Territory of the Virgin Islands Food Systems Resilience –

Impact from COVID and severe climactic events

Prepared by Courtney Long and Kaley Hohenshell: Iowa State University Extension and Outreach Food Systems Team

The snapshot is formatted to give an in-depth analysis of findings related to impacts of the Irma and Maria Hurricanes in 2018 and COVID-19 on the territory of the Virgin Islands. Iowa State Extension and Virgin Islands Good Food Coalition have been working in partnership since 2018 and this study includes an overview from initial findings in 2018,which included over 70 interviews and site visits, and 18 listening sessions with FEMA, resulting in a food systems assessment, snapshot and hurricane history and farmer preparedness checklist.

Following this work, additional collaboration and research was conducted between 2021-2022 to understand further impacts from the hurricanes and COVID-19 resulting in 12 interviews (16 people total), three focus groups (17 participants total), and two surveys. One survey had 17 responses, with IRB[1] approval and informed consent, and a second survey had 240 responses conducted at the Agriculture Fair and virtually in 2022 (no IRB).

Participants included community advocates, government, farmers and food businesses, non-profits, schools, and state organizations. Virgin Islands Good Food Coalition supported the project through outreach for participation in surveys, interviews and focus groups.

Overall, this research has shown the need for advocacy, technical assistance and infrastructure investment for the territory's food system. Potentials for active engagement and participation in decision making was also brought up in interviews and focus groups regarding reflective policies for food system growth. There was a general agreement that farmers have felt neglected, with one individual sharing, "there is neglect of the [agricultural] industry and disregard for developing," and another shared, "small farmers are the few businesses expected to be able to do all aspects of business without the labor and support for it."

A special thanks to all the farmers, businesses, organizations, staff, and individuals that met and shared their stories. Thank you for your work and dedication to resilient food systems. We are humbled and grateful for your time.

[1] Institutional Review Boards and Protection of Human Subjects- study Exempt

IOWA STATE UNIVERSITY
Extension and Outreach

Virgin Islands Suggested Priorities

Based on the snapshot, interviews, surveys and focus groups, below are priority projects suggested for the territory of the US Virgin Islands food system. These are broad categories related to the ability to prepare and sustain during disaster and build back stronger.

The report shares findings from the research conducted in 2021, as well as updated priorities based on the action planning sessions in June 2022. For notes and voting information from the action planning sessions, please see Appendix E.

The first priority that will be enacted through funding from the Agricultural Marketing Resource Center is the creation of a farm cooperative, specifically identified in priority 1 below. The primary goal will be to first understand the harm and concerns still present from what occurred with the cooperative that was developed years ago. Following this understanding, facilitated sessions will occur to identify ways to work together on a new business collaboration for seeking out expense sharing, aggregation of products, grant applications, etc. The $10,000 will be allocated to the Virgin Islands Good Food Coalition, which will then provide stipends to farmers and support organizations for attending meetings and developing a plan.

Additional support for evaluating the success of this initial project will be conducting by Iowa State University Extension Food Systems team.

Suggested Priorities

1. Create a farm cooperative for addressing current needs in individual business models
    1.1. Learn from previous cooperative and the constraints, harm, and frustrations that occurred
    1.2. Address feasibility for wholesale distribution and scaling-up of farms and food businesses
    1.3. Develop funding mechanisms that enhance the current food system and ensure sustainability
    1.4. Create plan for cost sharing of equipment, resources, etc.

2. Establish better social networks and mechanisms for engagement in policy development and government
    2.1. Create agricultural committees within Government that advocates and educates on needs
    2.2. Create an awareness campaign focused on the importance of local foods, and reason for cost of products for community members, including information on global, regional, and local supply chain and intersectionality
    2.3. Develop a Virgin Islands brand; perhaps creating a 'product of the month' branding campaign to increase local food procurement within schools, institutions, and grocers

3. Identify existing food supply pre-storm that farmers, grocers, etc. have on hand and develop strategy for storm mitigation, including policies for pre and post storm
    3.1. Add additional climate events to the existing hurricane preparedness checklist practices
        3.1.1. Include aspects of plant and animal care, storage of equipment, infrastructure, etc.
    3.2. Create a plan for aggregation and safe distribution of food post disaster, specifically around food preservation, food safe storage, and food distribution
    3.3. Discuss and ensure plan for farmers and food businesses to be able to get to property to check on land, animals, and infrastructure so that additional damage is minimized post-storm
    3.4. Create or identify existing insurance programs for farm and food businesses

4. Establish peer to peer networks, mentorship, and technical support options for existing and new farmers, particularly around risks within the agriculture and food business sectors
    4.1. Understand connections between existing Territory Agriculture Group (TAG) and ways to engage new farmers

5. Launch an online farmers market
    5.1. Ensure that adequate information is given on pricing, freshness and location of production, and choice of pick-up.
    5.2. Leverage learnings from the USDA Farmers Market Promotion Program
    5.3. Create appropriate marketing and educational tools for both farmers and consumers

6. Improve and invest in resilient infrastructure for farming, processing, storage and distribution
    6.1. Apply for funding for water infrastructure repair and expansion; may include needs for feasibility research on water access, salination processes, and innovative practices for water storage and delivery
    6.2. Consider needs for mobile storage and processing units to enhance access to abattoir facilities and storage of products post-harvest

7. Create a community disaster plan and communication strategy
    7.1. Establish pre-disaster and post-disaster contacts
        7.1.1. Consider networks both internal and external to disaster zone and address needs and innovative ways to respond
        7.1.2. Partner with organizations and support systems out of the disaster zone, which may help with receiving support from non-impacted areas
    7.2. Create a regional communication network for prevention, response, and recovery that includes various partner organizations, farmers, and businesses
        7.2.1. Encourage collaborative discussion and co-creation of ideas
    7.3. Develop a land use and water plan that details changes needed around community planning and policy

8. Create new, and update existing farm and food business educational resources
    8.1. Finance: Understand benchmarks, input costs, and value of products; receipt keeping (in case of storm and need for insuring crops) and other finance best practices; identify mechanisms for financing infrastructure and equipment
    8.2. Production: Learn about strategies for drought resistance planting, such as hügelkultur garden beds; pruning techniques prior to a storm; storage and value-added product creation; farm management plan including production practices, environmental considerations, etc.
    8.3. Marketing: Develop innovative options for increasing market access whether through direct-to-consumer or scaling business for larger wholesale options; consider collaborative marketing techniques
    8.4. Enhance existing educational resources from Department of Agriculture and Extension with updated handouts, online modules, etc.,
    8.5. Consider developing Youth Local Food Leader to engage younger generation

Community Overview:

This section reviews values and ways that community members participate and connect in community. For a full overview of findings from 2019, please see the Food System Assessment or Snapshot. Within the survey, questions on individual values and community participation were asked. Within interviews and focus groups, open ended questions were asked about their community, like "how would you describe your community to someone else," "what are the best parts about your community" and "what are the worst aspects of your community." Responses are reflected in the following pages.

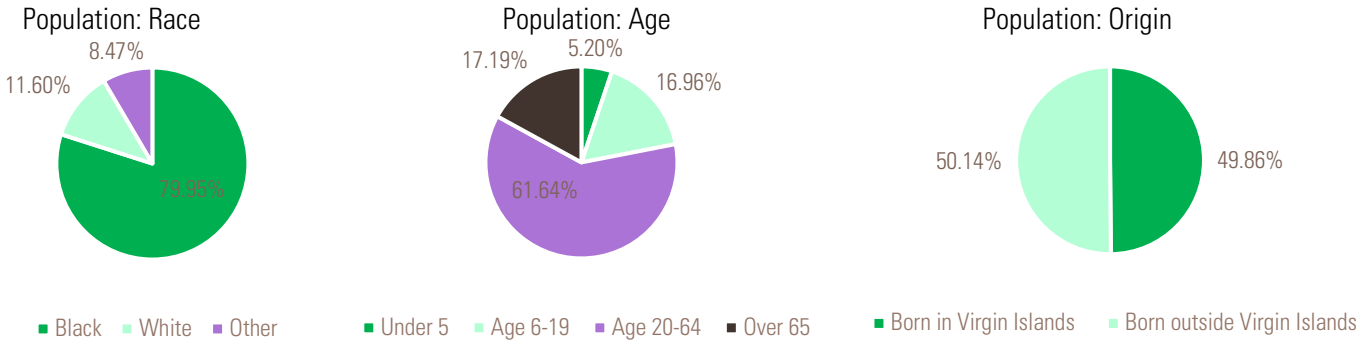

Figure 1: Population Data- TERRITORY (EASTERN CARIBBEAN CENTER AND UNIVERSITY OF THE VIRGIN ISLANDS, 2015; ISSUED 2018)

In 2020, the territory had an estimated population of 87,146, a population change of -18.1% from 2010 (106,405) (USDA Census Bureau, 2020). The following details estimates from 2020 for each island.

- St. Croix: 41,004 (USDA Census Bureau, 2020) – estimated loss of 19% since 2010
- St. John: 3,881 (USDA Census Bureau, 2020) – estimated loss of 6.9% since 2010
- St. Thomas: 42,261 (USDA Census Bureau, 2020) – estimated loss of 18.2% since 2010

For information on the demographics of those that participated in the survey, see Appendix A.

Values

Individuals who participated in the resilience survey were asked to select their top three societal values from a pre-created list; if they had additional values, they could add in options in "other." Environment, Culture, and Education rank as the highest values, with 56% agreeing that Environment is a top value (See Figure 3).

In addition to these values, through focus groups and interviews, community networks, diversity and culture, education, and natural environment as assets across the territory. While diversity was a top value in the survey, this was shown as both a strength and challenge from interviews and focus groups. Culture was seen as a strength when shared as understanding collective history, connection to the land and awareness of social justice needs. However, it was stated as a challenge that some people can be "a little rougher than they need to be" and there is a gap in fully understanding the impact of colonization. Colonialism was also connected by some to interest in farming. One individual shared, "people on this island were enslaved until 1917, and forced to work on the land" and another stated, "farming is not always typically attractive to people of color [due to legacy of slavery and sugarcane], so just recently there is interest in farming, but it is at such a small scale…it is hard to get people interested".

Future generations were seen as a value as well, connecting to education. Several see the next generation as the leading future and opportunity for change. One individual shared, "our hope is in youth and community and educating

folks," and another stated, "we don't have enough confidence in our children…[we are] missing an opportunity to secure our future."

Social networks were seen as a strength, and that it was easy to find people to be involved in community. However, there were also discussions about siloed activities and resistance to sharing information across different populations. People may be seen as isolating and un-trusting. Community ownership and trust were quite low as values for the community, and this also connects to many of the interviews and focused conversations around distrust of knowledge-base and transparency. One person shared, "knowledge transfer [doesn't happen], there are not records and there will be a real loss in the next 5-10 years".

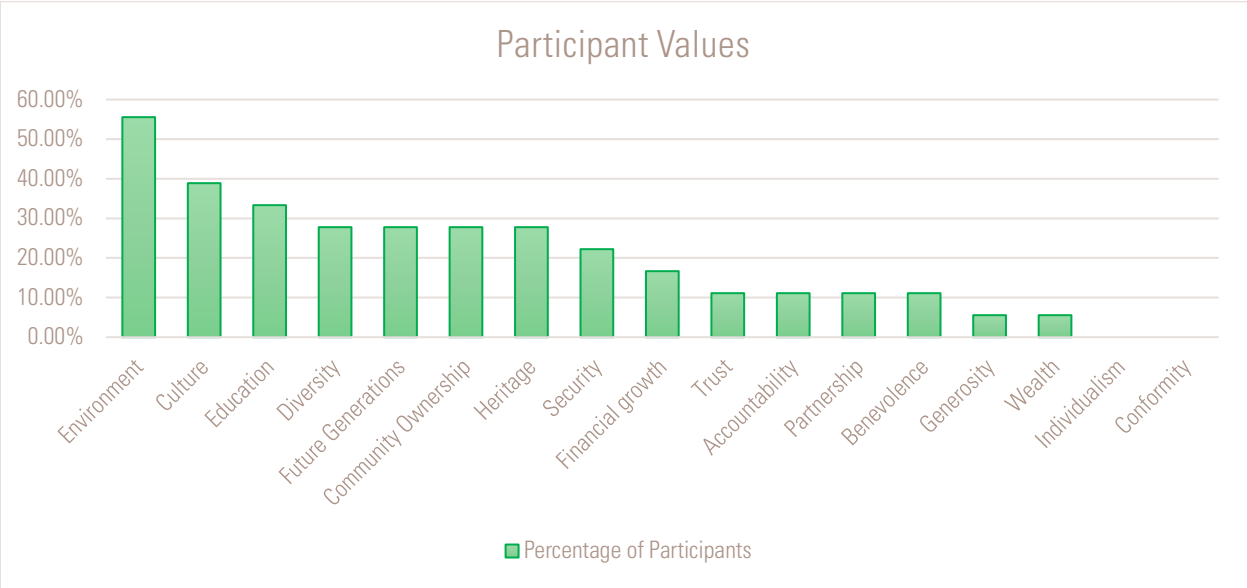

Figure 2: Participant Values (N=18)

In addition to the values shown in figure 1, individuals also shared "sustainability" and "spirituality" as values.

One additional area of concern was that of business and finance. It was mentioned that there are unemployment issues across the Virgin Islands, and they have continued through COVID. This was also expressed as potentially being connected to individuals leaving the territory for education within the contiguous U.S. and the lower salary rates. Another shared that they don't believe that Universities and other leaders are "listening to what is being said on the ground level from students and from people working with students".

Participation

There are many ways to participate and support the local community. Individuals were asked to share how they supported their community from a pre-created list and could also type in "other" responses. Over 83% of individuals shared that they purchase from local businesses. There are varying degrees of reliance on tourism as part of the main industry, and many also stated their interest in participating and supporting small businesses. This also connected to entrepreneurship and education for the future generations to get involved in their community.

