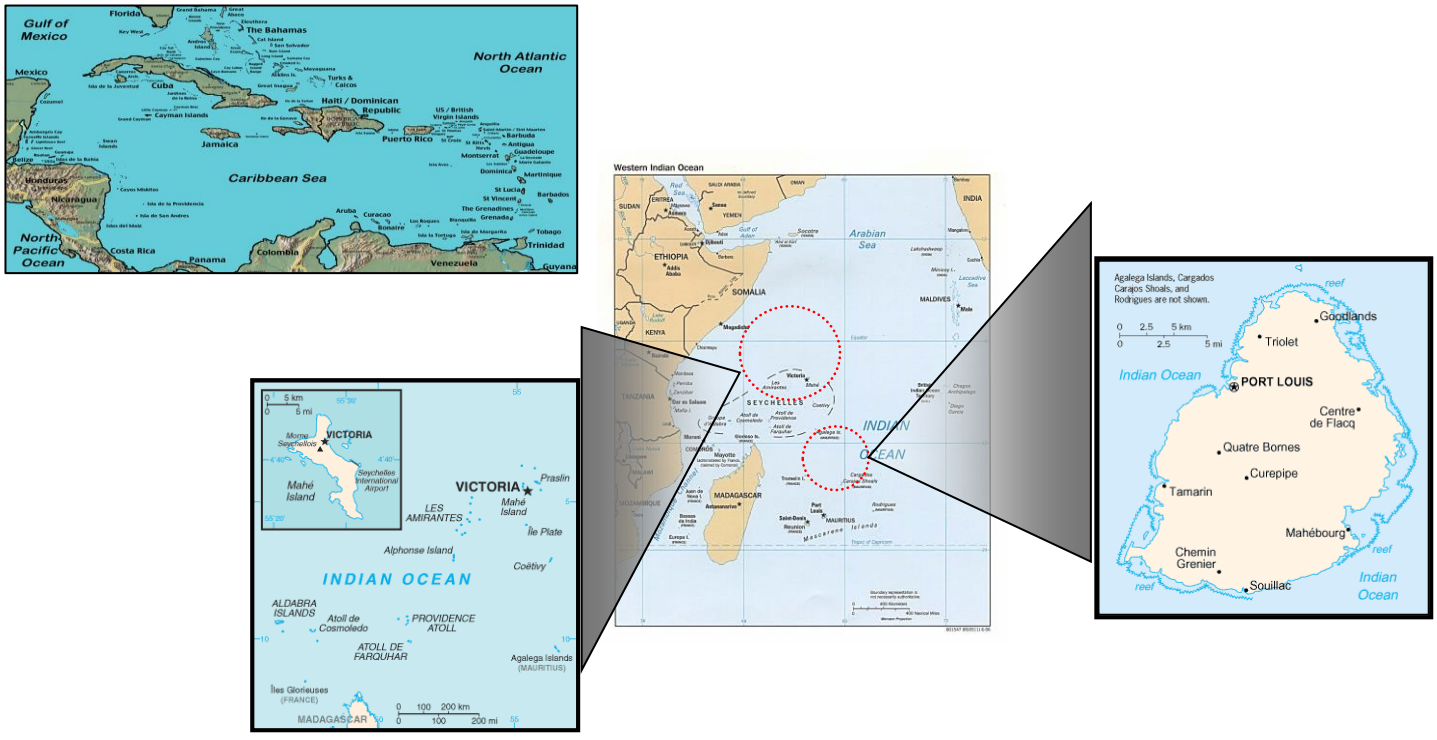
Working Paper Series

GIVRAPD
Global Islands' Vulnerability Research Adaptation Policy and Development

Contrasting Coping in the Caribbean and the Indian Ocean



Undertaken on behalf of Caribbean Risk Managers (CaribRM)

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v.2.1.

Micro-insurance Research Stream

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Contents

Tables

Figures

Global Islands' Vulnerability Research, Adaptation, Policy and Development (GIVRAPD): Microinsurance Component

Contrasting Coping in the Caribbean and the South West Indian Ocean

Global Islands' Vulnerability Research, Adaptation, Policy and Development (GIVRAPD): Microinsurance Component

Contrasting Coping in the Caribbean and the Indian Ocean

1. Project and Report Background

The Global Islands' Vulnerability Research, Adaptation, Policy and Development (GIVRAPD) Project is funded by the Climate and Development Knowledge Network (CDKN) and involves international not-for-profit organisations the INTRASAVE Partnership and CARIBSAVE, and Caribbean Risk Managers (CaribRM). The GIVRAPD project:

> *'…is a two year research project on community adaptation to climate change in four Small Island Developing States in the Caribbean (St. Lucia and Jamaica) and the Indian Ocean (Mauritius and Seychelles). It seeks to understand the multiple social, economic, governance and environmental conditions that shape vulnerability and capacity to adapt to climate change.'*[1]

The Microinsurance Component of GIVRAPD is comprised of three work streams:

1. Microinsurance Demand Analysis and Interviews which draws on previous survey research in the Caribbean conducted by the Munich Climate Insurance Initiative (MCII) and the German Development Corporation (GIZ), and fieldwork in Indian Ocean SIDS, specifically Mauritius and The Seychelles.
2. Review of survey and interview results.
3. Hazard modelling and product testing with the aim to develop product ideas, protocols and methodologies to implement microinsurance in these regions.

The current working paper addresses the remit of Work Streams 1 and 2 and compares the results to emerge from the MCII/GIZ project undertaken in the Caribbean in 2011, and analysed in *Demand for Weather-Related Insurance and Risk Management Approaches in the Caribbean*[2], and data to emerge from a sample survey of low income persons in small island developing states (SIDS) in the South West Indian Ocean (SWIO), specifically Mauritius and the Seychelles.

The rest of the working paper is structured as follows. Section 2 provides a socio-economic profile of the countries studied, and an overview of the effect of extreme weather on these regions. Section 3 presents the methodology and results of the surveys conducted in these regions in relation to demographics of the sample, labour market activity, financial behaviour, experience of extreme weather, and analysis of coping mechanisms. Section 4 concludes and provides recommendations for reducing vulnerability and promoting adaptation in these SIDS.

[1] See http://givrapd.org/

[2] This report is cited as Lashley (2012) when mentioned in the rest of the current report.

2. The Caribbean and South West Indian Ocean Regions: An Overview

2.1. Background

The research is based a comparison of data to emerge from a survey of low income persons in the Caribbean countries of Belize, Grenada, Jamaica and St. Lucia (see Lashley, 2012), and a similar survey undertaken in 2013 in the Indian Ocean countries of Mauritius and the Seychelles. These small island developing states (SIDS) exist on different sides of the globe, both north and south of the equator. The Caribbean countries surveyed are located between 12° and 17° North and 61° and 88° West, with Grenada being the most Southerly and Belize the most Westerly. In contrast, Mauritius and the Seychelles are located off the south-east coast of Africa in the southern hemisphere from 20° to 4° South and from 55° to 57° East with Mauritius being the most southerly and easterly of the two countries.

The rest of this section presents a profile of the case countries in relation to social, economic and environmental factors. This profile also includes specific reference to the two key sectors under consideration, agriculture and tourism, as well as issues related to climate change and extreme weather events.

2.2. Socio-Economic Profile of Caribbean and SWIO Case Countries

Historically, the economies of the **Caribbean** region were based around primary production in agriculture and mining, dominated by plantation economies and slavery until emancipation in 1834. Currently the region relies on petroleum and bauxite extraction in Trinidad and Tobago, Jamaica and Guyana, and small scale manufacturing, financial services and tourism in the other countries in the region. While Jamaica is also involved in mineral extraction, all of the case countries' primary and secondary activities are reliant on the light manufacturing of textiles and food.

For the **SWIO countries**, the Mauritian economy was traditionally dependent on the sugar and textile industries. The mid 1990's saw Mauritius shift its economy from a low-income agriculture-base towards an upper middle income, diversified economy with financial and industrial services, and tourism as the key drivers of the economy. However, a considerable number of Mauritians still depend on agriculture and fishing for their livelihood. The Seychelles has also shifted from an agriculturally-based economy, and is now based on tourism and fisheries. Table 1 outlines the main economic data for the two regions. The data shows that the regions vary widely in terms of performance and population; Grenada and St. Lucia are experiencing negative GDP growth, although marginal, and Belize, Mauritius and the Seychelles are experiencing growth in excess of 2%. GDP per capita also varies widely, from US$4,536 in Belize to US$11,226 in the Seychelles, with population levels varying from 92,000 in the Seychelles to 2.7 million in Jamaica. One of the starkest differences between the two regions is the unemployment rate which is significantly lower in SWIO states.

Figure 1: Maps of the Caribbean, Mauritius and the Republic of the Seychelles[3]

Caribbean

Mauritius **Indian Ocean** **The Seychelles**

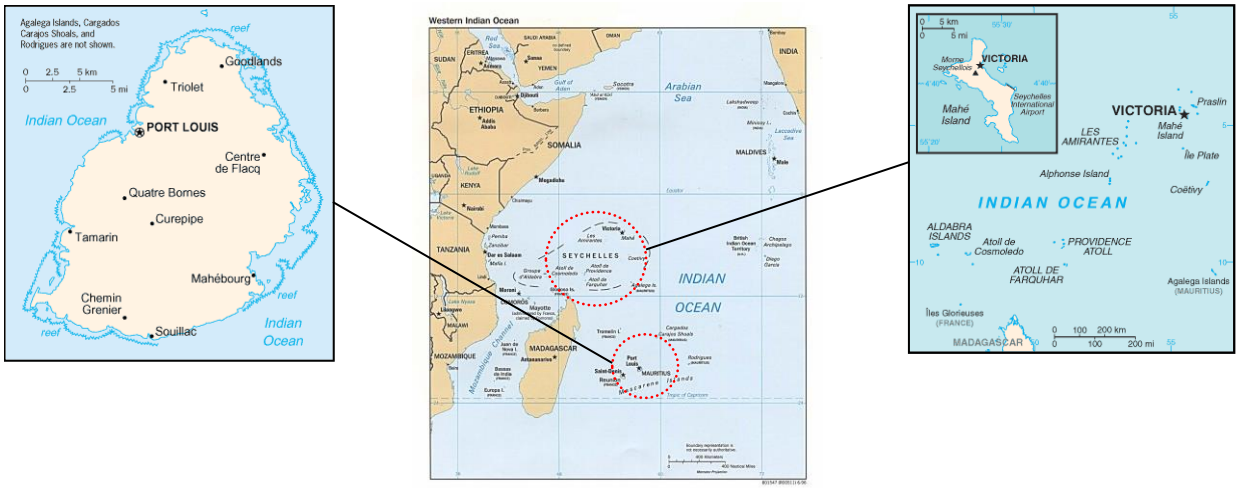


Table 1: Background of Caribbean and SWIO Economies for 2012

Country	GDP Growth (%)	GDP per Capita (US$)	Unemployment Rate (%)	Population (millions)
Belize	5.3	4,536	16.1	0.343
Grenada	-0.8	7,496	24.9[a]	0.105
Jamaica	0.1	5,541	13.0	2.752
St. Lucia	-0.4	7,276	21.4[b]	0.168
Mauritius	3.3	8,850	8.0	1.296
Seychelles	2.8	11,226	3.7	0.092

Source: International Monetary Fund, World Economic Outlook Database, April 2013 unless otherwise specified

[a] *Source: Grenada Country Poverty Assessment (2008)*

[b] *Source: Labour Force Survey conducted by Central Statistical Office (2012)*

[3] Source: CIA World Factbook, 2011.

As with the information in Table 1, Table 2 also shows a wide variation in other key country indicators. For the specific countries under study, Grenada is the smallest in terms of land area and Belize the largest, occupying approximately 23,000 square kilometres. In terms of agricultural cropland, this ranges from 4.4% in Belize to 40.2% in Mauritius. The ranges of urban populations are also quite disparate, with 28% of the population in St. Lucia being urban to over 50% in Belize, Jamaica and the Seychelles.

Table 2: Key Country Indicators

Country	Land Area (sq km)	Arable Land (%)	Permanent Crops (%)	Agricultural Labour Force (%)	Urban Population (%)	Literacy (%)	Individual Poverty Rate (%) (year)
Belize	22,806	3.0	1.4	10	52	76.9	42.0 (2010)*
Grenada	344	5.9	29.4	24	39	96.0	37.7 (2008)*
Jamaica	10,831	15.8	10.0	17	52	87.9	16.5 (2009)
St. Lucia	606	6.4	22.6	22	28	90.1	28.8 (2007)*
Mauritius	2,030	38.2	2.0	9	42	88.8	7.9 (2006)**
The Seychelles	455	2.2	4.4	3	54	91.8	30.0 (2007)***

Source: CIA World Factbook (2011)
**Based on individual Country Poverty Assessments*
***Based on estimate from Mauritius Central Statistics Office*
****See* http://www.nsb.gov.sc/files/Reports/HBS_2006-2007%20Report.pdf for discussion in relation to the Basic Needs Poverty Line (BNPL) in The Seychelles.

While literacy in the two regions is relatively good, with the exception of Belize, the poverty rates range from 29% to 42% for 4 of the six countries, with the exception of Mauritius and Jamaica where the rates are 8% and 16% respectively.

With respect to the Human Development Indicators from the UN, in 2012 the case countries all ranked as high human development with the exception of the Seychelles which ranked as very high and Belize which ranked as medium. As Table 3 shows, life expectancy is relatively similar across countries while there are variations in the education index ranging from 0.659 in Mauritius to 0.775 in Grenada. The education index is calculated using mean years of schooling for adults and expected years of schooling for children. As the components show, mean years of schools ranges from 7.2 years for Mauritius to 9.6 for Jamaica and expected years range from 12.5 for Belize to 14.3 for the Seychelles. As another point of comparison between these economies, the poverty line also varies considerably as a proportion of GDP from 17% in Mauritius to 41% in Belize. As a matter of interest, these two countries also have the lowest and the highest poverty rates respectively. While an analysis of the manner of construction of these poverty lines is beyond the scope of the paper, this correlation between the poverty line as a proportion of GDP and actual poverty levels should serve as a caution in interpreting these rates given that the estimation of too high a poverty line can lead to high levels of estimated poverty and *vice versa*.

Table 3: Human Development Indicators for the Caribbean and SWIO (2012)

	Belize	Grenada	Jamaica	St. Lucia	Mauritius	Seychelles
Human Development Index Rank	96	63	85	88	80	46
Life Expectancy	76.3	76.1	73.3	74.8	73.5	73.8
Education Index	0.665	0.775	0.748	0.683	0.659	0.733
Mean Years of Schooling (adults)	*8.0*	*8.6*	*9.6*	*8.3*	*7.2*	*9.4*
Expected Years of Schooling (children)	*12.5*	*15.8*	*13.1*	*12.7*	*13.6*	*14.3*
Poverty Line	US$1,727[1]	US$2,164[2]	US$1,280[3]	US$1,905[4]	US$1,489[5]	US$2,637[6]
Poverty Line/GDP per capita (%)	41%	29%	26%	26%	17%	24%

Source: United Nations (2011). UNDP Human Development Report 2011
[1] Sourced from Belize Country Poverty Assessment (2010)
[2] Sourced from Grenada Country Poverty Assessment (2008)
[3] Sourced from Jamaica Labour Force Information System (2011)
[4] Sourced from St. Lucia Country Poverty Assessment (2007)
[5] Sourced from Mauritius Central Statistics Office Poverty Analysis (2006/7)
[6] Sourced from Seychelles Household Budget Survey (2006/7)

For the employed ***labour force***, this ranges from 36,000 in Grenada to over 1.1 million in Jamaica, with men comprising the majority of the workforce in all countries. The lowest levels of female representation in the labour force is seen in Belize and Mauritius where females comprise 34% and 37% of the labour force respectively; this is as compared with 46% and 47% in Grenada and St. Lucia respectively.

Table 4: Employed Labour Force (various years)

	Belize (2005)	Grenada (2008)*	Jamaica (2006)	St. Lucia (2012)	Mauritius (2011)	Seychelles (2010)
TOTAL ('000)	98.6	35.7	1129.5	75.3	564.4	52.2
Men ('000)	64.9	19.3	649.8	40.1	356.2	29.0
Women ('000)	33.7	16.4	479.7	35.2	208.2	23.2
Men (%)	65.8	54.1	57.5	53.2	63.1	55.6
Women (%)	34.2	45.9	42.5	46.8	36.9	44.4

Source for Caribbean: ILO- www.laborsta.ilo.org
** Sourced from Grenada Country Poverty Assessment (2008)*
Source for Mauritius: http://www.gov.mu/portal/goc/cso/census_11.htm
Source for Seychelles: http://www.nsb.gov.sc/wp-content/uploads/2012/12/Population_and_Housing_Census_2010_Report.pdf

As regards employment status (see Table 5), the majority of the employed are employees, from a high of 83% in the Seychelles to a low of 61% in Jamaica. Consequently, Jamaica demonstrates a high-level of self employment (employers and own account workers) at 37%, while the average for the other countries is 19%.

