Strengthening Fisher Resilience to the Impacts of Climate Change Through the Use of Vulnerability and Capacity Assessment Tools in 3 Communities in Saint Lucia

Fortalecimiento de la Resiliencia de los Pescadores a los Impactos del Cambio Climático Mediante el Uso de Herramientas de Evaluación de Vulnerabilidad y Capacidad en 3 Comunidades en Santa Lucía

Renforcer la Résilience des Pêcheurs aux Impacts du Changement Climatique Grâce à l'Utilisation d'Outils d'Évaluation de la Vulnérabilité et des Capacités dans 3 Communautés de Sainte-Lucie

MARIE-LOUISE FELIX
Department of Fisheries, Ministry of Agriculture,
Pointe Seraphine, Sans Souci, Castries, Saint Lucia.
mlfelixearth@gmail.com

ABSTRACT

Fishing communities in the Eastern Caribbean are prone to the influences of climate. In Saint Lucia, under the CC4FISH (Building Resilience in the Eastern Caribbean Fisheries Sector) Project, efforts are in place to aid fisherfolk adapt and better cope with climate hazards. In so doing, there is a need to prioritize interventions to take into consideration client needs and resource constraints. A Vulnerability and Capacity Assessment mechanism to quantitatively assess climate change vulnerabilities of fishing communities has thus been developed. This mechanism enables communities most in need of assistance to be identified through the calculation of vulnerability indices (VI). The mechanism was field tested in July 2019 in 3 communities in Saint Lucia. CC vulnerability indicators were selected as a function of the IPCC (2007, 2014) recommendations of Exposure (E), Sensitivity (S) and Adaptive Capacity (AC). Climatic hazards assessed included extreme drought, rainfall variability, tropical waves and hurricanes, and invasive species. A minimum of 100 fisherfolk and residents were interviewed in each community. Responses were linked to indicators with assigned scores from 1 to 3. Vulnerability indices (VI) were calculated based on the overall score received per community. Selection and prioritization of CC interventions was also achieved using a series of open ended questions and scoring guidelines. Validation of results occurred through community meetings. Vulnerability indices results ranged from 148 to 152 out of a possible range of 71 to 213. The higher the VI the more vulnerable the community. Notably, recommended key interventions were similar but not identical per community. The VCA outcomes will be used to provide needs-based interventions to fishing communities.

KEYWORDS: Climate, vulnerability, assessment

OBJECTIVE

The key objectives of this research were to

i) Identify and scale the key vulnerabilities of coastal fishing communities to climate change,
ii) Determine the options / opportunities available to help build resilience in fisherfolk and aquaculturists in Saint Lucia, and
iii) Prioritize interventions within fishing communities that will best assist in CC adaptation and mitigation.

The need to prioritize actions was essential considering that funds, of any type, are finite. Not all interventions can thus be financed. It is important therefore to understand the various Climate Change (CC) impacts and prioritize interventions per community. It is also necessary to acknowledge that the degree of vulnerability may differ significantly amongst communities. The method of assessing vulnerability levels must be simple and transparent, enabling all stakeholders to understand the process and trust the outcomes.

METHODOLOGY

Exposure, Sensitivity and Adaptive Capacity

IPCC / Intergovernmental Panel on Climate Change (2014, 2007) defines vulnerability as a function of exposure, sensitivity, and adaptive capacity. In this study, these were used to guide the selection of parameters for the calculation of vulnerability indices. For this VCA, the levels of exposure, sensitivity and capacity to adapt to climatic stressors by various stakeholders in the target communities were assessed in order to determine qualitative and quantitative measures of vulnerability. The key assessment tool selected was a questionnaire comprising of primarily closed ended questions which were developed specifically to determine exposure, sensitivity and adaptive capacity. Climate exposure indicators included temperature rise, heavy rainfall, drought, and sea level rise. Sensitivity was assessed using geographic and socio-economic factors such as coastal vulnerability, population size, poverty and infrastructure. The adaptive capacity was determined based on economic capability, physical infrastructure, social capital, and institutional capacity. *Economic Capability* was assessed based on value of fish landed, earnings per fisher from fisheries and any other income generating activity, and access to alternative income opportunities. *Physical infrastructure* valuations included the presence of jetties, fisheries landing site and markets, Fish Aggregating Devices (FADs), slipway, boat hauling equipment, boatyard, locations suitable for boat storage, access to a marina or other safe harbour, coral reefs and mangroves. *Institutional capability* was represented by political leadership and governance structures, disaster prevention systems, and climate change policy, to name a few.

