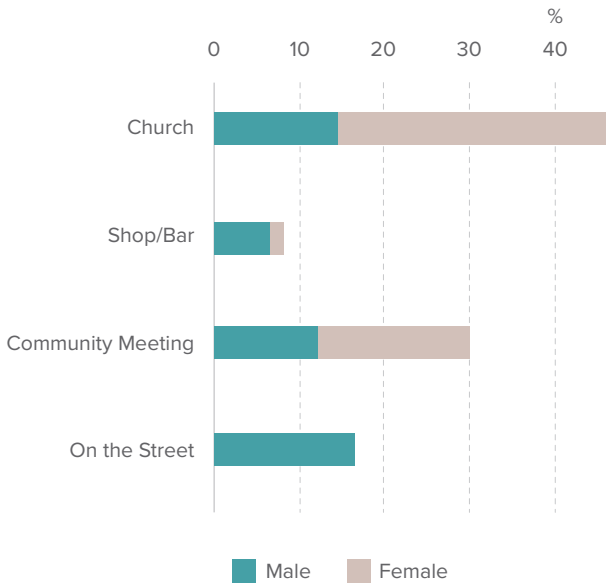
In a survey that was conducted October 2018, sports and religious events are the activities most commonly patronized by members of the Overland community.

Figure 15: Most Patronized Community Activities (CES, 2018)



The Figure 16 below shows that overall in the community members displayed a preference for a church setting or a community meeting for receiving information on community activities. Males almost equally preferred an informal setting on the street.

Figure 16: Preferred Venue for Community Engagement (CES, 2018)



Respondents showed a preference toward Saturdays (37%) and to a lesser extent Sundays (16%) for engaging in community activities.

3.16 DEVELOPMENTAL CHALLENGES

Residents identified the following issues as the main challenges impacting the Overland community:

- Unemployment was #1 issue affecting the community. It was ranked number one by 49% of respondents, and a top-5 issue by 73% of persons overall.
- Drugs and drug abuse was the #2 most commonly ranked issues affecting the community (43% of respondents).
- Respondents also mentioned a general lack of facilities, resources, education and overall development in the community as the #3 most common issue (33%).

During the 2016 RCCVA investigation, the following main challenges were identified:

1. Marketing of agricultural produce (farmers are primarily dependent on (Traffickers[3])
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.

[3] 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

In a Community Engagement Survey conducted in October 2018 in the community, perceptions of community groups were positive. Forty-two (42%) said they would be "good thing." Six percent (6%) said they were "poorly managed", not serious and "did not last long". Fifty-seven (57%) believe they have a role to play in the community. Sixteen (16%) play a role through membership in a community groups.

Figure 17: Perceptions of Contribution to Community Development (CES, 2018)

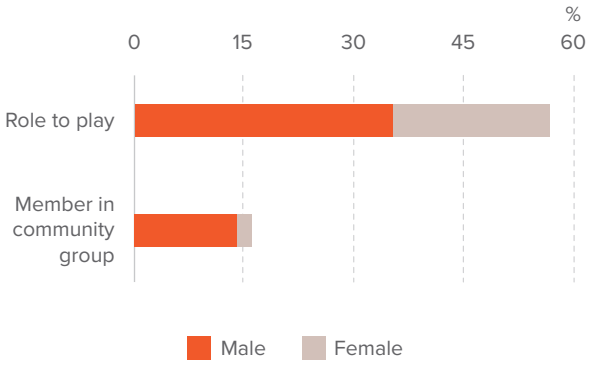


Figure 18: Perceptions of Community Groups (CES)

4.2.1. TYPES OF COMMUNITY GROUPS

OVERLAND YOUTH IN AGRICULTURE

President:
Ms. Sophia Byron

The Overland Youth in Agriculture Group has developed its group to the point of coming up with a mission, vision, and objective.

Vision:
The Leading Youth Organisation in Overland which helps to empower, develop and create employment opportunities to young persons.

Mission:
To become the leading and richest agricultural group through training, team building and effective and innovative strategies that benefits the community and its members.

Objectives:

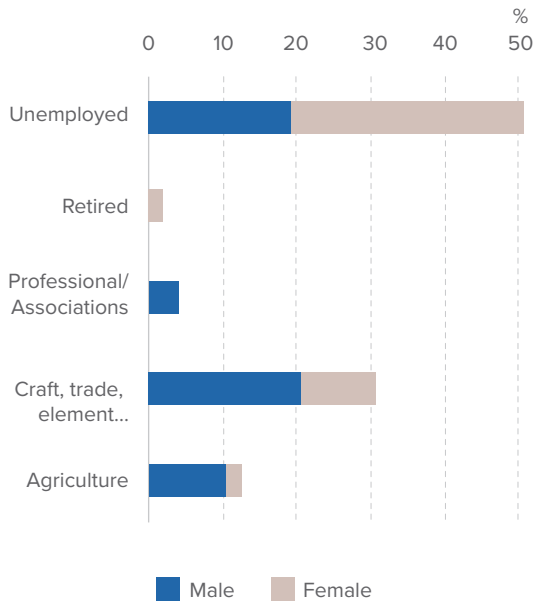
- To provide training activities in agriculture on a day to day basis to all members by April 30, 2020.
- To host an Agricultural sensitization session to encourage youths to accept agriculture as a viable means of employment by June 2020.

5 Economic Profile

Unemployment was the number (#1) issue affecting the community. It was ranked number one by 49% of respondents, and a top-5 issue by 73% of persons overall.