Table 5: Employment by Status (various years) (%)

Employment Status	Belize (2005)	Grenada (2008)*	Jamaica (2006)	St. Lucia (2012)**	Mauritius (2011)	Seychelles (2010)
Employees	69.3	81.4	61.2	74.3	81.3	82.7
Employers	7.1	2.7	3.1	6.1	4.3	1.4
Own Account Workers	19.6	9.2	34.2	17.9	12.7	13.7
Contributing Family Workers	3.9	-	1.2	0.5	1.2	1.1
Workers not classified	0.1	6.7	0.3	1.2	0.5	1.0

Source: ILO- www.laborsta.ilo.org
** Sourced from Grenada Country Poverty Assessment (2008)*
***Sourced from St. Lucia Housing and Population Census (2010)*
Mauritius data available from: http://www.gov.mu/portal/goc/cso/census_11.htm
Seychelles data available from: http://www.nsb.gov.sc/wp-content/uploads/2012/12/Population_and_Housing_Census_2010_Report.pdf

For industry of employment, Table 6 shows that on average the largest non-governmental/non-social service sectors being trade (wholesale and retail, and repairs) and tourism (hotels and restaurants) (24%), and Agriculture, Hunting, Forestry and Fishing (13%). At the country level, the contribution to employment by trade and tourism only show marginal differences, while Agriculture, Hunting, Forestry and Fishing is relatively less important in SWIO where the average is 5% of employment, as compared to 17% for the Caribbean.

Table 6: Industry Share of Employment (%)

SUB-CLASSIFICATION	Belize (2005)	Grenada (1998)	Jamaica (2006)	St. Lucia (2004)	Mauritius (2011)	Seychelles (2010)	Average
A: Agriculture, Hunting and Forestry + Fishing	**19.5**	**13.8**	**18.2**	**14.8**	7.0	3.4	12.8
C: Mining and Quarrying	0.2	0.2	0.6		0.2	0.6	0.4
D: Manufacturing	**9.7**	**7.4**	6.5	**7.5**	**18.5**	**9.0**	**9.8**
E: Electricity, Gas and Water Supply	0.9	1.5	0.6	0.7	1.0	1.9	1.1
F: Construction	7.0	**14.8**	10.0	7.9	**10.1**	**11.0**	**10.1**
G: Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods	**17.2**	**23.9**	**24.1**	**15.7**	**14.0**	7.2	24.1
H: Hotels and Restaurants	**8.9**			**10.9**	**7.6**	**14.8**	
I: Transport, Storage and Communications	6.5	5.9	7.0	5.3	6.1	9.2	6.7
J: Financial Intermediation	1.6	3.8	5.3	1.9	2.7	2.1	4.2
K: Real Estate, Renting and Business Activities	2.1			4.1	0.3	1.2	
L: Public Administration and Defence; Compulsory Social Security	6.9	25.1	27.5	13.1	7.2	9.3	24.9
M: Education	6.3			1.7	5.8	5.3	
N: Health and Social Work	2.7			0.6	3.5	5.7	
O: Other Community, Social and Personal Service Activities	3.9			3.1	1.5	5.5	
P: Private Households with Employed Persons	5.9			3.0	3.8	2.0	
Q: Extra-Territorial Organizations and Bodies	0.6				0.1	0.2	0.3
X: Not classifiable by economic activity	0.1	3.8	0.2	9.7	0.2	11.7*	4.3

Source: ILO- www.laborsta.ilo.org
Mauritius data available from: http://www.gov.mu/portal/goc/cso/census_11.htm
Seychelles data available from: http://www.nsb.gov.sc/wp-content/uploads/2012/12/Population_and_Housing_Census_2010_Report.pdf
**Seychelles data has a large percentage of unclassified due to differences in classification*

As with employment, the contribution of trade and tourism to value added is also significant for these economies where it averages 21%, ranging from 29% in the Seychelles, to 12% in Grenada. The relative marginality of agriculture in the SWIO countries in relation to employment is also reflected in value added where the average contribution is 3.2% as compared to 6.7% in the Caribbean case countries.

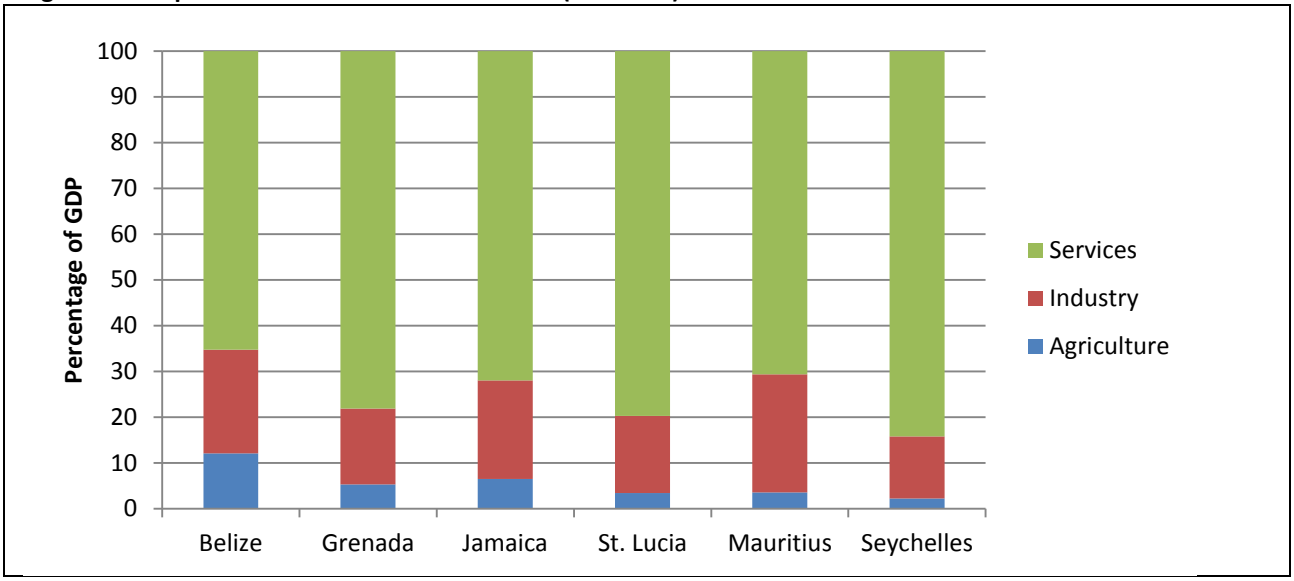
Table 7: Contribution to Value Added by Sector and Country (2012) (%)

Sector	Belize	Grenada	Jamaica	St. Lucia	Mauritius	Seychelles	Average
Agriculture, hunting, forestry, fishing	11.86	5.46	6.07	3.32	3.71	2.75	**5.53**
Mining, Manufacturing, Utilities	16.58	9.36	**13.89**	8.06	19.98	10.35	**13.04**
Manufacturing	13.06	4.52	8.89	3.71	18.10	8.94	9.54
Construction	4.51	7.26	7.35	8.37	6.48	5.75	6.62
Wholesale, retail trade, restaurants and hotels	**20.91**	**11.94**	**22.77**	**22.84**	**18.94**	**29.28**	**21.11**
Transport, storage and communication	**11.65**	**12.81**	9.20	**16.71**	9.11	**13.32**	12.13
Other Activities	**34.50**	**53.18**	**40.72**	**40.70**	**41.78**	**38.54**	41.57

Source: UN Stats National Accounts Main Aggregates Database
See http://unstats.un.org/unsd/snaama/Introduction.asp
Note: Shares do not sum to 100% due to the inclusion of Financial Intermediation Services Indirectly Measured (FISIM)

As shown in Figure 2, the marginality of agriculture is again highlighted, as is the dominance of services in the economy. The main differences seen amongst the case countries in relation to the composition of GDP is a larger share of agriculture in Belize, and a larger share of industry in Mauritius.

Figure 2: Composition of GDP for Case Countries (% of GDP)



Source: World Development Indicators

In looking in more detail at the main sectors of interest, tourism and agriculture, the following highlights their main contribution to the case country economies. Table 6 demonstrates that agriculture's direct contribution to employment is between 3% and 20% in the case countries, and the direct contribution for trade and tourism is between 22% and 27%. This result for tourism is echoed in Table 8 which shows the estimated direct and indirect contribution of tourism to these economies. As the table demonstrates, tourism's estimated total contribution to GDP ranges from 22% in Grenada to over 58% in the Seychelles, while the estimated contribution to employment, both direct and indirect, ranges from 21% in Grenada to 59% in the Seychelles.

Table 8: Contribution of Tourism to Case Country Economies (2013)

Indicators	Belize	Grenada	Jamaica	St. Lucia	Mauritius	Seychelles
Direct Contribution to GDP (%)	12.7	6.4	8.7	13.6	12.7	**24.1**
Total (direct and indirect) Contribution to GDP (%)	35.6	22.2	29.1	40.1	28.5	**58.2**
Direct Employment (%)	11.8	6.0	8.0	19.4	12.4	**24.3**
Total (direct and indirect) Employment (%)	32.2	20.7	26.4	43.7	27.0	**58.6**

Source: World Travel and Tourism Council (2013)[4]

All of the data related to contributions to employment and GDP indicate that while agriculture is marginal in the SWIO countries, tourism is an important contributor to all of the case economies, more so in the Seychelles. It should however be noted that while agriculture is marginal in Mauritius, and that tourism is not as significant a part of that economy as in the Seychelles and St. Lucia, this is compensated for by a greater contribution of manufacturing to the Mauritius economy at 18% of employment and 20% of GDP.

[4] Data available from http://www.wttc.org

The socio-economic profile of the Caribbean and the SWIO countries demonstrates that not only are these countries for the most part experiencing relatively high levels of unemployment and poverty, they are also demonstrating high levels of dependence on services, particularly tourism. This high level of dependence on services exposes these countries to the vagaries of the international economy as they are dependent on growth in more developed countries. In addition to **economic** issues, these countries also experience a number of **social** challenges as a result of their economic marginalisation, particularly the consequences of poverty, gender inequalities, HIV/AIDS, crime and brain drain. To complete the troika, they are also exposed to extreme weather events.

2.2.1 Completing the Troika: Exposure to Extreme Weather in the Caribbean and SWIO

The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)[5] notes, with high confidence, that:

> *"Economic losses from weather- and climate-related disasters vary from year to year and place to place, but overall have increased...*
>
> *Total economic losses from natural disasters are higher in developed countries…*
>
> *Economic losses expressed as a proportion of Gross Domestic Product (GDP) are higher in developing countries…*
>
> *Deaths from natural disasters occur much more in developing countries… From 1970 to 2008 for example, more than 95% of deaths from natural disasters were in developing countries…*
>
> *Economic losses from weather- and climate-related disasters have been heavily influenced by increasing exposure of people and economic assets."*

Therefore, not only do small island states in the developing world (SIDS) suffer from economic marginalization and the social consequences of poverty, they are also exposed to environmental risks and hazards. The experience of the case countries over the period 1990 to 2013 shows that they have experienced 51 disasters in total, with total damage in excess of US$3,400 million (see Table 9), supporting SREX results.

Table 9: Disaster Information by Country (1990 to 2013)

Disaster Type	Country	Disasters	Killed	Injured	Affected	Homeless	Total Affected	Total Damage (US$'000)
Drought	Grenada	1	0	0	0	0	0	0
	Jamaica	1	0	0	0	0	0	6000
	Mauritius	1	0	0	0	0	0	175000
	St Lucia	1	0	0	0	0	0	0
Flash flood	Jamaica	1	15	0	550000	1340	551340	30000
	Mauritius	1	11	82	0	0	82	0
	St Lucia	1	0	0	2000	0	2000	0
General Flood	Belize	1	1	0	38000	0	38000	9697
	Jamaica	2	10	0	30000	0	30000	20000
Tropical cyclone	Belize	9	63	570	172000	0	172570	542357

[5] http://ipcc-wg2.gov/SREX/images/uploads/IPCC_SREX_fact_sheet.pdf (p.2)

	Grenada	4	40	0	62860	0	62860	894500
	Jamaica	15	61	32	616346	2188	618566	1505215
	Mauritius	6	10	1050	6800	4000	11850	185400
	Seychelles	2	0	0	8000	0	8000	9300
	St Lucia	5	15	0	1600	350	1950	41000
TOTAL		**51**	**226**	**1,734**	**1,487,606**	**7,878**	**1,497,218**	**3,418,469**

Source: EM-DAT- The OFDA/CRED International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.

In addressing SIDS in general, Mimura *et al.* (2007:689) concluded: *"small islands, whether located in the tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea level rise, and extreme events (very high confidence)"*.

Given the dependence of these countries to varying degrees on agriculture, fisheries and tourism, the following findings on small islands are also of relevance:

> *Climate change is likely to heavily impact coral reefs, fisheries and other marine-based resources (high confidence)…*
>
> *It is very likely that subsistence and commercial agriculture on small islands will be adversely affected by climate change (high confidence)…*
>
> *New studies confirm previous findings that the effects of climate change on tourism are likely to be direct and indirect and largely negative (high confidence). Tourism is a major contributor to GDP and employment in many small islands. Sea-level rise and increased sea water temperature will cause accelerated beach erosion, degradation of coral reefs, and bleaching. In addition, loss of cultural heritage from inundation and flooding reduces the amenity value for coastal users. [16.4.6]* (Mimura *et al.*, 2007:689)

As detailed in Lashley (2012), the Caribbean has seen increases in the number and severity of storms in recent years, noting Jamaica had experienced five hurricanes, two storms and a seven month drought between 2002 and 2007, while other countries in the region were also affected by storms and subsequent flooding and wind damage. For SWIO countries, extreme weather events in Mauritius have not increased in frequency, but in intensity, as noted by Government of Mauritius (2010:8)[6]:

> *Though no change has been observed over the last 30 years in the number of tropical storm formations in the SWIO, the frequency of intense tropical cyclones (wind gusts between 234 and 299km/h) has increased… The number of rainy days and the amount of precipitation has decreased, but the number of heavy rainfall events has increased in recent years. Consequently, flash floods and* ***temporary disruption of various socio-economic activities have become more frequent.*** **(emphasis added)**

In the Seychelles, the situation is somewhat different to the other case countries where its location close to the equator results in limited direct experience of tropical cyclones. However, as noted by the Seychelles National Climate Change Committee (2009:30), *"…it is important to note that extreme rainfall and wave*

[6] http://givrapd.org/wp-content/uploads/2013/01/Mauritius_Second_National_Communications_2010.pdf

swells resulting from Indian Ocean tropical cyclones do affect the Seychelles and need to be taken into consideration". The main vulnerabilities of the Seychelles relate to its low elevation and a concentration of activity in narrow coastal zones which are subject to wave swells, and sea-level rise.

2.3. Section Summary

The overview of the case countries demonstrates that while they are classified broadly as small island developing states (SIDS), with a medium to high level of human development, there is a high level of heterogeneity as regards size, economic structure and levels of poverty. However, these countries are mostly similar in their dependence on services, particularly tourism, a sector highly vulnerable to the vagaries of climate change and extreme weather. While Cutter *et al.* (2012) notes in general that multiple coping mechanisms are employed to cope with loss and damage in vulnerable communities, the following section highlights the results from a survey of 1,650 low income persons in the SIDS of Belize, Grenada, Jamaica, St. Lucia, Mauritius and the Seychelles, to illustrate actual financial behaviour and coping mechanisms utilised in the two separate regions. This exercise seeks to address Cutter *et al.*'s (2012:294-295) observations that:

> ***Inequalities influence local coping and adaptive capacity and pose disaster risk management and adaptation challenges (high agreement, robust evidence).*** *Understanding and increasing the awareness of coping mechanisms in the context of local-level livelihood is important to climate change adaptation planning and risk management. This signifies the need for the identification and accommodation of these differences to enhance opportunities arising from their incorporation into adaptation planning and disaster response. [5.5.1]…*
>
> ***Insurance is a risk transfer mechanism used at the local level (medium agreement, medium evidence).*** *Risk sharing (formal insurance, micro-insurance, crop insurance) can be a tool for risk reduction and for recovering livelihoods after a disaster. Under certain conditions such tools can provide disincentives for reducing disaster risk at the local level through the transfer of risk spatially (to other places) or temporally (to the future). [5.6.3]*

In essence the following sections seeks to identify the types of coping mechanisms utilised, including the extent of use of insurance, and assess the feasibility of introducing alternative risk management approaches for low income persons in SIDS such as microinsurance.