Presence of an active fisher cooperative, community cooperative, a Community Disaster Management Plan, hospital, health centre, polyclinic, fire station, police station, hurricane shelters, secondary schools, tertiary learning institutions were considered as important indicators of institutions capable of supporting CC resilience and adaptation.

Data Collection

The questionnaire developed by the research team specifically sought to obtain the vales for exposure, sensitivity and adaptive capacity. It should be reiterated that the VCA specifically targeted fisherfolk, and sought to determine their vulnerabilities to climate hazards and their general capacities to adapt or mitigate the impacts from these hazards. The questionnaire was thus desired to obtain the following information:

Exposure

i) What are the main climate related hazards faced by the coastal and fishing communities? (CC hazards can include high waves, beach erosion, coral reef damage, flooding from nearby rivers, land slippage from surrounding hillsides.)
ii) Which areas and groups within coastal and fishing communities are exposed to climate related hazards?
iii) How many persons in the fishing industry are exposed to coastal hazards?
iv) How many boats are likely to be lost after a storm, tropical depression and or hurricane?
v) How many fisher homes are located along the coast?

Sensitivity

i) How dependent are the coastal and fishing communities on areas or resources impacted by climate related hazards?
ii) What are the key impacts resulting from climate related hazards?
iii) Are climate related impacts linked to other environmental, economic and social problems faced by the communities?

Adaptive capacity

i) How do coastal and fishing communities, including households, resource users/ managers and local groups, currently cope with climate related hazards?
ii) What are other possible strategies to enable coping by coastal communities?
iii) What capacities/ resources (insurance schemes, alternative livelihoods, boat repair yards, trained engine mechanics, boat repair specialists) are there already to support adaptation?

Meetings were held with Fisheries and Sustainable Development Officers responsible for Climate Change Adaptation and Mitigation in order to determine the best method or methods to be used in the collection of data to facilitate the conducting of the VCAs. It was agreed that a survey which would enable a rapid assessment of fisherfolk would be most efficient. The questionnaire developed therefore sought to enable

i) Identification of key climatic and non-climatic threats to fisherfolk and fisheries resources
ii) Identification of the social and economic needs of the fisherfolk at different fishing villages
iii) A rapid review of fisheries and aquaculture projects and programmes
iv) An analysis of the status of fisherfolk in coastal communities (based on average income per family, access to education, healthcare, insurance, alternative livelihoods, etc.)
v) An assessment of fish landing facilities (landing sites, markets, fisher cooperatives, cold storage, ice facilities, jetties) per fishing community
vi) Acquisition of historical data on climate impacts on coastal communities
vii) Aelection of the communities most likely to be affected by CC
viii) Listing of priorities for implementing projects and other initiatives under an approved fisheries plan
ix) Understanding of operational constraints such as funding, time, human resources, expertise
x) Feedback from a wide selection of stakeholders (fishermen, fish vendors, fish processors, residents, boat boys, teachers, secondary and tertiary school students, emergency workers, aquaculture farmers, farmers, forest workers, nurses, doctors, business persons).

Based on the above considerations, the questionnaire was developed as well as a vulnerability score card designed specifically to guide a quantitative assessment of coastal vulnerability per community. This card was entitled the Coastal Community Vulnerability Index card. A series of variables with weighted indicators were used to help calculate Coastal Community Vulnerability per community surveyed. The indicator values designated per variable were determined based on good knowledge of the fishing sector and socio-economic status of the fishers in Saint Lucia. Based on the responses per community per variable, a score was allocated for that variable. The variables were specified under *exposure, sensitivity* or *adaptive capacity*. The sum of the scores for the various variables were used to calculate a comparative vulnerability score for each community.

The questionnaires were administered via 12 trained graduates of Environmental Science of the Sir Arthur Lewis Community College. There was 1 fisheries consultant, and 1 - 2 fisheries officers with many years of extension services who also organized the interviews and validation meetings and participated in the actual administration of the questionnaires. A minimum of 100 residents were interviewed from each community. Of persons interviewed every effort was made to ensure that at least 30% were fishers. Other interviewees were farmers, students, teachers, business persons, police officers, boat mechanics, and health care workers. Some persons were retired residents.