Information gathered using the community engagement survey revealed that Fifty-one (51%) of residents said that they were unemployed. A combined total of 30% were employed in craft, trade and elementary jobs such as domestic workers and block makers. Approximately 2% are retired, all of those being females. More than 12% are into the agriculture industry as farmers, the professional residents are about 4% which are also only females. The area of craft, trade and elementary is made up of 30% of which 20% are females.

Figure 19: Occupational Status (LBA, 2019)



OCCUPATION & SKILLS

- Farmers (Male & Female)
- Labourers (farmers assistant) (Male & Female)
- Mechanics (Male)
- Nurses (Female)
- Teachers (Male & Female)
- Preacher (Male)
- Police (Male)
- Shopkeeper (Male & Female)
- Fisher folk (Male & Female)
- Van drivers (Male)
- Truck driver (Male)
- Drivers (Available to drive truck or van upon request) (Male)
- Tradesmen (Carpenters, Mason, Tiles men, and laborers) (Male)

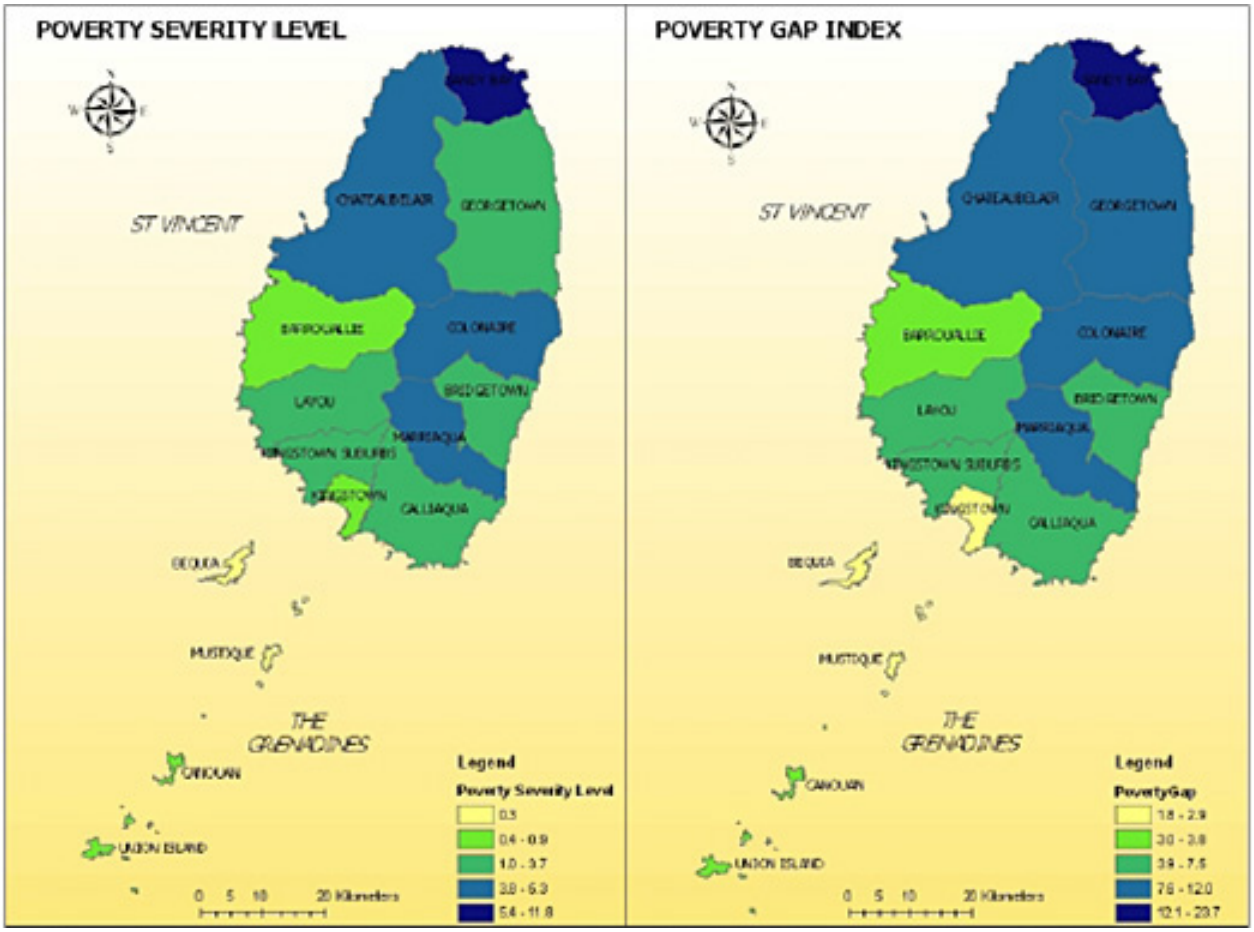
5.1 FINANCIAL SERVICES

There is no banking facility in the Overland and Magum community. The Bank of S.V.G has several Branches throughout the country with one being located in Georgetown. This is the closest Banking Facility. It is about 9 km from Overland and about ten (10) minutes drive from Georgetown.

5.2 POVERTY LEVELS

Figure 20 (below) from the Survey of Living Conditions/Country Poverty Assessment (KAIRI, 2007/2008) shows that Overland and Magnum experiences the highest level of poverty ranking in the island.