There are opportunities to be involved in local government and informal leadership areas. One individual shared that "people seek leadership…there is a lot of initiative and people doing things…". However, there were also many concerns shared about the process and government planning and action. The territorial government was seen to have limited capacity by many of the interview participants. This also connects to the ability to receive and handle funding

from federal sources and grants. One individual shared, "there is a real capacity issue that the federal government will dump in money but won't work with [us] on how to handle the funds." Another shared, "the system is a mess" while another shared that they believe the "[government] is somewhat ineffective".

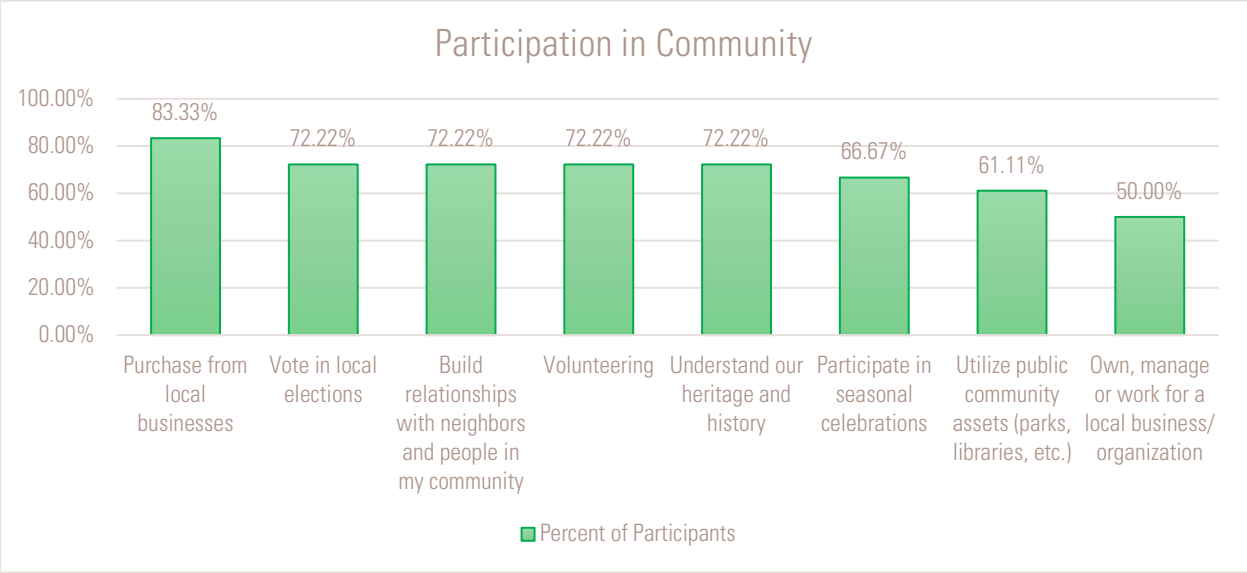

Figure 3: Community Participation (N=18)

In addition to the values shown in figure 2, individuals also shared that they participated in "worship in local church" and "give food, water and money in homeless hot spots."

Business and Industry

While the first section of the report took a broad look at community engagement and values, the next portion focuses on the business and industry, specifically related to food systems.

Within the community, it is estimated that there are 909 small business establishments within St. Croix, (annual payroll of $676,256,000), 227 within St. John (annual payroll of $66,143,000), and 1,209 within St. Thomas (annual payroll of $472,936,000). See Appendix C for full table of businesses.

Agriculture

Around 70% of the Virgin Islands territory is comprised of agricultural and forested property, with only around 12% being in agriculture and the rest being in forested land (The World Bank, 2018). "The arable land is used for annually cultivated crops; permanent crop land includes space for perennial species including fruit trees, nuts, etc.; permanent pastures are for forage and naturally grown areas that are not harvested; and forest includes land that has a canopy cover of more than 10% and is over .5 hectares in size, and over 5 meters high." (Iowa State University Food Systems Team, 2019, p. 21)

According to the 2017 Census of Agriculture, the U.S. Virgin Islands has 565 farms, where a farm is any place where $500 or more of agricultural products are sold during one year (USDA, 2018). This is a dramatic increase in farms since 2007, where only 219 farms existed. The 565 farms account for 9,324 acres; with 2,620 in cropland (1,374 of harvested crops and 1,247 in other); 5,538 acres are used for pasture or grazing, 668 for woodland, and 476 for other types of land (U.S. Department of Agriculture National Agriculture Statistics Service, 2018, p. 2). Most farms, 331 (59%) operate their farm business at their residence (USDA National Agriculture Statistics Service, 2017). Only 29% of the current farms are operated by individuals under 54 (U.S. Department of Agriculture National Agriculture

Statistics Service, 2018), with an average farm operator age of 61. Sixty-four percent of farms have operators that work off farm; with 40% working more than half of the year off farm (U.S. Department of Agriculture National Agriculture Statistics Service, 2018).

The average size of farms in the territory is 16.5 acres; with St. Croix having an average of 17.9 and St. Thomas and St. John having an average of 10.2 (U.S. Department of Agriculture National Agriculture Statistics Service, 2018).

The definitions of terms used in Tables 1-4 can be found in the 2017 Census of Agriculture, Appendix B (USDA, National Agricultural Statistics Service, 2017)

Table 1: Size of Farm by Island (USDA NASS 2018)

Acres	# of Farms 2018	St. Croix	St. John + St. Thomas
Less than 3	268	203	65
3-9	139	117	22
10-19	77	69	8
20-49	44	40	4
50-99	23	20	3
100-174	2	2	
175-259	5	4	1
260-999	2	2	
Total # of Farms	**565 (9,324 acres)**	**461 (8,269 acres)**	**104 (1,056 acres)**

The farm sales table below details the total sales by island, average sales, and the number of farms for each category of sales. Within the category of sales, both the number of farms and the percentage of total farms is shown. Additionally, to distinguish between 2007 data, if the farm numbers increased in percentage of total farms each year, a (+) is identified, if there was a decrease a (-) is identified and if no change, it is left blank. The farms that have sales of less than $1200 have increased significantly and account for at least 50% of the farms.

Table 2: Sales by Farm (USDA NASS 2018)

Total Sales	VI	St. Croix	St. Thomas and St. John
Total Sales	$3,334,652	$2,843,423	$491,229
Average	$5,902	$6,168	$4,723
Farms by Values of Sales	565	418	104
Less than $1200	294 (52%) (+)	242 (53%) (+)	52 (50%) (+)
$1200-$2,499	71 (13%) (-)	53 (13%) (-)	16 (15%) (-)
$2,500-$4,999	74 (13%) (-)	56 (14%) (-)	18 (17%) (-)
$5,000 - $7,499	37 (6.5%) (-)	34 (8%) (-)	3 (3%) (-)
$7,500 - $9,999	25 (4%)	20 (5%) (+)	5 (5%) (-)
Over $10,000	64 (11%) (-)	56 (14%) (+)	8 (8%) (-)

To compare the market value of agricultural products in the Virgin Islands, the table below details primary categories of products by farm and dollar value. Only two products, by number of farms, decreased since 2007: cattle and calves decreased in STX, and hogs and pigs decreased in STT/STJ. This could be due to the lack of abattoir services for livestock. From the interviews, it was shared that, "[we are] trying to build capacity, but infrastructure isn't in place."

Anecdotally, livestock farmers shared of additional constraints for accessing the abattoir, both with time for openings and available personnel.

Table 3: Farms by Product Type and Sales Value (USDA NASS 2018)

Farm Product	VI		St. Croix		St. Thomas and St. John	
	Farms	Dollars	Farms	Dollars	Farms	Dollars
Field and Forage Crops	100	$128,692	85	$121,707	15	$6,985
Vegetables	215	$1,130,809	182	$958,419	33	$172390
Fruit and Nuts	259	$544,305	211	$488,830	48	$55,475
Nursery Crops (and ornamentals)	63	$725,125	57		6	
Cattle and calves	21	$100,439	15	$87,039	6	$13,400
Hogs and pigs	33	$83,590	25	67,940	8	$15,650
Other livestock and products	136	$465,247	103	$371,057	33	$94,190
Poultry	32	$100,662	17		15	
Chicken Eggs	57	$35,503	36	$27,504	21	$7,999
Milk	2		2			
Fish and aquaculture	4		4			

Business constraints include access to water, equipment, and internet. Only 244 (43%) farms have computers for their business and only 233 (41%) have access to internet of variable kinds. Equipment and water access was brought up in numerous interviews and focus groups as a constraint for farmers. The following tables detail the access to equipment and water.

Drought and water access continue to be concerns for farmers. While water can be brought to farms through water trucks, this is a service through the Government and can take quite a bit of time to acquire and can be expensive. One individual shared that "farmers are almost in a fight for water".

Table 4: Water and Equipment Access (USDA NASS 2018)

	# of Farms	St. Croix	St. John + St. Thomas
Selected Equipment			
Tractors	184 (31% of farms)	174 (38% of farms)	10 (9% of farms)
Motortrucks	329	268	61
Automobiles	323	275	59
Land Irrigated	247 farms; 582 acres	224 farms; 551 acres	23 farms; 31 acres
Private	221 farms; 550 acres	210 farms; 533 acres	11 farms; 17 acres
Public	34 farms; 32 acres	21 farms; 18 acres	13 farms; 14 acres
Irrigation Source			
Well/ Cistern	178	167	11
River/ Stream	1		1
Lake or Private Pond	38	35	3
Public Utility	16	16	
Other	14	6	8

As shown from the census data, production is growing; particularly smaller, diversified farms. There are numerous markets available through new programs like the farm tiendas, as well as enhanced farmer's market space on St. Croix at the Department of Agriculture. One individual shared that "the market has been one of those places that people are happy together and [feel] safe." Production and markets on St. Thomas and St. John are not as strong, which could be due to the lack of access to land and the type of terrain available for production.

It was stated that "[farmers] are in competition, and [we] want to encourage people to empower each other." Several stated the need for new cooperative business models that may support in buying new equipment, educational programming, and various farmer-to-farmer learning. Others are seeking out wholesale opportunities for consistent production.

With reoccurring drought and fear of returning hurricanes, farmers and food businesses have shared the need for planning and preparedness. This includes the need to identify water storage mechanisms, access to equipment, and best practices for care of plants and animals in extreme drought and additional weather events. In 2019, a hurricane preparedness checklist was created, however, this document should be something that is continually updated to ensure that the information is current. Additionally, other aspects, such as drought preparedness, could be included in the future.

While there are some concerns of isolation and lack of connections and sharing among farmers, there are strides being made in developing a new network and collaborative effort for farming. Good Food Coalition has been hosting Tuesday meetings with farmers to understand needs, and also supports additional grants for farmer technical assistance, one of these that led to the "farm tienda project." Individuals also shared that they are more frequently meeting with USDA and state partners around agriculture and forestry and showcased that "farmers…feel so much more called to something larger…[they] help build and shape the culture of consciousness around agriculture and are on the front lines."

A primary challenge shared is the lack of awareness and education of non-farmers about the farm and food system. About 50% of those that participated in focus groups and interviews felt that the do not see the interest in the community for local foods, both at direct-to-consumer and wholesale distribution. There was also discussion on the lack of understanding overall, one person stated, "folks don't have the true perception and vison of what can be done [or] what's occurring at a national and global [level]," and another shared "[people] are not focused on local agriculture, they are focused on bulk production and lowest cost." This has led to, what one would call, "a rollercoaster in interest and support for agriculture," creating a difficult space for individuals to engage and consider how to develop new infrastructure and support the local farming and food industry in the territory.

Food System

The intent of this research is to understand the interest and ability to have a resilient food system. Primarily, understanding the community's interest in local and regional foods, and the willingness to participate and purchase from farm and food businesses that operate within a local or regional geography. To understand the following questions on food systems, both a resilience survey (18 participants) and a consumer survey (240 participants) were aggregated.

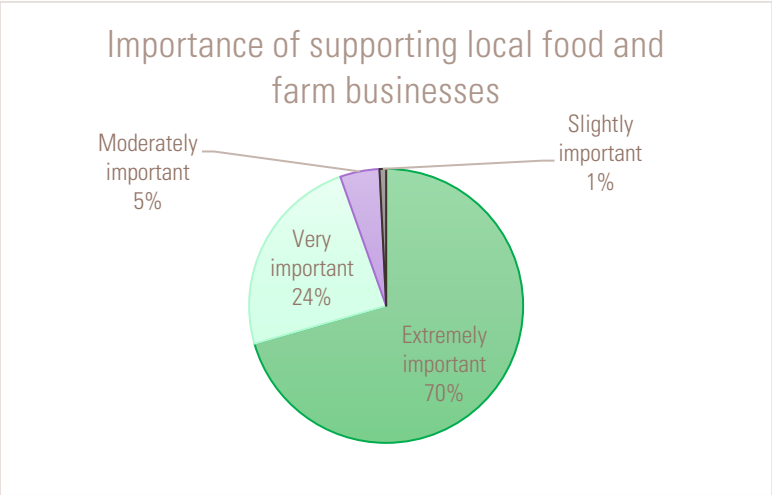

Figure 4: Extent of importance for supporting local food and farm businesses (N=258)

When asked about the importance of supporting local food and farm businesses, over 94% believed it was either extremely or very important. However, as shared previously, there are mixed feelings on if consumers are showing up to support local food businesses and if they are purchasing local products. Many still feel that local agriculture is not important to the broader community. Predominantly, local food is also seen as existing within the direct-to-consumer markets (farm stands, farm tiendas, farmers markets, and community supported agriculture). There is a smaller number of farmers considering wholesale and aggregated distribution to larger purchasers like restaurants, hospitals, schools, and additional institutions.

This opportunity for increasing sales through cooperative models and aggregating to larger scale businesses is a shared idea among many participating in this research, with about 40% specifically sharing their desire for developing a cooperative model for farmers. This shift may be able to support consumers "seeing local food" in more spaces than just direct retail locations and broadening the awareness and interest.

When asked specifically about how important it was to support local farm and food businesses, 94 percent agreed that it was either extremely important or very important.

Shopping Patterns

Comparisons of Figure 4, perspectives of the importance of supporting local food and farmers, and Figure 5, local food purchasing locations, showcase individuals utilize several different methods of supporting local food and farm businesses, most frequently shopping at independent grocery stores, or purchasing direct from producers.