Selection of Fishing Communities for VCA

The VCA was undertaken in 3 fishing communities which were selected based primarily on geographic location and estimation of exposure and sensitivity. The community of Gros-Islet in the north- west of the island is located close to the Capital and often does not experience major impacts due to climatic hazards. Soufriere, a town, located on the west coast, is an important tourism centre, and is located along one of the deepest bays on the island. It is surrounded by mountains and the Soufriere river runs through the town. During heavy rains the river transforms into a raging body of water that dumps large volumes of water along with rock, tree trunks, sediment and solid waste into the bay. The depth of the bay also leads to high swells along the coast during the passage of hurricanes and tropical storms. Micoud, primarily a fishing village, is located south-east of the island and is significantly impacted by Sargassum influxes. The impact is often enough to stop all fishing activity and has been blamed for the frequent loss of function of electrical appliances throughout the community.

A further scoping exercise enabled other key features of the communities to be defined for inclusion in the VCA. The findings of the scoping exercise were based on site visits, a review of national and community reports, fisheries landing data sheets, fisheries registration documents, interviews with officials from the private and public sector and community groups in and outside of the communities.

Stakeholder Identification

A number of stakeholders were identified to participate in the assessment. Stakeholder selection and engagement were based on a number of considerations:

i) Are there stakeholders with specific roles and responsibilities who may be useful to engage? What are their needs, priorities and interests?
ii) Who might be the most affected by the impacts of climate change and proposed adaptation strategies (e.g. elderly, disabled, women, men or youth)?
iii) Who might be resistant to changes required for climate change adaptation?
iv) Are there any conflicts between stakeholders that may affect the conduct of the VCA? How can these be managed?
v) What conditions exist within various stakeholder groups that may limit participation in the VCA?
vi) Who will conduct the vulnerability assessment – local, foreign consultant, youth, fisher specialist?
vii) How will participatory approaches be used to engage local communities in collection and analysis of data?
viii) Who are the end users of the assessment and its findings?
ix) What are the preferences in terms of communication products and pathways?

Average scores per variable per community were determined and applied to a master sheet for each community. From this, a CCVI score was determined for each community. The results of the survey were then shared through well publicized validation meetings held in each community. Validation of the VCA results and recommended actions to support proposed interventions were identified at these meetings.

Table 1: Scoping Exercise

Parameters	Soufriere Town	Micoud Village	Gros-Islet Town
What is the level of dependence on fisheries and marine resources?	*High*	*High*	*High*
Level of impact and frequency of past climate and disaster events (e.g. hurricanes, storm surge, coral bleaching and flooding)?	*Extremely high. Major impact from Soufriere river in the town and bay (from siltation)*	*Sargassum influx has caused great difficulty in accessing fishing craft and delivery fish catches. Smell leads to discomfort and health issues and damage to boat engines and fisher appliances at home.*	*Moderate. Landing site rather protected. Beach armouring exists.*
Site specific actions identified in national assessments or reports as priorities for reducing coastal vulnerability to climate change and disasters.	*Manage flooding from Soufriere river.*	*Removal of Sargassum. Clean up of beach. Manage littering on the beach and off shore areas.*	*Monitor for coastal erosion.*
Average unemployment and poverty levels **	*Moderate -high*	*Moderate*	*Moderate*
Other information is available to facilitate the VCA	*Yes*	*Yes*	*Yes*
List of local community partners, such as fisherfolk organisations and other civil society organisations, who have an interest in and capacity to support the VCA and address climate change	• *Fisher Cooperative Associations;* • *SMMA* • *Water Taxi Association* • *Challengers Sports Club* • *ICAN Youth Movement* • *Ghetto Stars Youth Organization*	• *Fisher Cooperative Associations;* • *Malgretoute Community Centre Management Committee* • *Micoud Development Foundation* • *National Mothers and Fathers League*	• *Fisher Cooperative Associations;* • *Gros Islet Roteract Club* • *St. Lucia Animal Protection Society* • *St. Lucia Guyana Association* • *St. Lucia Cuba Association*