Figure 20: Poverty Levels by Census District *(Source: Kairi, 2007/2008)*



6 Vulnerability and Hazard Profile

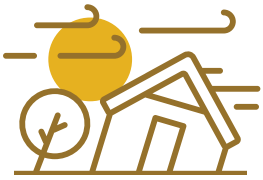
St. Vincent is exposed to high levels of risk to meteorological (high wind, extreme rainfall, hurricanes, and drought) and geophysical (earthquakes, volcanic eruptions, tsunamis) hazards, which have significant negative impacts on economic development, fiscal stability, and communities. Some of these 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 steep 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[4] (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 22) 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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[4] http://www.charim.net/stvincent/information

Figure 21: Soil erosion map of St. Vincent. *(Source; Government of SVG 2011.)*

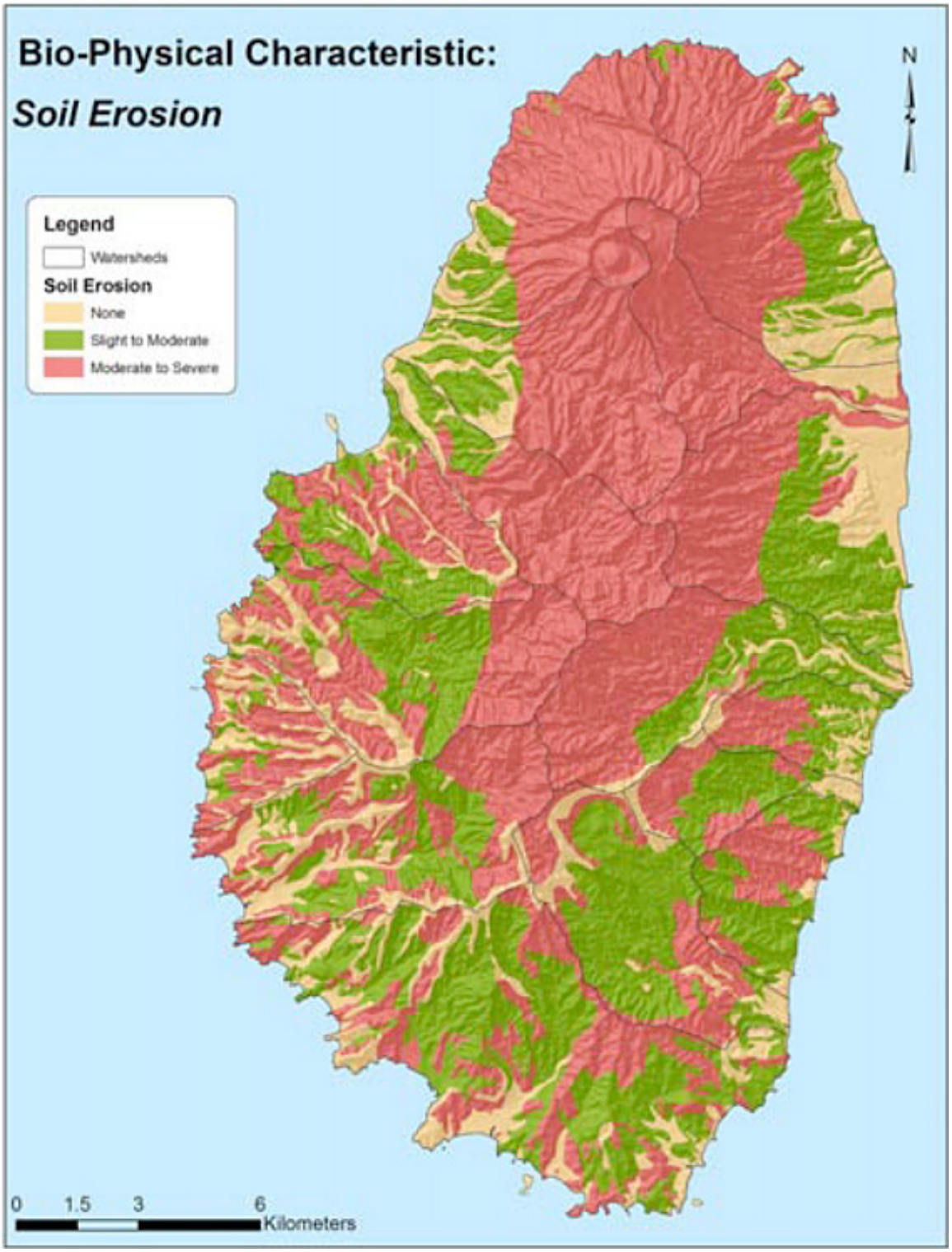
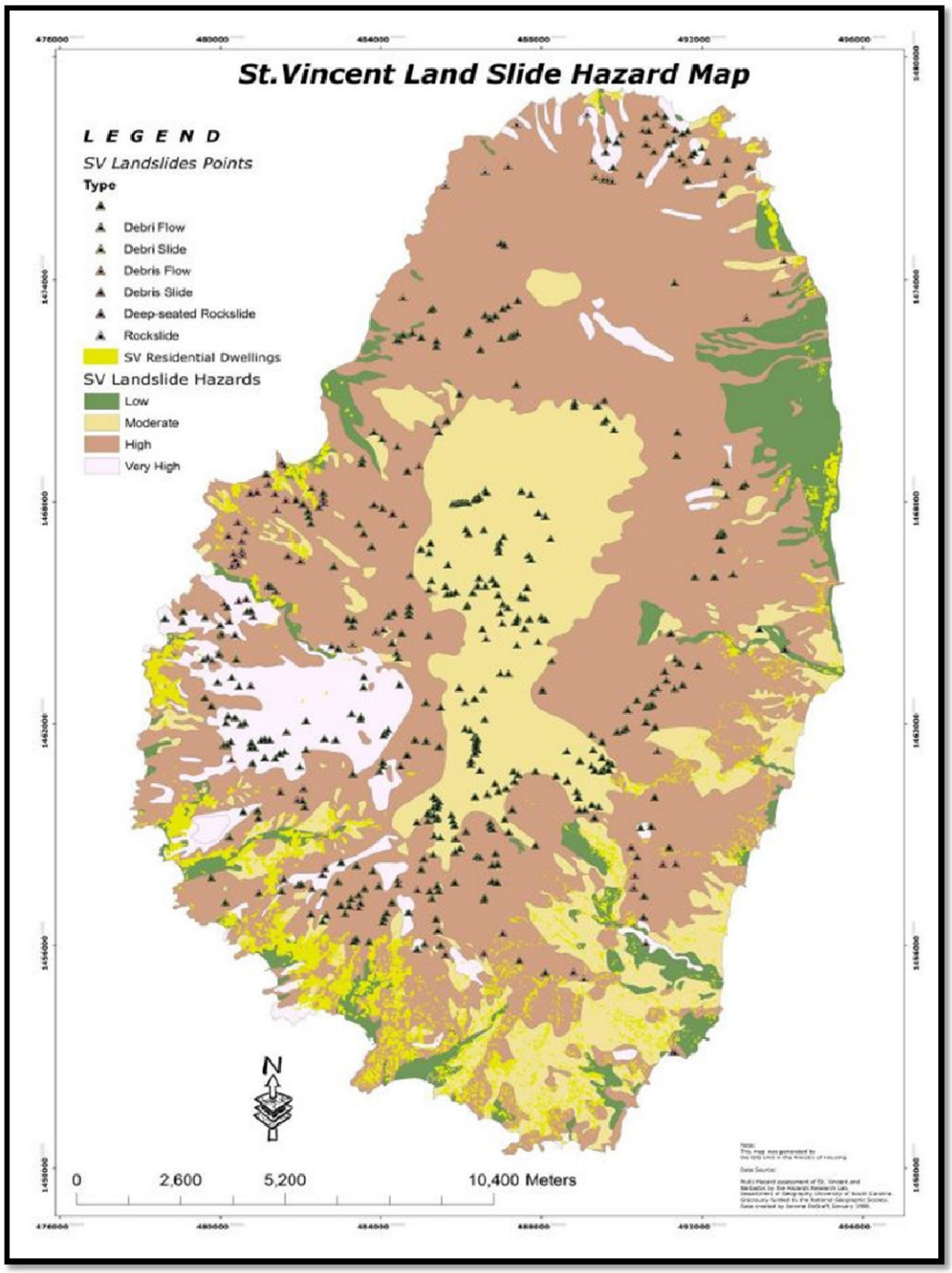