Survey participants were asked about their shopping patterns and where they purchase food, ranging from direct-to-consumer options like farmer's markets and Community Supported Agriculture (CSA) to larger grocery chains and supermarkets. On average, 63 percent of participants stated they purchased from independent grocery stores, followed by "direct from farmer, fisher, or hunter" (52.33%) and roadside stands (46.90%). Figure 4 details the different perspectives from the resilience survey, consumer survey and the average response rate.

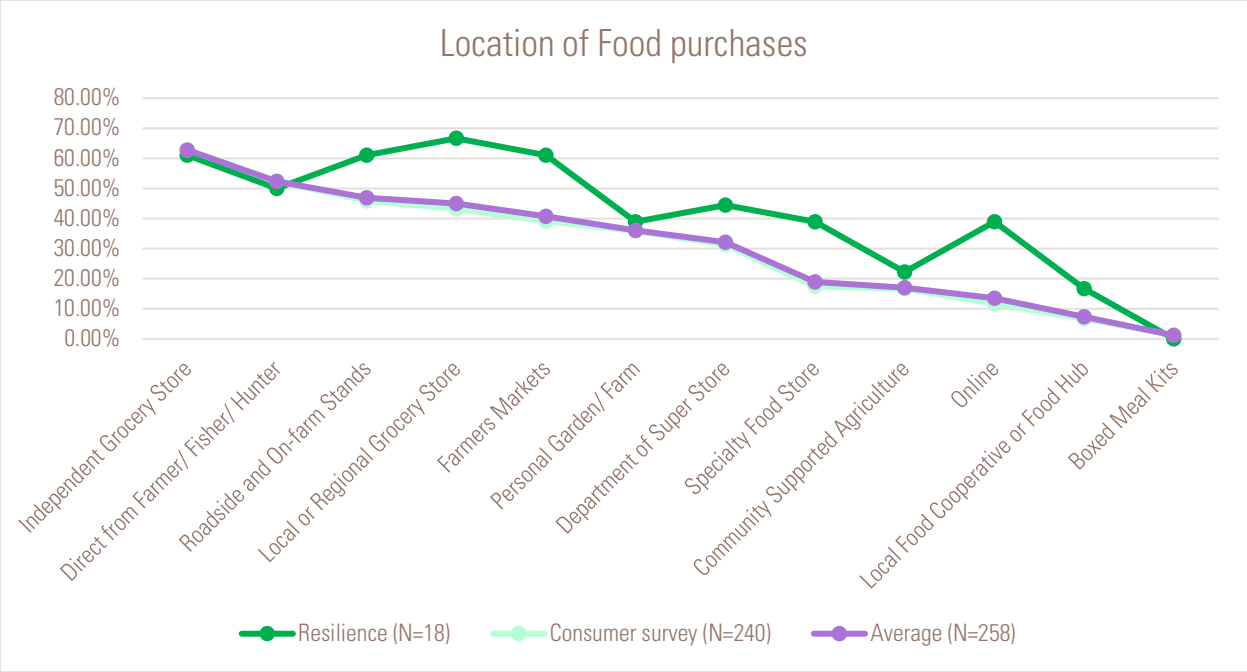

Figure 5: Location of food purchasing by participant percentage (N=258)

Attributes for food purchasing

To further understand purchasing habits, survey participants were asked about the level of importance for attributes for purchasing food. Based on average rankings (with extremely important equaling 5 and not at all important equaling 1), fresh (4.5), grown local (4.09) and affordability (4.09) were ranked highest; relationship with the producer (3.38) and location (3.47) were ranked lowest (see Table 6 for all averages). Figure 5 details each attribute ranking and shows different perspectives from the resilience survey, consumer survey and the average response rate.

Table 5: Averages for importance of food purchasing attributes

	Grown Local	Affordability	Relationship with producer, seller, etc.	Location	Convenience	Organic	Fresh	Food Safety Practices
Resilience	4.06	4.18	2.94	3.11	3.72	3.00	4.39	3.72
Consumer	4.27	4.08	3.42	3.50	3.71	3.64	4.51	4.01
Average Scores	4.09	4.09	3.38	3.47	3.71	3.60	4.50	3.99

**Resilience: N=18, except Affordability N=17*

**Consumer: Grown Local N=237, Affordability N=229, Relationship N=228, Location N=230, Convenience N=228, Organic N=224, Fresh N=225, Food Safety N=222*

**Total: Grown Local N=255, Affordability N=246, Relationship N=246, Location N=248, Convenience N=246, Organic N=242, Fresh N=243, Food Safety N=240*

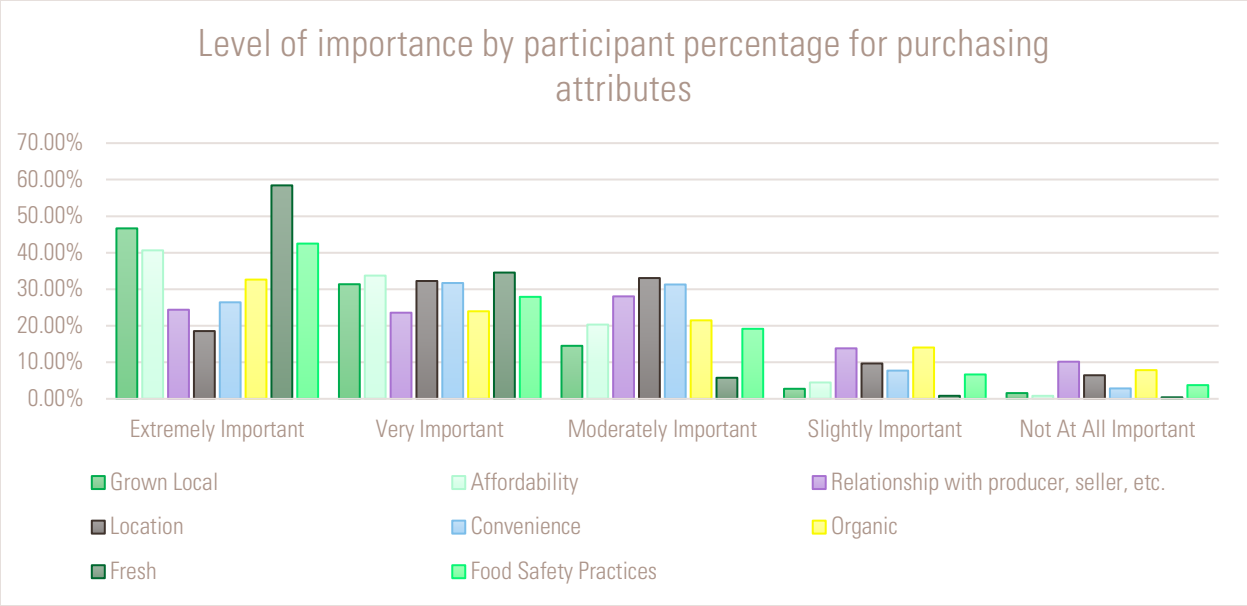

Figure 6: Importance of food attributes by percentage (see total numbers in Table 6) for full data spreadsheet on level of importance of attributes, see Appendix D

Overall, many of the attributes appear to be important to individuals. Freshness, grown local, and affordability are the top categories for importance. During interviews, people shared that food is starting to become more expensive, particularly in the grocery story setting. While consumers have shared these as their preferred categories, farmers are still unable to "make a business out of it," or not have a job away from the farm. Increasing the profitability of farmers, while maintaining the affordability for consumers is an ever-occurring challenge.

An additional unique aspect is that while grown local is one of the most important indicators for purchases, having a relationship with the producers or seller is the lowest importance criteria. Relationships with food producers may not be essential for consumers but can contribute to the invested interest and willingness to purchase products.

Consumer Survey

Within the consumer survey, participants were asked about specific purchasing habits related to potential e-commerce capability for farmers. The tables below detail responses.

Willingness to Pay

Individuals were asked to state if they were willing to pay more for locally produced foods. More than 85% of participants shared that they are willing to pay more for local foods. When considering just the group who is willing to pay, 40% didn't provide additional details to the extent of payment, however, approximately 25% were willing to pay 10% or more for local foods.

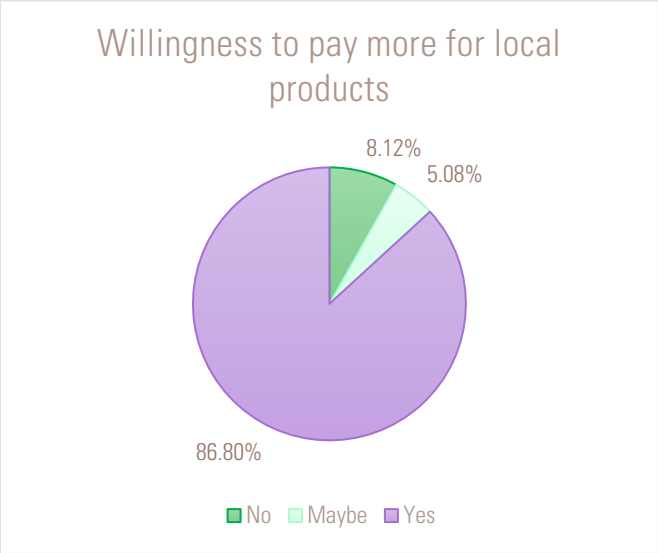

Figure 8: Participant's willingness to pay more for local foods (N= 197)

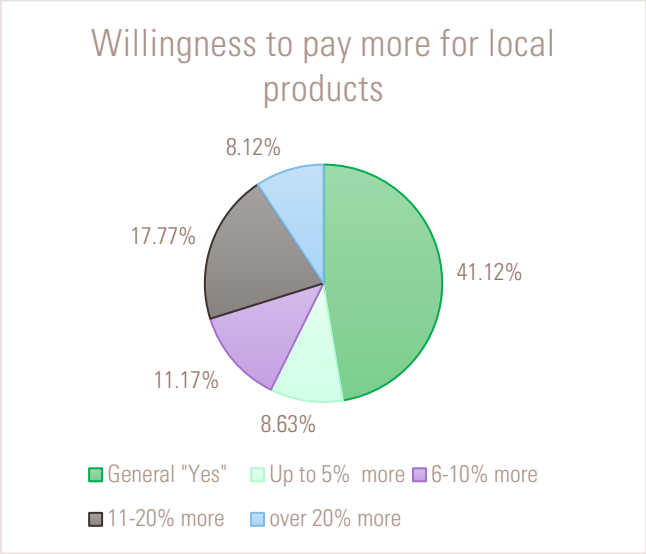

Figure 7: Extent to which participants are willing to pay more for local foods (N=171)

Willingness to pay is a helpful indicator of potential interest in local foods, however, it should be noted that while 86% are stating that they would pay more for local, affordability is still an important indicator of which foods will be purchased. Farmers, grocers, and other food businesses will have to consider their customer base to best connect and market their products.

Online Purchases

A current grant project within the Virgin Islands is a Farmer's Market Promotion Program that seeks to create an e-commerce platform for farmers and food businesses to be able to sell products. This could be utilized both as a means for sales at existing markets, or additional sale opportunities outside of current market times.

Participants were asked about their current shopping habits and how frequently they shop online. Forty-one participants (17%) shared that they purchased product online, and the other 83% do not currently purchase through online means. Most individuals purchased once per week, and three purchased up to 4-6 times per week.

When asked if individuals would consider purchasing through online means, 30% stated "yes", 40% stated "maybe" and 30% stated "no" regarding their willingness to shop online.

Incentives

When asked what would make individuals willing to purchase online, 193 participants shared their responses, 64 of whom had also stated they were not interested in purchasing through an online application. Figures 8, showcases both the full responses, including those who stated they wouldn't use an online platform (dark green), and compares to a second group that controls for those who said they would not use an application for purchasing food (light green).

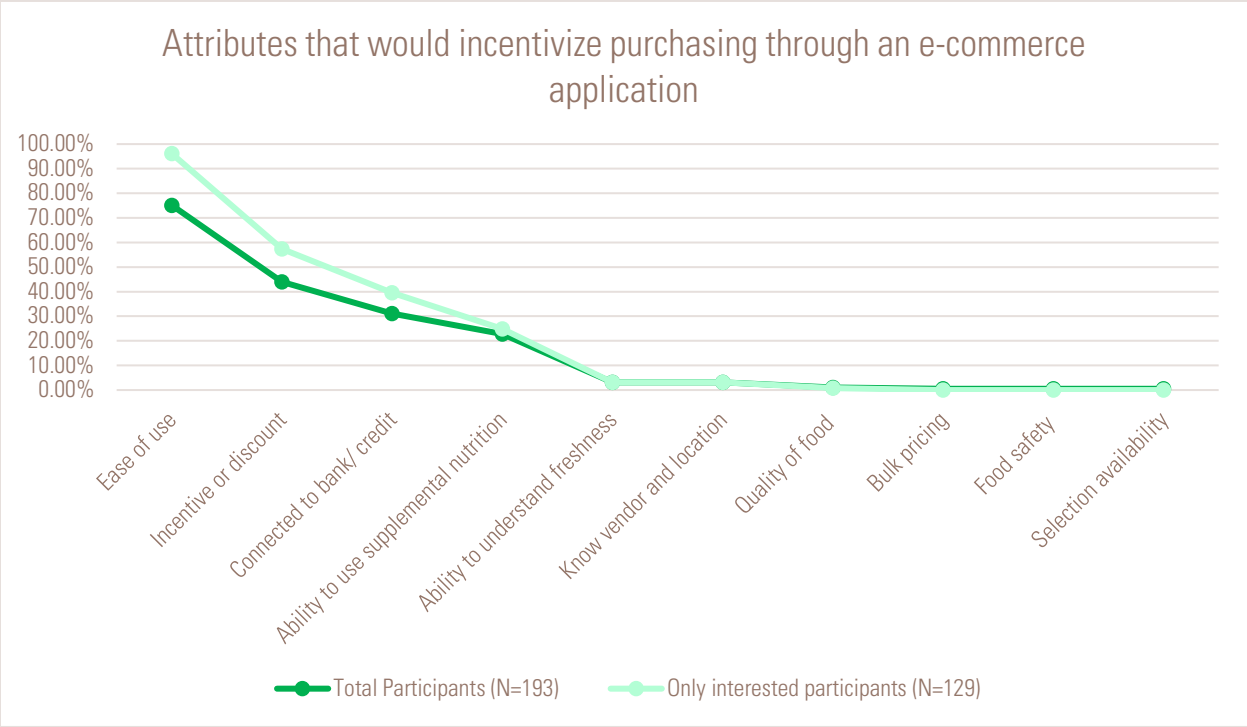

Figure 9: Attributes needed for an online application for purchasing food (N=193), Interested in virtual farmers market (N=129)

Concerns

Participants were asked to share their concerns for using an online ordering system for products. While correct drop-offs, safety of money, privacy and technology are concerns, over 10% of individuals wrote in the "other" option that they also have concerns about freshness and quality. Other notes included a desire to be able to see and select product on their own, knowing the vendor and having a good selection.