Vulnerability Score Card
Calculating CCVI (Coastal Community Vulnerability Index)
The higher the CCVI, the more vulnerable the Community

	Variables	Weighted Indicators: Scores 1 - 3			Score
	# Community	1	2	3	
S	Number of residents	> 15,000	6000 – 15000	<6,000	
S	Number of registered fishers	>500	200 -500	<200	
AC	Average age of fishers	18 - 40	41 - 65	>66	
S	***Vulnerability of coast***	1	2	3	
S	Shoreline: sandy beach, rocky shore, cliff	cliff	rocky	sandy	
S	Presence of coral reefs along shore line	> 50%	25 – 50 %	< 25%	
S	Presence of mangroves along shore line	> 50%	25 – 50 %	< 25%	
E	***Residence: Proximity to High Tides***	1	2	3	
E	% Fishers who live within 10m of the high tide line	<45	45 - 74	75 - 100	
E	% Fishers who live between 10 -60m from the high tide line	75 - 100	45 - 74	<45	
E	% Fishers who live at altitudes over 40 metres above sea level	75 - 100	45 - 74	<45	
S	***Infrastructure at risk***	1	2	3	
S	# Coastal fishing infrastructure	0	1 - 2	>2	
S	Number of boats with outboard engines	<10	10 - 30	>30	
S	Number of boats with inboard engines	<5	>5	>10	
AC	***Infrastructure to support adaptation***	1	2	3	
AC	Presence of safe harbor facility	Yes	No		
AC	Presence of jetties	2	1	0	
AC	Presence of cold storage capability	2	1	0	
AC	Presence of Access to ice	2	1	0	
AC	Presence of fisher storage rooms	yes	no		
AC	Number of fisher storage rooms	>50	20 - 49	<20	
AC	Presence of beach armour	Yes	Partial	None	
AC	Presence of retail outlets for wholesale purchases	Yes		No	
AC	***Technical expertise***	1	2	3	
	Presence of trained /certified engine repair mechanics	>10	>5	< 5	
	Number of untrained engine mechanics	>10	>5	< 5	
	Presence of engine repair shops	>5	>3	< 3	
S	***Economic vulnerability***	1	2	3	
	Number of engines 9.9 – 75 HP	<5	10 -20	> 20	
	Number of engines 75 – 150 HP	<5	10 -20	> 20	
	Number of engines 150 – 250HP	<5	10 -20	> 20	
	Number of engines > 250 HP	<3	3 - 5	> 5	
	% fishers boats with insurance	75 - 100	10 - 74	<10	
	% fishers with engine insurance	75 - 100	10 - 74	<10	
	% fishers with life insurance	75 - 100	50 - 74	<50	
	% fishers paying NIC	75 - 100	50 - 74	<50	
AC	***Aquaculture***	1	2	3	
	Seamoss cultivation	Yes	Sometimes	No	
	Number of sea moss farmers	>30	20 - 30	<20	

	Variables	Weighted Indicators: Scores 1 - 3			Score
	# Community	1	2	3	
S	Number of residents	> 15,000	6000 – 15000	<6,000	
S	Number of registered fishers	>500	200 -500	<200	
AC	Average age of fishers	18 - 40	41 - 65	>66	
S	***Vulnerability of coast***	1	2	3	
S	Shoreline: sandy beach, rocky shore, cliff	cliff	rocky	sandy	
S	Presence of coral reefs along shore line	> 50%	25 – 50 %	< 25%	
S	Presence of mangroves along shore line	> 50%	25 – 50 %	< 25%	
E	***Residence: Proximity to High Tides***	1	2	3	
E	% Fishers who live within 10m of the high tide line	<45	45 - 74	75 - 100	
E	% Fishers who live between 10 -60m from the high tide line	75 - 100	45 - 74	<45	
E	% Fishers who live at altitudes over 40 metres above sea level	75 - 100	45 - 74	<45	
AC	Presence of seamoss processing plants	Yes		No	
	Presence of seamoss processers	>10	5-9	<5	
	Presence of freshwater aquaculture farmers	>10	5 - 9	<5	
	Acreage of land under aquaculture	>5 acres	3-5 acres	<3 acres	
	Number of aquaponics farmers	>5	2 -4	<2	
AC	***Education***	1	2	3	
AC	(%) of fisher households with children at secondary school	>35	10 - 35	<10	
AC	(%) of fisher households with children at tertiary level	>20	10 - 20	<10	
S	Average family/household size of fishers	<5	10 - 15	>15	
AC	Number of secondary schools in community	2	1	0	
AC	***Health***	1	2	3	
	Presence of health centre	Yes		No	
	Presence of hospital	Yes		No	
	Presence of senior care facility	Yes		No	
AC	***Income / Productivity***	1	2	3	
AC	Presence of fisher cooperatives	Yes, Active	Yes, Not active	No	
AC	% of fishers who are members of fisher cooperatives	> 70%	40 – 70%	<40%	
AC	# of fishers who are members of credit unions / banks	80 - 100	45 - 79	<45	
	Safety at Sea	1	2	3	
S	# of fishers lost at sea in the past 3 years	<5	5 - 10	>10	
AC	Presence of a community disaster management plan	Yes		No	
	Does this plan have a fisheries component?	Yes		No	
AC	Are persons familiar with the Disaster plan?	Yes		No	
AC	Majority of fishers have_____ standard safety gear	>8 items	4 - 8	<4	