3. Contrasting the Demand for Microinsurance in Selected Caribbean and SWIO Countries

3.1. Methodology

The methodology for both studies utilised as a starting point the identification of best practice from previous related research (defined as areas of congruence among previous demand studies), the requirements of the project sponsor, and the adaptation of approaches to fit the context of the Caribbean and the islands in the Indian Ocean. The details of this methodology are expanded on in the subsections that follow.

3.1.1 Construction of Survey Instrument

In terms of best practice, Sebstad, Cohen and McGuinness (2006) identified a number of issues to be considered when designing a market research project to determine the demand for microinsurance. The issues of gender, marital status, age, education and literacy are of prominence, as are the understanding, perception and trust of insurance. For gender and marital status, Sebstab *et al.* (2006) note that these variables will affect the level of vulnerability and access to coping mechanisms, while age will affect demand for lifecycle products. For education and literacy, these have direct effects on the choice of delivery systems, and the level of product education required in marketing and promotion of the concept of insurance. These relate directly to the issues of understanding, perception and trust.

Aside from these core issues, a number of other key variables are considered essential in assessing the demand for microinsurance, as detailed below (Sebstab *et al.,* 2006; Barnett and Mahul, 2007; Churchill, 2006; Matul 2005):

- Household income levels, variations due to seasonality and assets possessed
- Understanding of mitigation and coping strategies as it relates to use of savings and credit, insurance possessed, seeking additional employment, role of extended family, community and government
- Types of risks exposed to and frequencies as well as severity and types of losses likely to occur (asset loss, income loss, compromising of physical integrity of property etc.)
- Previous experience with financial products, especially insurance, in relation to ease, convenience, timeliness and complexity of processes

Following a review of previous microinsurance demand studies in developing countries, and drawing on previous microfinance studies in the Caribbean, particularly Lashley (2010a; 2010b), the survey instrument for low income persons for the current study was constructed. The instrument utilised in SWIO, which is broadly similar to that utilised in Lashley (2012), is included in Appendix 1 and is structured as follows:

1. Background information on location of respondents' residence
2. Key demographic indicators (sex, age, marital status, education, household size, employment status, assets)
3. Organisational membership
4. Business characteristics of the self-employed
5. Possession and views on insurance
6. Risk profile

7. Credit behaviour/Remittances/Banking and savings
8. Expenditure and Seasonality

3.1.2 Development of Sampling Methodology

As outlined in Section 1, the objectives of the project define the sphere of the study as the independent Caribbean countries of Belize, Grenada, Jamaica and St. Lucia, and the SWIO countries of Mauritius and the Seychelles, with the study elements defined as low income persons in tourism and agriculture. In developing the sampling methodology for the Caribbean study (Lashley, 2012), it was noted that while the geographic locations of the study were clear, and agriculture has clearly defined boundaries, the tourism sector required more specific delineation. As outlined by the World Travel and Tourism Council (2011), tourism commodities comprise accommodation (hotels and catering), transportation, entertainment and attractions, with retail as a related sector. Taking this into consideration, and following an analysis of the sectors, the subsectors were defined to reflect various stages along the agricultural and tourism supply chains to include persons in these sectors that would either be affected directly or indirectly by severe weather. This served to also assist in the sampling of these sectors. The sampling targets (and potential areas of loss due to severe weather) for the Caribbean study, and subsequently applied to the SWIO study, were defined as those in the:

- Agricultural supply chain:
    - Small farmers (infrastructural/property damage and loss of product to on-sell)
    - Small fishermen (property damage and loss of product to on-sell)
    - Individual vendors of agricultural/fishery products (at markets) (loss of products from farmers and fishermen for on-sale)
    - Small agro-processors (infrastructural/property damage and loss of production inputs from farmers and fishermen)
    - Agricultural day workers (loss of income)
- Tourism sector: (loss of custom and damage)
    - Transport providers (specifically taxis as small bus operators would still have the local population to draw on)
    - Vendors/crafts-persons of tourism products/services
    - Small attractions (small tour guides, small water-sport operators)
    - Small restaurants catering to the tourist trade
    - Employees in hotels and restaurants

Following the identification of the sampling elements for both studies, and due to the lack of an appropriate sampling frame in both regions, specific locations were identified to enable capture of the sample. The areas targeted included produce markets, beaches, tourist attraction, fishing villages and agricultural areas.

Given the lack of a population frame for the sample elements, sample sizes were calculated based on an infinite population. To accommodate time and financial constraints, a 90% confidence level and a 5% confidence interval were deemed appropriate at the country-level. For the Caribbean, this resulted in a calculated sample size of 275 per country for a total sample size of 1100. At the regional level this sample size of 1100 would allow for a confidence level of 95% and a confidence interval of 3%. In order to avoid under-sampling, the country-level targets for the SWIO study were set at 300 per country to give a total sample size of 600. The character of the final samples is shown in the following subsection.

The survey conducted in the Caribbean achieved a useable sample size of 1059, while the Indian Ocean survey received 586 respondents for a full sample size of 1645. The response by country is shown in Table 10. For Mauritius and the Seychelles, which achieved sample sizes of 299 and 287 respectively, 43% of respondents were planters, 41% were in tourism, and 16% were fishers.

Table 10: Responses by Country

Country	Frequency	Valid Percent
Grenada	275	16.7
St. Lucia	255	15.5
Jamaica	275	16.7
Belize	254	15.4
Mauritius	299	18.2
Seychelles	287	17.4
Total	**1645**	**100.0**

Overall, 32% of the sample was urban, 20% suburban and 48% rural, comprising 67% males and 33% females. In terms of age, the majority of the sample was between 30 and 49 years of age (54.5%), while 29.5% were 50 years of age or over. In terms of marital status, 51% were married, 41% were single, and the remainder single, divorced or widowed. In addition, the majority of respondents were heads of household (66.2%), while 18% were partners of the head of household and 11% were the child of the head of household. A breakdown of this information by region is shown in the table below.

Table 11: Sample Characteristics by Region

Variable	Caribbean	SWIO
Community Type	32% Urban; 17% Suburban; 51% Rural	31% Urban; 27% Suburban; 42% Rural
Sex	60% Male	78% Male
Age	53.6% 30-49 years	56.4% 30-49 years
Marital Status	44% Married; 47% Single	65% Married; 29% Single
Head of Household	64%	69%

In relation to education, Table 12 shows the highest level of education completed by respondents, with 47.7% in the Caribbean and 27.9% in SWIO completing less than a secondary education. This result suggests that the SWIO respondents were more likely to have completed secondary or tertiary education than their Caribbean counterparts.

Table 12: Highest Level of Schooling Completed (%)

Highest Level of Schooling	Caribbean	SWIO
No schooling completed	5.7	3.6
Primary	42.0	24.3
Secondary	37.2	47.6
Technical/Vocational	10.4	19.1
University	4.8	5.4
Total	100.0	100.0
Number of Respondents	1043	576

Other background data on the respondents in the two regions is shown in Table 13. As the table demonstrates, house ownership was more prevalent in SWIO while household size, number of employed persons and number of children were broadly similar. In addition, the dependency measure indicates that in

the Caribbean approximately 44% of the household were not working and therefore dependent, while the related figure for SWIO was 49%.

Table 13: Background Characteristics of Sample by Region (%)

Variable	Caribbean	SWIO
Owned Residence	72.5%	84.9%
Number of Persons in the Household (RANGE)	1-16	1-11
Number of Persons in the Household (MEAN)	3.7	4.0
Number of Persons Working Full-Time (MEAN)	1.6	1.9
Number of Children in the Household (MEAN)	1.9	1.6
Dependency (MEAN)*	0.44	0.49
**Dependency is a measure of those not working in the household as a ratio of the total number of persons in the household. Part-time workers as allocated 0.5 of full-time workers.*		

The background information on the samples in the two regions indicate that the Caribbean sample was more rural, less male and less likely to be married, while the SWIO sample had on average completed higher levels of education and were more likely to own their residence. Apart from these issues, the general background of the samples was broadly similar. Despite these similarities, it should be noted that the issues of rurality, education and marital status can have direct effects on coping abilities and mechanisms employed.

3.1.3 Household Expenditure, Assets and Financial Behaviour

The overall objective of the project is to assess the coping behaviour of low income persons in the vulnerable sectors of agriculture and tourism. Assessing the status of respondents utilised three measures in the Caribbean study, assets, income and expenditure, while in the SWIO countries, assets and expenditure were used due to local advice to remove the income module of the survey instrument. In assessing income by utilising expenditure as a proxy[7], Table 14 shows that the Caribbean sample lies within 113% of the poverty line and can therefore be categorised as vulnerable; individuals or households within 125% of the poverty line are considered vulnerable by convention in the Caribbean. For SWIO, the sample was on average at 151% of the poverty line, suggesting a relatively better position than the Caribbean sample. However, these results were based on mean monthly expenditure. In reviewing the source data it was apparent that the data was skewed towards higher values with the mean exceeding the median in all case countries. Calculating the mean and median expenditure as a percentage of the monthly poverty line demonstrates that the Caribbean sample was operating between 79% and 162% of the poverty line when using the mean and between 58% and 99% when using the median. In SWIO the respective percentages were between 179% and 144% when using the mean and between 61% and 99% when using the median.

Table 14: Household Expenditure Data Normalised for Number of Persons in the Household by Country (Expenditure per Capita)

Country	Mean Monthly Expenditure (US$)	Median Monthly Expenditure (US$)	Monthly Poverty Line (US$)	Mean Expenditure		Median Expenditure	
				% of Poverty Line	% of GDP per capita	% of Poverty Line	% of GDP per capita
Belize	113.66	83.33	144	79%	32%	58%	22%
Grenada	189.54	140.47	180	105%	30%	78%	22%
Jamaica	173.42	105.88	107	162%	42%	99%	23%
St. Lucia	198.72	128.00	159	125%	33%	81%	21%

[7] Household expenditure data is utilised here as it is usually more accurately reported in surveys of this type.

Caribbean	**166.40**	**110.09**	**147**	**113%**	**33%**	**75%**	**21%**
Mauritius	221.66	122.33	124	179%	30%	99%	17%
Seychelles	316.14	133.88	220	144%	34%	61%	14%
SWIO	**259.98**	**125.00**	**172**	**151%**	**31%**	**73%**	**15%**

Although these results should be treated with caution given that the survey instruments were not as robust as poverty surveys, nor did they account for age and sex differentials in calculating the actual household poverty line, they do indicate that the respondents can be categorised as living in poverty or vulnerable to living in poverty. This would suggest that the surveys were able to capture the relevant target group.

Other measures of standard of living include inventories of assets. As indicated in Table 15, the majority of households possessed refrigerators, televisions, stoves and mobile phones. The main difference between the two regions was the greater possession of computer/laptops and motorcar/motorcycle in SWIO.

Table 15: Possession of Various Household Assets (% of respondents)

	Caribbean	SWIO
Refrigerator	91.4	96.7
Television	90.6	97.4
Computer/Laptop	**46.7**	**64.9**
Motorcar/Motorcycle	**38.2**	**54.8**
Stove	95.1	82.0
Mobile Phone	91.9	91.1

In terms of other assets, respondents were also asked to indicate agricultural and financial assets. As shown in Table 16, respondents in both regions indicated they had livestock for household use or for sale (30% in the Caribbean and 21% in SWIO), as well as farmland (47% in the Caribbean and 40% in SWIO). While the Caribbean respondents indicated the availability of livestock and farmland to a marginally greater degree than SWIO respondents, significantly larger differences were seen in relation to financial assets and access to financial services. While nearly 42% of Caribbean respondents indicated that they had savings in a credit union, only 11% of SWIO respondents indicated the same. This is mostly in keeping with the much lower penetration ratio of credit unions in the SWIO countries which was 9% in Mauritius and 18% in the Seychelles as compared to an average of 63% in the Caribbean case countries[8]. This imbalance in utilisation of credit unions is somewhat offset by the greater use of commercial banking services in SWIO where 81% of respondents had savings in a commercial bank as opposed to 62% in the Caribbean, and SWIO respondents more likely to have a credit card (31% versus 13%). For informal savings groups, this was more prevalent in the Caribbean (21% versus 8%).

Table 16: Possession of Financial and Agricultural Assets (% of respondents)

	Caribbean	SWIO
Livestock for Household	21.8	15.3
Livestock for Sale	8.0	5.8
Savings in Credit Union	**41.8**	**11.0**
Savings in Bank	**62.0**	**81.3**
Savings in Informal Group	**21.4**	**7.6**
Credit Card	**12.9**	**31.1**
Land for Farming for Household	31.5	23.2
Land for Farming for Sale	15.5	16.8

[8] http://www.woccu.org/documents/2012_Raw_Statistical_Data

For household expenditure, the main expenditure items were food and utilities in both regions with nearly 80% of respondents spending on these items in the last month. The next most prevalent expenditure items were deposits to savings in both regions (51% in the Caribbean and 67% on SWIO) and loan repayments in SWIO (60%). The most significant differences seen between the regions were spending on rent or mortgage (34% in the Caribbean and 58% in SWIO) and loan repayments (60% in SWIO and 26% in the Caribbean). In terms of quantum for the most prevalent expenditure categories, spending on food was less than US$150 in the Caribbean for 54% of those spending on this category and for 29% in SWIO. The related figures for utilities were 74% and 84%.

Table 17: Household Monthly Expenditure Categories and Expenditure Items (%)

	Rent/Mortgage		Food		Loan Repayments		Deposits to Savings		Utilities	
	C'bean	SWIO	C'bean	SWIO	C'bean	SWIO	C'bean	SWIO	C'bean	SWIO
US$25 or less	**39.3**	**81.1**	**2.7**	1.7	**43.7**	**64.3**	**26.8**	**32.1**	**8.4**	**3.5**
US$26 to US$75	**6.4**	4.4	**13.9**	7.2	**11.9**	5.7	**33.9**	**23.5**	**30.6**	**35.9**
US$76 to US$150	**14.2**	4.7	**37.5**	19.8	17.8	8.3	19.7	18.6	**35.2**	**44.6**
US$151 to US$250	24.5	5.0	24.9	**35.0**	8.5	8.9	10.7	9.2	19.9	9.2
US$251 to US$500	8.4	3.3	19.1	**33.5**	11.1	9.7	6.3	9.2	4.9	4.6
More than US$500	7.2	1.5	2.0	**2.8**	7.0	3.1	2.6	7.4	1.0	2.2
Number of Responses	*359*	*338*	*921*	*460*	*270*	*350*	*542*	*392*	*876*	*457*
Percentage of Sample	*34%*	*58%*	*87%*	*78%*	*26%*	*60%*	*51%*	*67%*	*83%*	*78%*

Respondents were also asked to indicate the names of financial organisations that they would utilise for loans and savings to ascertain potential distribution channels for any new financial risk management products; Table 18 outlines the main responses and percentage of respondents citing the organisation.

Table 18: Financial Institutions Utilised by Respondents for Loans and Savings by Country

Financial Institution	Belize	Grenada	Jamaica	St. Lucia	Mauritius	Seychelles
Domestic Commercial Banks	24%	26%	31%	27%	64%	43%
Foreign Commercial Banks	35%	50%	33%	31%	33%	42%
Cooperatives/Credit Unions	46%	37%	35%	42%	5%	11%

Specific Responses	• Belize Bank (24%) • Scotiabank (18%) • St. Francis Xavier Credit Union (14%) • Atlantic Bank (11%) • La Inmaculada Credit Union (9%) • Other Credit Unions (23%) • Other Banks (6%)	• Grenada Cooperative Bank (26%) • Republic Bank (21%) • RBTT Bank (17%) • Communal Cooperative Credit Union (13%) • Grenada Cooperative Credit Union (9%) • Scotiabank (8%) • Other Credit Unions (15%) • Other Banks (4%)	•National Commercial Bank of Jamaica (31%) •Credit Unions (no names) (27%) •Scotiabank (13%) •Jamaica National Building Society (8%) •Republic Bank (8%) •Royal Bank of Canada (5%) •Other Banks (7%)	•Bank of St. Lucia (27%) •Scotiabank (12%) •Choiseul Credit Union (8%) •CIBC-First Caribbean Bank (7%) •Laborie Credit Union (6%) •National Farmers Credit Union (6%) •Other Credit Unions (22%) •Other Banks (12%)	• Development Bank of Mauritius (30%) • Commercial Banks (26%) • Mauritius Commercial Bank (23%) • State Bank of Mauritius (11%) • Other named commercial banks (7%) • Cooperatives, Credit Unions and MFIs (5%)	• Savings Bank (21%) • Commercial Bank (21%) • Mauritius Commercial Bank (15%) • Barclays Bank (14%) • Credit Union (11%) • Development Bank of the Seychelles (7%) • Other named banks (7%) • Other (3%)

Responses may sum to more than 100% as multiple responses were allowed per interviewee

Following the trend seen in the Caribbean survey, domestic financial institutions appear to be the organisations of choice for placing savings and seeking credit in SWIO. However, in SWIO countries, there is a greater concentration on banks rather than credit unions, in keeping with the penetration rates noted previously. This result suggests that in considering distribution channels, domestic commercial banks appear to be the best vehicle in SWIO.