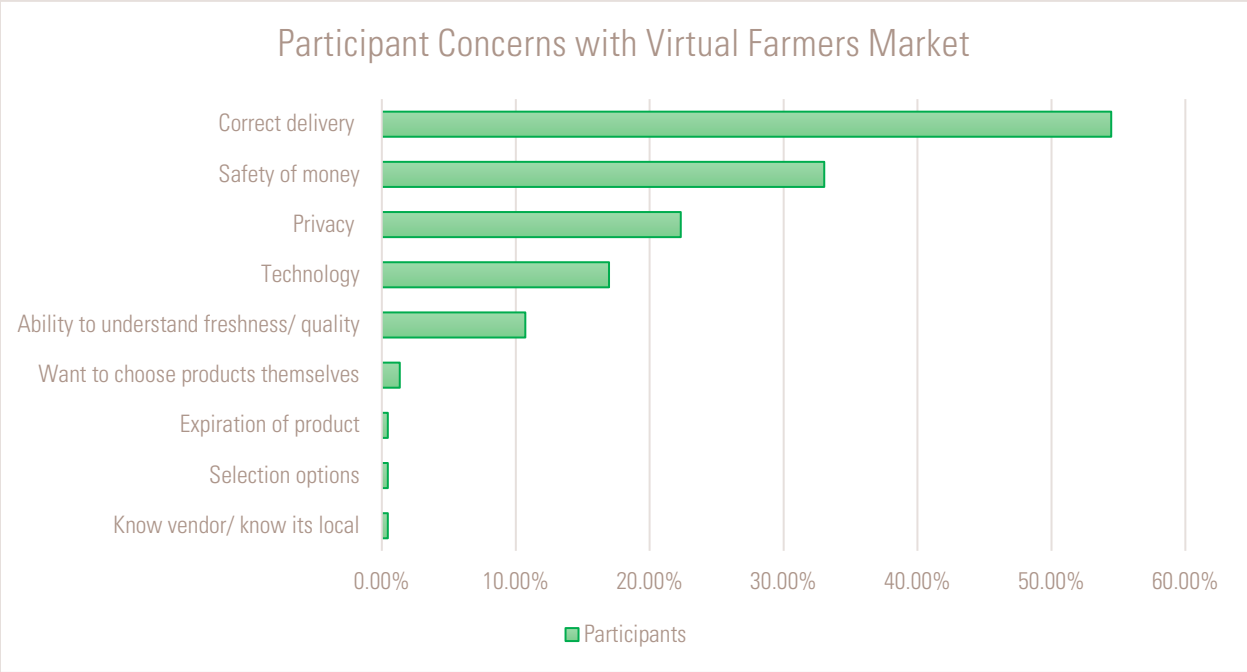

Figure 10: Participant concern on virtual farmers market (N=224)

Marketing about the online platform will be critical for successful implementation. This will need to occur both for farmers to access, use, and sell on the platform, and for consumers to fully understand the intent and accessibility to local produce from the platform. Additionally, it will be helpful for considerations for pre-order and drop off to occur at an existing farmers market, since correct delivery was the highest concern for consumers. For example, this type of application could be a payment method still utilized at the farmer's market and for those who prefer a more convenient method of pre-ordering.

Natural Disasters

Natural disasters impact all of community life, ranging from mild challenges for transportation and ease of access to devastating loss of infrastructure and life. The Virgin Islands has been involved in 4 designated disasters since 2011 according to FEMA (FEMA, 2022); Table 7 details each of these disasters. The funding allotment is shown for the entire region of impact, as specific county level data is not available. Each line details the name of the disaster, date, type of assistance and total amount allotted. Types of disaster declarations include:

- DR: Major disaster declared
- FM: Fire Management
- EM: Emergency Declaration

The table design has the most recent disaster listed first, and the shading includes all disasters within a particular year. For example, the first light grey shades occurred in 2021, the second dark grey coloring occurred in 2017.

Table 6: Natural Disaster Declarations (FEMA, 2022)

Disaster Declaration	Date	Assistance Type	Funding allotted (full region)
Virgin Islands Hurricane Maria DR-4340-VI	Sep. 16, 2017 – Sep. 22, 2017	Individual Assistance Housing + Other	$44,112,250 11,701 applications approved
		Public Assistance PA- A-B Emergency and PA C-G Permanent work	$2,925,276,651
		Hazard Mitigation Assistance	$65,262,309
Virgin Islands Hurricane Maria EM-3390-VI	Sep. 16, 2017 – Sep. 22, 2017	PA- A-B Emergency	N/A
Virgin Islands Hurricane Irma DR-4335-VI	Sep. 5, 2017 – Sep. 7, 2017	Individual and Households	$40,826,320 8,891 applications approved
		PA- A-B Emergency and PA C-G Permanent work	$68,865,341
		Hazard Mitigation Assistance	$20,349,22
Virgin Islands Hurricane Irma EM-3383-VI	Sep. 5, 2017 – Sep. 7, 2017	PA- A-B Emergency	N/A
Virgin Islands Hurricane Dorian EM-3418-VI	Aug. 26, 2019 – Sep. 26, 2019	PA-B Emergency	N/A
			$42,510,767
Virgin Islands Potential Tropical Cyclone Nine EM-3531-VI	Jul. 27, 2020 – Jul. 31, 2020	PA-B Emergency	N/A

While these disasters shown in Table 7 are specific to FEMA declared national disasters, additional droughts have also been impacting famers, businesses, and individuals throughout the years. The years of 2014-2016 also brought extreme drought conditions to the Caribbean (USDA Climate Hubs, n.d.). This has been seen again in the spring of 2021. The territory experienced severe drought and relied on deliveries of hay and water to support the agricultural sector (Natinonal Integrated Drought Information System, 2021). Currently, in July 2022, St. Croix and St. John continue to experience extreme drought (D3) and St. Thomas with severe drought (D2). St. Croix has been in this state for the last month (Natinonal Integrated Drought Information System, 2021).

Natural Disaster Impact

While there are disasters covered by FEMA for federal support, there are many instances where climate change is creating additional havoc on farming and businesses with ever-evolving cycles and changes in weather making it difficult to plan.

Interview, focus group and survey participants were asked to reflect on their experiences of natural disasters. There was low participation in the survey, with only a total of 18 participants. Fourteen of the 18 participants (78%) shared that they experienced Hurricane Irma and Maria.

Impact from Hurricane Irma and Maria

Table 7: Total participant impacted by hurricane Irma and Maria

	Increase in mental stress	Loss of communications	Damaged home/ land/ etc.	Loss of essential provisions	Increase in physical stress	Increase in financial pressures	Diminished personal health	Damaged business/ farm/ etc.	Diminished family health	Business Closure
Hurricane Irma and Maria (14)	14	14	12	10	8	8	6	5	4	2

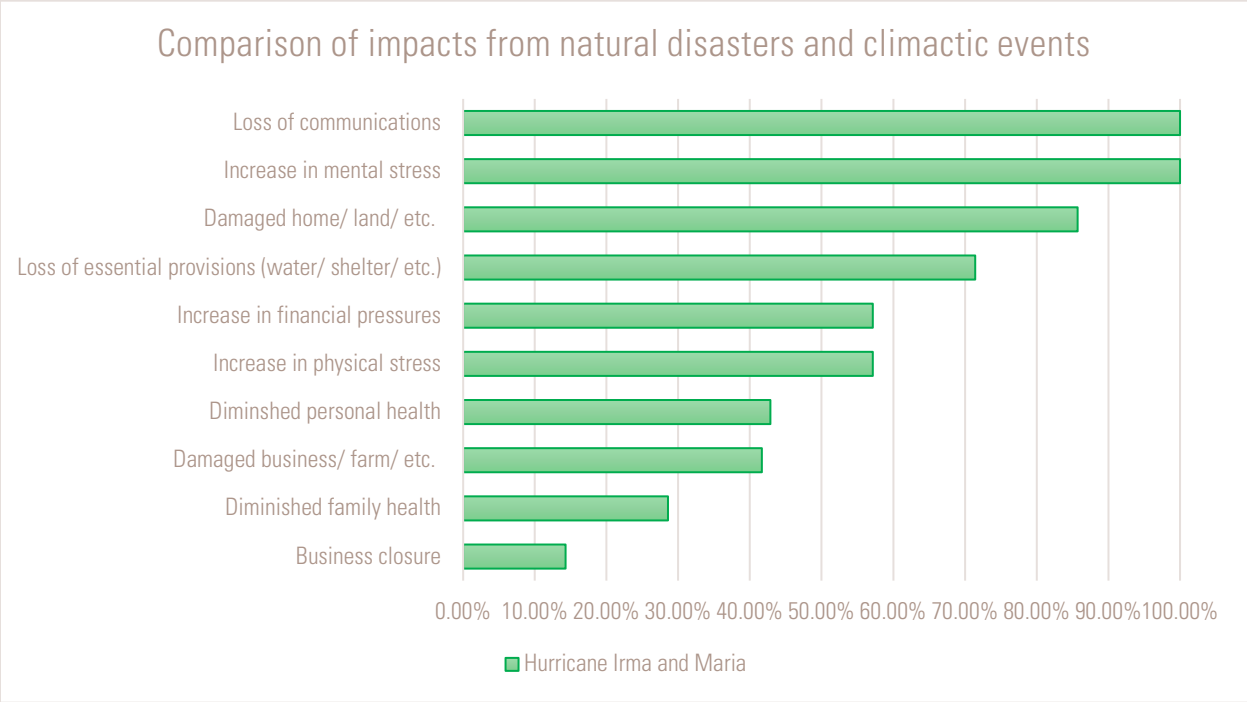

Figure 11: Comparison of impacts from Hurricane Irma and Maria (N=14)

Other Responses for impact included, "responded, never got time off."

Loss of communications and increase in mental stress occurred for all individuals that participated in the survey, and 85% stated they had damage to home or property.

The following is an excerpt from findings in 2019 from interviews, focus groups and listening sessions, all from the [Virgin Islands Community Food System Assessment.]

In addition to the immediate impact of the storms, there were continuous rains and floods that continued to impact the territory as well as power outages, severe infrastructure damages, and general collapse of communication and connectivity.

The territory had over 22,500 damaged homes, accounting for over 52% of the housing. Of the total, over 5,000 homes had severe destruction. Infrastructure damages included 90% of aerial powerlines including approximately 13,500 total poles. By December 2017, less than 50% of all islands reported power to homes. This led to issues for storage and access to food and water. More than 40% in STT and STJ felt they had to choose between spending money on food versus other needs, and in STX, 27% chose to spend funds on necessities other than food.

Power was not fully restored until February 2018, leaving numerous homes, businesses and organizations without power for cleaning, food storage, and general safety. Damage to infrastructure within the community also included but was not limited to wastewater pump damage and spillover into surface waterways, extreme road damage and repairs, sinking vessels within the coastal waters, and telecommunication service transmission issues. (FEMA, 2018)

Of the properties affected, all schools reported receiving some damage, with at least 30 schools in need of permanent renovation. Critical care units had to evacuate 784 of their patients to the mainland and experienced major destruction to their medical facilities. Government properties were also impacted, with a total of 800 properties experiencing damage (FEMA, 2018).

Much of the infrastructure prior to the storm was aging and fragile. Storm damage included roads, maritime facilities, and airports. Throughout the territory, many residents are now served by single lane roads with fragile condition. Continued repairs exist from DPW FHWA and FEMA and restoration requires more than $50 million for surface and wall repair; debris removal is an additional $30 million. FHWA is funding another $20 million for traffic signal and signage.

Overall, losses of over $1.5 billion dollars economically occurred in the US Virgin Islands territory through loss of wages ($398 million), lost government revenues ($576 million) and commercial property damage ($561 million) (FEMA, 2018).

A key component that came from the discussions with farmers in 2018 following the hurricanes was the need to be able to get to their farm and animals quickly. However, due to safety protocols, many individuals were unable to travel on the roads. This led to increased loss of animal life as well as additional destruction to property. One farm shared that when they were unable to repair fencing, "had a lot of wild dogs that had gotten to goats…all but one goat [died]."

Farmers also discussed the need for access to farm equipment and processing equipment for value-added product development. This would support developing a product prior to the storm hitting and potentially extending the season and sales ability. To do this, a focus group stated that, "farmers could buy in bulk and share in shipping and overall [costs]…working together and pool funds for supplies." However, they also believed that they "can't go to [Department of Agriculture] to do anything like that."

The hurricanes and response from organizations brought to light distrust among government and farmers. *Many farmers stated that they do not believe that the DOA views production and the agricultural sector as an economically viable business. DOA and USVI Extension may be able to support and hold farmers and fishers accountable for record keeping, business development and resilience by providing additional workshops and programs on business development options. Additionally, there needs to be clear understanding of roles of DOA and VI Extension as it relates to financial and equipment support. Several farmers view the DOA and VI Extension as public organizations*

that are required to provide equipment, water, soil, etc. while other farmers operate on their own without as much reliance on external support. It appears that USVI is offering a service-based approach to the production sector, vs. a business-based approach in supporting sustainable and profitable business practices for all farmers and fishers. (Excerpt from VI Food Systems Assessment)

In addition to the hurricanes, concerns about drought were shared. Because USVI has little natural water, there have been constraints in accessing fresh water sources for agriculture. Most residents use cisterns to collect rainwater and have access to water supply through WAPA, the water and power authority of the territory. WAPA produces freshwater through reverse osmosis plant on STX and STT. One farmer shared, "[we] are in an extended drought that is putting pressure on those farms that don't have access to [reliable] water sources," and another stated, "water trucks are still way behind, or [people] don't have access to water trucks…the well and cisterns are dry and are behind in growing."