	Variables	Weighted Indicators: Scores 1 - 3			Score
	# Community	1	2	3	
S	Number of residents	> 15,000	6000 – 15000	<6,000	
S	Number of registered fishers	>500	200 -500	<200	
AC	Average age of fishers	18 - 40	41 - 65	>66	
S	***Vulnerability of coast***	1	2	3	
S	Shoreline: sandy beach, rocky shore, cliff	cliff	rocky	sandy	
S	Presence of coral reefs along shore line	> 50%	25 – 50 %	< 25%	
S	Presence of mangroves along shore line	> 50%	25 – 50 %	< 25%	
E	***Residence: Proximity to High Tides***	1	2	3	
E	% Fishers who live within 10m of the high tide line	<45	45 - 74	75 - 100	
E	% Fishers who live between 10 -60m from the high tide line	75 - 100	45 - 74	<45	
E	% Fishers who live at altitudes over 40 metres above sea level	75 - 100	45 - 74	<45	
	Fishery	1	2	3	
AC	# of fishers who fish on a FAD	75 - 100	50 - 74	<50	
AC	# of FADs offshore	2 -3	1	0	
AC	Presence of a FAD Management Plan	Yes	No		
AC	Implementation of the FAD MP	Yes	No		
	Annual fish landings 2018	> 300 metric tonnes	101 – 299 metric tonnes	30 – 100 metric tonnes	
	Annual fish landings 2017				
	Annual fish landings 2016				
	Annual fish landings 2018 $XCD	> $5 million	$1 - $5 million	< $1 million	
	Annual fish landings 2017 $XCD				
	Annual fish landings 2016 $XCD				
AC	**Individual knowledge**	1	2	3	
	% fishers who can define Climate Change	75 - 100	50 - 74	<50	
	% Fishers who have attempted any CC adaptation strategies in the last 12 months	75 - 100	50 - 74	<50	
AC	***Alternative livelihoods/ Economic dependence***	1	2	3	
	% of fishers with other form of employment (agriculture, vending, tourism, construction, teachers, other)	75 - 100	45 - 74	<45	
E	**Evidence of Climate-related Hazards**	1	2	3	
E	Breaking up of coral reef damage, bleaching, sedimentation	No	Yes, but only occasionally observed	Yes	
E	Sea grass beds uprooting	No		Yes	
E	Destruction of mangroves: sea water intrusion, siltation, tree collapse, pollution: solid waste	No		Yes	
E	Rainforests: soil erosion, loss of trees	No		Yes	
E	Presence of Sargassum influx	No		Yes	
E	Heavy siltation in coastal waters	No		Yes	