In looking at other aspects of the financial activities of respondents, the areas of credit and general banking behaviour were investigated. For the Caribbean sample, only 21% had applied for a **loan** in the last 2 years while in SWIO this was marginally higher at 25%. The main reason for not applying for a loan was that the respondent did not need a loan (57% in the Caribbean and 75% in SWIO). For SWIO countries the other main issue was that it was too expensive, but this was only cited by 8% of the sample (see Table 19).

Table 19: Credit Activity and Reasons for Not Applying (% of sample)

	Caribbean	SWIO
Applied for a loan	20.8	24.9
Did not apply: Did not need a loan	56.8	75.3
Did not apply: Too Expensive	14.5	7.8
Did not apply: Lack of Collateral	7.6	1.3
Did not apply: Would not be accepted	6.8	2.3
Did not apply: Too Complicated	6.0	4.0
Did not apply: Do not trust institutions	2.8	2.5

In keeping with the significant differences seen in relation to credit union penetration rates between the two regions, SWIO respondents were less likely to apply to credit unions for loans (5% in SWIO versus 42% in the

Caribbean) and more likely to apply to commercial banks (83% versus 45%)[9]. In addition, SWIO respondents were also less likely to apply to family or friends (8% versus 16%) or informal money lenders (1% versus 5%).

The main purpose of loan applications was for business expenses in both regions (42% in the Caribbean and 41% in SWIO). This was followed by household renovations (21% and 24%) and debt consolidation (11% and 9%). Loans to cover emergencies only accounted for 6% of applications in the Caribbean and 4% in SWIO. In terms of loan amounts, 62% of Caribbean respondents indicated that applications were for US$2500 or less, while 55% of SWIO respondents indicated that applications were for more than US$2500. Despite this differential in loan sizes, the median monthly repayments were quite similar at US$121 in the Caribbean and US$133 in SWIO.

When asked if the credit sought was related to losses incurred from a hurricane or storm, only 9% of Caribbean respondents indicated that this was the reason as opposed to 44% in SWIO; the main types of loss to be covered were property damage (44% in the Caribbean and 26% in SWIO) and crop damage (24% and 30%), while loss of business accounted for 16% in the Caribbean (8% on SWIO).

Overall, the majority of loan applications were approved (83% in the Caribbean and 89% in SWIO), while the main reasons for refusal in the Caribbean were lack of collateral (31%) and lack of sufficient income (28%), while 19% did not know why the loan was refused. For SWIO, lack of sufficient income (35%), riskiness of sector employed in (12%), and lack of collateral (12%), were the main reasons for refusal while 18% were unsure as to the reason for refusal.

For those managing to obtain a loan, the main differences in relation to collateral was that those in the Caribbean were less likely to have to supply collateral, and if they did savings were the main type supplied, while land, buildings, business equipment and guarantors were more prevalent in SWIO (see Table 20).

Table 20: Collateral Supplied for Most Recent Loan (% of responses)

Collateral Supplied	Caribbean	SWIO
None	**21.8**	9.8
Business Equipment	6.3	**13.5**
Land/Building	17.2	**36.8**
Savings	**30.3**	4.5
Crop/Livestock	1.3	2.3
Vehicle	10.9	6.8
Guarantor/Cosignee	10.5	**22.6**
Other	1.7	3.8
Number of Responses	*238*	*133*

As regards **savings**, 77% of Caribbean respondents and 82% of SWIO respondents had some form of savings, while for those with savings, 90% in the Caribbean and 89% in SWIO had some of these savings in a commercial bank or credit union. In terms of contributions to these savings, 44% in the Caribbean and 53% in SWIO contributed monthly, while 35% and 31% respectively contributed irregularly. In terms of the main reasons for keeping savings, Table 21 demonstrates that there is only limited deviation between the regions where the main reasons given were *'To cover other unforeseen expenses'*, *'To cover unforeseen expenses due*

[9] This is based on the source of those applying for loans. Percentages reflect the number of respondents utilising these sources.

to hurricane or storm', and for education purposes. The table also demonstrates that there are multiple reasons for saving, with at least two reasons given per respondent in both regions.

Table 21: Main Reasons for Keeping Savings (% of cases- multiple response)

Reasons for Keeping Savings	Caribbean	SWIO
To start a business in the future	13.5	11.6
To cover unforeseen expenses due to hurricane or storm	**35.6**	**49.3**
To cover other unforeseen expenses	**77.8**	**65.9**
To buy a house/land	11.9	15.6
For special occasions	14.7	16.8
For education	**24.5**	**23.7**
Other	10.9	3.3
Total	*188.9*	*186.2*

One of the main differences between the two regions was in relation to **remittances** where only 10% of SWIO respondents indicated that they had received remittances in the last year as opposed to 20% of Caribbean respondents. For those receiving remittances, the majority for the Caribbean were received from North America (80%) or the UK (13%), while for SWIO, the main sources were mainland Europe (56%), North America (20%) and the UK (15%). Apart from the numbers receiving remittances, and the expected geographical differences in relation to source counturess, other main differences related to frequency, medium of receipt, and quantum. For frequency, 89% of SWIO respondents receiving remittances got these either annually or irregularly while 50% of Caribbean recipients received remittances at least quarterly. The medium of receipt for SWIO was mainly through banks (44%) or by hand (36%), while in the Caribbean money services such as Western Union dominated at 78%; only 13% of SWIO recipients used a money service to receive remittances. The other main difference related to quantum where the median amount received in the Caribbean was US$201 while in SWIO it was US$807. This large differential can however be explained by the prevalence of irregular or annual payments in SWIO as opposed to more regular payments in the Caribbean.

For the use of remittances, these are highlighted in Table 22. There are a number of clear differences between the two regions where remittances are more likely to be used in the Caribbean for household consumption, although this is the largest category for both regions. While education and covering emergencies is similar in both regions, the use of remittances for investment is much more prevalent in SWIO (49%) than in the Caribbean (18%); however this may also be related to the irregularity and larger sums involved with remittances in SWIO.

Table 22: Main Use of Remittances (% of cases- multiple response)

Use of Remittances	Caribbean	SWIO
Household Consumption	**80.3**	**57.8**
Education	**21.2**	**20.0**
Special Occasions	10.6	**22.2**
Savings	**21.7**	**31.1**
To Cover Emergencies	**15.7**	**13.3**
To Invest in a House	6.6	11.1
To Invest in Land	0.5	8.9
To Invest in a Business	10.6	**28.9**
Other	6.6	4.4
Total	*173.8*	*197.7*

The profile of the respondents in the two regions demonstrated some distinct similarities in relation to poverty status, or vulnerability to poverty (when measured using median expenditure), asset possession, spending behaviour, and a preference for using domestic financial institutions for credit and savings. However, the actual type of financial institutions utilised varied considerably with a greater tendency towards utilising credit unions in the Caribbean as opposed to commercial banks in the SWIO countries. Apart from this difference in credit union penetration, the potential use of remittances is curtailed in SWIO as only 10% of respondents received remittances, and these were either annual or irregular.

3.1.4 Labour Market Activity

Given the bias of the sampling methodology to self-employed persons, it was not surprising that the **main** economic activity in the last month was self-employment in both regions (61% in the Caribbean and 84% in SWIO). The majority of the sample was working full-time, 83% in the Caribbean and 88% in SWIO, while 14% and 9% respectively were working part-time. Approximately 19% in both regions had an additional job outside their main job. The main job categories for respondents are shown in Table 23.

Table 23: Category of Main Job (%)

	Caribbean	SWIO	Caribbean		SWIO	
Sector of Main Job	***(%)***	***(%)***	***Males (%)***	***Females (%)***	***Males (%)***	***Females (%)***
Agricultural Worker	**18.0**	**28.8**	**20.8**	13.7	**32.1**	17.1
Fisheries Worker	**12.5**	**13.7**	**18.6**	3.1	**16.7**	3.1
Food Vendor (mobile/market)	**12.1**	**18.2**	4.8	**23.4**	16.3	**24.8**
Restaurant Operation (fixed location)	6.0	3.6	4.7	**8.0**	3.8	**3.1**
Hotel/Restaurant Worker	7.4	6.8	4.8	**11.1**	5.8	**10.1**
Craft Vendor	**13.0**	8.8	8.1	**20.5**	5.1	**21.7**
Taxi Driver	**10.5**	7.5	**17.0**	0.5	**9.4**	0.8
Beach Services Provider	3.8	2.4	5.2	1.7	2.9	0.8
Tour Guide (land and sea)	3.9	2.6	4.7	2.7	2.0	4.7
General Services Worker	8.3	1.6	7.8	9.2	1.3	2.3
Other	4.5	6.1	3.4	6.3	4.5	11.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	*1056*	*577*	*640*	*416*	*448*	*129*

As the results demonstrate, there is a wide spread of jobs included in the survey with 42.6% directly related to the agricultural sector, and 34.1% directly related to the tourism sector in the Caribbean with the respective percentages for SWIO being 60.7% and 24.2%. In terms of the level of dependence on these sectors, in the Caribbean, 49% indicated a high or very high level of dependence on agriculture or fisheries and 41% indicated similar for a dependence on tourists to their country. The situation in SWIO is somewhat different with a much higher level of dependence on agriculture of 69%, reflective of the higher level of employment in this sector; dependence on tourism was 52%. Approximately 14.3% in the Caribbean and 21.6% in SWIO were highly dependent on **both** sectors.

Looking at the distribution of employment by sex, there is a clear sexual division of labour with Agriculture/Fisheries accounting for 39.4% of male employment and only 16.8% of female employment in the Caribbean; the related shares in SWIO were 48.8% and 20.2%. In addition, for food/craft vending and hotel/restaurant work, these account for 63.0% of female employment and only 22.4% of male employment in the Caribbean and 59.7% of females in SWIO and 31% of males. These results suggest that females have a greater dependence on income from tourism and males a greater dependence on agriculture and fisheries.

3.1.4.1. Background of Self-employed Respondents

As indicated previously, there was a large representation by the self-employed with 61% of Caribbean respondents and 84% of SWIO respondents indicating that they were self-employed. In seeking to ascertain whether self-employment was also seen amongst the employed, these respondents were asked whether they also had their own business. The results indicated that 71% of the Caribbean sample and 93% of the SWIO sample depended to some degree on self-employment as a livelihood strategy while 89% of the self-employed in both regions indicated that their own business was their main source of income.

In looking at the issue of informality, while only 39% of Caribbean businesses were registered, 76% of SWIO businesses were registered. Other characteristics of these businesses included a median age of 10 years in the Caribbean and 12 years in SWIO, a mean of 2 full-time and 1 part-time employees in the Caribbean and 1 full-time and 1 part-time employees in SWIO. Overall these businesses can be considered micro.

In keeping with the general categories in Table 23, Table 24 shows the general distribution across the agriculture and tourism subsectors where male self-employment is dominated by agriculture and fisheries and female self-employment dominated by food and craft vending.

Table 24: Sector of Self-Employment (%)

	Caribbean	**SWIO**	**Caribbean**		**SWIO**	
Sector of Main Job	***(%)***	***(%)***	***Males (%)***	***Females (%)***	***Males (%)***	***Females (%)***
Agricultural	**21.9**	**45.1**	**25.2**	16.7	**49.1**	29.3
Fisheries	**11.5**	**13.3**	**16.9**	2.8	**15.9**	3.0
Food Vendor (mobile/market)	**15.0**	7.8	5.8	**29.8**	6.4	**13.1**
Restaurant (fixed location)	6.7	2.7	4.5	**10.3**	2.6	3.0
Craft Vendor	**13.4**	8.2	7.8	**22.3**	5.4	**19.2**
Hotel/Guest House	1.5	5.5	1.6	1.4	4.1	**11.1**
Taxi Driver	**12.9**	8.0	**20.3**	1.1	9.7	1.0
Beach Services Provider	2.1	1.0	3.1	0.4	1.0	1.0
Tour Guide (land and sea)	2.3	2.2	3.1	1.1	1.8	4.0
General Services Worker	8.5	1.4	8.2	8.9	1.0	3.0
Other	4.2	4.9	3.6	5.3	3.1	12.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	*731*	*490*	*449*	*282*	*391*	*99*

In terms of level of dependence on agriculture, 50% in the Caribbean and 68% in SWIO consider that they are highly dependent on the sector, while 35.2% in the Caribbean and 41% in SWIO consider that they are highly dependent on tourists to the country. For business location, the majority operated from a fixed location outside of the home (56% in both regions), and 23% in the Caribbean and 30% in SWIO operated from the home. The remainder businesses were mobile. As would be expected in regions dependent on tourism and agriculture, some form of seasonality was experienced in both regions; 86% indicated that there was some period during the year when income was lower than normal. For the Caribbean, 24% indicated January to March and 27% indicated July to September as slow periods, while the related figures for SWIO were 24% and 22%. Approximately 27% of SWIO respondents indicated April to June as their main slow period.

3.1.5 Insurance: Possession and Views

Approximately 38% of the Caribbean sample and 53% of the SWIO sample possessed some form of insurance. For those with insurance in both regions, the most prevalent types of insurance possessed were life

insurance, house insurance, and vehicle insurance. In terms of differences between the regions, medical insurance was more prevalent in the Caribbean sample and crop or livestock insurance was more prevalent in SWIO. It should however be noted that these shares relate to approximately one-third of the Caribbean sample and half of the SWIO sample.

Table 25: Types of Insurance Possessed for those with insurance (%)

	Caribbean (%)	SWIO (%)
Life Insurance	**43.3**	**53.9**
House Insurance	**20.5**	**18.6**
Contents Insurance	4.1	1.4
Vehicle Insurance	**65.3**	**46.4**
Personal Accident Insurance	6.3	9.5
Medical Insurance	**30.4**	10.2
Crop/Livestock Insurance	2.8	**25.8**
Other type of insurance	2.5	9.8
Total	*395*	*295*

In terms of the annual cost of insurance, the median value for the Caribbean sample was US$449 (US$37 per month) and US$422 (US$35 per month) in SWIO. As a matter of concern, the main reason for not having insurance was cost in both cases, with 44% of Caribbean respondents and 26% of SWIO respondents citing this as a reason for not having insurance[10]. Apart from the issue of cost, the other main reasons prevalent across both regions related to a lack of knowledge or thought about insurance and a lack of trust, although these issues were for the most part less relevant in SWIO than in the Caribbean.

Table 26: Main Reasons for Not Having Insurance (% of cases)

	Caribbean (%)	SWIO (%)
Does not know enough about insurance	21.8	24.7
Does not know where to get insurance	3.8	2.1
Insurance companies too far away	2.0	1.3
Insurance is too expensive	**44.2**	**26.4**
No information on policies	9.8	3.8
Never thought of getting insurance	**26.5**	**18.8**
Insurance not needed/not relevant	**25.0**	**13.0**
Application for insurance too complex	5.4	8.4
Does not trust insurance companies	**26.7**	**15.1**
Other	3.0	6.7
Total Responses (%)	168.2	120.3
Total	*559*	*239*

For those with insurance, a number of issues were assessed in relation to satisfaction with the product. These issues will be important in the implementation of any 'new' interventions in the market and, as Table 27 illustrates, there was a general satisfaction with the various components of insurance tested in both regions; premium costs, paperwork, location of institutions, level of coverage and speed of payouts, although there was a lower level of satisfaction with speed of payout.

Table 27: Levels of Satisfaction with aspect of current insurance (%)

Satisfaction	Premiums		Paperwork		Location		Level of Coverage		Speed of Payout	
	C'bean	SWIO	C'bean	SWIO	C'bean	SWIO	C'bean	SWIO	C'bean	SWIO
Very dissatisfied	2.6	8.4	2.8	3.4	1.6	3.1	3.6	8.3	12.7	7.9

[10] Note that there were multiple responses to this item and therefore percentages will total more than 100%.

Dissatisfied	10.8	8.4	9.2	7.1	3.8	6.6	17.8	15.9	22.4	22.4
Neither	19.5	13.5	19.0	23.9	16.5	16.8	9.6	7.9	13.7	14.5
Satisfied	**58.0**	**67.1**	**63.1**	**64.2**	**67.0**	**69.2**	**60.4**	**64.3**	**43.8**	**51.9**
Very satisfied	9.0	2.5	5.9	1.5	11.1	4.2	8.7	3.6	7.4	3.3
Responses	*343*	*237*	*358*	*268*	*370*	*286*	*366*	*277*	*299*	*241*

In seeking to ascertain views on insurance in general, a prerequisite for microinsurance studies, Likert statements were presented to respondents to assess their level of agreement. The results are presented in Table 28 and indicate that low income persons do not necessarily think that insurance is not for them and do not think insurance premiums are an unnecessary expense. However, as indicated in the reasons for persons not having insurance, 36.8% of Caribbean respondents and 28.0% of SWIO respondents disagreed that they had a high level of trust in insurance companies to pay what was promised; *id est*, lack of trust is not only a reason for not having insurance, it is also an issue for those with insurance which may prevent them expanding their coverage. With these issues related to insurance in mind, the following section explores the various coping mechanisms utilised in the two regions.