Usefulness of Organization when responding to a Natural Disaster

Individuals were asked about usefulness for organizations in the U.S. Virgin Islands, based on a pre-made list from interviews. Organizations included in the survey were City Government, County Government (island), Virgin Islands Department of Agriculture, Virgin Islands Department of Education, Virgin Islands Department of Public Health, University of Virgin Islands, University of Virgin Islands Extension, We Grow Food, Good Food Coalition, Research and Technology Park and FEMA. Figure 11 details the extent individuals felt that each organization was useful in responding to disaster on average, not specific each type of natural disaster. Table 9 shows exact percentages; bolded numbers are the top three highest values per category.

Table 8: Average and Percentage usefulness of organizations in responding to natural disasters

Organization Usefulness	FEMA	Territory Government	VI DPH	We Grow Food	University of the VI	UVI Extension	Virgin Islands Good Food	Island Government	VI DOE	VI DOA	VI DOE	RT Park
Total Participant numbers	11	7	11	9	10	9	9	7	10	10	10	8
Average Usefulness	4.55	3.86	3.64	3.00	3.00	2.78	2.67	2.57	2.50	2.40	2.50	2.25
Extremely useful	**54.55%**	**28.57%**	9.09%	11.11%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Somewhat useful	**45.45%**	42.86%	**54.55%**	11.11%	10.00%	11.11%	11.11%	42.86%	20.00%	10.00%	20.00%	0.00%
Neither useful or useless	0.00%	14.29%	27.27%	55.56%	60.00%	**66.67%**	**66.67%**	14.29%	40.00%	50.00%	40.00%	**62.50%**
Somewhat useless	0.00%	**14.29%**	9.09%	11.11%	10.00%	11.11%	0.00%	**14.29%**	10.00%	10.00%	10.00%	0.00%
Extremely useless	0.00%	0.00%	0.00%	11.11%	10.00%	11.11%	22.22%	14.29%	**30.00%**	**30.00%**	**30.00%**	**37.50%**

Additional categories were identified by providing "other" responses in surveys, which included "church," "all hands and hearts," "non-profit orgs," "red cross," "love city strong," and "my brothers workshop."

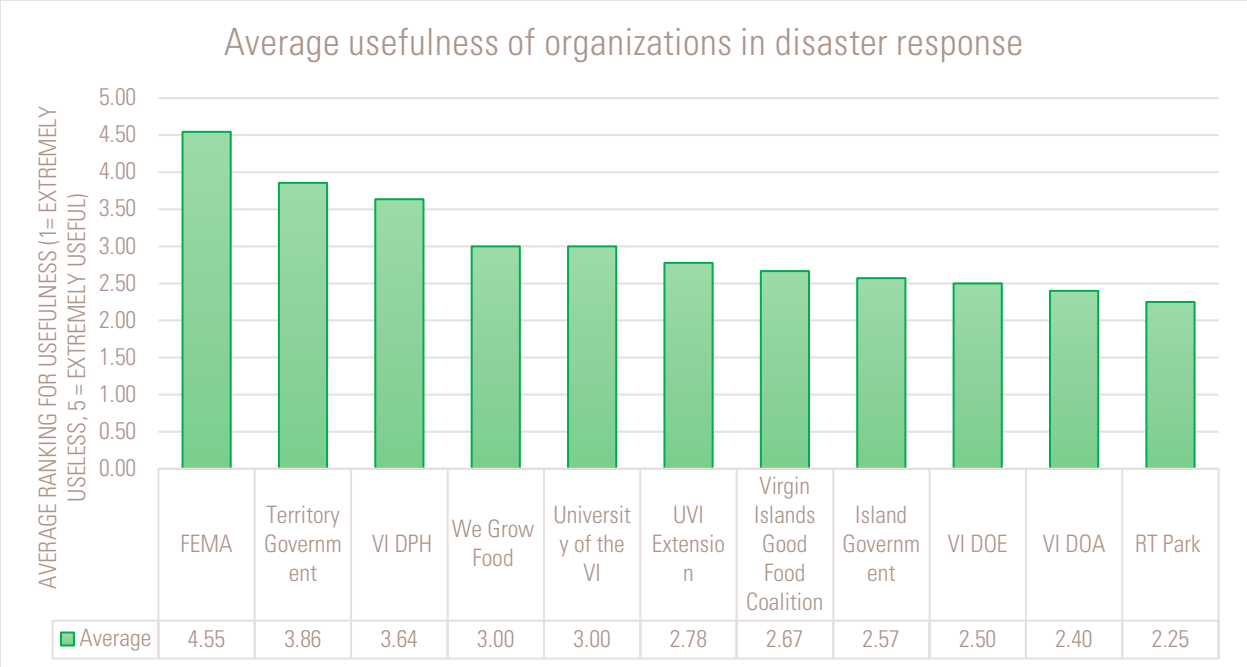

Figure 12: Average usefulness of organizations for responding to Natural Disasters; see Table 9 for participant numbers

FEMA, Territory Government, and Virgin Islands Department of Public Health were seen to be the most useful organizations, while Research and Technology Park, Virgin Islands Department of Education, and Virgin Islands Department of Agriculture were seen to be the least useful.

Some of this response may be due to the perspective that Department of Agriculture and in general Government agencies do not have capacity. One individual shared, "[we] need a lot of support because Department of Agriculture is understaffed and they don't have the capacity to [help], but they are the ones who create the policy." The perception is that there is a realization that the works needs to be done, but there are not people who are able to do it.

Natural Disaster Resilience Next Steps

Based on the full research scope, the following are suggested priorities and next steps. Additionally, partners were identified though focus groups for who would need to be a part of prevention and recovery.

1. Improve pre-storm prep through securing of vehicles, storage facilities (on-farm), and other community response protocols.

Identify existing food supply pre-storm that farmers/ grocers/ etc. have on hand. Create a plan for aggregation and safe distribution of food post disaster so food does not go to waste without electricity; create bunkers and food safe storage options to secure food.

Establish farmer to farmer networks to learn about strategies for drought resistance planting, such as hügelkultur garden beds; pruning techniques prior to a storm; storage and value-added product creation. Create a community disaster plan for re-securing and identifying existing food supply available.

Develop new response protocols for businesses and farmers that live off site. Work with policy makers and FEMA responders to create safe passage opportunities for producers to get to their livestock and crops for both repairs and safety considerations. Many farmers experienced loss weeks and months after the storms due to lack of access to their business operations. While livestock may have still been living, fencing and other safety mechanisms were down, allowing for predators to kill their livestock. Other examples included looting of farm produce.

2. Establish pre-disaster and post-disaster contacts

Consider networks both internal and external to disaster zone and address needs and innovative ways to respond. Partnering with organizations and support systems out of the disaster zone, may help with receiving support from non-impacted areas.

3. Businesses best practices and farmer to farmer education

A continuous issue felt by farmers was the lack of support for cost of goods/ products lost from the storms. Individuals were receiving $2 - $8 per fruit tree lost in the storm, while many of these were orchards that had developed over years and were producing substantially larger bounties. While farming is a high-risk business, there are necessary procedures to ensure that food suppliers and producers can get back on their feet.

Similarly, to assist in identifying losses, farmers and food businesses should adapt best practices for record keeping and business planning. These efforts would assist not only in the wake of disaster, but also in general business development planning and future programming efforts. Record keeping will also assist in financial business strategies and ability to leverage funds through grants and loans.

4. Create a cooperative and enhance infrastructure

When considering changes needed for a resilient future, overwhelmingly, participants shared a desire to form a collective business model that can provide cost-sharing for equipment and other inputs, as well as the ability to

aggregate and distribute foods to larger scale markets. One individual also thought that a cooperative business "could provide healthcare [benefits] and build in [pathways] for the next generation."

5. Improve farm and food infrastructure

While several areas across the territory are still in need of repair, current conditions are creating significant concerns for farmers who need access to processing facilities such as an abattoir and meat processing/ packaging facility.

Additional infrastructure and feasibility research is needed around water access, including expanding water truck availability. It may also be beneficial for additional investigation into water desalination for utilizing the oceanic water resources around the territory or ways of better connecting into existing aquifers.

COVID-19 Impact

Interview, focus group and survey participants were asked to reflect on their experiences of natural disasters. All 18 survey participants shared that they experienced COVID. COVID-19 has multiple influences on mental and physical health, general fatigue from exposure and worry, and stress related to financial and employment constraints that have occurred due to supply-chain and corporate closures. Table 11 details the funding allotment for the entire territory of the Virgin Islands COVID response, which was deemed both a "major disaster declaration" and "emergency declaration".

Table 9: COVID-19 Natural Disaster Declaration (FEMA, 2022)

Virgin Islands COVID-19 Pandemic DR-4513-VI	Jan. 20, 2020; continuing	Individual and Households	$398,799 63 applications approved
		Public Assistance (B)	$88,412,456
Virgin Islands COVID-19 Pandemic EM-3433-VI	Jan. 20, 2020; continuing	Public Assistance (B)	NA

Table 12 details the number of participants that experienced COVID by type of impact and Figure 14 showcases the percentage of individuals that experienced each impact.

Table 10: Total participant numbers based on impact from COVID

	Diminished family health	Inability to see family/ friends/ social networks	Increase in mental stress	Increase in physical stress	Increase in physical stress	Business Closure	Loss of job or unemployment	Diminished personal health	Unable to pay rent/ mortgage/etc.
COVID-19	16	15	15	7	5	3	2	1	1

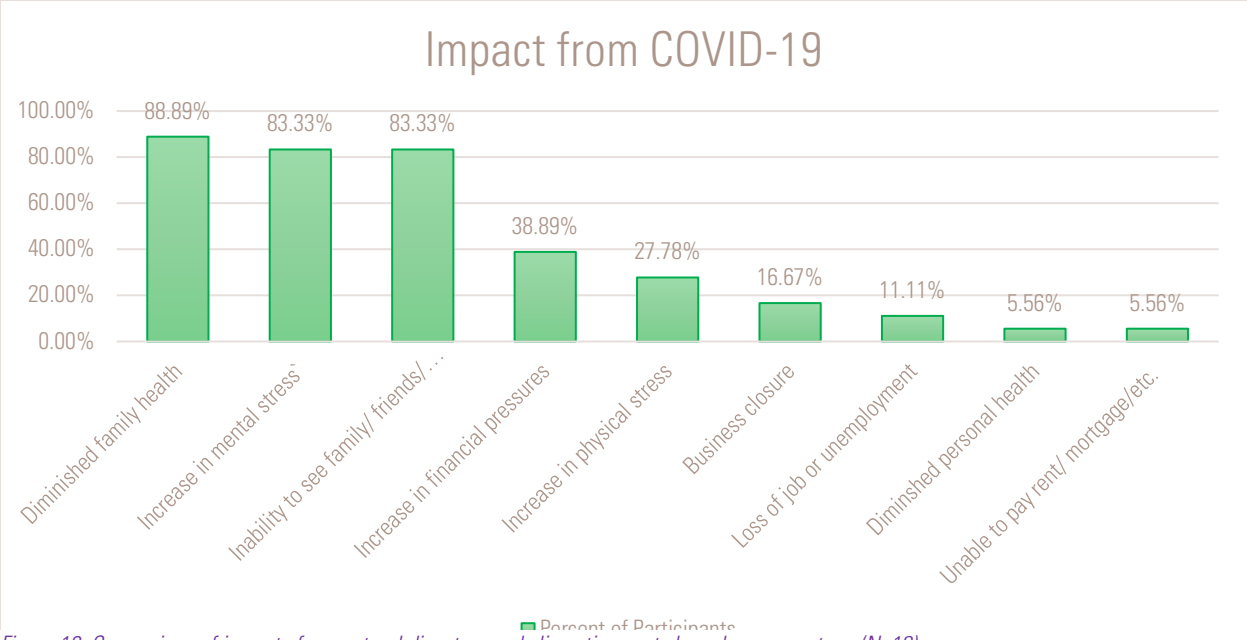

Figure 13: Comparison of impacts from natural disasters and climactic events based on percentage (N=18)

Other Responses for impact included "unable to workshop in person," "Media fear/ disappointment medical industry not emphasizing the importance of building our immune system," "stuck with no health insurance," and "Worked straight through."

The most significant impact for individuals was having family members with diminished health, increase in mental stress, and inability to see others. While several organizations remained open, they moved to virtual program offering and sales. It was perceived that businesses that already had a web presence were able to respond better during COVID, and they had the ability to maintain clear communications with customers. Farms and other businesses were forced to consider the best strategy for continuing retail sales. One individual shared that "if we reopened retail, we need a new structure that is bigger for social distancing…and that may not make sense [for our business]."

Overall, throughout the territory, there were mixed perspectives on vaccinations and the future with COVID, "there has been a mix of who wants it, some boomers and older generations want [the vaccine] and younger don't." Another shared, "culturally, there has been a big hesitation around the vaccine." Many noted the desire for utilizing food as medicine; "stop pushing medicine when we have medicine in our yard- our food."

The territory continued to have tourism throughout COVID which brought on additional concerns for tourists who were vaccinated. A participants shared that they are "worried about people being safe and not being considerate, which is also emotionally draining." However, the Department of Tourism also was using COVID as a strategy for "vaccine tourism" and "[hosted] a vaccine fair, but [marketed] beyond the territory because there was a big supply but not the demand [locally]."

The survey showcases that almost 40% experienced increase in financial pressures. Prior to COVID, the territory experienced a high amount of unemployment (9.4%) (Kids Count, 2015) and individuals in poverty (25%) and children in poverty (29%) (Kids Count, 2015) . An interview participant shared that "almost a third of the children in the territory live in poverty or in families below or at the poverty level." COVID could have exacerbated these conditions, "[we] still face the same low salary rates…and [now are asked] to do more and are disgruntled about low salaries." Additionally, individuals shared that, "many businesses have closed down [because] it was too much to handle, and [wanted to] get out before it got too crazy."