Figure 22: Landslide Hazard Map – St. Vincent *(Source, cited in Joslyn, 2008)*



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[5] (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[6]) at category VII or VIII (potentially damaging) in the past 200 years, although actual damage reports for these events are not readily available.

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.

[5] Modified Mercalli Intensity scale

[6] 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

Figure 23: 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.

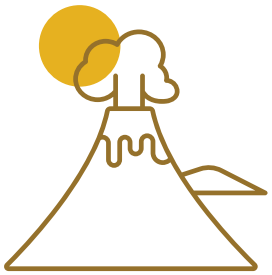
VIII. Destructive
Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly builts structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.

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.



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).

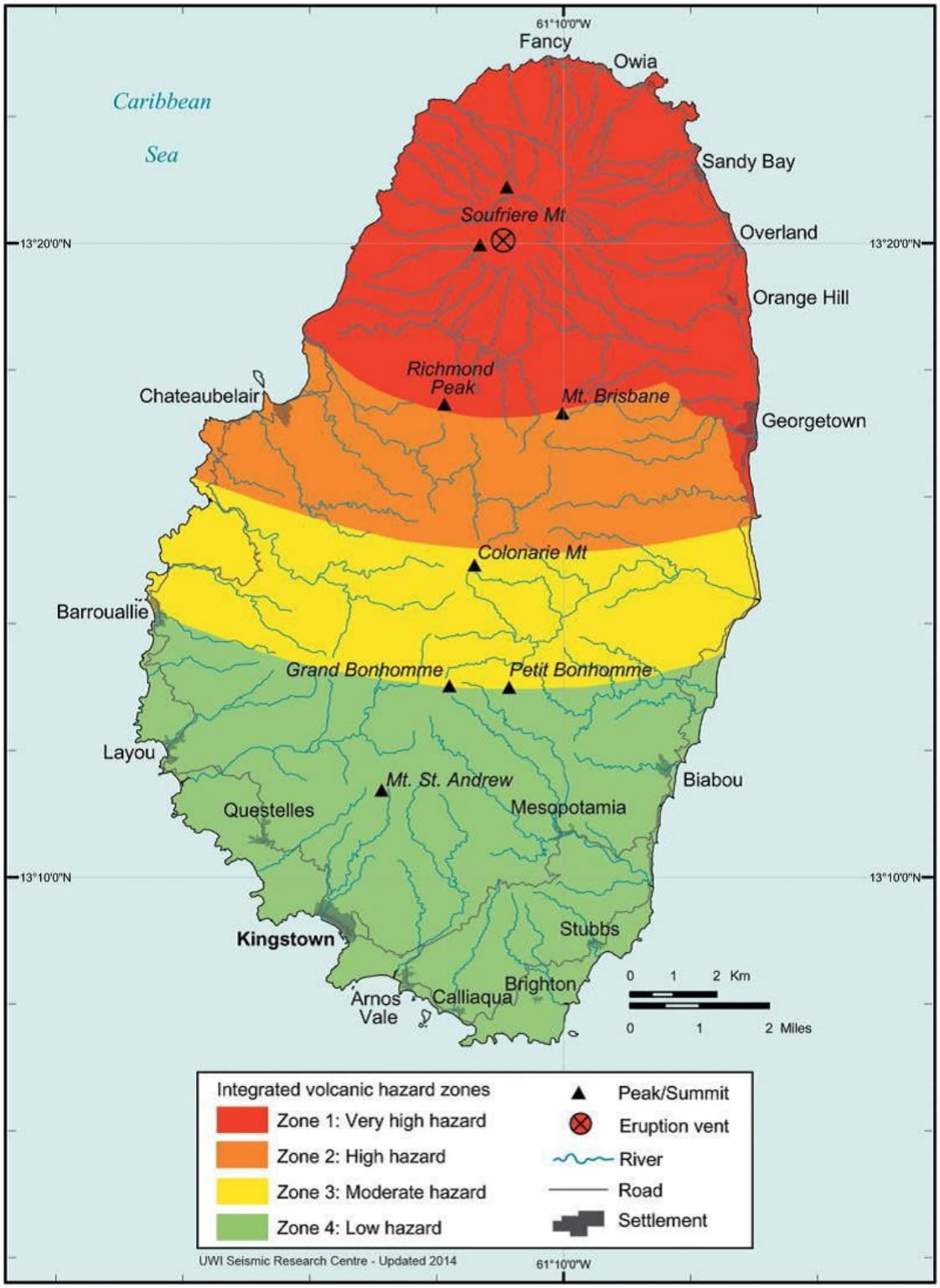
Figure 24 shows the various volcanic hazard zones for the whole island of St. Vincent and shows that Overland and Magnum which are in the Sandy Bay Census Division, are the Red Zone.

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 18: 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 9: 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 11 presents these hazards and the types of impacts they can be expected to cause.

Table 11: 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 OVERLAND AND MAGUM

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.

The community suffers from the occasional land slippage due to the hilly terrain overlooking the coastal lands. The coastal lands suffer from storm surges with the last major event taking place 2103 that left significant damages to property. Several houses are found within the river bed and along the banks. Additionally, livestock housing is erected along the river pathways which become affected during storm surges and heavy rains. Abandoned and useless structures are still evident in the river or gutter ways area of the community.

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. Hurricanes, storm surges and flooding were the three main natural hazards cited by residents shown in table 2. Hurricane was identified as the predominant hazard as the flooding and storm surges normally happens during the hurricane season. The overall impact of the Hurricane, especially when accompanied by storm surges was seen as significant given the loss of homes and crops.

A Community Engagement survey administered in Overland revealed the following:

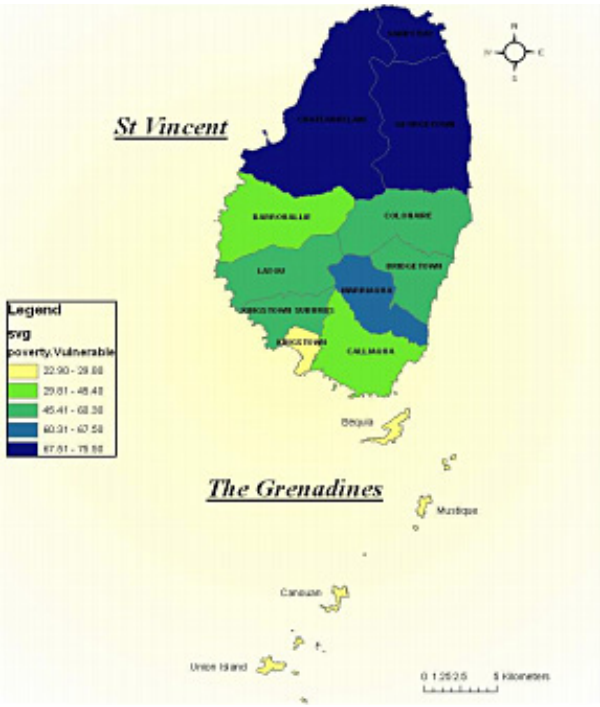
- Ninety-six percent (94%) of persons could identify an emergency shelter in the community.
- Only 12% believed there was a community disaster plan and 4% had seen evidence of this plan.
- Twenty-seven (27%) of persons reported having family disaster plans.

KoBo Tool box analysis showed that 30% of persons did not take any precautionary measures to prepare for any hazardous event and the Community Engagement survey indicates that Ninety-six percent (98%) of persons could identify an emergency shelter in the community.

Table 12: Overland Hazard Matrix

Hazard Type	Frequency (When)	Season (Month)	Geography (Where)	Typical Damage (Max=5)	Typical Loss (Max=5)	Overall Impact on lives and livelihoods
Landslides	2010	Oct - Nov (Hurricane Season)	Overland School Corner	5	5	• Relocation • Loss of Livestock • Partial land loss • Loss of sanitary facilities • Damaged and blocked access route to schools, farmlands and regular traffic
	2013	December				
	2019	December	Magum- deep corner	4	4	
Flooding (Road Blockage)	2010	December	Savannah or Bristol Corner	4	4	
			Overland river	5	5	
	2013					
			Noel Road	3	3	
	2019					

Figure 25: 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.

It was evident that NEMO has 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.

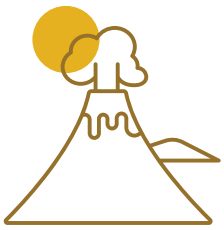
To also seek to effectively incorporate climate change in the proposed initiative, it will be important to broaden the focus from the volcanic hazards to the "volcanic environment" in general In other words, to determine how the presence of the volcano creates other hazards that can interact with or 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[7])
- 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 challenging. 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.

[7] 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 13 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)[8] 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.

[8] 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 13: 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 26 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 26: Vegetation changes (NDVI) using Sentinel 2 after April 10th 2021 (left: Jan1-Apr9 and Right: Apr10-Apr26)

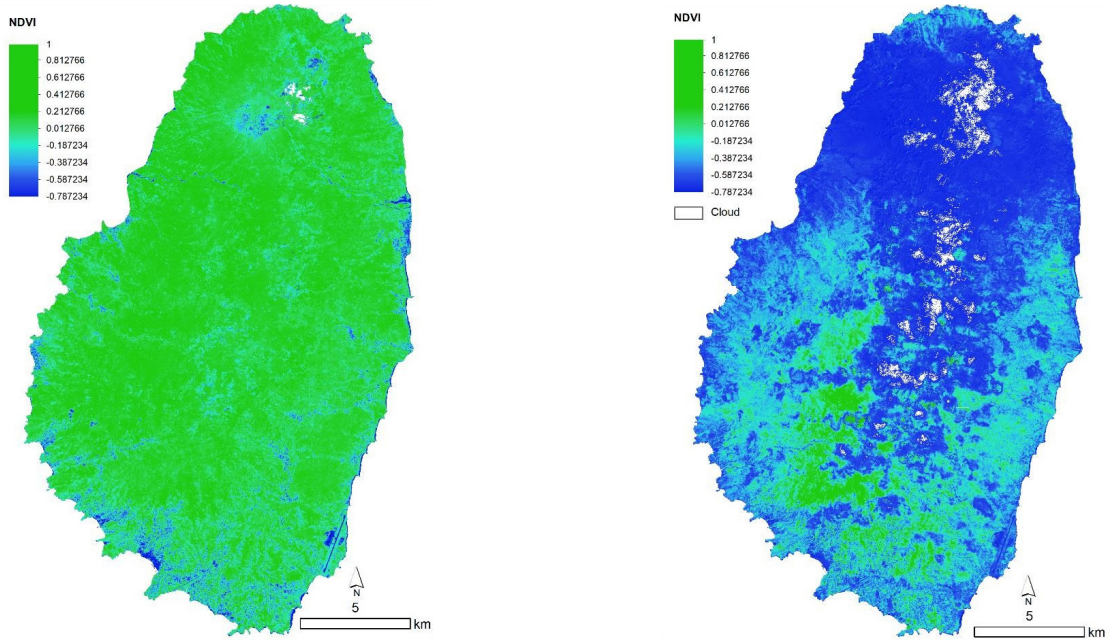
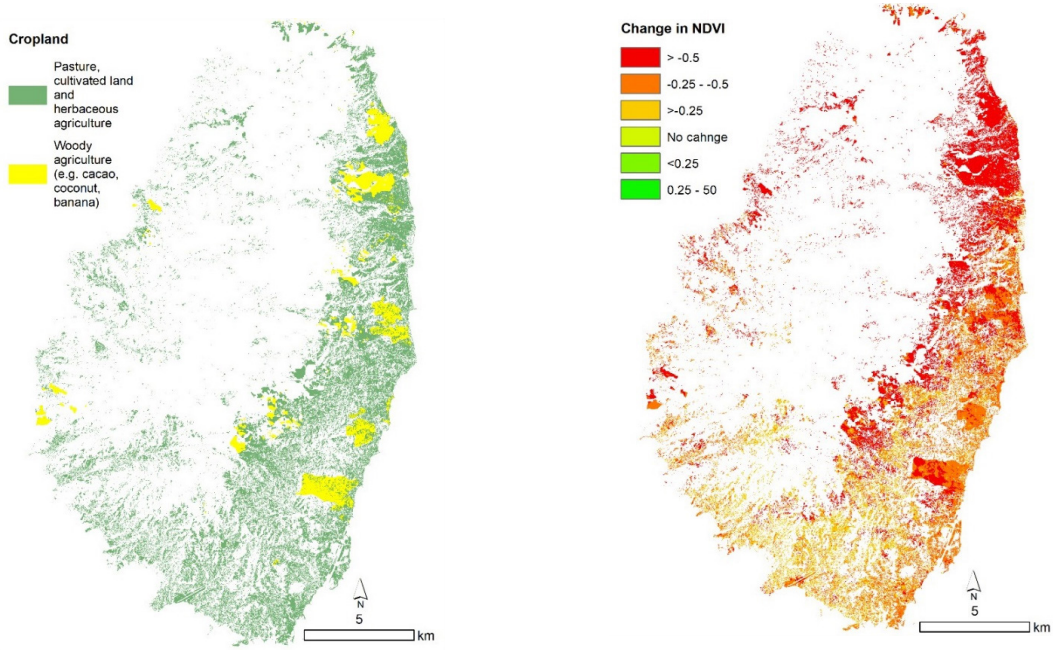


Figure 27 illustrates type of damage and changes in NDVI for specific types of land cover, including pasture, crops, and woody agriculture (tree crops).

Figure 27: 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 14 and 15 provide further detailed estimated area of damage and the types of changes in vegetation and crop land in each of the hazard zones.

Table 14: 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 15: 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 16: 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 28: Map of St. Vincent Showing Agricultural Districts and Hazard Zones

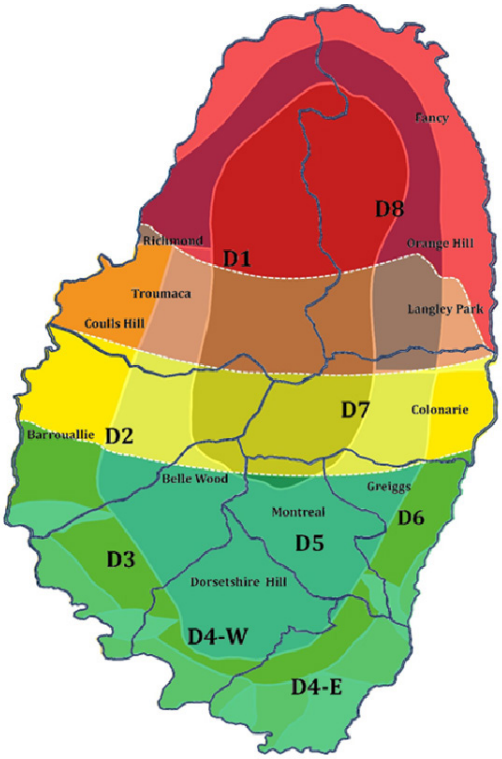


Figure 28 Composite map of St Vincent including Agro-ecological zones (CARDI), Agricultural Regions and Districts (MAFFRTIL) and Volcanic Hazard Zones (UWI SRC). Layers and overlays put together by Colville King, Diversification Officer MAFFRTIL, April 2021.

The National Emergency Management Organization (NEMO) reported that a total of 13,303 persons[9] 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 17: 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 25 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.

[9] 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.

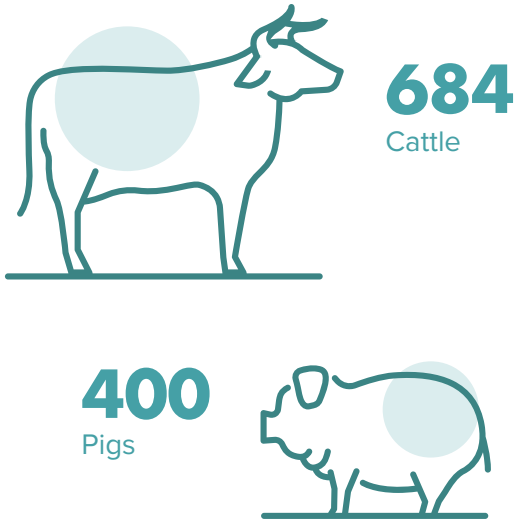


Table 18: Livestock Damage and Loss

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 19: 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 20: 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 21: Fish Landing loss

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

7.5 FORESTRY

The DaLA 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 22: 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.

Table 23: 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

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 23 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.

7.7 VULNERABLE GROUPS

According to the United Nations[10] 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[11] 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 a field 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[12] 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.

[10] United Nations. April 2021. UN Global Funding Appeal. Explosive Eruption of Soufriere Volcano: St. Vincent
[11] Lesbian, Gay, Bi-Sexual, Trans, Queer
[12] 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

Focus group participants in Overland identified five (5) main types of livelihood categories within the community, namely: Farmers, fishermen, carpentry, teaching and hunting.

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.

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.

The community suffers from the occasional land slippage due to the hilly terrain overlooking the coastal lands. The coastal lands suffer from storm surges with the last major event taking place 2103 that left significant damages to property. Several houses are found within the river bed and along the banks. Additionally, livestock housing is erected along the river pathways which become affected during storm surges and heavy rains. Abandoned and useless structures are still evident in the river or gutter ways area of the community.

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.

Evidently farmers who depend on bananas, plantains and those persons who fall in the service provider livelihood category are most affected by the Hurricane. Banana and plantain farmers suffer significant losses to crops already planted therefore harvest or reaping is drastically reduced leading to significant financial losses. In the case of the service provided, households seemingly cut back on their usage as more urgent recovery strategies, such as rebuilding and money for food take precedence.

Table 24: Overland Livelihood Assessment Matrix

Activities	Skills Needed	Tools & Equipment Needed	Natural Resources
Farming • Bananas • Sweet Potato • Eddoes • Tania • Plantains • Watermelons • Peppers • Arrowroot	Knowledge of: • Plowing & Clearing land • Planting & Harvesting • Soil type & Soil ph • Weather Patterns • Planting techniques • Maintenance of crops & tools	How To Use: • Spray cans • Fertilizers • Cutlass, rakes etc • Hoe • Scoop • Wheelbarrow • Spray Can • Tractor • Fork • McDonald Almanac • Plower • Watch house	• Land • Sunlight • Rain • Man Power
Mechanic	Knowledge of: • Vehicle repair • Vehicle parts • Driving skills • Vehicles • Vehicle Problem sound	How To Use: • Safety Gear • Jack • Spray gun • Compressor • Wheel spanner • Sockets • Sand paper • Gas • Flashlight • Welding equipment • Foller • Grinder • Dust mask	• Land • Man power • Water • Sunlight
Shopkeepers	Knowledge of: • How to count money • Measurements & weights • How to communicate with customers • Inventory of goods • Bookkeeping	How To Use: • A Scale • Measuring equipment • Calculator • Cash register	• Land • Man power • Water • Sunlight