Table 28: Levels of Agreement with Insurance Perception Statements

	Insurance is only for people with a lot of money		I have a high level of trust in insurance companies to pay what is promised		Insurance premiums are an unnecessary expense for my household	
	Caribbean	SWIO	Caribbean	SWIO	Caribbean	SWIO
Strongly disagree	**15.1**	**23.8**	**11.3**	**10.5**	**6.4**	**13.3**
Disagree	**43.2**	**37.8**	**25.5**	**17.5**	**38.5**	**29.8**
Neither agree nor disagree	13.6	13.9	26.3	25.6	21.6	23.2
Agree	13.7	12.2	20.2	29.9	19.2	17.9
Strongly Agree	9.7	6.4	3.9	6.0	7.1	6.0
Don't Know	4.7	5.9	12.8	10.5	7.1	9.8
Number of Responses	*1044*	*576*	*1042*	*571*	*1035*	*570*

3.1.6 Coping Mechanisms, Perception of Risk, and Disaster Management

Small Island Developing States (SIDS) exhibit a number of vulnerabilities as it relates to economic, social and environmental risks. The poorest members of these societies are especially at risk from falling deeper into poverty in all of its conceptualisations in terms of income, assets and social exclusion. Understanding how this segment of the population copes with disasters of all types is important in developing alternative, sustainable, mitigation measures. It is not only important to identify the type of coping mechanisms utilised, it is also important to understand the short and long term effects of the variety of mechanisms utilised. Drawing on the work of Watts (1983) who ranked coping mechanisms according to the degree of reversibility and the level of commitment of household resources, Montgomery (1996) categorised a series of these mechanisms according to stressor level as low, medium and high. This work was later adapted by Cohen and Sebstad (2005) and Sebstad *et al.* (2006) in referring to the demand for microinsurance (see Table 29). As the table shows, depending on the response to an event, the longer term impact of a decision can range from a reduction in unnecessary expenditure to social isolation.

Table 29: Responses to Disasters

Stress Level	Responses	Longer Term Impact
Low	Modify consumption Improve family budgeting Call in small debts Draw on informal group-based insurance Draw on formal insurance	Reallocate household resources Reduce unnecessary expenditure Temporary change in lifestyle
Medium	Use savings Borrow from formal and informal sources Diversify income sources Mobilize labour Migrate to work Get help from friends Shift business to residence **Use of remittances*** **Government assistance***	Depleted financial reserves Indebtedness- claim on future income flow Long work hours Business loss Interference with family life Increased social obligations
High	Sell household assets Sell productive assets Let employees go Run down business stock Default on loans Drastically reduce consumption Divest of family ties Take children out of school to work ***'Do nothing'****	Loss of productive capacity Loss of income Depleted assets Loss of access to financial markets Untreated health problems Social isolation

Source: Sebstad et al.(2006:16)
**Drawn from Lashley (2012)*

This classification was also utilised by Lashley (2012), which also included responses that were not included in previous literature such as the use of remittances, government assistance, and *'doing nothing'*, which included not repairing damaged property, 'waiting' or simply *'doing nothing'*. These coping mechanisms were classified by stressor level in keeping with previous studies as follows:

- **Use of Remittances** was classified as a *Medium Stressor* as this approach was considered as equivalent to the use of savings or informal borrowing.
- **Government Assistance** was classified as a *Medium Stressor* as this approach was considered as borrowing, albeit 'in kind'. It was also considered that this approach reinforced a level of dependency and this lent support to the classification here as a medium level stressor.
- ***'Doing Nothing'*** was classified as a *High Stressor* due to the degradation of assets that this action can cause. This was considered as the equivalent of selling possessions and other asset depleting actions which have long terms consequences such as loss of productive capacity, loss of access to finance, health risks and social isolation.

In seeking to establish the main types of coping mechanisms employed in the two regions, respondents were presented with scenarios and asked to indicate the manner in which they would cope with each eventuality. The three scenarios related to covering the costs of a health emergency, property damage from severe weather, and general living costs if respondent lost their job. The responses to these scenarios are shown in Table 30. The table shows that the main responses to the three (3) scenarios are medium level stressors in both regions. However, it reviewing the specific responses to the scenarios, while use of savings is prominent in all cases, SWIO respondents were more likely to seek out governmental assistance in all three scenarios.

Table 30: Main Coping Mechanisms for Health Emergencies, Property Damage and Job Loss (% of responses)

Coping Mechanism	Health Emergency		Property Damage		Job Loss		Stress Level
	C'bean	SWIO	C'bean	SWIO	C'bean	SWIO	
Use insurance	9.5	11.3	6.8	12.0	0.7	3.7	Low
Reduce spending	2.6	1.2	1.1	1.1	2.0	1.8	Low
Total Low Level Stressors	***12.1***	***12.5***	***7.9***	***13.1***	***2.7***	***5.5***	
Use savings	44.8	41.1	29.2	29.7	24.3	27.1	Medium
Get another job	1.8	1.1	5.0	0.7	37.3	16.8	Medium
Get assistance from government	2.4	12.4	13.3	25.8	3.4	23.2	Medium
Use credit card	1.0	0.2	0.1	0.4	0.4	0.0	Medium
Borrow from family/friend	15.1	7.8	6.7	6.4	10.2	7.3	Medium
Borrow from bank	4.8	5.7	10.6	13.4	3.4	9.6	Medium
Borrow from credit union	5.0	5.1	10.4	1.8	3.2	1.8	Medium
Borrow from money lender	0.8	0.0	0.9	0.5	0.4	0.2	Medium
Total Medium Level Stressors	***75.7***	***73.4***	***76.2***	***78.7***	***82.6***	***86.0***	
Do nothing	2.2	6.5	3.9	2.1	1.1	1.1	High
Sell possessions	1.5	1.2	0.8	0.9	2.5	2.1	High
Total High Level Stressors	***3.7***	***7.7***	***4.7***	***3.0***	***3.6***	***3.2***	
Don't know what to do	7.3	3.9	9.4	3.7	9.0	3.2	-
Other	1.3	2.5	1.9	1.6	2.1	2.1	-
Total Other	***8.6***	***6.4***	***11.3***	***5.3***	***11.1***	***5.3***	
Total Respondents	*1045*	*565*	*1033*	*566*	*1025*	*561*	

In terms of mitigation measures for extreme weather events, both long-term and immediate pre-event, respondents were asked to indicate measures they had taken to reduce the effect on life and property. In both regions the long term actions undertaken included strengthening of house when funds available (62% in the Caribbean and 66% in SWIO) and moving away from risky areas (24% and 23%). For immediate pre-disaster action, 54% in the Caribbean and 30% in SWIO indicated they stocked up on emergency food supplies, and 28% in the Caribbean and 15% in SWIO moved to a secure storm shelter.

3.1.6.1. Perceptions of Risk

Climate change and exposure to extreme weather events are a reality for populations living in SIDS. In seeking to assess individuals' perception of their exposure to such risks, respondents were asked to *self-assess* their level of exposure to a number of scenarios related to house damage, crop or livestock loss, and loss of employment or customers due to an extreme weather event. These results are presented in Table 31 to Table 33.

For house damage due to flooding or high winds, only 6.5% of Caribbean respondents and 5.5% of SWIO respondents perceived that they were at a high or very high level of risk from flooding, while 14.8% in the Caribbean considered the same for high winds. While there are few respondents in both regions that consider themselves at risk from house damage due to flooding, and a significantly higher percentage that consider themselves at risk from high winds in the Caribbean, only 1.8% in SWIO consider themselves at a high or very high risk from house damage due to high winds. These perceptions appear to be borne out in relation to actual experience where very few respondents had actually experienced these events; 10% and 16% experienced damage due to flooding and high winds in the Caribbean respectively while the related percentages for SWIO were 4% and 2%.

Table 31: Perceptions of Risk Exposure: House Damage (%)

	House damage due to flooding		House damage due to high winds	
Risk Level	Caribbean	SWIO	Caribbean	SWIO
At no risk	56.2	72.9	48.5	78.3
Small risk	27.0	15.1	22.6	14.9
Moderate risk	10.2	6.5	14.1	5.0
High risk	**4.8**	**4.3**	**12.4**	**1.6**
Very high risk	**1.7**	**1.2**	**2.4**	**0.2**
Number of Responses	*980*	*509*	*982*	*497*
Number Experiencing Event	*108*	*26*	*166*	*9*
Percentage Experiencing Event	*10.2%*	*4.4%*	*15.7%*	*1.5%*

The lack of relevance of loss from high winds is also seen in relation to crop or livestock where only 13% of respondents in both regions assessed this as a high or very high risk. However, the issues of loss due to flooding and drought appears to be more of a concern in SWIO where 32% consider themselves at a high or very high risk of crop or livestock loss due to flooding, and 30% of loss due to drought; the related percentages for the Caribbean were 10% and 4%. Again this differential is matched in relation to experience where 23% and 20% of SWIO respondents had experienced loss due to flooding or drought respectively as opposed to 8% and 4% in the Caribbean.

Table 32: Perceptions of Risk Exposure: Crop/Livestock Loss (%)

	Crop/Livestock loss due to flooding		Crop/Livestock loss due to high winds		Crop/Livestock loss due to drought	
Risk Level	Caribbean	SWIO	Caribbean	SWIO	Caribbean	SWIO
At no risk	67.8	41.1	65.7	46.1	76.1	44.9
Small risk	13.2	15.1	13.8	19.3	13.6	14.9
Moderate risk	8.6	12.2	7.7	21.2	5.9	10.5
High risk	**7.7**	**18.1**	**9.5**	**10.8**	**2.9**	**21.6**
Very high risk	**2.8**	**13.5**	**3.2**	**2.6**	**1.5**	**8.1**
Number of Responses	*689*	*304*	*686*	*306*	*678*	*296*
Number experiencing Event	*83*	*135*	*89*	*109*	*46*	*118*
Percentage Experiencing Event	*7.8%*	*23.0%*	*8.4%*	*18.6%*	*4.3%*	*20.1%*

While exposure to crop or livestock loss and house damage as a result of extreme weather is not perceived as high for the majority of respondents in the Caribbean and SWIO, risk of loss of earning capacity is considered as relatively higher. In both regions, respondents consider themselves at high or very high risk from loss of customers (37% in the Caribbean and 36% in SWIO), while 33% in the Caribbean consider their exposure to loss of employment as high or very high. For SWIO, only 16% consider themselves at high or very high risk of loss of employment due to extreme weather, however this may be due to the higher prevalence of self-employment in SWIO where 84% in SWIO cited self-employment as their main economic activity as opposed to 61% in the Caribbean.

Table 33: Perceptions of Risk Exposure: Loss of Customers or Employment (%)

	Loss of customers due to storm		Loss of employment due to extreme weather	
Risk Level	Caribbean	SWIO	Caribbean	SWIO
At no risk	30.1	45.9	33.0	47.6
Small risk	17.7	7.6	19.8	22.2
Moderate risk	15.5	10.5	13.9	14.2
High risk	**25.9**	**25.7**	**22.3**	**7.8**
Very high risk	**10.8**	**10.3**	**11.0**	**8.3**
Number of Responses	*891*	*370*	*904*	*374*
Number experiencing Event	*222*	*147*	*183*	*42*
Percentage Experiencing Event	*21.0%*	*25.1%*	*17.3%*	*7.2%*

As with the other cases, these risk perceptions are borne out by experience where nearly one-fifth had experienced these events in the Caribbean and one-quarter of respondents in SWIO experienced loss of customers due to a storm; only 7% in SWIO had lost employment due to extreme weather.

3.1.6.2. Extreme Weather Events: Experience and Coping

Turning from the issue of perception of risk exposure, respondents were also requested to report on behaviour in relation to actual experience of a number of extreme weather events. For the entire sample, **approximately 42% in each region had experienced some loss from an extreme weather event**, with some respondents experiencing multiple events. In terms of those experiencing the various events, these are shown in Table 34, with house damage more prevalent in the Caribbean and crop or livestock loss more prevalent in SWIO. Both regions experience earnings loss to a similar degree, with the exception of loss of employment as discussed above.

Table 34: Experience of Extreme Weather Event[11] (% of sample)

Event	Caribbean	SWIO
House Damage due to Flooding	**10.2**	4.4
House Damage due to High Winds	**15.7**	1.5
Crop/Livestock Loss due to Flooding	7.8	**23.0**
Crop/Livestock Loss due to High Winds	8.4	**18.6**
Crop/Livestock Loss due to Drought	4.3	**20.1**
Loss of Customers due to Storm	**21.0**	**25.1**
Loss of Employment due to Extreme Weather	**17.3**	7.2

The experiences of extreme weather events were also quite recent, with Caribbean respondents indicating that the most recent experience was between 2009 and 2011 (59%) and for SWIO between 2011 and 2013 (80%).

The actual coping mechanisms that those experiencing extreme weather events utilised, as opposed to perceptions or hypothetical responses, are shown in the tables below. Table 35 shows that in response to house damage the three main responses to flooding and high wind damage were use of savings, government assistance and not repairing or replacing. In addition in the Caribbean, in response to flooding, respondents borrowed informally to cover the costs of damage. What is noticeable is that the SWIO respondents are more likely to rely on government assistance in response to flood damage, and less likely to rely on borrowing or do nothing.

[11] Experience is based on respondents' citing of a specific year of experience as not all of those experiencing an event indicated a coping mechanism and year of experience was considered the most useful indicator.

Table 35: Actual Coping Mechanisms Utilised in Last Extreme Weather Event: House Damage (% of responses)

	House damage-flooding		House damage- high winds	
Coping Mechanism	Caribbean	SWIO	Caribbean	SWIO
Insurance Payout	2.1	5.3	2.1	5.9
Used Savings	**44.3**	**36.8**	**41.1**	**58.8**
Used Remittances	1.0	-	2.7	-
Found another job	-	-	1.4	-
Sold possessions	-	2.6	2.7	-
Government Assistance	2.1	**36.8**	**25.3**	**17.6**
Borrowed (informal)	**13.4**	5.3	2.7	5.9
Borrowed (formal)	3.1	-	5.5	-
Did not repair/replace	**27.8**	**10.5**	**12.3**	**11.8**
Other	6.2	2.6	4.1	-
Number of Responses	*97*	*38*	*146*	*17*
Median Estimated Loss (US$)	*$212*	*$750*	*$745*	*$125*

As with the scenarios presented earlier and actual responses to house damage, the use of savings as a coping mechanism again dominates in relation to loss of crops or livestock. For loss due to flooding, the use of savings is SWIO is significantly higher than in the Caribbean where there was a greater tendency to 'do nothing'. A similar situation was seen for both losses due to high winds and losses due to drought. Unlike with house damage, those in SWIO were less inclined to use government assistance to address loss of livestock or crops.

Table 36: Actual Coping Mechanisms Utilised in Last Extreme Weather Event: Crop/Livestock (% of responses)

	Crop/Livestock loss-flooding		Crop/Livestock- high winds		Crop/Livestock- drought	
Coping Mechanism	Caribbean	SWIO	Caribbean	SWIO	Caribbean	SWIO
Insurance Payout	5.6	7.6	2.6	6.1	-	6.2
Used Savings	**36.6**	**64.6**	**26.3**	**78.3**	**33.3**	**59.2**
Used Remittances	5.6	0.7	3.9	-	-	-
Found another job	2.8	-	3.9	-	-	-
Sold possessions	-	-	3.9	-	-	-
Government Assistance	7.0	1.4	**14.5**	0.9	5.1	-
Borrowed (informal)	4.2	**13.2**	7.9	7.0	7.7	**17.7**
Borrowed (formal)	7.0	7.6	6.6	4.3	**12.8**	**10.0**
Did not repair/replace	**25.4**	2.1	**23.7**	-	**35.9**	3.8
Other	5.6	2.8	6.6	3.5	5.1	3.1
Number of Responses	*71*	*144*	*76*	*115*	*39*	*130*
Median Estimated Loss (US$)	*$800*	*$1000*	*$376*	*$666*	*$368*	*$1000*

The trend seen in relation to house damage and loss of crops or livestock is repeated in relation to loss of earning capacity where the use of savings dominates responses in both regions but to a greater degree in SWIO, while 'doing nothing' is more prevalent in the Caribbean.