Shelter and housing also became a critical need during COVID and there was work to have a local motel and other areas to offer housing to those that were unable to afford rent, payments, or other necessary finances. Advocacy became critical to ensure evictions did not occur. Additionally new pantry programs, meal support, and food box delivery items started up to provide for essentials to individuals and families.

COVID had a direct impact on the food system within the territory. Individuals saw an increase in interest for gardening and farming as well as people buying local. This increase in interest led to constraints with finding materials in the store. One person shared, "it was impossible to find seeds on the shelf; people started gardening and getting into their own [garden]." Individuals also felt that COVID highlighted the dependency on a global food supply chain, and the constraints that this caused with infrastructure and distribution. A participant shared, "because of the same food security issues and the high import rates, it has made us need to understand the food imports, it reminds us of the hurricane and critical aspects of being self-sufficient."

It was also critical that services like the farmers market and other retail outlets for farms were available. A participant shared that "because of COVID, [we] needed to relocate the market ground for social distancing. The new market is growing and there are a lot more vendors." Businesses also became more tech savvy and there are additional food-based businesses like food trucks, farm tiendas and roadside stands available. A constraint with food supply during COVID-19 was meeting the need of school meals and adapting for children to still access food, "many young people get at least some of their meals from schools, so when those shut down, it took meals out of some young people's mouths." Other programs stepped up to deliver food to individuals who didn't have access. This included "delivery of fresh foods and drop off bags to the [healthcare] and senior centers" and "Health and Human Services launched an inter-island food delivery program to help people that were at risk through door-to-door delivery."

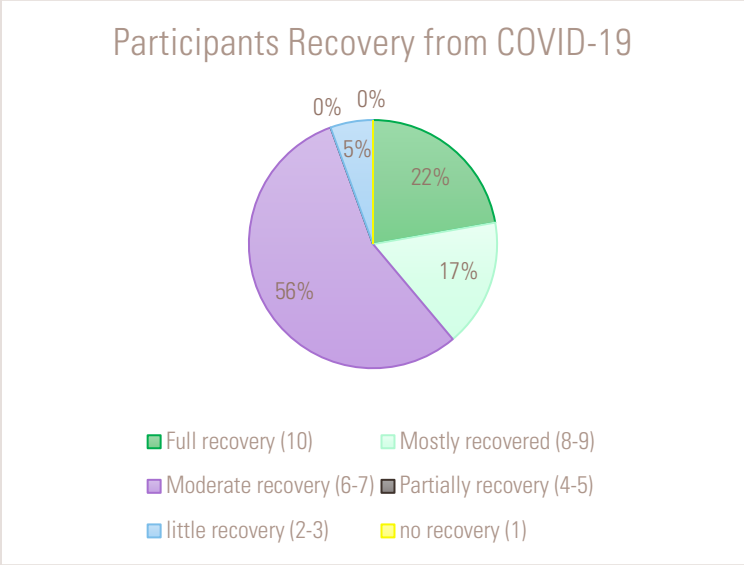

Figure 14: Perceived extent of recovery from COVID (N=18)

While it is difficult to know the extent of recovery that has been able to occur from COVID-19 since it is an ongoing pandemic, individuals were still asked to share their perceived level of recovery from COVID-19 based on the moment in time that they were participating in the research study. Figure 14 showcases the extent individuals feel they have recovered. On average, people thought they were moderately recovered (7.4 on a scale of 10). It is fair that people have mixed reviews on recovery, as we are still continuously hearing about COVID-19 impacts and new scares. This is a time to take stock in the potential reality that this will be a long-term reality for our communities and the need to have practices in place to ensure safe and economically vibrant communities, amidst an ongoing pandemic.

Usefulness of Organization when responding to COVID-19

Individuals were asked about usefulness for organizations in the Virgin Islands based on a pre-made list and options to add additional responses. Organizations included in the survey were City Government, Territory Government, Virgin Islands Department of Agriculture, Virgin Islands Department of Education, Virgin Islands Department of Public Health, University of Virgin Islands, University of Virgin Islands Extension, We Grow Food, Good Food Coalition, Research and Technology Park and FEMA; other responses included "CDC" as somewhat useful and "HHS" as somewhat useful.

Figure 15 details the extent individuals felt that each organization was useful in responding to Covid, on average and Table 11 shows exact percentages; bolded numbers are the top three highest values per category.

Table 11: Average and Percentage usefulness of organizations in responding to COVID

Organization Usefulness	VI DoH	Territory Government	Island Government	FEMA	University of the VI	We Grow Food	UVI Extension	VI DOE	Virgin Islands Good Food Coalition	VI DOA	RT Park
Total	12	10	9	11	10	10	9	10	9	10	7
Average Usefulness	4.58	4.00	3.78	3.45	3.10	3.00	2.89	2.80	2.67	2.50	2.29
Extremely useful	**83.33%**	**50.00%**	44.44%	36.36%	10.00%	10.00%	11.11%	20.00%	0.00%	10.00%	0.00%
Somewhat useful	0.00%	**30.00%**	**22.22%**	9.09%	20.00%	20.00%	11.11%	10.00%	**22.22%**	10.00%	14.29%
Neither useful or useless	8.33%	0.00%	11.11%	27.27%	**50.00%**	**50.00%**	**55.56%**	30.00%	44.44%	40.00%	42.86%
Somewhat useless	8.33%	10.00%	**11.11%**	**18.18%**	10.00%	0.00%	0.00%	10.00%	**11.11%**	0.00%	0.00%
Extremely useless	0.00%	10.00%	11.11%	9.09%	10.00%	20.00%	22.22%	30.00%	22.22%	**40.00%**	**42.86%**

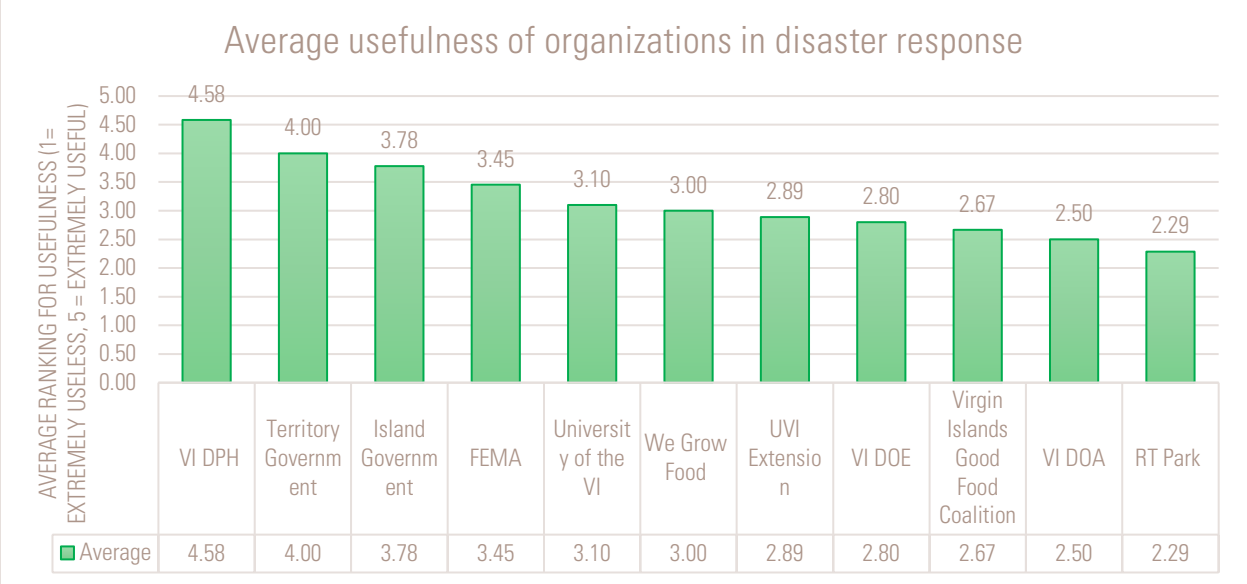

Figure 15: Average usefulness of organizations for responding to COVID; see table 13 for participant numbers

Virgin Islands Department of Health, Territory Government, and Island specific Government were seen to be the most useful organizations, while the Research and Technology Park, Virgin Islands Department of Agriculture and Virgin Islands Good Food Coalition were seen to be the least useful.

Additional categories were identified by providing "other" responses in the survey, which CDC and Health and Human Services, both receiving a somewhat useful rating.

Communication about COVID-19 and resources varied in success. Some felt that it was difficult to receive communications, which also connects to lack of resources. One individual shared that "when [they] attempted to reach out to farmers in an online format, [they were difficult to reach] because they aren't resourced with devices to receive information." Others shared that they felt groups came together well and pivoted to share information, "There was a joint team response and [we] worked better during COVID-19. There were weekly updates and consistent information."

COVID-19 Resilience Next Steps

Based on the research scope, the following are suggested as next steps. These strategies also connect to that natural disaster priorities and areas of interest in the Department of Agriculture Territorial Plan.

1. Create a regional network for communication for prevention, response, and recovery, that includes various partner organizations, farmers, and businesses; encourage collaborative discussion and co-creation of ideas
2. Establish better social infrastructure and accessibility for internet and communication strategies for sharing of information
3. Develop funding mechanisms that enhance the current food system and ensure sustainability during disaster; funding food for people and infrastructure/ insurance for farmers

Appendix A: Demographics and additional identifiers from survey participants

Zip Code

Zip Code	Resilience	Consumer
00801		2.00
00802	8.00	7.00
00803	2.00	3.00
00805		1.00
00820	3.00	78.00
00821		11.00
00822		3.00
00823	1.00	18.00
00824		6.00
00829		1.00
00830	1.00	4.00
00831	1.00	1.00
00840	1.00	41.00
00841	1.00	17.00
00850		5.00
00851		28.00
Outside territory		10.00
Total	254.00	

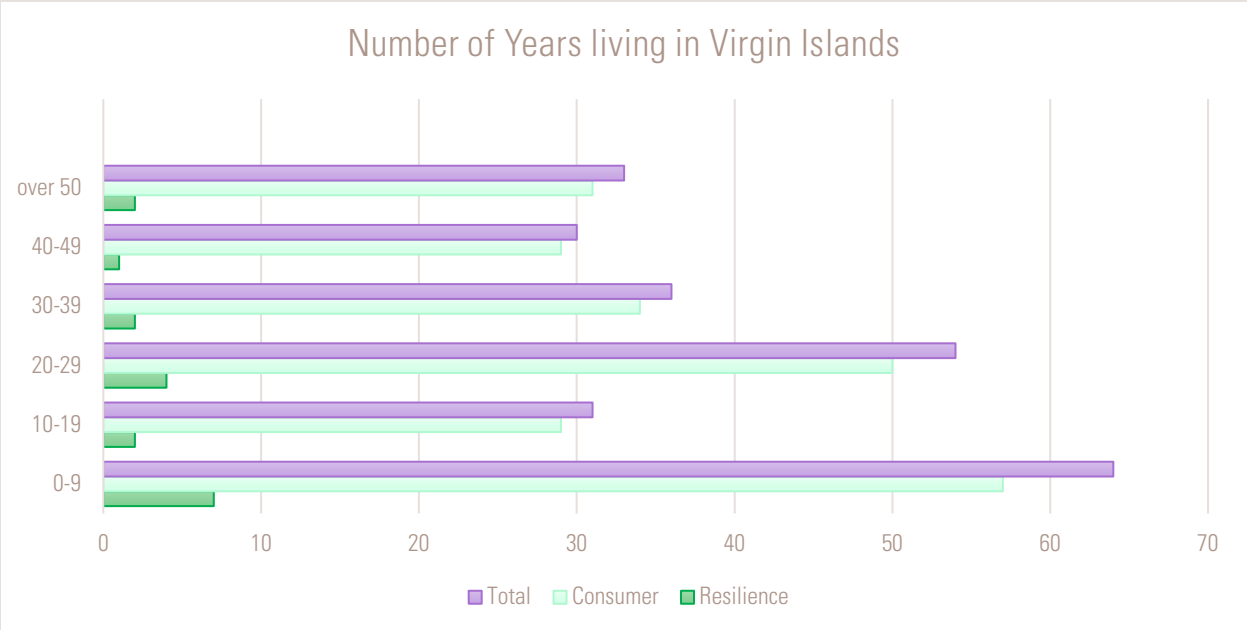

Figure 16: Number of Years in Virgin Islands (N=248)

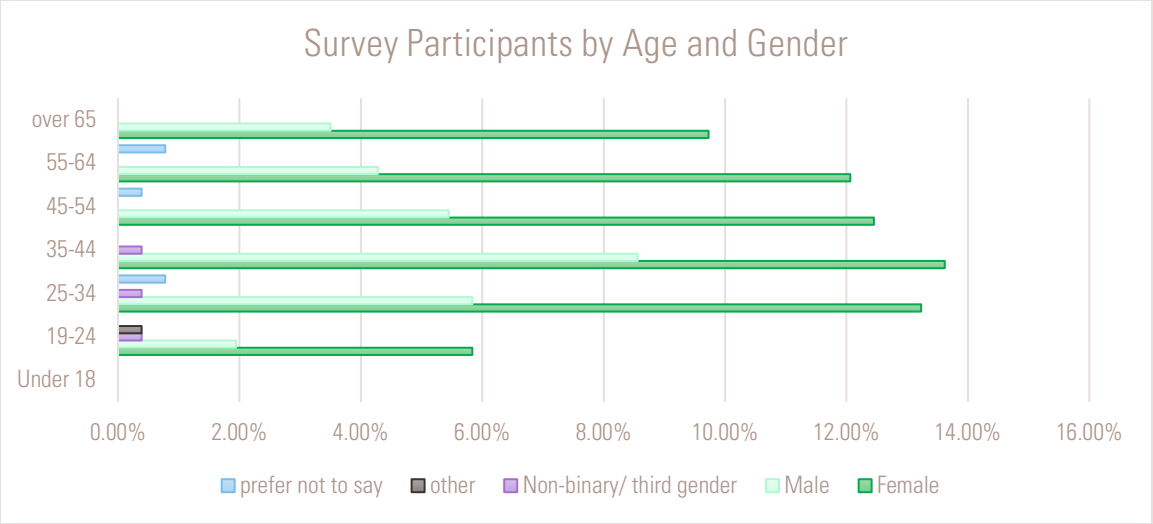

Figure 17: Survey Participants by Age and Gender (N=257)