Table 25: Overland Seasonal Calendar – Normal Year

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Farming:												
Banana	X(P)	X	X	X	X	X	X(H)	X	X	X	X	X
Sweet Potato	X(P)			X(R)	X(P)				X(R)			
Eddoes	X(P)	X	X	X	X	X(H)	X	X				
Tannia	X(P)	X	X	X	X	X	X	X	X(H)	X	X	X
Plantains	X(P)	X	X	X	X	X	X	X(H)	X	X	X	X
Watermelon	X(P)	X	X(H)	X	X	X	X	X	X	X	X	X
Peppers	X(P)	X(H)	X	X	X	X	X	X	X	X	X	X
Arrowroot	X(P) (H)	X	X	X	X	X	X	X	X	X	X	X
Construction	X	X	X	X	X	X	X	X	X	X	X	X
Shopkeeprs	X	X	X	X	X	X	X	X	X	X	X	X
Mechanics	X	X	X	X	X	X	X	X	X	X	X	X

Key: Plant (P) Harvest (H)

Table 26: Overland Seasonal Calendar – Hazard Year

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Farming: Banana		X(P)	X	X	X	X	X(H)	X	X	X	X	X
Sweet Potato												
Eddoes			X(P)	X	X	X	X	X(H)				
Tannia	X	X	X	X(P)	X	X	X	X	X	X	X	X(H)
Plantains			X(P)	X	X	X	X	X	X	X(H)	X	X
Watermelon		X(P)	X	X(H)	X	X	X	X	X	X	X	X
Peppers			X(P)	X(H)	X	X	X	X	X	X	X	X
Arrowroot		X(P) (H)	X	X	X	X	X	X	X	X	X	X

Key: Plant (P) Harvest (H)

Effects:
Reaping is significantly reduced in the hazard year due to loss of crops.
Eddoes, Tannia and arrowroot are more resilient to Hurricane as they are root crops. Harvesting and Planting are slightly affected when there is a landslide.
Bananas, plantains, watermelons and peppers will be affected widely and therefore those crops will have to be replanted from beginning.

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 the residents, the main strategies they use to cope with the fallout from hazards are to seek government assistance in the form of seedlings, banana and plantain suckers, equipment and housing material. Borrowing, remittances and doing odd jobs were also listed as coping strategies. Whilst these strategies help them to cope, they also threaten negative long-term effects such as conflicts due to the borrowing, frustration and ultimately depression.

Table 27: Overland Coping Strategy Inventory

Likely Climate Impact (Flooding & Landslides)	Coping Strategies	Positive Impacts	Negative Impacts
Loss of Crops	Assistance from government: • Seedlings • Farming Equipment • Loans from Credit Services • Use up Savings • Do odd jobs • Borrow from friends and family	• Families are able to recover quickly. • Quick access to needed funds to purchase necessities. • Families will not starve • Help to provide for your family. • Families will not starve.	• Having to start over crops. • Political Favoritism. • Increase Debt. • Depletion of savings can lead to more hardships. • Uncertainty, frustration and depression. • Can create tension and damage relationships.
Loss of Livestock	Assistance from Government: • Provide replacement livestock	• Able to increase stock by breeding	• Subsidiary cost of Livestock
Damage To Roads	Assistance from Government: • Workmanship and Material provided to fix roads	• New and improved roads and pathways • to farms and main roads so residents can resume normal living	• Impassable road, which prevents residents from going to their work, school and farms.

10 Response and Recovery Typologies

While individuals employ their own responsive mechanisms/coping strategies, external interventions are sometimes required for the effective and efficient restoration of livelihoods.

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 OTHER TYPES OF HAZARDS

In the event of a hurricane and/or storm surge, possible responses post-disaster could include the replacement of farming equipment for economic purposes and dwellings for Shelter. The clearing of the main drains in the district post-flood would alleviate excess flood waters.

Table 28: Overland Livelihood Response Typologies for Farmers

Type of Response Needed	Geographical Area	# of Households likely to be affected	Required quantity (US$)	Duration	Cost (US$)	Responsibility
Flooding:	Overland & Magum					
Replacement cost of plant material:						
Sweet Potato		47	14,520 plants @$0.37x12 acres	One-off	64,469	Min. of Agri.
Tannia		43	4,840 plants @$0.74x9.5 acres	One-off	34,025	
Eddoes		29	11,616 plants @$0.74x5 acres	One-off	42,979	
Cost of production per acre*:	Overland & Magum					Min. of Agri.
Sweet Potato		47	12 acres@$1,098		13,176	
Tannia		43	9.5 acres@$2,216		21,052	
Eddoes		29	5 acres@$1,519		7,595	
Loss of Livestock due to landslide:	Overland & Magum					Min. of Agri.
Goat and Sheep		48	20 @$111	1-2mths	2,220	
Chicken (Layers)		2	100 @47.41	6 wks	4,741	
Support for house repairs	Overland & Magum	20	$925.93 per structure	One-off	18,519	Min. of Housing
Rental Assistance	Overland & Magum	10	222.22 per month	6 months	13,333	Min. of National Mobil.
Interim assistance benefit	Overland & Magum	20	184.19 Per month	9 months	33,154	Min. of National Mobil.
Basic amenities & disaster relief	Overland & Magum	20	444.44	One-off	8,889	Ministry of National Mobil.
4. Uniform assistance	Overland & Magum	50	$55.56 per student	One-off	2,778	Min. of National Mobil.
Meals & transport subsidy	Overland & Magum	50	$66.67 per student	9 months	30,002	Min. of National Mobil.

*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			

ANNEX 5 – REFERENCES

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