Table 37: Actual Coping Mechanisms Utilised in Last Extreme Weather Event: Customers and Employment (% of responses)

	Loss of customers		Loss of employment	
Coping Mechanism	Caribbean	SWIO	Caribbean	SWIO
Insurance Payout	1.2	1.9	1.6	-
Used Savings	**32.5**	**62.6**	**35.9**	**76.4**
Used Remittances	4.2	0.6	-	1.8
Found another job	4.2	-	9.4	1.8
Sold possessions	1.2	-	2.3	1.8
Government Assistance	3.6	3.2	0.8	-
Borrowed (informal)	7.2	**13.5**	4.7	3.6
Borrowed (formal)	5.4	7.1	6.3	1.8
Did not repair/replace	**24.7**	**10.3**	**23.4**	**9.1**
Other	15.7	0.6	15.6	3.6
Number of Responses	*166*	*155*	*128*	*55*
Median Estimated Loss (US$)	*$500*	*$500*	*$581*	*$750*

Reviewing the overall prevalence of coping mechanisms utilised in response to actual weather events, Table 38 emphasises the trend seen in the previous tables where the use of savings accounts for 65% of responses as opposed to 36% in the Caribbean. The high level stressor of 'doing nothing' however appears to dominate in the Caribbean, after savings, accounting for nearly one-quarter of responses. The other main coping mechanisms utilised were government assistance and formal and informal borrowing, all medium level stressors. Overall, medium level stressors appear to dominate, accounting for 64% of responses in the Caribbean and 87% in SWIO. Of concern is the prominence of high level stressors in the Caribbean case where these accounted for a quarter of responses, as opposed to 6% in SWIO.

Table 38: Actual Coping Mechanisms Utilised in Last Extreme Weather Event (% of responses)

Coping Mechanism	Caribbean	SWIO	Stressor Level
Insurance Payout	2.1	4.9	Low
Used Savings	**36.2**	**64.7**	Medium
Used Remittances	2.6	0.5	Medium
Found another job	3.6	0.2	Medium
Government Assistance	**8.9**	**3.8**	Medium
Borrowed (informal)	**6.5**	**11.6**	Medium
Borrowed (formal)	**5.9**	**6.3**	Medium
Sold possessions	1.7	0.3	High
Did not repair/replace	**23.0**	**5.4**	High
Other	9.5	2.4	-
Number of Responses	*723*	*654*	

These results suggest that asset depletion is a major concern in both regions, either by allowing assets to degrade in relation to doing nothing or depleting savings to cope; as the results indicate, the use of insurance is marginal in both regions. While the situation in the Caribbean may be more severe given the higher level stressors utilised, the issue of using savings and credit as pseudo-insurance in SWIO suggests a need for alternative coping mechanisms such as microinsurance.

It should however be cautioned not to interpret these survey results in isolation from the prospect of increased frequency or intensity of extreme weather events. As the surveys analysed are cross-sectional in nature, they do not give any indication of the effect of asset depletion; what would the majority of respondents do if they had no savings? In order to seek to provide some insight into this, during the analysis, those that currently had no savings were analysed separately. Although there were only 81 Caribbean

respondents (8%) and 40 SWIO respondents (7%) that did not *currently* have savings and had experienced a loss due to extreme weather, the analysis did reveal some interesting results. Table 38 shows that this cohort of the sample demonstrates a different profile to the full sample, although the use of savings is still high at 17% in the Caribbean and 37% in SWIO, suggesting that one of the reasons for not currently having savings is depletion from a previous extreme weather event. In terms of the difference in the two profiles, apart from the use of savings, *'doing nothing'* dominates in the Caribbean (34%) and informal borrowing dominates in SWIO (34%). In these cases, the use of high stressor mechanisms increased from 24.7% in the Caribbean for the full sample, to 38.1% for the 'no savings' cohort. The related percentages for SWIO were 5.7% to 10.8%. Although not thoroughly rigorous, the results do suggest some form of 'pecking order' in relation to coping mechanisms for low income persons in the two regions where without the option of utilising savings, low income persons in the Caribbean opt to either *'do nothing'* or seek government assistance. For SWIO, low income persons switch to informal borrowing and to some degree formal borrowing or *'doing nothing'*.

Table 39: Actual Coping Mechanisms Utilised in Last Extreme Weather Event by Persons with No Current Savings (% of responses)

Coping Mechanism	Caribbean	SWIO	Stressor Level
Insurance Payout	1.4	1.2	Low
Used Savings	**17.3**	**37.3**	Medium
Used Remittances	2.9	2.4	Medium
Found another job	4.3	1.2	Medium
Government Assistance	**16.5**	**0.0**	Medium
Borrowed (informal)	**7.2**	**33.7**	Medium
Borrowed (formal)	**4.3**	**12.0**	Medium
Sold possessions	4.3	0.0	High
Did not repair/replace	**33.8**	**10.8**	High
Other	7.9	1.2	-
Number of Responses	*139*	*83*	

These results suggest that as fewer coping mechanisms become available, low income persons utilise higher stress responses. In SWIO the results indicate that as the use of savings becomes less of an option, they resort to credit as pseudo-insurance which in the longer term could lead to further depletion of assets in an environment of increased frequency of extreme weather events. This is especially discouraging given the lack of utilisation of insurance as a coping mechanism which the results suggest is related to cost, lack of knowledge and trust.

The use of insurance as a coping mechanism is however not just to recover the losses incurred, but to ensure that those affected are able to survive shocks without a significant drop in livelihoods. This is especially important given the perception of being at risk of loss of earning capacity due to an extreme weather event in both regions. In seeking to address this issue of insurance, in addition to determining the monetary cost of the last event experienced, respondents were also asked to indicate the amount of time it took before life returned to normal, amount needed to cover monthly bills, and amount needed to if unable to work. For the amount of time before things returned to normal, the median value for the Caribbean sample was 7 weeks, and 5 weeks for SWIO. In terms of the funds required *per month* to cover monthly bills and amount needed if unable to work, these were US$250 and US$600 for the Caribbean respectively, and US$97 and US$500 for SWIO. While these figures do not provide clear indicators as to the levels needed for essentials, they do provide some parameters for consideration in the development of microinsurance products for the two

regions. In addition to actual monetary needs in relation to coping with an extreme weather event, respondents also indicated that they would need funds from any hypothetical insurance payout in two weeks or less; 90% of Caribbean respondents and 86% of SWIO respondents indicated that the longest period they could wait for a payout was two weeks or less. As respondents in SWIO were not introduced to a proposed insurance product, the actual level of demand cannot be ascertained. However, reviewing the perception of exposure to risk from extreme weather, the dominance of asset depleting coping strategies, and the expected increased frequency or intensity of extreme weather events, suggests the need for alternative coping mechanisms such as microinsurance.

3.2. Section Summary

The preceding analysis has revealed that low income persons in agriculture and fisheries and tourism in the Caribbean and SWIO are at risk from loss of livelihoods from extreme weather events. While there are some differences seen in the actual coping mechanisms utilised in the two regions, for the most part the mechanisms utilised are medium level stressors. However, the potential for asset depletion through the use of these mechanisms, and switching to higher stressors approaches, especially in light of increasing frequency or intensity of extreme weather events, suggests a need for the introduction of alternative coping mechanisms. It should however be noted that the introduction of such approaches as microinsurance will need to be cognisant of the issues of cost, lack of knowledge and trust that were demonstrated by respondents with and without insurance. There is also a need to address the issue of the feasibility of the use of insurance in dealing with the consequences of climate change. These issues are taken into consideration in the development of recommendations to deal with the threat to the livelihoods of low income persons in SIDS in the following section.

4. Promoting Resilience from Weather Hazards and Climate Change in SIDS

4.1. Overview

The GIVRAPD project:

> *'…is a two year research project on community adaptation to climate change in four Small Island Developing States in the Caribbean (St. Lucia and Jamaica) and the Indian Ocean (Mauritius and Seychelles). It seeks to understand the multiple social, economic, governance and environmental conditions that shape vulnerability and capacity to adapt to climate change.'*[12]

The specific focus of this element of the Microfinance Component of the project was to compare the results of a 2011 survey of 1,059 low income persons in agriculture/fisheries and tourism in the Caribbean (Belize, Grenada, Jamaica and St. Lucia) with a 2013 survey of 586 of their counterparts in the Indian Ocean, specifically Mauritius and the Seychelles. The analysis sought to identify the types of coping mechanisms utilised in these two regions, including the extent of use of insurance, and assess the feasibility of introducing alternative risk management approaches for low income persons in SIDS such as microinsurance.

The research is informed by the findings of the IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)[13] which noted with *high confidence* that developing countries were particularly at risk from losses due to weather- and climate-related disasters, both in relation to economic losses and death. For small island developing states (SIDS), these losses are exacerbated; Mimura *et al.* (2007:689) concluded: *"small islands, whether located in the tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea level rise, and extreme events (very high confidence)"*.

Given the dependence of these countries to varying degrees on agriculture, fisheries and tourism, the following findings on small islands are also of relevance:

> *Climate change is likely to heavily impact coral reefs, fisheries and other marine-based resources (high confidence)…*
>
> *It is very likely that subsistence and commercial agriculture on small islands will be adversely affected by climate change (high confidence)…*
>
> *New studies confirm previous findings that the effects of climate change on tourism are likely to be direct and indirect and largely negative (high confidence). Tourism is a major contributor to GDP and employment in many small islands. Sea-level rise and increased sea water temperature will cause accelerated beach erosion, degradation of coral reefs, and bleaching. In addition, loss of cultural heritage from inundation and flooding reduces the amenity value for coastal users. [16.4.6]* (Mimura *et al.*, 2007:689)

[12] See http://givrapd.org/

[13] http://ipcc-wg2.gov/SREX/images/uploads/IPCC_SREX_fact_sheet.pdf (p.2)

These findings suggest that there is a need for greater understanding of the effects of weather- and climate-related disasters on the most vulnerable in these countries and seek to address the observations of Cutter *et al.* (2012:294-295) who note that for small islands:

> ***Inequalities influence local coping and adaptive capacity and pose disaster risk management and adaptation challenges (high agreement, robust evidence).*** *Understanding and increasing the awareness of coping mechanisms in the context of local-level livelihood is important to climate change adaptation planning and risk management. This signifies the need for the identification and accommodation of these differences to enhance opportunities arising from their incorporation into adaptation planning and disaster response. [5.5.1]…*
>
> ***Insurance is a risk transfer mechanism used at the local level (medium agreement, medium evidence).*** *Risk sharing (formal insurance, micro-insurance, crop insurance) can be a tool for risk reduction and for recovering livelihoods after a disaster. Under certain conditions such tools can provide disincentives for reducing disaster risk at the local level through the transfer of risk spatially (to other places) or temporally (to the future). [5.6.3]*

Given these issues the research sought to provide greater understanding of the local context in relation to coping with these disasters, and the feasibility of insurance as a tool for risk reduction and the recovery of livelihoods. The results of the analysis of these issues are summarised in the following sections.

4.2. Coping Mechanisms of Low Income Persons in the Caribbean and the SWIO

In seeking to understand the coping mechanisms adopted by low income persons there is firstly a need to understand the available options in relation to the types of human, physical, and financial capital possessed, as well as the particular vulnerabilities attached to their livelihoods such as sector of employment, and exposure to weather- and climate related hazards.

An analysis of the survey results in both regions suggested that the samples were either living in poverty or vulnerable to poverty with median expenditure per capita as a percentage of the poverty line at 75% in the Caribbean and 73% in SWIO. Utilising highest level of education as a measure of human capital however suggested that those in SWIO were more educated with 72% having completed *at least* a secondary education as opposed to 52% in the Caribbean.

In relation to physical and financial assets, respondents in both regions possessed basic household assets such as refrigerators, televisions and stoves, as well some level of savings, with a greater utilisation of credit unions in the Caribbean. The main reasons for keeping savings in both regions related to covering emergencies, while 36% in the Caribbean and 49% in SWIO indicated that they saved specifically to cover losses from a hurricane or storm. Approximately one-quarter in both regions saved to cover education costs, suggesting that without the burden of having to cover emergency expenses, greater resources could be placed towards educational and other productive investments.

For access to finance, one-fifth in the Caribbean and one-quarter in SWIO had applied for a loan in the last two years, with 80% to 90% approval, while in relation to those not applying for a loan, 57% in the Caribbean and 75% in SWIO indicated that they did not need a loan. These results suggest that only a small proportion of respondents perceive that they are excluded from the credit market, with the main reason being the cost

of finance, although some respondents cited lack of collateral and the complexity of the process as reasons for self-exclusion.

In relation to vulnerability, those in tourism and agriculture/fisheries were specifically targeted as low income persons in these sectors were considered as particularly vulnerable, with the results showing that these persons' livelihoods were particularly dependent on these sectors, with some respondents dependent on both. Given these sectors exposure to weather- and climate-related disasters, respondents considered themselves especially at risk from loss of customers or employment because of extreme weather; approximately one-third of the sample in both regions considered themselves at high risk in this area (see Table 40), although in SWIO loss of employment due to extreme weather is lower, mostly due to the higher level of self-employment in that sample. As Table 40 also shows, while there are several similarities in relation to risk perception, issues related to flooding and drought are more prevalent in SWIO.

Table 40: Perception of Risk Exposure and Actual Experience

	Perception of Risk Exposure as High or Very High (%)		Actual Experience of Extreme Weather Event (%)	
Event	Caribbean	SWIO	Caribbean	SWIO
House Damage Due to Flooding	6.5	5.5	10.2	4.4
House Damage Due to High Winds	**14.8**	1.8	**15.7**	1.5
Crop/Livestock Loss Due to Flooding	10.5	**31.6**	7.8	**23.0**
Crop/ Livestock Loss Due to High Winds	12.7	13.4	8.4	18.6
Crop/Livestock Loss Due to Drought	4.4	**29.7**	4.3	**20.1**
Loss of Customers Due to Storm	**36.7**	**36.0**	**21.0**	**25.1**
Loss of Employment Due to Extreme Weather	**33.3**	16.1	**17.3**	7.2

As with the perception of risk exposure, Table 40 indicates a similar pattern in relation to actual experience, although at lower levels, with those in SWIO having experienced losses of crops or livestock in greater proportions than in the Caribbean, and less likely to experience house damage.

Overall, approximately 42% of respondents in each region had experienced an extreme weather event, the majority since 2009, with some experiencing multiple events. Table 41 outlines the coping mechanisms utilised in the event of the various events as utilised in Table 40.

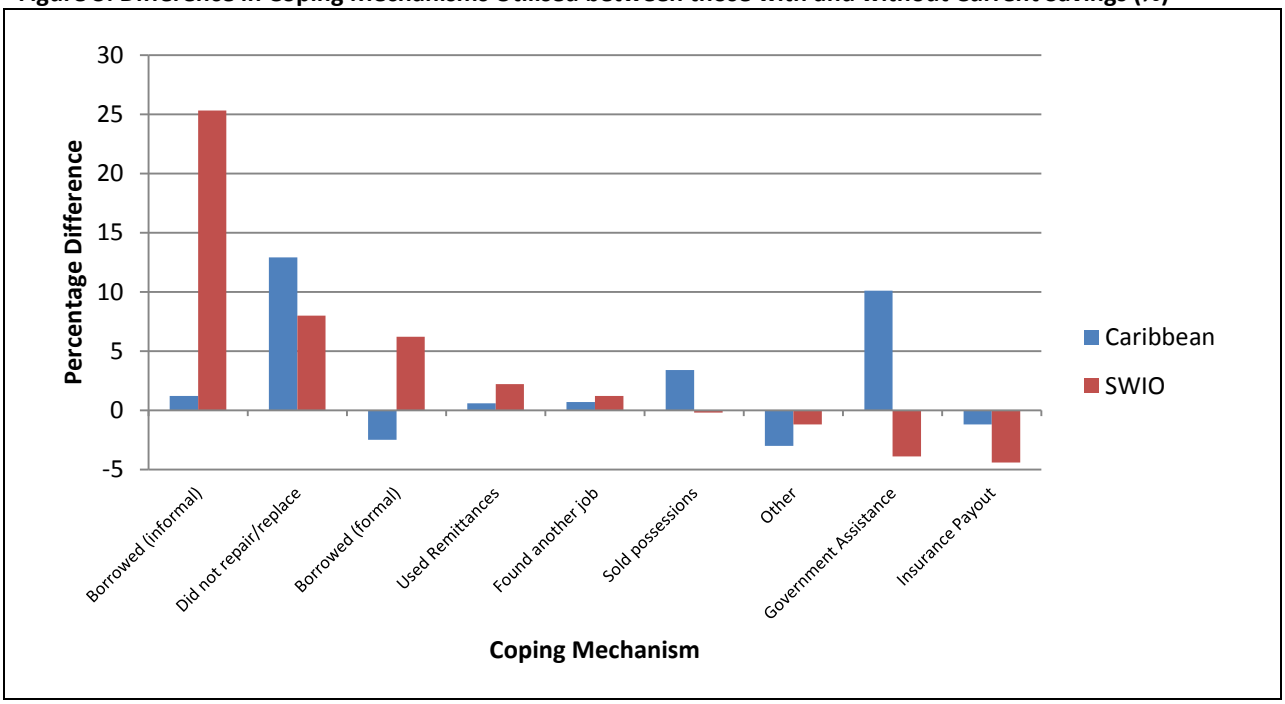
Table 41: Actual Coping Mechanisms Utilised in Last Extreme Weather Event (% of responses)

	Full Cohort		No Current Savings Cohort		
Coping Mechanism	**Caribbean**	**SWIO**	**Caribbean**	**SWIO**	**Stressor Level**
Insurance Payout	2.1	4.9	1.4	1.2	Low
TOTAL LOW	**2.1**	**4.9**	**1.4**	**1.2**	
Used Savings	36.2	64.7	17.3	37.3	Medium
Used Remittances	2.6	0.5	2.9	2.4	Medium
Found another job	3.6	0.2	4.3	1.2	Medium
Government Assistance	8.9	3.8	16.5	0.0	Medium
Borrowed (informal)	6.5	11.6	7.2	33.7	Medium
Borrowed (formal)	5.9	6.3	4.3	12.0	Medium
TOTAL MEDIUM	**63.7**	**87.1**	**52.5**	**86.6**	
Sold possessions	1.7	0.3	4.3	0.0	High
Did not repair/replace	23.0	5.4	33.8	10.8	High
TOTAL HIGH	**24.7**	**5.7**	**38.1**	**10.8**	
Other	9.5	2.4	7.9	1.2	-

As Table 41 indicates, the majority of coping mechanisms are categorised as medium level stressors, especially as it relates to the use of savings in both regions, although to a greater degree in SWIO, with limited use of insurance as a low level stressor in both. Of concern in the Caribbean was the high stress approach of doing nothing or waiting. These results indicate that many of these approaches have as a consequence the depletion of assets, however due to the cross-sectional character of the surveys undertaken, conclusions cannot be drawn as to the consequences of this asset depletion or the effect on future approaches to coping; this is especially given the expected increase in intensity of extreme weather events which may result in bigger shocks to the resources of low income persons.