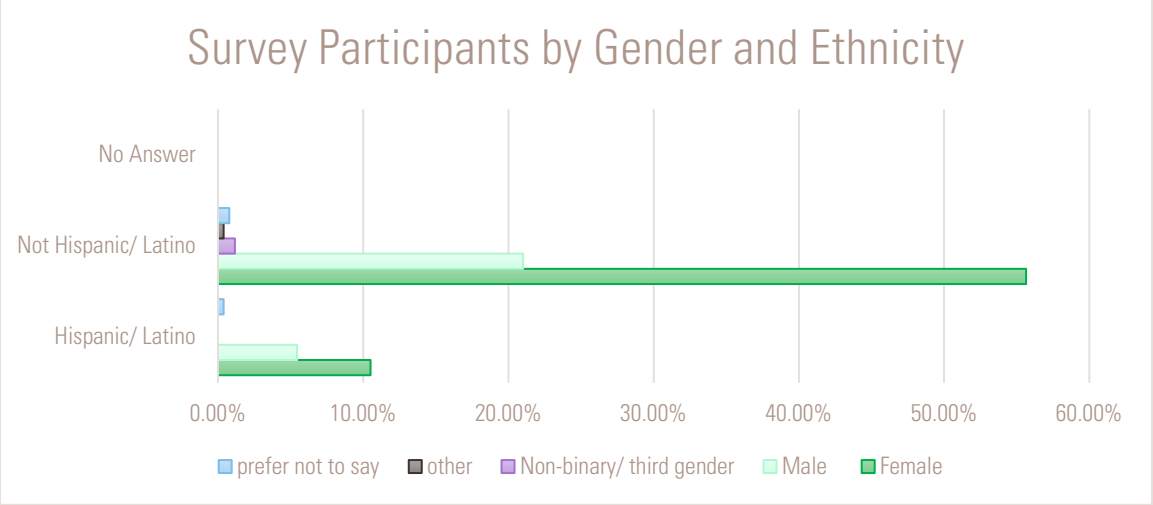

Figure 18: Survey Participants by Gender and Ethnicity (N=257)

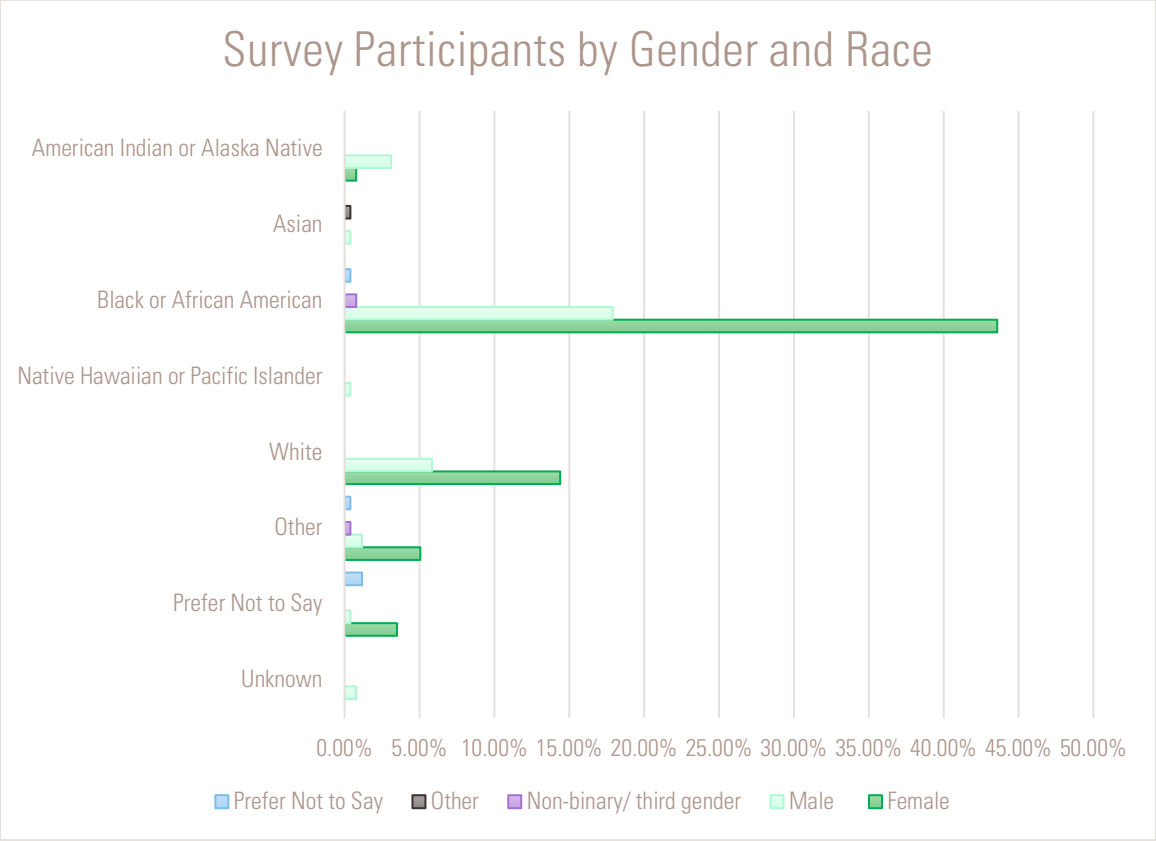

Figure 19: Survey Participants by Gender and Ethnicity (N=257; Participants could select all that apply)

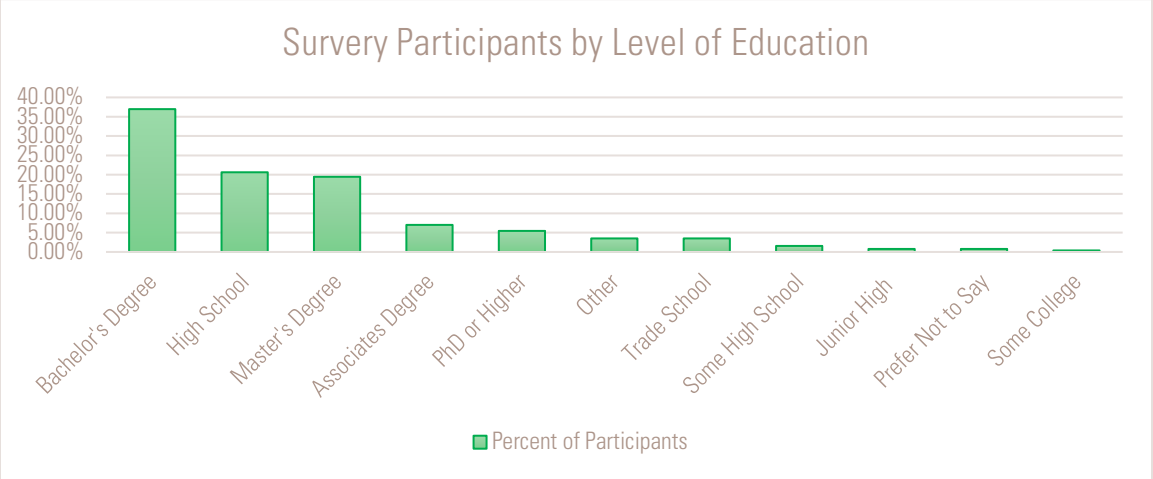

Figure 20: Survey Participants by Level of Education (N=257)

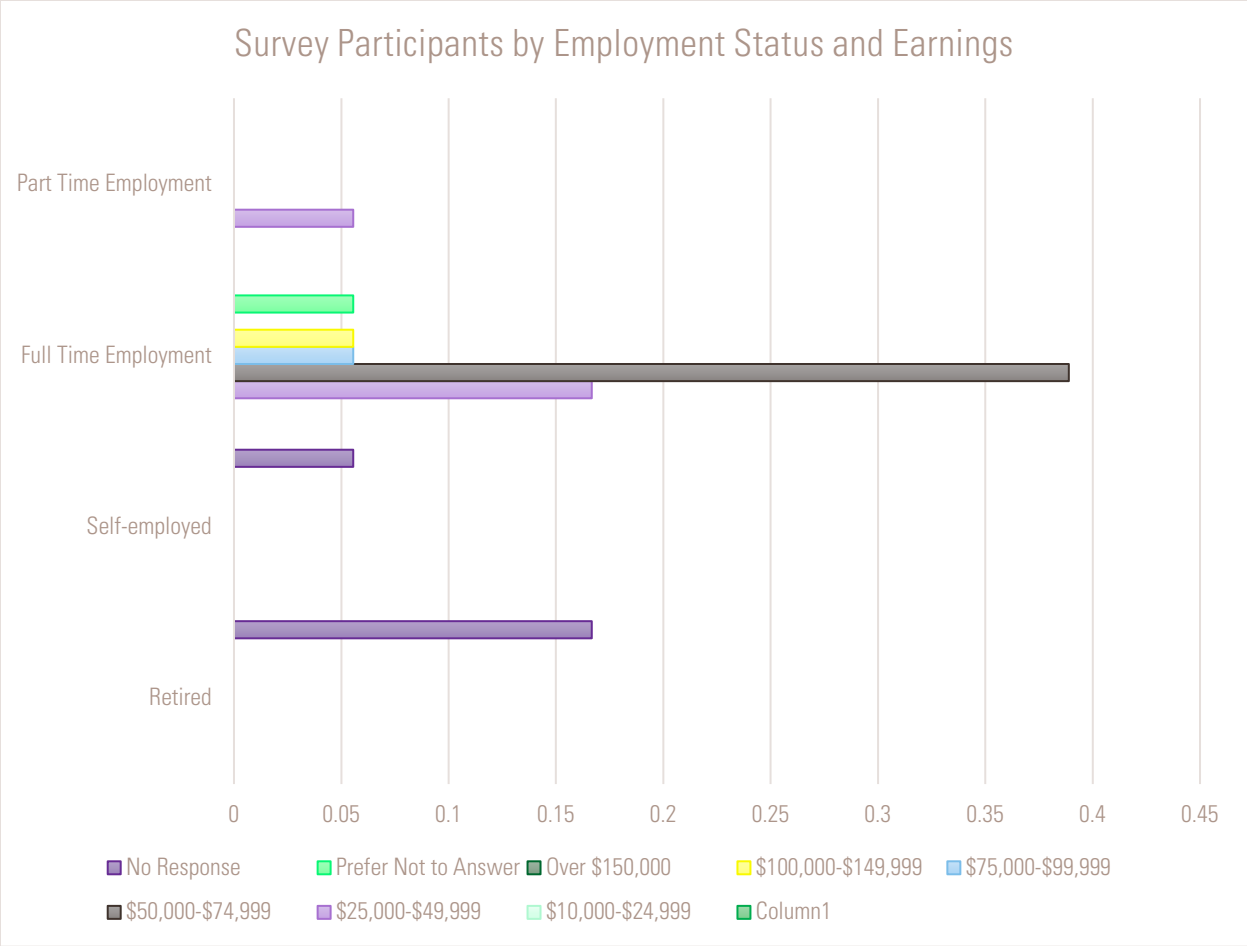

Figure 21: Survey Participants by Employment Status and Earnings (N=18)

Appendix B: Poverty Data

Table 12: Income and Poverty Thresholds for the United States

Size of family unit	Weighted average thresholds	Related children under 18 years								
		None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One person (unrelated individual):	13,171									
Under age 65	13,465	13,465								
Aged 65 and older	12,413	12,413								
Two people:	16,733									
Householder under age 65	17,413	17,331	17,839							
Householder aged 65 and older	15,659	15,644	17,771							
Three people	20,591	20,244	20,832	20,852						
Four people	26,496	26,695	27,131	26,246	26,338					
Five people	31,417	32,193	32,661	31,661	30,887	30,414				
Six people	35,499	37,027	37,174	36,408	35,674	34,582	33,935			
Seven people	40,406	42,605	42,871	41,954	41,314	40,124	38,734	37,210		
Eight people	44,755	47,650	48,071	47,205	46,447	45,371	44,006	42,585	42,224	
Nine people or more	53,905	57,319	57,597	56,831	56,188	55,132	53,679	52,366	52,040	50,035
Source: U.S. Census Bureau.										

While the above showcases U.S. poverty guidelines, according to the department of health and human services, "the poverty guidelines are not defined for the U.S. Virgin Islands." In cases in which a federal program using the poverty guidelines serves any of those jurisdictions, the Federal office which administers the program is responsible for deciding whether to use the contiguous-states-and D.C. guidelines for those jurisdictions or to follow some other procedure." (Office of the Assistant Secretary for Planning and Evaluation, 2022)

Additionally, based on this poverty guideline, households can apply for assistance through the Supplemental Nutrition Assistance Program to receive monthly allotments to support their food purchases.

According to the U.S. Virgin Islands Department of Health Services, the following figure are the allotments for families based on income.