AC: Adaptive Capacity E: Exposure S: Sensitivity

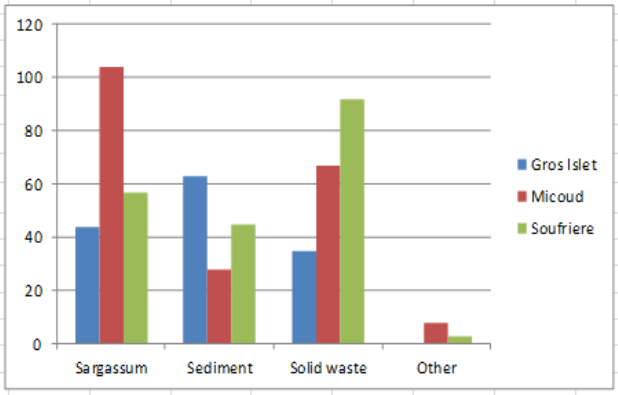
RESULTS

The following tables and graphs are summarized outcomes from the VCA assessments. For each parameter, the total number of persons responding to particular enquiries was used to create the graphs pertaining to Threats to Community, CC Impacts on Fisheries, Recommended Interventions and Responsible Entity.

Community	CCVI Score (Scores Range 71 – 213)
Gros-Islet	148
Soufriere	151
Micoud	152

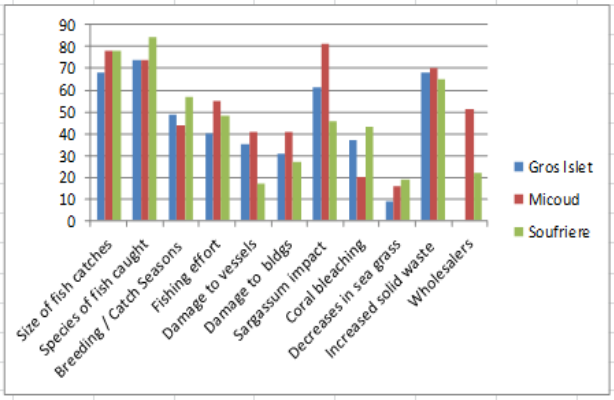
1. Threats to Community

Threats to Community	Gros Islet	Micoud	Soufriere
Sargassum	44	104	57
Sediment	63	28	45
Solid waste	35	67	92
Other	0	8	3



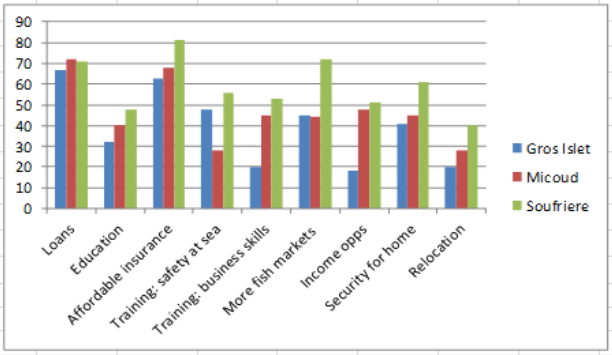
2. Main CC Impacts on Fisheries

CC Impacts	Gros Islet	Micoud	Soufriere
Size of fish catches	68	78	78
Species of fish caug	74	74	84
Breeding / Catch Se	49	44	57
Fishing effort	40	55	48
Damage to vessels	35	41	17
Damage to bldgs	31	41	27
Sargassum impact	61	81	46
Coral bleaching	37	20	43
Decreases in sea gr	9	16	19
Increased solid was	68	70	65
Wholesalers		51	22



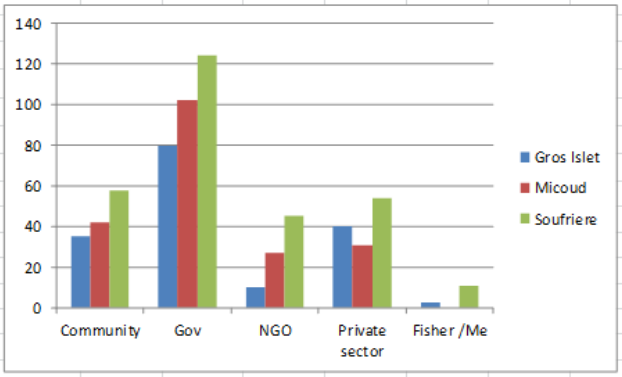
3. Recommended Interventions

Interventions	Gros Islet	Micoud	Soufriere
Loans	67	72	71
Education	32	40	48
Affordable insuran	63	68	81
Training: safety at s	48	28	56
Training: business s	20	45	53
More fish markets	45	44	72
Income opps	18	48	51
Security for home	41	45	61
Relocation	20	28	40



4. Responsible Entity

	Gros Islet	Micoud	Soufriere
Community	35	42	58
Gov	80	102	124
NGO	10	27	45
Private sector	40	31	54
Fisher /Me	3	0	11



Data Generated via the Validation Meetings

Once the data was analyzed and CCVI scores generated a community validation meeting was held in each community assessed. This was the opportunity for the sharing of the outcome of the VCA and to obtain community / fisher feedback. This is considered a critical component of the VCA as it allowed researchers to assess stakeholder response to vulnerabilities and capacities identified for the community. The validation meetings enabled researchers to evaluate the VCA process and prioritize actions in support of building climate resilience in the fisheries sector.

Community: Gros-Islet **Vulnerability Score Received:** 148

Key Vulnerabilities
Threats from rough seas, flooding, damage to crops, damage to fishing gear, bridges and other communication infrastructure due to wind and rainfall from storms, tropical waves and hurricanes.

Key Climate related threats to the community
Excessive sediment in rivers and along the coast from erosion of agricultural lands and forested slopes.

Key Climate related impacts on the Fisheries

i) Changes in the type of species of fish caught.
ii) Decreases in the average size of the fish landed / Increases in the amount of solid waste accumulated on the beaches and at sea.
iii) Excessive Sargassum offshore sometimes affects the pulling up of seine nets.

Type of Resources that may be of use:

i) Accessible loans
ii) Affordable insurance

Recommended Interventions

i) Increase affordability, availability and efficiency of new fishing gear.
ii) Improve the fish market and landing site infrastructure.
iii) Increase education of fishers on safety at sea, finance and business management.

Community Feedback during Validation Meetings with the CC4FISH Team

1. Findings of the VCA report were approved by the workshop participants.

Access to affordable and efficient fishing gear

2. Fishers were concerned that the cost of fish gear purchased through their Fisher Cooperative was much higher than the cost if purchased in local stores. This should not be the case. It made the fishers question the usefulness of the Fisher Cooperative. There were discussions about the role of the National Fisherfolk Organization (NFO) in making fishing gear available to fisherfolk at reasonable prices.

Improved Fish Landing Site

3. Fishers also felt that their fish landing site needed significant improvement in order to meet international standards for fish markets. CC4FISH support to improve some components of the landing site was requested.

Improved Safety at Sea

4. CC4FISH support in the provision of VHF hand held radios was discussed and strongly supported by the fishers who agreed that they needed greater access to gear that will improve their level of safety at sea. Fishers appreciated the effort to make the radios available at subsidized prices.

Community: Micoud **Vulnerability Score Received:** 152

Key Vulnerabilities
Threats from rough seas, flooding, damage to crops, damage to fishing gear, bridges and other communication infrastructure due to wind and rainfall from storms, tropical waves and hurricanes.

Key Climate related threats to the community
Excessive Sargassum along the beaches and inland water hinder the movement of fishing craft often preventing fishers from going out to fish. Outboard motors are also frequently damaged by Sargassum.

Key Climate related threats to the Fisheries

i) *Sargassum* affects the ability of fishers to go out to fish.
ii) Average size of the fish landed has decreased.
iii) Type of fish species landed has changed.
iv) Increases in the amount of solid waste accumulated on the beaches and at sea.

Type of Resources that may be of use:

i) Accessible loans
ii) Affordable insurance

Recommended Interventions

i) Build a jetty in Micoud bay for fishers.
ii) Removal of *Sargassum* on the beach and in the bay.
iii) Improve the fish landing site and market facilities.

Community Feedback with the CC4FISH Team

1. Findings of the study were approved by the workshop participants. The fishers absolutely agreed that a jetty would significantly expand their capacity to adapt to Climate Change threats. They felt that a well-designed and located jetty would facilitate access to their boats and landing of fish even when inshore waters become rough because of storms and tropical waves or during the periods of significant Sargassum influx.

How may the CC4FISH support the fishers?

Jetty

2. Fishers would like the Fisheries Department to lobby much more for the construction of the jetty. CC4FISh has offered to support this construction with funding depending on the amount required.

Sargassum Clean Up

3. Beach cleaners managed by the National Conservation Authority (NCA) must be hired long term to maintain the beach.

Bathroom Facilities

4. The bathroom facilities have been closed because of the lack of identification of a suitable authority to manage the facilities.

New Executive

5. It was proposed by CC4FISH that the Fisher Cooperative in Micoud, (Eastern Fishermen's Cooperative) be given the responsibility of managing the new washrooms. The recommendation by CC4FISH is that a meeting be called by fishers and they elect a new executive who will better serve their needs.

Community: Soufriere **Vulnerability Score Received:** 151

Key Vulnerabilities

Threats from rough seas, flooding, damage to crops, damage to fishing gear, bridges and other communication infrastructure due to wind and rainfall from storms, tropical waves and hurricanes. Loss of crops and high ocean salinity due to extensive drought.

Key Climate related threats to the community

The accumulation of solid waste within rivers and along the coastal areas. This blocks rivers and can cause flooding throughout the town. Plastic material ends up on coral reefs and other important fishing sites.

Key Climate related threats to the Fisheries

i) Changes in the type of species of fish caught.
ii) Decreases in the average size of the fish landed.
iii) Increases in the amount of solid waste accumulated on the beaches and at sea.

Type of Resources that may be of use:

i) Affordable insurance
ii) Access to more markets for their fish.

Recommended Interventions

i) Introduction of larger fishing vessels that can remain out to sea for multiple days at a time.
ii) Introduction of new fishing techniques and more efficient fishing gear.
iii) Reduction of fuel prices.

Community Feedback with the CC4FISH Team

Improved fishing gear

1. Findings of the VCA were approved. Fishers stressed that they were keenly interested in seeing the introduction of larger vessels for long line fishing. They indicated that the high cost for the boats makes it difficult for any 1 fisher to afford such a vessel. Many fishers believe that local fishers were not making the most of the pelagic fish resources available to them. Soufriere fishers feel that it is time to introduce a new form of fishing in Saint Lucia. Fishers also supported the use of more efficient fish gear and safety equipment. The provision of VHF radios by CC4FISH was given strong support.

Insurance

2. Fishers also wish to learn more about insurance schemes available to them.

Fish Aggregating Devices (FADS)

3. Fishers indicated that they were facing serious problems whilst fishing on the FADS. This is as a result of the presence of pilot whales which eat the fish on the lines at the FADs.

Vessel damage

4. FADS are too frequently cut by vessels. The FAD Management Plan must address this either by putting some type of beacon on the FAD or restricting boat traffic near the FADs. Boat lanes must be geo-positioned, locations made available to all mariners, and rules put in place and enforced with regards to movement of craft near the FADs.

Pilot Whales

5. CC4FISH will do some research to see if there are any non- lethal or non-harmful measures proposed to address the issue of the nuisance whales on FADs and to report on this during the FAD consultations. CC4FISH is also willing to cover the cost to enable some fishers to train and to go out fishing on long line boats.

IN CONCLUSION

It must be noted that the methodology used has many limitations. The development of the CCVI is very much dependant on the data available and the assumptions made with respect to the relationships between variables, indicators and scores assigned. Multiple variations to the CCVI score card are indeed possible. What is important is the standardization of the score card such that the same assumptions are used for all the communities in the survey. This is primarily a comparative assessment. The CCVI scores themselves are only of value in so far as they can be used to quantify vulnerabilities in a participatory way and compare levels of vulnerability per community in a transparent manner, involving key stakeholders and recognizing the input of multiple focus groups. Vulnerability assessments are typically conducted to meet specific objectives, and these are key determinants of the vulnerability questions asked and the methodologies that are ultimately employed. And, as with all vulnerability assessments, not all information is available when the VA is carried out. Conditions at the sites being assessed are also subject to change overtime. This means therefore that the vulnerability scores are very time sensitive. The CCVI should thus be simple to develop, inexpensive, and assessments should occur routinely.

Having said all of this, the CCVI methodology described here is a simple means to help compare coastal communities. Once the score card is applied consistently per community it should be possible to calculate a CCVI for any coastal fishing community in Saint Lucia. The CCVI provides a mechanism for prioritizing vulnerable sites and proposed interventions, utilizing fisherfolk and community residents as key informants.