In seeking to provide some insight into the effect of asset depletion, and given the large role played by savings as pseudo-insurance, the element of the sample with *no current* savings was analysed to establish coping behaviour in the absence of this option. As shown in Table 41, an element of this cohort did utilise savings to address an extreme event, although at a much lower level. This use of savings to cover the costs of a previous event perhaps suggests this as a reason for currently having no savings. While the share of those utilising savings as a coping mechanism fell by 19% in the Caribbean and 27% in SWIO, Figure 3 shows the changes in the other coping mechanisms utilised for those without any current savings as compared with those that did currently have savings.

Figure 3: Difference in Coping Mechanisms Utilised between those with and without Current Savings (%)



The results in Figure 3 appear to indicate, tentatively given the size of the relevant samples, that with the unavailability of savings as a coping mechanism, that those in SWIO switch to informal and formal borrowing, and not repairing or replacing, while those in the Caribbean opt not to repair or replace followed by seeking government assistance and selling possessions. What is a matter of concern here is that this switching, unsurprisingly, results in the use of higher stressor approaches, and as borrowing and indebtedness increase,

the option of credit may also be unavailable, resulting in a greater proportion of persons opting either to do nothing, sell possessions, or more detrimental approaches such as removing children from school to work.

Overall the results in relation to coping mechanisms demonstrate a reliance on credit and savings as pseudo-insurance, and that the majority of responses are medium level stressors with only a marginal use of insurance. However, in the absence of the availability of savings, and later as a consequence the availability of credit, there is the distinct possibility of greater use of higher level stressors, especially if the intensity of extreme weather events, and hence losses, are expected to increase. This suggests the need for the development of alternative financial risk management tools such as weather-related microinsurance. The potential for the introduction of such a tool is discussed in the following sub-section.

4.3. The Introduction of Insurance as a Coping Mechanism in the Caribbean and SWIO

As noted by Cutter *et al.* (2012:294-295) in relation to small islands:

> ***Insurance is a risk transfer mechanism used at the local level (medium agreement, medium evidence).*** *Risk sharing (formal insurance, micro-insurance, crop insurance) can be a tool for risk reduction and for recovering livelihoods after a disaster. Under certain conditions such tools can provide disincentives for reducing disaster risk at the local level through the transfer of risk spatially (to other places) or temporally (to the future). [5.6.3]*

The results of the surveys in the Caribbean and SWIO however do not support the claim that insurance is utilised to any significant degree by low income persons; there was only limited use of insurance as a coping mechanism. While 38% of respondents in the Caribbean and 53% of respondents in SWIO possessed some form of insurance, the majority of insurance types possessed related to life or vehicle insurance, with limited coverage for homes. This lack of possession of insurance to cover the consequences of extreme weather, and the potential for movement to higher level stressors to cope with such events, suggests an implicit demand, or need, for the promotion of insurance as a low stress approach to coping with disasters.

While there is conceptual support for Cutter *et al.*'s (2012) proposition that insurance can be a tool for risk reduction, there were several issues raised from the results that would require addressing. The main issues to emerge from the research related to levels of satisfaction for those with insurance, perceptions about insurance, and the reasons respondents did not have insurance.

For respondents that currently had insurance, there was a high degree of satisfaction with various elements of their insurance such as premiums, paperwork, location of institutions, and level of coverage. However, there was a relatively lower level of satisfaction with the speed of payout. In terms of general perceptions, respondents did not indicate that they thought that insurance was only for persons with 'lots of money', not that insurance was an unnecessary expense for their household. However there was an indication of a lack of trust in insurance companies with only 24% in the Caribbean and 36% in SWIO agreeing that they trusted insurance companies to payout what promised, and 27% in the Caribbean and 15% in SWIO indicating a lack of trust in insurance companies as a reason for not having insurance. The other reasons for not having insurance related to the expense involved (44% of Caribbean respondents and 26% of SWIO respondents), as well as a lack of knowledge of insurance (22% and 25%), *'never thought of getting insurance'* (27% and 19%), and insurance not considered relevant to their needs (25% and 13%).

These results suggest a number of issues for consideration in the development of microinsurance products in these regions where the main priority appears to be coverage of loss of earnings as this was the largest area of risk exposure as perceived by all respondents, and experienced by those in the Caribbean. For SWIO, losses of crops or livestock and loss of earnings were the highest perceived and experienced risk areas. Apart from the purpose of any new products, issues related to information dissemination and distribution channels also require consideration. As indicated in Table 18, and discussed in Lashley (2012), the financial institutions most likely to be utilised by Caribbean respondents were credit unions and domestic commercial banks. In SWIO, commensurate with the lower credit union penetration rates, credit unions were less utilised by the sample while domestic and foreign commercial banks dominated. In addition to these institutions acting as distribution channels in SWIO, they can also be utilised as information dissemination channels given the high level of *bankerisation* with 81% saving with these institutions. While information dissemination in this regard would speak to the issue of any new insurance products, it can also address issues related to the concept of insurance, the relevance of insurance, and the role this can play in reducing vulnerability and free up savings from a role as pseudo-insurance, to one of seed capital for investment in enterprise or education.

4.4. Conclusion

Cutter *et al.'s* (2012) proposition suggest that insurance has a role to play, but that under certain conditions may actually have a detrimental role in reducing exposure to risk. This suggests the need for a comprehensive approach, especially given that as a stand-alone measure insurance can be inadequate or inappropriate, and that there is a need for resilience-building and loss prevention (Lashley and Warner, *forthcoming*). The research has demonstrated that there is a need for alternative financial risk management tools such as microinsurance given the level of risk exposure of low income persons and the asset depleting coping mechanisms currently being utilised. However, the shortcomings of insurance in relation to climate and weather issues also need to be noted in the design of any new product offerings. These shortcomings include: high premiums in high risk areas where the most vulnerable are located; incentivising settlement in high risk areas and dis-incentivising the adoption of mitigation measures; limited coverage by private insurers in high-risk zones; and inefficiency of publicly funded programs (Thomas and Leichenko, 2011). A number of potential responses to these issues have been suggested such as: subsidisation of premiums for lower income groups (Thomas and Leichenko, 2011); information dissemination and education (Litan, 2006; Taylor *et al.*, 2012); linking of premium levels to types of mitigation undertaken (Botzen and van den Bergh, 2008); government grants to assist in property mitigation (Young, 2009; LeBlanc and Linkin, 2010); and public-private partnerships to ensure coverage in high risk zones (Thomas and Leichenko, 2011). Such recommendations would be highly relevant for low income persons in small island developing states given that cost of insurance and lack of information were two of the main reasons for not having insurance, and that the majority of the populations under consideration reside in high risk coastal locations. This habitation in high-risk zones in high-risk sectors is perhaps the need for the implementation of public-private partnerships. If the implementation of a new product was solely operated by private sector institutions, this would result in either an absence of coverage or unaffordable premiums, and if solely operated by government, result in implementation and resource issues as noted by Thomas and Leichenko (2011) in relation to the operation of the National Flood Insurance Program in the USA.

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Appendices

Appendix 1: Country and Community Profiles for Mauritius and the Seychelles

The Republic of Mauritius

The Republic of Mauritius is an island nation in the Indian Ocean located north of the Tropic of Capricorn, off the south-east coast of Africa. It is about 870 kilometers east of Madagascar at latitudes 19°-20°S and longitude 57°E. The island is 65km long, 45km wide and occupies a total area of approximately 1,864 km². Mauritius is protected by the world's third largest coral reef, which surrounds the island. Mauritius has a population of 1,265,000 people and it includes the main island, Mauritius, and the islands of Rodrigues, Cargados Carajos Archipelago (known as St. Brandon), Agalega, Tromelin and the Chagos Archipelago, which includes the Diego Garcia Atoll. The population of Mauritius has grown over time and consists of a mosaic of people from Europe, Africa and Asia.

Mauritius has a mild tropical maritime climate throughout the year. There are two seasons: a warm humid summer extending from November-April and a relatively cool dry winter from June-September. The period between October-May is known as the transition months. Mean maxim temperature reaches 29.2°C during the summer months when tropical cyclones occur. The coolest months are July- August when average temperature drops to 16.4°C. Summer rains are very often associated with tropical systems and contribute significantly to replenish reservoirs and aquifers. The wettest month is February while October is the driest. Annual variability is high, with rainfall ranging from 1171 mm to 3539 mm. Recurrent climate change experienced at the local level includes more intense cyclones, more frequent flash floods, prolonged and severe droughts and a more variable climate with inconsistent rainfall patterns coupled with higher temperatures.

Traditionally the Mauritian economy was dependent on the sugar and textile industries. The mid 1990's saw Mauritius shift its economy from a low-income agriculture-based one towards an upper middle-class income, diversified economy with financial and industrial services, and tourism as the key drivers of the economy. A considerable number of Mauritians still depend on agriculture and fishing for their livelihood.

Petit Sable and Grand Sable are small communities located in Grand Port, in the South-Eastern part of the country. Both sites are fishing and farming communities. Petit and Grand Sable are located close to the coastline hence most of the planting is done close to the coast, with upland areas still planting a considerable amount of sugarcane. Petit Sable is known for red onion cultivation. Blue Bay is a tourist area located southeast of Mauritius and known for its rare corals and fish species. Blue Bay is home to a marine park that is under protection of the government.

(Source: http://givrapd.org/wp-content/uploads/2013/05/Mauritius-Field-Work-Research-Summary.pdf)

The Seychelles

The Seychelles is an archipelago of 115 islands; 41 of which are granitic and 74 coral islands, found at latitude 4_o - 10_o south of the Equator and longitudes 55_o – 56_o east of the Indian Ocean, north of Madagascar. It has a total land area of 455 km_2. The actual population of the country is approximately 90,000. The Seychelles enjoys a tropical climate with average temperatures of 24_oC to 29_oC. There are two distinct seasons in the Seychelles; The South East Trades Winds (also known as the dry period), which begins in April and ends in October and the North West Monsoon (also referred to as the rainy season), during the period November to

March. The Seychelles receive most of its rain during the months of December and January. The average annual rainfall varies from year to year. The sea is roughest from May to October; consequently this time of the year is less suitable for fishing. Nonetheless, fishing remains one of the most important pillars of the economy besides tourism.

Mahé is the largest granitic island in the Seychelles archipelago. It covers a surface of 152 km2. It is 27km long and 8km wide. Approximately 90% of the entire Seychelles population live on Mahé. Victoria, the smallest capital in the world is the economic centre of the islands, a typical lively Creole town. Its passengers and commercial harbours are used by a constant traffic of boats, fishing vessels, ferries, yachts, cruise ships and people from every part of the world. The Victoria market offers local products such as different kinds of fish, vegetables and fruits as well as a great assortment of spices, much used in Creole cuisine.

La Digue Island, chosen as the project site for the GIVRAPD project, is the third largest granitic island in the Seychelles in terms of population, housing 2, 700 people. It lies 43km from the main island of Mahé. One can reach the island by plane via Praslin or by helicopter or by ferry. La Digue's many attractions include sailing, fishing and cycling. The pace of life is slow on the island as is its traditional way of transport; the ox-cart. Very few vehicles are allowed on the island. The main mode of transport on the island is by bicycle. Most people on La Digue are engaged in the tourism industry as the island is a great tourist destination with its beautiful beaches and animals, in particular the unique Seychelles Paradise Flycatcher. The fishing community on the island is very small and they practice mostly traditional fishing. There are 10 farmers on the island but very few of them do intensive farming. The actual total agricultural production of the island is not enough for the island's consumption.

La Digue Island is also very vulnerable to climate change impacts. The island has experienced increased coastal erosion during the past few years and early this year, heavy flooding was experienced in the plateau of La Passe and Anse Reunion after several hours of heavy rainfall.

Anse Royale which is found on the south coast of Mahé was the second project site for the GIVRAPD project. This district has a population of over 4, 000 people. Val dendor, an area in Anse Royale is well known for agriculture with a total of 90 farms. It is a very important area in terms of livestock and root crops. There are 5 other farms in the coastal plain of Anse Royale where extensive farming is done especially for vegetables such as cabbages, egg-plant, chillies, tomatoes, etc. Anse Royale also boasts fishing community with around 40 fishermen. There are extremely beautiful beaches along the coast of Anse Royale district which is why there are several hotels and guest houses in the area.

The Anse Royale District is quite vulnerable to natural disasters especially areas along the coast. In 2004, it was affected by the tsunami and early this year some of the coastal farms were flooded due to heavy rainfall over several days. The 400mm rains recorded which was more than twice the average for that period of the year, affected some large farms on the Anse Royale and Anse Boileau coastal plains. During that event, the farmers lost their entire support system, including reservoirs, stores, rotovators and other equipment as well as their crops. The government has put in place a disaster relief fund to help those affected by the bad weather.

(Source: http://givrapd.org/wp-content/uploads/2013/05/GIVRAPD-research-summary-Seychelles-May-2013_FINAL2.pdf)

Appendix 2: Survey Instrument

GIVRAPD South West Indian Ocean Demand for Weather-Related Insurance Survey v.2.