MONTHLY INCOME

Household Size	Maximum Net Monthly Income 100% of Poverty	Gross Monthly Household 130% of Poverty	Elderly/Disabled Separate Household 165% of Poverty	Maximum Gross Monthly Income 175% of Poverty	Elderly/Disabled 200% of Poverty	Maximum Allotment
1	$1,074	$1,396	$1,771	$1,880	$2,148	$ 322
2	1,452	1,888	2,396	2,541	2,904	590
3	1,830	2,379	3,020	3,203	3,660	845
4	2,209	2,871	3,644	3,866	4,418	1,074
5	2,587	3,363	4,268	4,527	5,174	1,275
6	2,965	3,855	4,893	5,189	5,930	1,530
7	3,344	4,347	5,517	5,852	6,688	1,691
8	3,722	4,839	6,141	6,514	7,444	1,933
Each Additional Member	+379	+492	+625	+663	+758	+242

Figure 22: SNAP Eligibility (Department of Human Services, 2022)

Appendix C: Business and Industry

Table 13: Business and Industry, Territory of the Virgin Islands by Island (County), United States Census 2020

Establishments by employees	Number of businesses	Annual Payroll ($1,000)	Number of employees
St. Croix			
Less than 5	470		
5-9	174		
10-19	126		
20-49	98		
50-99	21		
100-249	13		
250-499	3		
500-999	4		
Total	**909**	**$676,256**	**13,931**
St. John			
Less than 5	129		
5-9	41		
10-19	35		
20-49	20		
Total	**227**	**$66,143**	1,911
St. Thomas			
Less than 5	619		
5-9	253		
10-19	163		
20-49	126		
50-99	29		
100-249	15		
Total	1,209		
By category			
Mining, quarrying, and oil and gas extraction	3 (STX)	1,961(STX)	39(STX)
Construction	66 (STX); 21 (STJ); 81 (STT)	101,407 (STX); 66,143 (STJ); 42,270 (STT)	3,104 (STX); 1,911 (STJ); 878 (STT)
Manufacturing	27 (STX); 18 (STT)	32,867 (STX); 5,797 (STT)	480 (STX); 164 (STT)
Wholesale Trade	20 (STX); 36 (STT)	48,181 (STX); 16,575 (STT)	557 (STX); 353 (STT)
Retail Trade	145 (STX); 40 (STJ); 249 (STT)	49,308 (STX); (8,357 STJ); 75,226 (STT)	2,075 (STX) 308 (STJ); 3,300 (STT)
Transportation and Warehousing	1338 (STX); 10 (STJ); 66 (STT)	19,893 (STX); 742 (STJ); 28,774 (STT)	679 (STX); 101 (STJ); 1,052 (STT)
Information	1338 (STX); 21 (STT)	19,893 (STX); 19,593 (STT)	60 (STX); 407 (STT)
Finance and insurance	40 (STX); 6 (STJ); 59 (STT)	41,671 (STX); 729 (STJ); 31,079 (STT)	448 (STX); 19 (STJ); 483 (STT)
Real estate and rental and leasing	53 (STX); 42 (STJ); 77 (STT)	13,476 (STX; 5,620 (STJ); 16,149 (STT)	362 (STX); 166 (STJ); 427 (STT)
Professional, scientific and technical services	100 (STX); 14 (STJ); 128 (STT)	38,263 (STX); 1,541 (STJ); 35,555 (STT)	527 (STX); 41 (STJ); 553 (STT)
Management of companies and enterprises	3 (STX)	167 (STX)	6 (STX)
Administration and support and waste management and remediation services	56 (STX); 14 (STJ); 71 (STT)	39,657 (STX); 1,837 (STJ); 30,830 (STT)	877 (STX); 92 (STJ); 1,076 (STT)
Educational Services	15 (STX); 5 (STJ); 12 (STT)	6,290 (STX); 2,244 (STJ); 10,158 (STT)	236 (STX); 62 (STJ); 323 (STT)
Health Care and Social Assistance	100 (STX); 9 (STJ); 97 (STT)	76,855 (STX); 872 (STJ); 70,527 (STT)	1,568 (STX); 26 (STJ); 1,344 (STT)

Arts, Entertainment, and Recreation	13 (STX); 5 (STJ); 32 (STT)	3,893 (STX); 317 (STJ); 12,385 (STT)	177 (STX); 14 (STJ); 534 (STT)
Accommodation and Food Service	115 (STX); 41 (STJ); 150 (STT)	32,455 (STX); 30,131 (STJ); 60,279 (STT)	1,751 (STX); 853 (STJ); 3,278 (STT)
Other services (except public administration	94 (STX); 14 (STJ); 94 (STT)	61,429 (STX); 2,343 (STJ); 11,957 (STT)	890 (STX); 62 (STJ); 439 (STT)

Appendix D: Food Purchasing, Levels of Importance

Table 14: Level of Importance for food purchasing criteria- Resilience (N=18)

	Grown Local	Affordability	Relationship with producer, seller, etc.	Location	Convenience	Organic	Fresh	Food Safety Practices
Average	4.06	4.18	2.94	3.11	3.72	3.00	4.39	3.72
Extremely Important	44.44%	47.06%	11.11%	5.56%	22.22%	22.22%	44.44%	33.33%
Very Important	22.22%	23.53%	11.11%	27.78%	33.33%	22.22%	50.00%	33.33%
Moderately Important	27.78%	29.41%	50.00%	50.00%	38.89%	16.67%	5.56%	16.67%
Slightly Important	5.56%	0.00%	16.67%	5.56%	5.56%	11.11%	0.00%	5.56%
Not At All Important	0.00%	0.00%	11.11%	11.11%	0.00%	27.78%	0.00%	11.11%

Table 15: Level of Importance for food purchasing criteria- Consumer Survey

	Grown Local	Affordability	Relationship with producer, seller, etc.	Location	Convenience	Organic	Fresh	Food Safety Practices
Average	4.27	4.08	3.42	3.50	3.71	3.64	4.51	4.01
Extremely Important	50.21%	40.17%	25.44%	19.57%	26.75%	33.48%	59.56%	43.24%
Very Important	32.07%	34.50%	24.56%	32.61%	31.58%	24.11%	33.33%	27.48%
Moderately Important	13.50%	19.65%	26.32%	31.74%	30.70%	21.88%	5.78%	19.37%
Slightly Important	2.53%	4.80%	13.60%	10.00%	7.89%	14.29%	0.89%	6.76%
Not At All Important	1.69%	0.87%	10.09%	6.09%	3.07%	6.25%	0.44%	3.15%

Table 16: Level of Importance for food purchasing criteria-Average

	Grown Local	Affordability	Relationship with producer, seller, etc.	Location	Convenience	Organic	Fresh	Food Safety Practices
Average	4.09	4.09	3.38	3.47	3.71	3.60	4.50	3.99
Extremely Important	46.67%	40.65%	24.39%	18.55%	26.42%	32.64%	58.44%	42.50%
Very Important	31.37%	33.74%	23.58%	32.26%	31.71%	23.97%	34.57%	27.92%
Moderately Important	14.51%	20.33%	28.05%	33.06%	31.30%	21.49%	5.76%	19.17%
Slightly Important	2.75%	4.47%	13.82%	9.68%	7.72%	14.05%	0.82%	6.67%
Not At All Important	1.57%	0.81%	10.16%	6.45%	2.85%	7.85%	0.41%	3.75%

Appendix E: Action Planning Notes

Overall voting:

Engage: enhance connections for farmers, consumers and advocates to be part of policy making process (7 votes)

Build: create new business cooperative for farmers to allow for cost-sharing on equipment and supplies, and potential collective aggregation of products for sale; innovation center with business TA (6 votes)

Repair: repair and develop new water access protocols, including funding for additional water trucks and storage facilities for farmers (6 votes)

Complete water irrigation system (no votes)

Educate: establish peer-to-peer networks and mentorship with existing and new farmers; including preservation; agricultural courses for students and young people at primary, secondary and higher education levels (5 votes)

Plan/marketing for more farm labor–workforce for ag (1 vote)

Launch: develop and launch an online farmers market, with e-commerce for individual farm and food businesses with proper marketing materials on use (4 votes)

Invest: invest in resilient infrastructure for storage and processing for products (specific food processing/preservation such as drying and canning); consider modular and mobile facilities (4 votes)

Prepare: Identify existing food supply and products; develop strategy for storm mitigation on crops and animals; ensure policies are in place to access land post storm (3 votes)

Plan: create disaster contact list–locally, regionally and outside disaster zone for response support (2 votes)

we don't need support we need an action plan (2 votes)

Update: crate new and updated materials for financial, marketing, and production risk associated with climate change, business best practices and opportunities for market expansion; include business expansion/export (1 vote)

References

Austin, D. A. (2018). *Economic and Fiscal Conditions in the US Virgin Islands.* Congressional Research Service.

Callwood, G. B., Campbell, D., Gary, F., & Radelet, M. L. (2012). Health and Health Care in the U.S. Virgin Islands: Challenges and Perceptions. *US National Library of Medicine, National Institutes of Health*.

CIA World Factbook. (2018, January 20). *Virgin islands Land Use*. Retrieved from Index Mundi: https://www.indexmundi.com/virgin_islands/land_use.html

Department of Health and Human Services. (2019). *Annual Update of the HHS Poverty Guidelines*. Health and Human Services. Retrieved from https://www.federalregister.gov/documents/2019/02/01/2019-00621/annual-update-of-the-hhs-poverty-guidelines

Department of Homeland Security. (2022). *National Risk Index*. Retrieved from Learn More: https://hazards.fema.gov/nri/learn-more

Department of Human Services. (2022). *Supplemental Nutrtition Assistance Program*. Retrieved from U.S. Virgin Islands Department of Human Services: http://www.dhs.gov.vi/financial_programs/documents/2022-COLAADJUSTMENTSANDDEDUCTIONSTABLE10-21.pdf

FEMA. (2018). *St John Community Recovery Plan September 2018*.

FEMA. (2022). *FEMA*. Retrieved from Declared Disasters: https://www.fema.gov/disaster/declarations?field_dv2_state_territory_tribal_value=TX&field_year_value%5B%5D=2012&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All

FEMA. (2022). *National Risk Index*. Retrieved from National Risk Index County View Map: https://hazards.fema.gov/nri/map

Food and Nutritional Service. (2018). *Child Nutrition Labels*. Retrieved from Food and Nutritional Service: https://www.fns.usda.gov/pd/child-nutrition-tables

Foundation, H. J. (2017). *Overweight and Obesity Rates for Adults by Gender*. Retrieved from KFF: Filling the need for trusted information on national health issues: https://www.kff.org/other/state-indicator/adult-overweightobesity-rate-by-gender/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

Foundation, H. J. (2019, January 25). *Medicaid in the Territories: Program Features, Challenges, and Changes*. Retrieved from Henry J. Kaiser Family Foundation : https://www.kff.org/report-section/medicaid-in-the-territories-program-features-challenges-and-changes-issue-brief/

InTeGrate. (2018, January 11). *InTeGrate*. Retrieved from Introduction to Food Access, Food Security and Food Insecure Conditions: https://serc.carleton.edu/integrate/teaching_materials/food_supply/student_materials/1063

Iowa State University Food Systems Team. (2019). *U.S. Virgin Islands Food System Assessment.*

Johns Hopikins University and Medicine. (2022). *Coronavirus Center*. Retrieved from Texas : https://coronavirus.jhu.edu/region/us/texas

Kids Count. (2015). *Children in Poverty in the Virgin Islands*. Retrieved from Kids Count: https://datacenter.kidscount.org/data/tables/3620-children-in-poverty?loc=54&loct=4#detailed/4/any/false/573,869,36,868,867,133,38,35,18,17/5580/13552,10459

Kids Count. (2015). *Individuals in poverty in the Virgin Islands*. Retrieved from Kids Count: https://datacenter.kidscount.org/data/tables/6704-individuals-in-poverty?loc=54&loct=4#detailed/4/any/false/573,869,36,868,867,133,38,35,18,17/1385/13776

Natinonal Integrated Drought Information System. (2021, May 7). *Drought.Gov*. Retrieved July 16, 2022, from Drought Update for Puerto Rico and the U.S. Virgin Islands: https://www.drought.gov/drought-status-updates/drought-update-puerto-rico-and-us-virgin-islands-1

Office of the Assistant Secretary for Planning and Evaluation. (2022). *HHS Poverty Guidelines for 2022*. Retrieved from ASPE HHS: https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines

Task Force Advisory Committee. (2018). *USVI Hurricane Recovery and Resilience Task Force: Report 2018.*

Taylor, W. C., Shugart, D., & Paxton, R. J. (2011). Healthy Lifestyle Behaviors and Disparities Between the United States Mainland Compared to Puerto Rico, Guam, and United States Virgin Islands. *Journal of Health Disparities Research and Practice*.

Taylor, W., Shugart, D., & Paxton, R. (2019, Spring). Healthy Lifestyle Behaviors and Disparities between the United States mainland compared to Puerto Rico, Guam and United States Virgin ISlands (i.e. United States territories). *Journal of Health Disparities Research and Practice*.

The World Bank. (2018). *Agricultural land (% of land area) - Virgin Islands (U.S.)*. Retrieved from The World Bank: https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?locations=VI

U.S. Department of Agriculture National Agriculture Statistics Service. (2018). *2017 Census of Agriculture; Virign Islands of the United States (2018) Territory and Island Data.* USDA .

U.S. Department of Housing and Urban Development, Office of Policy Development and Outreach. (2017). *United States Virgin Islands: Comprehensive Housing Market Analysis* . U.S. Department of Housing and Urban Development.

United States Census Bureau. (2020). *United States Census Bureau.* Retrieved July 7, 2022, from Economic Surveys: County Business Patterns: https://data.census.gov/cedsci/table?t=Establishments&g=0400000US78%240500000

USDA. (2009). *Virgin Islands of the United States Terriory and Island Data.*

USDA. (2018). *U.S. Virgin Islands Agriculutre: Results from the 2018 Census of Agriculture.* USDA. Retrieved July 4, 2022, from https://www.nass.usda.gov/Publications/Highlights/2020/census-virginislands.pdf

USDA Census Bureau. (2020). *Population of the United States Virgin Islands: 2010 and 2020.* Retrieved July 4, 2022, from https://www2.census.gov/programs-surveys/decennial/2020/data/island-areas/us-virgin-islands/population-and-housing-unit-counts/us-virgin-islands-phc-table01.pdf

USDA Climate Hubs. (n.d.). *Caribean Climate Hub*. Retrieved from Disaster Presparedness - Puerto Rico and the U.S. Virgin Islands: https://www.climatehubs.usda.gov/hubs/caribbean/topic/disaster-preparedness-puerto-rico-and-us-virgin-islands

USDA, National Agricultural Statistics Service. (2017). *2017 Census of Agriculture.* USDA, National Agricultural Statistics Service.

Virgin Islands Department of Human Services. (n.d.). *Family Services* . Retrieved from Virgin Islands Department of Human Services: http://www.dhs.gov.vi/financial_programs/food_stamp.html