Interviewer:	**Questionnaire #:**	**Date:**	**Start Time:**

INFORMATION ON RESPONDENT'S AREA OF RESIDENCE						
Country	1. Seychelles	2. Mauritius				
Type of Respondent	1. Planter	2. Fisher	3. Tourism Operator			
Is this community:	1. Urban	2. Suburban	3. Rural			
Name of Community						

Section 1: Respondent Background						
1. **Name of Respondent**						
2. **Sex**	*1. Male*	*2. Female*				
3. **Age (years)**	***1.** Under 20*	***2.** 20 to 29*	***3.** 30 to 39*	***4.** 40 to 49*	***5.** 50 to 65*	***6.** Over 65*
4. **Marital Status**	*1. Single*	*2. Married*	*3. Divorced/Separated*	*4. Widow/Widower*		
5. **Relationship to Head of Household**	*1. I am Head of Household* *2. Partner (husband/wife/common law partner)* *3. Son/Daughter*			*4. Parent* *5. Other (please specify)* _____		
6. **Race/Ethnicity**	*1. Asian* *2. African*		*3. Chinese* *4. White*		*5. Mixed* *6. Other (specify)*_____	
7. **What was your MAIN economic activity in the last month? (indicate one)**	*1. Employed (public sector)* *2. Employed (private sector)*		*3. Self-employed/Employer* *4. Unemployed*		*5. Other*	
IF RESPONDENT IS NOT WORKING TO EARN AN INCOME, THANK RESPONDENT AND TERMINATE INTERVIEW. THIS WOULD NOT COUNT AS A COMPLETED SURVEY						
8. **What was working status in the last 6 months?**	*1. Working Full Time* *2. Working Part Time*		*3. Occasional odd jobs* *4. Not stated*			
9. **For how long have you been in this job? (years)**						
10. **Which of the following best describes your MAIN job? (if unclear, insert JOB TITLE under Other)**	*1. Agriculturalist* *2. Agro-Processor* *3. Agricultural Produce Seller* *4. Agricultural Worker* *5. Fisher* *6. Fish Seller* *7. Fisheries Worker* *8. Food Vendor (mobile/market)*		*9. Restaurant Operator (fixed property)* *10. Hotel/Restaurant Worker* *11. Craft Vendor* *12. Taxi Driver* *13. Beach Services Provider (watersports, beach chair rental etc.)* *14. Tour Guide (land or sea)* *15. General Service Worker (hairdressing, repairs, mechanic etc.)* *16. Other (specify here →)*			
11. **How dependent is MAIN sector you work in on agricultural/fish products?**	*1. Not dependent at all* *2. Low level of dependence* *3. Medium level of dependence*		*4. High level of dependence* *5. Very high level of dependence* *6. Don't know/Won't say*			
12. **How dependent is the MAIN sector you work in on tourists?**	*1. Not dependent at all* *2. Low level of dependence* *3. Medium level of dependence*		*4. High level of dependence* *5. Very high level of dependence* *6. Don't know/Won't say*			
13. **Do you have another job outside of this MAIN job?**	*1. Yes*	*2. No (SKIP NEXT)*				
14. **What type of work is this? (please state in space provided or use code from QUESTION 10 above)**						
15. **What is the highest level of schooling completed?**	*1. None* *2. Primary*		*3. Secondary* *4. Technical/Vocational*		*5. University*	
16. **Is your main residence:**	*1. Owned*	*2. Rented/ Leased*	*3. Other (state)*			
17. **How many persons live in your household? (including respondent)**						
18. **How many of these persons are 16 years or older?**						
19. **How many of these persons are currently employed FULL TIME?**						
20. **How many of these persons are currently employed PART TIME?**						
21. **How many of these persons are your children?**						

Does respondent have any of the following?	*1. Yes 2. No*	*Does respondent have any of the following?*	*1. Yes 2. No*
22. **Refrigerator**		23. **Livestock for sale**	
24. **Television**		25. **Savings in a credit union**	
26. **Computer/Laptop**		27. **Savings in a bank**	
28. **Motorcar/Motorcycle**		29. **Savings in informal group (cooperative fund, chit fund etc)**	
30. **Stove**		31. **Credit Card**	
32. **Mobile Phone**		33. **Land for farming for household consumption**	
34. **Livestock for household consumption**		35. **Land for farming for sale to public**	
36. ***If respondent has any land for farming*: How many acres/ARPENT do you have for farming? (ARPENT)**			
37. **Please name any organisations you are a member of? (Farmers' associations, business associations, trade unions, community groups etc.) (Need specific name of organisation)**			
38. **Please name any local finance organisations to which you would go to obtain a loan or save your money? (Credit unions, Banks, Microfinance institutions etc.) (Specify name)**			

For the following scenarios (QUESTIONS 39 to 41), please state the response of the interviewee in the space provided using the relevant code. INDICATE ONLY ONE MAIN RESPONSE [Ask question, wait for response and then code. If no response, use probes and code appropriately]	*1. I would do nothing*	*8. Use credit card*
	2. I have insurance	*9. Borrow from family/friend*
	3. Reduce Spending	*10. Borrow from bank*
	4. Use savings	*11. Borrow from Credit Union*
	5. Get another job	*12. Borrow from money lender*
	6. Sell possessions	*13. I don't know what I would do*
	7. Assistance from Government	*14. Other (specify in space below)*

39. In the event of a HEALTH emergency, what is the **MAIN** way that you would cover the costs incurred because of the emergency? (INDICATE ONLY ONE)	
40. In the event of PROPERTY DAMAGE from severe weather (heavy rain/wind, flooding etc.), what is the **MAIN** way that you would pay for the costs of repair because of the severe weather? (INDICATE ONLY ONE)	
41. In the event you were unable to earn any income (loss of job, no customers, damage to business, etc.) what is the **MAIN** way that you would cover your general living costs (food, rent, loan repayment, transport etc.)? (INDICATE ONLY ONE)	

Section 2: Self-Employment

42. Do you have your own business? *(i.e. is the person self-employed in any way as main or extra job)*	*1. Yes 2. No (go to next section)*	
43. Is this business your main source of income?	*1. Yes 2. No*	
44. Is your business registered?	*1. Yes 2. No*	
45. For how many **years** has this business been in operation? (years)		

46. What sort of activity is this? (Indicate only one)	*1. Agriculture*	*7. Taxi Driver*	
	2. Fisheries	*8. Beach Services (water sports, beach chair rental etc.)*	
	3. Food Vending (mobile/market location)	*9. Tour Guiding*	
	4. Restaurant (fixed property)	*10. General Service Worker (hairdressing, mechanic etc.)*	
	5. Craft Vending	*11. Other (specify)*	
	6. Hotel/Guest House	_____	
47. How dependent is your business on agricultural or fishery products?	*1. Not dependent at all*	*4. High level of dependence*	
	2. Low level of dependence	*5. Very high level of dependence*	
	3. Medium level of dependence	*6. Don't know/Won't say*	
48. How dependent is your business on tourists to your country?	*1. Not dependent at all*	*4. High level of dependence*	
	2. Low level of dependence	*5. Very high level of dependence*	
	3. Medium level of dependence	*6. Don't know/Won't say*	

49. How many persons do you employ…	Full-time?		Part-time?	
50. Where does your business **usually** operate from?	*1. Home*	*2. Other fixed location*	*3. Mobile*	
51. For which period of the year do you have lower income than normal? (indicate a maximum of two)	*1. NO PERIOD*	*3. April - June*	*5. October - December*	
	2. January - March	*4. July - September*	*6. Other period*	

Section 3: Insurance

On a scale of 1 to 5- please indicate your level of agreement with the following statements?	*1. Strongly Disagree*	*3. Neither agree nor disagree*	*5. Strongly Agree*	
	2. Disagree	*4. Agree*	*6. Don't Know*	

52. Insurance is only for persons with a lot of money					
53. I have a high level of trust in insurance companies to pay out what was promised					
54. I believe that insurance premiums are an unnecessary expense for my household					
55. Do you currently have any form of insurance?	*1. Yes (skip next question)*		*2. No (go to next question)*		
56. Why do you **NOT** have any insurance? (indicate ALL that apply)	*1. Do not know enough about it* *2. Do not know where to get insurance* *3. Insurance companies are too far away* *4. Too expensive* *5. No information on policies* *6. Never thought of it*		*7. Not needed/not relevant* *8. Application too complex* *9. Do not trust insurers* *10. Other (specify) _____* ***IF ANSWERED THIS QUESTION GO TO QUESTION 64***		
57. What type of insurance is this? (indicate ALL that apply)	*1. Life Insurance* *2. House Insurance* *3. Contents Insurance* *4. Vehicle Insurance*		*5. Personal Accident Insurance* *6. Medical Insurance* *7. Crop/Livestock Insurance* *8. Other:_____*		
58. How much do you pay in total premiums a YEAR? (Please convert to US$)	*Rupees*		*US$*		

On a scale of 1 to 5- how satisfied are you with the following aspects of your insurance?	***1.*** *Very dissatisfied*	***2.*** *Dissatisfied*	***3.*** *Neither*	***4.*** *Satisfied*	***5.*** *Very satisfied*	***6.*** *NOT APPLICABLE/Don't Know*	
59. Monthly Premiums							
60. Amount of Paperwork required							
61. Location of institution							
62. Amount of Coverage							
63. Speed of payout when event occurs (e.g. illness, accident, theft etc.)							

Section 4: Risk and Weather-Related (WR) Insurance Demand

QUESTIONS 64 to 68: For the following effects of natural disasters, please indicate your level of risk, year of last experience, approximate loss and how you paid for the loss. **HOW AT RISK ARE YOU OF…**	***LEVEL OF RISK*** *1. At no risk* *2. Small Risk* *3. Moderate Risk* *4. High Risk* *5. Very High Risk* *6. NOT APPLICABLE (if not applicable skip to next disaster event)*	***Year of Last Experience*** *If Never experience insert 'X' and, go to next disaster effect.*	*About how much did this* ***cost you****? (Convert to US$)*	***How did you pay/cover for this loss? (indicate ALL that apply)*** *1. Insurance payout* *2. Used savings* *3. Used remittances* *4. Found another job* *5. Sell possessions* *6. Government* *7. Borrowed from family/friend/ money lender* *8. Borrowed from bank/credit union* *9. Did not repair/replace* *10. Other (specify)*
64. a) House damage due to flooding				
b) House damage due to high winds				
65. a) Crop/livestock loss due to flooding				
b) Crop/livestock loss due to high winds				
66. Crop/livestock loss due to drought				
67. Loss of customers for business due to hurricane/tropical storm/cyclone				
68. Loss of employment due to extreme weather (e.g. torrential rainfall)				

IF NEVER EXPERIENCED ANY OF THESE EVENTS (no answer to Year of Last Experience), SKIP TO QUESTION 73. OTHERWISE GO TO NEXT QUESTION

69. From your last experience with a natural disaster, how long before things returned to normal? (please answer in WEEKS)					_____weeks
70. From your last disaster experience, did you have to stop paying any of your monthly bills such as loan repayments, electricity bills etc.?	*1. Yes*	*2. No (Skip Next)*	*3. Can't recall (Skip Next)*		
71. How much would you have needed to pay these bills? (Please convert to US$)	*Rupees*		*US$*		
73. If you were to lose your current employment or business because of a natural disaster, what would you do to cope? (INDICATE ALL THAT APPLY)	*1. Live off savings* *2. Start a business in different sector* *3. Seek new employment*		*4. Borrow from family/friends* *5. Borrow from bank/credit union* *6. Seek government assistance* *7. Other (specify)*		

83. Where would you MOST PREFER to pay annual insurance premiums and collect any insurance payout? (Indicate ONE)	*1. Credit Union/ Cooperative Office* *2. Commercial Bank* *3. Money Service (e.g. Western Union)*	*4. Post Office* *5. Insurance Office* *6. Other (specify)*	
84. In the event that you were not able to earn any income because of a hurricane/storm, how much money would you need to survive for a **week**? (Please convert answer to US$)	*Rupees*	*US$*	
85. How much would you be willing to pay per YEAR for insurance so that you received this sum (FROM QUESTION ABOVE) in the event of a severe hurricane/storm? (Please convert answer to US$)	*Rupees*	*US$*	
86. a) What is the longest period you could wait for a payout?	*1. Less than 3 days* *2. Between 3 and 7 days*	*3. Between 1 to 2 weeks* *4. More than 2 weeks*	
b) Which of the following things have you done to reduce the effect of severe weather on your household? (Indicate ALL that apply)	*1. Strengthen house when funds available* *2. Move away from risky areas* *3. Take extra employment to save more* *4. Take out insurance* *5. Evacuate livestock in a storm*	*6. Move to secure shelter in a storm* *7. Keep emergency food supplies* *8. Other measures? (insert below)*	
Section 5: Credit			
87. Which **of the following have you APPLIED TO for a loan in the last two (2) years? (Indicate all that apply)**	*1. Did not apply for a loan (go to **question 97**)* *2. Family or friends* *3. Informal money lender*	*4. Bank* *5. Credit Union/Cooperative Office* *6. Other (specify) _____*	
88. What is/was the **MAIN** purpose of the **most recent loan application**? (Indicate only ONE)	*1. For business expenses (Cash flow)* *2. Pay other debts* *3. To pay for an emergency* *4. Household Loan for Renovations*	*5. Purchase of household goods* *6. Other (state below)* *_____*	
89. Did this loan application relate to any losses from a hurricane or storm?	*1. Yes*	*2. No (if NO, skip next question)*	
90. What sort of loss was this loan to cover?	*1. Property damage* *2. Crop damage*	*3. Loss of livestock* *4. Loss of business* *5. Other (please specify) _____*	
91. Approximately how much was this **MOST RECENT** application for? (approximate in US$)	*1. US$375 or less* *2. US$376 to US$750* *3. US$751 to US$1,250*	*4. US$1,251 to US$2,500* *5. US$2,501 to US$5,000* *6. More than US$5,000*	
92. Was the loan approved?	*1. Yes*	*2. No (if NO, skip to **QUESTION 95**)*	
93. Approximately how much is your monthly loan repayment? (Approximate in US$)	*Rupees*	*US$*	
94. What collateral was supplied for this loan?(Indicate **ALL** that apply)	***1. NO COLLATERAL SUPPLIED*** *2. Business equipment* *3. Land/Building (including house)* *4. Savings*	*5. Crop/Livestock* *6. Vehicle* *7. Guarantor/Cosignee* *8. Other (specify) _____* ***IF ANSWERED THIS QUESTION, SKIP TO QUESTION 98***	
95. What was the MAIN reason the loan was NOT approved? (indicate ONLY ONE)	*1. Don't know* *2. Lack of collateral* *3. Lack of sufficient income*	*4. Bank considers the sector I work in to be too risky* *5. Other (specify)_____* *6. Not officially registered as planter/fisher/tourism operator*	
96. *Please indicate your level of agreement with the following:* If I had insurance to protect against loss of income from a hurricane or storm, I would have a better chance of getting a loan? (Note answer and skip to **QUESTION 98**)	*1. Strongly Disagree* *2. Disagree* *3. Neither Agree nor Disagree*	*4. Agree* *5. Strongly Agree* *6. Don't Know*	
97. Why did you **NOT** apply for a loan in the last two (2) years? (Indicate **ALL** that apply)	***1. I DID NOT NEED A LOAN*** *2. Institution too far away* *3. Too complicated to apply* *4. I would not be accepted*	*5. Too expensive* *6. I Lack collateral* *7. I do not trust the institutions* *8. I am not eligible* *9. Other (specify) _____*	
Section 6: Remittances			
98. In the last year, did the household receive any remittances from relatives or friends abroad?	*1. Yes (go to next question)*	*2. No (go to next **section**)*	
99. From what country do you receive these remittances?	*1. USA/Canada* *2. United Kingdom*	*3. Europe* *4. Other African countries* *5. Other (please specify) _____*	
100. What is the normal frequency of these remittances?	*1. Weekly* *2. Monthly*	*3. Quarterly* *4. Yearly* *5. Payments are not regular*	

101. NORMALLY, approximately how much are these remittances? (Approximate in US$)		Rupees	US$
102. What are these remittances normally used for? (indicate ALL that apply)	*1. Household consumption* *2. Education* *3. Special occasions* *4. Savings* *5. To cover emergencies* *6. To invest in house* *7. To invest in land* *8. To invest in a business* *9. Other (specify)* _____		
103. How do you normally receive these remittances?	*1. Through bank* *2. Through money service (e.g. Western Union)* *3. By hand* *4. Other (specify)*		
Section 7: Banking, Savings and Saving Habits			
104. Do you have any savings	*1. Yes* *2. No (go to question 109)* *3. Don't want to say*		
105. Do you keep any of these **savings** in a commercial bank or credit union?	*1. Yes (skip next question)* *2. No*		
106. For what reason do you NOT have savings in a Bank or Credit Union? (indicate ALL that apply)	*1. Interest rate too low* *2. Cost too much to keep savings* *3. Institutions too far away* *4. Too little to deposit* *5. Too complicated* *6. Do not trust the institutions* *7. Other (specify)* _____ **IF ANSWERED THIS QUESTION GO TO NEXT SECTION (SECTION 8: Expenditure)**		
107. How often do you contribute to these savings?	*1. Weekly* *2. Monthly* *3. Quarterly* *4. Yearly* *5. Contributions are NOT regular*		
108. For what reason do you keep these savings? (indicate ALL that apply)	*1. To start a business in the future* *2. To cover unforeseen expenses due to hurricanes/storms* *3. To cover OTHER unforeseen expenses* *4. To buy a house/land* *5. For Special occasions (wedding, christening etc.)* *6. For education* *7. Other (specify)* _____		

Section 8: Expenditure			
APPROXIMATELY how much did the **household** SPEND on the following items in the **last 30 days**? (local currency OR US$) (indicate '0' in the household did not spend on that source)	*Local Currency (Rupees)*	*US$*	***Expenditure Code:*** *1. US$25 or less* *2. US$26 to US$75* *3. US$76 to US$150* *4. US$151 to US$250* *5. US$251 to US$500* *6. More than US$500*
109. Rent or mortgage			
110. Food			
111. Loan repayments			
112. Deposit to Savings Account			
113. Utilities (Electricity, Water, Phone, etc.)			
a. Children's education			

Section 9: Income												
Indicate relevant months with a circle around the relevant month number	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
114. In which months do you experience your highest level of income?	1	2	3	4	5	6	7	8	9	10	11	12
115. In which months do you experience your lowest level of income?	1	2	3	4	5	6	7	8	9	10	11	12
116. If you had extra money after paying normal expenses, what would you do with the funds? (Indicate only ONE)	*1. Save* *2. Buy household goods* *3. Invest in a business* *4. Pay off debts* *5. Other (specify)* _____											

END OF QUESTIONNAIRE- THANK RESPONDENT FOR THEIR TIME.

END TIME: