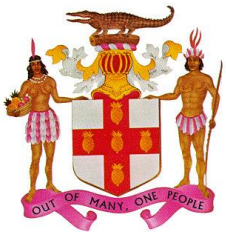

REPORT
ON
CLIMATE CHANGE KNOWLEDGE, ATTITUDE AND BEHAVIOURAL PRACTICE SURVEY

Prepared by the Caribbean Institute of Media and Communication,
University of the West Indies, Mona Campus

For the Planning Institute of Jamaica

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Executive Summary

In May 2009, Jamaica accepted the offer extended by the Sub-Committee of the Pilot Programme for Climate Resilience (PPCR) to participate in the PPCR, as one of the six countries in the Caribbean regional pilot programme. One of the main thematic areas of focus of the PPCR is that of climate change education and awareness. The objective of the 2012 study was to update the current information base on the knowledge, attitudes and behavioural practices (KAP) regarding climate change among Jamaicans, using a KAP study done in 2005 as a basis for comparison to detect any changes over the years.

It has been argued that human activity is the main cause of climate change. Any alteration of this kind of behaviour necessitates insight into what people know, believe and do. A KAP study is for this reason useful because it evaluates and measures the knowledge, attitude and practice of people. In recent times, KAP studies on matters relating to climate change have been increasing. In the United States of America, for example, the Yale Project on Climate Change Communication and the George Mason University Center for Climate Change Communication, have been conducting a series of studies on Americans' beliefs and attitudes about global warming. Another project worthy of note is the International Public Opinion on Climate Change study done by the Yale Project on Climate Change Communication in collaboration with the Gallup World Poll. This global survey asks questions on climate change with a sample of 150+ countries worldwide.

In the Caribbean, climate change KAP studies have blossomed perhaps beginning with six studies initiated by the Mainstreaming Adaptation to Climate Change (MACC) Project between 2005 and 2006 in five countries: Barbados, Belize, Dominica, Jamaica and St. Vincent and the Grenadines (ACM, 2005). These were national surveys of the general public. About 1,700 respondents participated in the Jamaican 2005 KAP study which included not only members of the general population but also representatives of the public and private sector as well as international lending agencies.

Methodology

A mix of quantitative and qualitative methods was employed in this study. Three surveys were carried out to ascertain levels of knowledge, attitude and practices among Jamaicans in general and particular sectors. A national survey of Jamaican households collected data from 1484 respondents. The online version of this survey had 503 persons completing the survey.

The sector survey targeted six sectors (1. Agriculture; 2. Construction (Built Environment and Human Settlements); 3. Energy; 4. Health; 5. Tourism and 6. Water); and 276 organisations completed the interviews. The qualitative component utilised a total of ten different focus group discussions with different targeted audiences patterning the structure of the quantitative investigation. Six separate sectoral focus group discussions were held and four separate community sessions were also completed with Portmore residents, farmers from Spring Village,

young persons in Port Maria and retired persons. The data collection for the study happened during July 7 to 18, 2012.

Results

The results are organised according to the three surveys. For each survey, the knowledge, attitude and practices are presented followed by media usage. The survey results are followed by the focus group results.

National Household Survey Results (N=1484)

Individuals' level of preparedness for climate-related disasters can debatably be linked to the degree to which they insure their homes and property. Only 14.7% reported having home insurance; 61.3% did not have insurance and another 24% did not know or were not sure. For those who had home insurance, only 28.6% stated they had insurance against climate-related events such as hurricanes or other natural hazards.

Knowledge of Climate Change: Most persons (82.6%) have heard the term "climate change". The main theme from respondents' explanation of climate change was that it was a variation in global climate, temperature of weather patterns; about 56.4% of respondents said this.

Regarding their community's risk associated with climate change, a majority (37.3%) also indicated they did not know much while a similar amount either knew a fair amount (21%) or hardly anything (20%) about their community's risk. Hurricanes (83.7%) and droughts (84.5%) were the commonly cited events that most respondents related to climate change. Floods (76.9%), increases in air temperature (74.9%), and global warming (73.6%) were also related to climate change.

From the list of probable causes presented on the questionnaire, land clearing (deforestation) and improper disposal, such as burning garbage, were the two most commonly selected causes, with 80% choosing these two responses as causes of climate change.

Attitudes to Climate Change: About half (49.5%) of the respondents were very concerned about climate change with another 31.2% being moderately concerned; 14.1% were not concerned at all. Many persons were either "very interested" (60.0%) or "somewhat interested" (30.2%) in finding out more about the effect of climate change on Jamaica.

Over 80% of the respondents agreed (42.1%) or strongly agreed (42.1%) that the government should play a stronger role in addressing the impact of climate change on communities. In terms of paying more or tolerating some inconvenience to help preserve the environment, only 16.5% strongly agreed to doing this, while another 45% agreed.

Most persons (51.0%) felt that climate change was extremely important for Jamaica, but only 39.2% felt it was extremely important for their community.

When asked who should be mainly responsible for handling climate change, while just over one-third (37%) noted the government, 45.7% said that all of the agencies listed (government, business/industry, community organisations, private citizens, industrialised countries and UN organisations) should play a role.

Practices regarding Climate Change: Respondents declared what they had done to worsen the impact of climate change on their communities. These actions included improper waste disposal such as burning garbage, deforestation and increased energy use. At the individual level many stated they had done nothing, or were not sure (42.7%) they had done anything to worsen the effect of climate change. At the community level, a comparable set of responses were given. And at the country level, negligence in garbage disposal, lack of environmental planning and protection, as well as a shortage of public education, were listed as some practices that worsened the impact of climate change.

Respondents disclosed that they have no idea or were not sure (10.7%) what could be done to prevent or lessen the effects of climate change on the community. Others recommended proper garbage disposal (11.7%), community support (6.4%) and planting trees (4.2%) as some actions that could be taken to prevent or lessen the effects of climate change. Other responses included increased public awareness, keeping drains and gullies clean, resource conservation, and disaster preparedness at the community level. At the national level, several respondents suggested a major educational campaign (10.5%) among other activities such as maintaining and improving infrastructure (roads, bridges and drains) and enacting laws to deal with pollution.

Media Usage: Respondents reported that they occasionally (33.5%) or infrequently (31.7%) read or listen to or watch stories on climate change. Many (84.9%) informed that they would like to read, watch or listen to stories about climate change.

Persons noted that they obtained their information on climate change from television (80.1%), radio (57.7%), newspaper (37.3%), the internet (22.5%), schools (17.2%) and friends or family (16.4%).

The three most effective actions for delivering information on climate change were: television (94.2%), radio (76.7%) and newspapers (38.6%).

Online Survey Results (N = 503)

The online survey was executed using a snowballing sampling technique whereby the link to the survey was shared on social media and persons were prompted to share it with their friends. The findings are therefore not representative, but nevertheless reflect a demographic that utilises online media.

More than a quarter (36.2%) reported having home insurance, with 42.9% informing they had insurance against climate-related events such as hurricanes or other natural hazards; 52.4% was not sure if their houses were insured against climate-related events.

Knowledge of Climate Change: Online respondents (94.2%) stated that they had heard the term "climate change". About 73.5% of respondents described climate change as variation in global climate, temperature or weather patterns.

In terms of knowledge of their community's risk associated with climate change, just over one-third (35.2%) established that they did not know much, while a fairly similar percentage either knew a fair amount (21.2%) or hardly anything (26.4%) about their community's risk.

Hurricanes (90.9%), floods (84.1%), sea level rise (84.3%), increases in air and sea temperatures (89.5%), more intense storm surges (82.6%), global warming (86.9%), droughts (88.5%), and climate variability (83.1%) were the events that most online respondents mainly associated with climate change.

Burning fossil fuels (87.4%); transportation and vehicle emissions (86.9%); land clearing (88.5%); poor industrial practices (88.7%) and improper garbage disposal (86.0%) were the most commonly selected items that online respondents thought were causes of climate change.

Attitudes to Climate Change: Over 90 % of the online respondents were either very concerned (44.8%) or moderately concerned (48.7%) about climate change. Regarding level of interest in finding out more about the impact of climate change on Jamaica, many persons online were either "very interested" (45.7%) or "somewhat interested" (47.9%).

While 40.2% agreed they would be willing to put up with some inconveniences to help preserve the environment; several also strongly agreed (58.4%) that the government should take a stronger role in addressing the impact of climate change on communities.

For online respondents, 50.0% felt that climate change was extremely important for Jamaica, but only 24.6% felt it was extremely important for their community.

A majority (63.5%) noted that all of the agencies listed (government, business/industry, community organisations, private citizens, industrialised countries and UN organisations) should play a role when asked who should be mainly responsible for addressing climate change.

Practices regarding Climate Change: Almost one-third, 32.4% of the respondents, reported that they did nothing to worsen the effect of climate change on their community. Other responses were use of fuel that depletes the ozone layer (7.3%), increased consumption of energy (6.1%) and improper waste disposal (6.1%). On the community level, respondents felt that their communities had improper waste disposal practices (13.3%). At the national level, many

respondents (17.3%) said that they were unsure or unaware of what Jamaica has done to worsen the impact of climate change, while 8.1% felt that Jamaica did nothing to contribute to worsening climate change.

In terms of what could be done to prevent or lessen the effects of climate change on the community, some online respondents (11.5%) suggested increased awareness and consciousness of the dangers and effects as the main factor. Respondents also admitted that they have no idea or were not sure (11.3%) of what could be done to prevent or lessen the effects of climate change on the community. Other suggestions included proper garbage disposal practices (6.9%), recycling (2.7%) and reforestation (1.9%). When asked about actions the community could take, respondents listed increased awareness (11.7%), proper disposal of waste (10.7%) as main actions. Online respondents stated that at the national level, increased environmental awareness (11.73) and proper disposal of waste (10.7%) were important in reducing the impact of climate change.

Media Usage: Many online respondents reported that they occasionally (43.7%) or infrequently (34.1%) read or listened to or watched stories on climate change. The majority (76.0%) indicated that they would like to read, watch or listen to stories about climate change.

Respondents informed that they received climate change information from television (70.8%), radio (43.5%), newspaper (48.7%), the internet (66.2%), schools (31.2%) and videos (21.1%). Online respondents reported that the three most important channels for disseminating information on climate change included television (85.3%), radio (46.4%) and the internet (25.1%).

Sector Survey Results (N = 276)

The sector survey targeted organisations within six sectors. Most participants represented the agriculture (25.7%) and tourism (23.2%) sectors. More private sector organisations (68.6%) completed the survey than public sector entities (25.8%); about 6% of respondents represented non-governmental organisations or considered themselves quasi-public sector.

Knowledge of Climate Change: Ninety-seven percent (97.4%) of respondents stated that they had heard of "climate change". When asked to explain the term, many noted that it related to variation in climate globally, temperature or weather patterns. Respondents were also asked to differentiate between the terms "mitigation" and "adaptation". About 22% informed that they were not sure, but about 19% were able to explain adaptation, while 15% was able to explain mitigation.

Over a third of the sample (38.5%) reported that they did not know much about the government's response to climate change. Another 20.1% indicated that they had a fair amount of knowledge about the government's response.

About a third of participants (31.7%) also had a fair amount of knowledge of their organisation's risk in terms of effects resulting from climate change.

Attitudes to Climate Change: Most organisations participating in the study felt that climate change adaptation and mitigation initiatives were very important (51.7%) or important (24.4%) to their organisation. A fairly large number also felt that climate change adaptation and mitigation were very immediate to their organisation (38.3%), to their sector (50.6%) and to Jamaica (53.9%).

Many respondents (85.2%) thought that the government should aid their sector in adapting to, or mitigating the effects of climate change.

Practices regarding Climate Change: About two-thirds of the respondents (68%) stated that their organisation had a role to play in managing the likely effects of climate change on Jamaica. For those organisations playing a role in managing climate change, several actions were described, including educating and informing the public on climate (18.8%); ensuring environmentally-friendly practices (14.8%); research and development of alternative energy (9.4%); and waste management (9.0%).

In terms of recent practices being used to address the consequences of climate change, some organisations noted they were not doing anything (12.6%). Others noted they participated in conservation of energy-related processes and other resources (7.9%); waste management (7.9%); education and awareness with the assistance of training (10.8%).

The potency of these current practices being followed by the organisations was that they supported efficiency and provided environmental protection, provided exposure in terms of educating employees and prepared the organisation to have an early recovery after a climate-related event. Some respondents (15.9%) stated there were no weaknesses related to the main measures they were using to address the impact of climate change. For those which had weaknesses, they related mainly to lack of appropriate resources and ineffective communication.

Less than a third of the respondents (27.9%) noted that climate change issues are included in their business' corporate or strategic plan; 16% did not know or were not sure. Many respondents were unable to describe fully how these climate change matters were integrated into their organisations' budget; those who responded gave answers which suggested that between 5% and 30% of their budget was allotted to climate change issues.

Only 15% of organisations were involved in the development of government policies; another 15% were not sure or did not know. Twelve percent (12%) had existing policies to address climate change issues. Examples of these policies included environmental management and recycling, health and wellness, protection of natural resources, proper waste management and disposal, energy conservation and disaster management.

It was previously noted that 85.2% felt that the government should help their sector in adapting to or mitigating the consequences of climate change. Public education programmes, financial assistance and policies and legislation were some of the most frequently cited ways in which the respondents felt the government could help.

In terms of collaboration, a little over a quarter (26.3%) of the organisations indicated they currently worked together with other organisations on climate change issues. Collaborating activities included mainly meetings with other organisations and community groups, conferences and workshops.

Fourteen percent (13.9%) of organisations considered themselves leaders in their sectors as they coordinated other organisations on climate change issues. Coordinating activities included playing an advisory role, information sharing, organising meetings, sponsorship, conferences and workshops as well as outreach programmes.

Media Usage: Organisations cited traditional and new media as common sources of information on climate change. Most organisations (66.7%) reported that they got their information from web sites. Others reported that they received information from newspapers (55.1%); television (53.6%) and radio (50.7%).

In terms of the three most effective channels for delivering information on climate change to their organisations, sector respondents noted that television (52.4%) would be the first most effective channel, followed by radio (32.4%) and then websites/Internet (27.2%).

Focus Group Results

Community Focus Group Discussions

There was a substantially high level of understanding of climate change and reasons for its existence. While not necessarily using scientific terminology, across all four groups, people explained climate change as "changes in the weather pattern and seasons over time". The impact of climate change was generally understood. The list of consequences that respondents personally noted included increased hurricanes, storms, floods and drought; shorter (crop) growing periods, longer droughts; hotter days among others.

Building of homes in gullies and hazard-prone areas was also stated as a factor that increased the impact of climate change on communities. The illegal construction of homes in zones where there should be no construction was cited. So too was the disregard for the building code itself. Erecting houses too close to each other was also viewed as one factor that contributed to the unfavourable effect of climate change.

There were strong feelings and attitudes with respect to just how willing Jamaicans would be to become prepared for climate change. Some of the attitudes that would hinder readiness included the desire for large concrete block structures that many people cannot afford, but want

in order to have social status; disregard for the building code extends across all levels and classes of society; a single-minded mentality that prevents greater community spirit and cooperation; and a belief that alternatives are not really viable.

Some of the central practices that community respondents in the focus group sessions highlighted as being most important included starting vegetable gardens; recycling plastic bottles and bags; preserving produce; disposing of garbage properly – composting; educating oneself and becoming more aware.

Respondents generally indicated that all forms of communication should be used to improve public awareness and education about climate change at the community level. However, there were some specific comments that were highlighted. These included the use of sports champions such as Asafa Powell; Facebook and social media; alternative media – such as puppets and drama.

Sectoral Focus Group Discussions

While several negative impacts were articulated across all groups, common positive impacts were also articulated. Participants indicated that climate change would bring, for example, an increased urgency for energy and water conservation solutions and technologies; new business opportunities for the private sector – new niche markets for goods and services; greater innovation and creativity to address solutions and greater public awareness and attention to the work that agencies are doing.

All of the sector representatives believed that their individual agencies had a crucial role to play in facilitating climate change readiness, albeit for different reasons. Despite their importance to the sector, and the key role they play in promoting climate resilience, most agencies did not feel they were adequately prepared, or had sufficient capacity and resources to deliver everything that would be required. They noted that several steps had been taken – in most cases in terms of: (1) trying to make their own organisation more energy and climate efficient (i.e., energy efficient lights, energy audits, etc. (2) increased staff training and awareness and (3) enhancement of some building infrastructure (i.e., use of generators). But while these approaches were a start, more was required.

Some limitations in responding to climate change included lack of a long-term view which led to short term planning horizons that do not adequately accommodate climate change; lack of effective interagency cooperation which involved much consultation, but unproductive collaboration in many instances; and lack of enforcement and regulation capacity among others.

Participants noted the most important adaptation and mitigation strategies for the next five years should involve climate smart agriculture that includes energy and water conservation, safe pest management; alternative livelihood solutions that seek to capitalise on positive opportunities that climate change will bring; community auditing, data collection and monitoring and increased public awareness across all sectors.

Analysis

The surveys demonstrated fairly high levels of knowledge about climate change with the various samples (household, sector, online). This high level of awareness was also confirmed in the qualitative investigations. Comparatively, the online and sector samples seemed to have comprised more highly educated respondents and so it is not surprising that their knowledge levels of "climate change" was above 90%. Some 94.2% of online respondents and 97.4% of sector respondents indicated that they had heard the term. The household sample, which had a wider variation in education levels, with most persons completing secondary level, also had a fairly high level of knowledge about climate change, with 82.6% indicating that they knew the term.

Several respondents from the household (78.4%) and online (73%) surveys indicated that they did not believe the government was doing anything about climate change. This finding was evident in both the qualitative community-based and sectoral discussions. While this lack of awareness of what the government is doing might point to a general lack of interest in climate change matters, it is interesting to note the respondents still felt very concerned about climate change; 49.5% of the household sample and 44.8% of the online sample were very concerned about climate change.

Based on the qualitative investigation, however, there is a reasonable level of awareness of "community risk factors" that can serve as a foundation for such an approach. The focus groups pointed to participants being more aware of their community's level of risk when they had had a personal experience with a fairly extreme climate change event such as flooding or hurricanes. In contrast, from the quantitative survey, many indicated that they did not know much about their community's level of risk.

The small number of persons reporting that they have home insurance against natural hazards and other climate-related events is another cause for concern. This is exacerbated by observations made in the focus group discussion where participants noted that home insurance, as well as loans to make one's dwelling more climate resilient, was financially prohibitive.

The attitude of many Jamaicans toward climate change seems to be positive, in that many expressed that they were very concerned about it and were interested in finding out more about the impact of climate change on the country. While most believed that Jamaica was not adequately prepared to deal with the effects of climate change, for some there seemed to be a general feeling that it was the government which should be mainly responsible for climate change.

This perception was reflected in the focus group discussions. However, in these discussions – especially those at the community level – people did indeed identify actions for which they could take personal responsibility without relying on government. Future campaign strategies must address this issue by convincing members of the society that they have a role to play in

addressing climate change issues. Individuals as well as various organisations will need assistance in establishing the roles that they can play in responding to climate change.

While there might be a fair amount of knowledge among the general population concerning climate change, the range of responses collected from the household and online surveys points to an area that needs addressing. It is noteworthy that when asked to describe actions that should be adapted to address climate change, or what actions could be implemented to prevent or lessen the impact of climate change in one's community, a common theme found in the household survey was that of waste management and garbage disposal. Addressing these behaviours would seem to be a reasonable starting point for any communication intervention, but there is a greater challenge presented here – that of educating Jamaicans to understand that lessening the effects of climate change involves much more than abstaining from burning garbage and the proper management of waste disposal.

Overall, this study supported the need for an increase in public education and awareness activities as respondents from the various samples made suggestions about increasing activities carefully designed to make Jamaicans more aware of the issues surrounding climate change. Future communication-based interventions will have to move beyond merely sharing information and spreading awareness, and now focus as well on promoting specific behavioural practices that are feasible for most of the population to implement.

Recommendations

Communication-based interventions should take the following into consideration:

1. there needs to be more public education about the meaning of climate change and its impact on individuals, communities and the country in general, even though many persons are aware of the term "climate change".

2. there is still the notion that the government must take the main responsibility for addressing climate change. While the government can play a major role in Jamaica's response to climate change, individuals and organisations must be of the persuasion that they also have a role too, although most persons indicated that they are very concerned and interested in climate change matters.

3. there is a need to introduce persons to a wider range of actions which can be implemented in addressing climate change issues - although many survey respondents stated actions regarding proper garbage disposal as activities that they could individually carry out to help lessen the effects of climate change.

4. across all three surveys, there was the suggestion by respondents that there is a need for more awareness and public education activities. There was also the suggestion that messaging must be very creative and bold to capture the attention of Jamaicans and persuade them to change present behavioural practices which negatively affect climate change issues.

Sectoral Recommendations

Several key recommendations were concluded from the qualitative sectoral focus group discussions. For one, there is much greater need for inter-agency collaboration and partnership in implementing climate readiness strategies. For this to happen however, specific indicators and reporting evidence to support collaboration need to be mandated and institutionalised. In other words, agencies must be able to prove collaboration or be held accountable.

Greater financial resources will be required to help organisations fulfil their mandates. Without budgetary increases, efficient and clearly delineated mechanisms for inter-agency collaboration will be even more critical.

A further institutional and budgetary consideration which cannot be overlooked is the need to ensure that climate change reporting indicators are also included within the job descriptions of public sector staff and that staff are remunerated at least well enough to keep them.

Related to these same budgetary realities, the qualitative sectoral assessments also strongly recommended the need for incentives (tax breaks, credits and/or financing) that would better enable private sector and householders to adopt climate change best practices and technologies.

Another very important recommendation from the sectoral discussions that must be stressed is the need for the country as a whole to have a long-term preparedness view with regards to climate change that will not be subject to political interference.

One common recommendation from both the community and sectoral respondents is the need to enact, promote and enforce the building code.

Introduction

Background

Jamaica, a small island developing state, is particularly vulnerable to climate change. Approximately two-thirds of the population of about 3 million people live in coastal towns and communities, that is, within 2 km of the coast. In addition, the coastal zone contains an estimated 75% of industries and service sector and is responsible for generating some 90% of Gross Domestic Product (GDP). The country has low human development indicators - 18.7% national poverty head count with 25.1% rural and 12.8 % urban (2000).[1] These could be further threatened by climate change. For example, it is estimated that by 2025 the cost to Jamaica of dealing with the effects of climate change on the country, could be 13.9% of GDP, 27.9 % by 2050, 42.3 % by 2075 and approximately 57% by 2100 (based on 2004 GDP).

Over the last 25 - 30 years, Jamaica has experienced an increase in the frequency of natural events, primarily floods related to inclement weather as well as tropical depressions, tropical storms, hurricanes, and droughts. Some of the more recent meteorological events that have had a severe impact on Jamaica include Hurricane Ivan in 2004, Hurricanes Emily and Dennis in 2005, Hurricane Dean in 2007 and Tropical Storm Gustav in 2008. The adverse effects included a decline in the health of coral reefs; loss of sea-grass beds; severe beach erosion and loss of forested areas. These natural disasters resulted in significant social dislocation and monumental economic losses and damage. For instance, in 2004, Hurricane Ivan resulted in damage totalling J$35 billion, while Hurricane Dean in 2007, and Tropical Storm Gustav in 2008, left J$23 billion and J$15 billion respectively, in damage[2].

Based on the most recent available projections, countries like Jamaica will be severely threatened by the direct and indirect impact of climate change, most of which will more than likely accelerate in the coming decades. Among some of the possible effects are: increased coastal flooding, storm surge, erosion of hillsides and other coastal hazards – leading to extensive damage to coastal infrastructure and communities, tourism infrastructure and coastal ecosystems; drought from reductions in water resources and increased invasion of non-native species, which may include pest infestations. For these reasons, adaptation is critical for a country like Jamaica, as failure to implement adaptation measures can only serve to retard the achievement of the country's sustainable development goals under Vision 2030 Jamaica - National Development Plan and the Millennium Development Goals. The attainment of the targets in these two planning frameworks is contingent on effective planning for managing climate change risks. A major challenge faced by Jamaica is the limited capacity to implement

[1] World Bank. World Development Indicators

[2] The data were obtained from impact assessments conducted by the Planning Institute of Jamaica (PIOJ).

adaptation options. This limitation is manifested in weak capacities of national and local institutions and vulnerable communities to develop and implement adaptation and disaster risk reduction strategies; inadequate tools and systems to plan and implement climate change strategies; and general lack of scientific information to facilitate adaptation planning. This has been exacerbated by the limited suitability of global and regional models currently being used to build climate scenarios.

Against this background, in May 2009, Jamaica accepted the offer extended by the Sub-Committee of the Pilot Programme for Climate Resilience (PPCR) to participate in the PPCR, as one of the six countries in the Caribbean regional pilot programme. The other five countries are Grenada, St. Vincent and the Grenadines, St. Lucia, Dominica, and Haiti. The PPCR aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development policies, planning and implementation. The objectives of the PPCR include:

- piloting and demonstrating approaches for integration of climate risk and resilience into development policies and planning;
- strengthening capacities at national levels to integrate climate resilience into development planning;
- scaling-up and leveraging climate resilient investment, building on other on-going initiatives;
- and enabling learning-by-doing and sharing of lessons at country, regional and global levels.

The activities of the PPCR for Jamaica will culminate in the development of a Strategic Programme for Climate Resilience (SPCR). The development of the SPCR will consider all the components that need to be in place. The activities are aimed at:

- mainstreaming Climate Change into priority sectors;
- facilitating sectoral adaptation measures;
- strengthening policy/institutional arrangements;
- building capacity for planning and forecasting; and
- climate change education and awareness.

Initiatives related to these themes will be implemented for priority sectors including: water resources; agriculture and food security; tourism; human health; human settlements and coastal resources.

Literature Review

Many researchers concur that human activity is the main cause of climate change (IPCC, 2007). A modification of this kind of behaviour necessitates insight into what people know, believe and do. A KAP study is for this reason useful because it evaluates and measures the knowledge, attitude and practice of people (WHO, 2008) and in so doing helps to identify "the most effective ways to teach the public about what has been learned (about climate change) through scientific research and data" (MAAC, 2006, p. 3). The KAP study also helps in establishing

baseline indicators. When KAP data are collected before an intervention which is designed to change knowledge, attitudes and behaviours, they can then be compared later with other data to assess the impact of that intervention; in this way, KAP studies form a very important part of evaluation research.

Studies that measure people's attitudes and behaviour are not new to climate change. Patchen (2006) writes:

> Since climate change has become a topic of public discussion in the last few decades, a considerable number of studies have examined the influences on people's attitudes and behaviour relevant to climate change.

However, very few KAP studies on climate change exist. Instead, there are studies that measure "worldviews, such as those about the relation of humans to nature; perceptions of personal and social risks; political philosophy; knowledge; the personal discomfort of given actions; the perceived efficacy of one's actions; perception of personal responsibility; social norms; and many other influences" (Patchen 2006, p.1).

In recent times, KAP studies on matters relating to climate change have been increasing. Interestingly, some of these studies focus on one or two aspects of the knowledge, attitude and practice (KAP) triad. In the United States of America, for example, the Yale Project on Climate Change Communication and the George Mason University Center for Climate Change Communication, have been conducting a series of studies on only Americans' beliefs and attitudes (not knowledge) about global warming. The most recent sharing of results sourced online (Leiserowitz, Maibach, Roser-Renouf, & Smith, 2012) show data collected in March 2012, November 2011, May 2011, June 2010, January 2010 and November 2008. This longitudinal research tracks public understanding of the causes, consequences, solutions to climate change, as well as current barriers to action and attempts to detect changes in attitudes and beliefs about global warming. In their most recent study, they concluded that:

> Overall, Americans' beliefs and attitudes about global warming have remained relatively stable over the past several months, with a few exceptions. There has been a slight increase in the proportion of people that believe global warming is happening and a slight decrease in the proportion that believe it is caused mostly by human activities. (Leiserowitz et al., 2012)

Another project worthy of note is the International Public Opinion on Climate Change study done by the Yale Project on Climate Change Communication in collaboration with the Gallup World Poll. This global survey gathers climate change information from a sample of 150+ countries worldwide. The first results were presented at the Copenhagen Climate Summit in 2009. Then, Leiserowitz reported that approximately 40% of the world's population or 1.9 billion persons worldwide are unaware of climate change. Of the 60% that were aware of climate change, when asked "Temperature rise is a part of global warming or climate change.

Do you think rising temperatures are a result of human activities or result of natural causes?", 58% noted it was caused by human activity, 25% said natural causes, 14% indicated both while 3% did not know (Yale University School of Forestry and Environmental Studies, 2010).

While the research output of entities like the Yale University Project on Climate Change Communication points to the growing trend towards studying issues such as attitudes and beliefs about climate change in more recent times, researchers have been studying beliefs about climate change as far back as 2000. In Canada, for example, Mortsch, Bradley, Andrey, Warriner and Fisher (2000) explored climate change beliefs among a group of Canadians and found that survey respondents believed they were less well informed about climate change issues and required additional information on the matters such as the consequences of temperature and precipitation changes, social and economic impacts as well as adaptation strategies. The survey results indicated that industry/business and federal and provincial governments were perceived as "very responsible" for taking action on climate change (Mortsch et al., 2000).

More recently Brody, Grover and Vedlitz (2012) focused on the willingness of Americans to change their behaviours to mitigate climate change. Using a national telephone survey of 831 respondents conducted from 4 March to 18 July 2007, they found that "overall, the majority of respondents seem willing to change their behaviour to address the climate change problem. Over 66% of the sample either agrees or strongly agrees with the idea of changing [their behaviour] to reduce their contribution to climate change" (Brody, Grover & Vedlitz, 2012, p. 10). They also found that specific personal traits and contextual characteristics trigger a significantly greater willingness to change longstanding behavioural patterns. For example, the perceived risk of the adverse effects of climate change on individuals and their families is one of the most significant predictors of persons' willingness to alter their own behaviour. Also a heightened awareness of climate change, in terms of personal impact, corresponds to a greater willingness to make personal adjustments to mitigate the problem (Brody, Grover, & Vedlitz, 2012).

The studies cited so far tend to focus on various aspects of what a KAP study would involve. Brody et al. (2012) focused on behaviours regarding climate change while Leiserowitz et al. (2012) focused on beliefs and attitudes about climate change. The current study done in Jamaica focuses on knowledge, attitude and practice and go a step further by exploring media usage regarding climate change. The foregoing studies provide information about climate change from national and even global samples. The current study in Jamaica used a national sample but also included an online sample as a way of assessing the climate change knowledge, attitudes and practices of persons who frequent online spaces.

In the Caribbean, climate change KAP studies have blossomed perhaps beginning with six studies initiated by the Mainstreaming Adaptation to Climate Change (MACC) Project between 2005 and 2006 in five countries: Barbados, Belize, Dominica, Jamaica and St. Vincent and the Grenadines (ACM, 2005). These were national surveys of the general public. Some of these studies also surveyed various stakeholder groups such as farmers (Barbados), hoteliers (St.

Vincent and the Grenadines), private and public sector representatives (Jamaica and Belize) and the media (Belize) "in an attempt to provide greater context within the country's social fabric" (MAAC, 2006, p.10).

These studies found that Caribbean people are generally "very" or "moderately" concerned about climate change. They believe that their countries are not prepared for climate change for various reasons including: financial difficulties, lack of technology, insufficient attention to the issue and the government's insufficient knowledge about the issue. They felt that the countries could do more to address the impacts of climate change on their communities.

The majority of private sector representatives in Jamaica and Belize as well as hoteliers in St. Vincent and farmers in Barbados were aware of and concerned about climate change (MAAC, 2006). All but the farmers however acknowledged the financial implications that climate change has had and will have on their business.

In Jamaica, knowledge and perception of climate change and drought have been investigated through a survey of sixty farmers in the parish of St. Elizabeth (Gamble, Campbell, Allen, Barker, Curtis, McGregor & Popke, 2010). The survey showed that while most farmers are concerned about an increase in drought occurrence, their perceptions of drought are not driven by the magnitude and frequency of dry months alone but rather by the difference between growing seasons. This study represents one approach to assessing aspects of knowledge, attitude and practices, that is, the focus of the study is on one particular group (in this case, farmers) and their perceptions of a particular climate change event (drought).

In June 2005, as part of the MACC Project a more detailed KAP study was conducted in Jamaica with not only a sampling of the general population but also a sample containing representatives of the public and private sector as well as international lending agencies. About 1,700 respondents participated in the 2005 KAP study. The research found that 77.9% perceived climate change as variation in the global climate accompanied by changes in temperature and weather patterns. About 61% of the respondents strongly agreed with the statement that the government should place a stronger role in addressing the impacts of climate change on communities. When asked what had been done to exacerbate the effects of climate change, approximately 40% of respondents felt that their community contributed to the worsening of environmental problems through the improper disposal of garbage. In terms of what could be done to prevent or lessen the impact of climate change, most respondents stated proper disposal of garbage. The most popular suggestion on what government could do involved mounting a major public education campaign (BRAC, 2005).

The 2005 KAP survey also explored media use and found that approximately 48.3% of respondents stated that they had only occasional exposure to stories that dealt with climate change. About 92% said they would like to read, listen to or watch more stories about climate change. Radio and television were the most popular method chosen for transmitting information about climate change. The study also included private and public sector

organisations, targeting about 200 such organisations. Within the sample of private sector companies, about 71% represented the manufacturing industry, while the rest of the sample included sectors relating to services, commerce/distribution, energy, and agriculture (BRAC, 2005, p 42). About 73% of these private sector companies felt that they had a role to play in addressing the effects of climate on Jamaica. However, they needed more information on how they could help or participate in climate change activities. While over half the companies did not include climate change issues in their annual budget or business plans, about 70.5% believed the issue of climate change was very immediate (41%) or somewhat immediate (29.5%) to their businesses. For the public sector, over 46% of respondents indicated that there was collaboration among ministries, departments and agencies on climate change matters. About 54% of the government entities noted that they had members of staff who were responsible for climate change matters (BRAC, 2005).

In a white paper on the visualization of hazards, Broad, Campbell, Frazier, Howe, Murtinho, and Reyes Hernandez (2010) considered both the relevance and challenge of visualizing slow developing hazards as a way to influence the perceptions of individuals in vulnerable communities and encourage behaviours to mitigate and adapt to the hazards. In the paper, they noted one major limitation in assessing the impact of visualizations of hazards on people's behaviours which is:

> ...behavioural changes have rarely, if ever, been monitored. This is, of course, a common state of affairs in social scientific research; one that can only be remedied by the increased use of multiple research methodologies. In this case, some experimental research might be appropriate, but there is an even more central need for longitudinal research projects that gauge social and behavioural changes over time within communities that have developed or disseminated these visualization applications. (Broad et al., 2010, p. 14)

Broad et al.'s suggestion about using multiple research methodologies underscores the research design employed in the current study. As indicated earlier, the KAP study helps to assess behavioural practices. The 2005 KAP study done by BRAC was used as the basis for the current 2012 study in that many of the questions asked then were asked in this survey to enable comparisons. This comparison attempts to address a central need identified by Broad et al, that is the need for more longitudinal studies to evaluate social and behavioural changes over time. While the 2005 KAP study data set could not be accessed, the current study manages to present some basic comparisons between the main findings reported in the 2005 study and the current 2012 investigation. The present study also builds on the 2005 study by focusing on specific sectors that were either deeply affected by climate change or had the potential to lessen the impacts of climate change. A component of the 2012 study was also done with an online sample to detect the knowledge, attitude and practice of persons who use online technologies.

Rationale for the Knowledge, Attitude and Practice (KAP) Survey

One of the main thematic areas of focus of the PPCR is that of climate change education and awareness. Addressing this area of need across the various priority sectors will be one of the primary foci of the SPCR. As indicated in the literature review, the climate change knowledge, attitude and behavioural practice survey conducted in 2005 revealed that there were significant gaps in the knowledge, attitude and behavioural practices of Jamaicans, with respect to climate change. Despite the implementation of a number of climate change awareness projects in selected communities/parishes in recent years, consultations held earlier in 2012 with a wide cross section of stakeholders confirmed that there is still a need for greater public awareness and education regarding the current and likely impact of climate change and appropriate adaptation strategies.

In order to ensure that the proposed climate change education and awareness component of the SPCR is based on a proper understanding of the current level of knowledge, attitudes and practices of the target population, the PPCR undertook another knowledge, attitude and practice survey in 2012. It is expected that the 2012 survey will help to indicate any changes that have taken place since 2005 and provide the information that will enable the design of a nationwide knowledge and awareness programme. This programme is expected to build on the progress made to date, and provide the framework for the achievement of the desired targets in the medium to long term.

The results of the 2012 study will be used in the design of a climate change knowledge and awareness programme and a communication strategy to improve existing knowledge, attitude and practices, thereby increasing Jamaica's capability for adapting to climate change and for building a climate change resilient society, environment and economy.

Objectives

The objectives of the 2012 study were:

- to use a mix of methodologies to assess and quantify the level of climate change knowledge, attitudes and practices among the members of the Jamaican population as well as key stakeholders;
- to determine variation in knowledge, attitudes and practices by different demographic groupings in the Jamaican population and by various sectors, etc.;
- to explore that national situation in the context of the international trends and best practices in improving KAP; and
- to use the findings and analysis to inform policy recommendations.

Structure of the Report

The rest of this document presents the methodology, results and analysis, and recommendations associated with the 2012 KAP survey. The methodology gives a description of the research design and sampling technique applied in the study. This is followed by a description of the results arranged according to each type of method. Next, an analysis of the findings is offered followed by recommendations. The document ends with a bibliography and a glossary of terms. A set of appendices regarding the terms of reference, survey instruments, frequency tables of data collected and other relevant material is available as a separate document.

Methodology

This chapter outlines the methodological approach used for the study. First, the research design is briefly described. This is followed by a description of the quantitative component of the study which includes a detailed account of the sample design. The chapter then describes the purpose of the qualitative component and outlines how the qualitative dimension of the survey was designed and conducted. Finally, constraints and limitations in executing the study are articulated.

Research Design

The methodology employed for the research involved a mix of methods to glean information for the development of a comprehensive communication strategy. Mixed methodology is generally preferable to any single method as the phenomenon being investigated can benefit from the strengths of both quantitative and qualitative research paradigms (Tashakkori & Teddlie, 2009).

Behaviours surrounding climate change and resilience are complex. In order to refine a communication strategy from the research results, quantitative data alone may limit the ability to understand why people do the things they do when it comes to climate change and resilience. The methodology, therefore, involved the following:

- Quantitative Surveys
    - Face-to-face national survey
    - Online survey
    - Sector survey
- Qualitative Focus Groups

Each of these is described below.

Quantitative Survey

A national survey of Jamaican households was conducted to detect their levels of knowledge, attitudes and practices regarding climate change. This survey was interviewer-administered. Fieldworkers were recruited from the CARIMAC student body and other groups. Three training sessions were held for survey supervisors and fieldworkers during the month of June 2012. During these sessions, topics such as interviewing techniques and selecting respondents for the study were discussed.

The target sample size for this national household survey was approximately 1800 respondents and the response rate was 82% or 1484 completed questionnaires. The sample was nationally-representative, selected from all 14 parishes, including the general public/residents, women, men, and children in rural and urban settings, across occupations, income groups and various age categories. The sample was designed by Hubert Sherrard, Kadi-Ann Hinds and Day-Dawn Simon of the Research, Design and Evaluation section at the Statistical Institute of Jamaica. The household survey was fielded over a ten-day period, during July 7 to July 16, 2012.

The instrument used for the study was a questionnaire comprising a range of questions related to the topic of this survey. At the start of the questionnaire, there were demographic questions, followed by questions about housing characteristics and location. This was followed by questions on knowledge of climate change, attitudes toward climate change and practices related to climate change. The questionnaire ended with questions about media usage. See Appendix D for a sample of the instrument.

While the household survey was the main survey activity, other mini-surveys were conducted among particular sectors within the Jamaican society that were either greatly affected by climate change or had the potential to assuage the effects of climate change. The sectors surveyed included:

- Agriculture
- Built Environment and Human Settlements
- Energy
- Health
- Water
- Tourism

These groups involved private and public sector organisations within each sector. Surveys with relatively smaller sample sizes were conducted within each of these six groupings. The target sample size for each of these groups ranged from 50 to 200 depending on the nature of the group or sector, and the level of access to a list of all members. Purposive and snowball sampling was used for the sector survey which had 321 organisations starting the survey and 276 actually completing it.

The instrument for the sector survey followed a similar layout to that of the one used for the household sample. At the start, there were questions about the characteristics of the organisation/sector being interviewed. Then there were knowledge questions, followed by some attitude questions and the practice questions. The questionnaire ended with items about media usage. See an example of the sector survey instrument in Appendix E.

The interviews with the various representatives of sectors/organisations were conducted during July 9 to July 18, 2012. The actual response rate for each sector is shown in Table 1. According to Wimmer and Dominick (2011), response rates for survey interviews conducted via telephone can range from as low as 5% to as high as 80% (p. 213). The response rates shown in Table 1 fall within this acceptable range. Even though these response rates may seem relatively low, the quality of the quantitative data gathered was not compromised as qualitative data from focus groups with members of the various sectors helped to strengthen the research findings.

Table 1: Response Rate for Sectors Sampled

Sector	Target Sample Size	Number of Respondents	Response Rate
Agriculture	220	70	31.8
Built Environment and Human Settlements	78	28	35.8
Energy	55	18	32.7
Health	143	50	34.9
Tourism	165	63	38.1
Water	50	22	44.0
Other	--	21	--
Total	711	272*	38.2

* A total of 276 organisations completed the sector survey. Four (4) declined to state the sector they represented. Other sectors which completed the survey included a mix of manufacturing, general exports, physical and social development, governance/community mobilisation, bottling, or a combination of agriculture/tourism, agriculture/water/health.

In addition to the national household survey and the sector survey (done with 6 sectors), an online version of the national survey, which was self-administered was also conducted. Seven hundred and one (701) persons attempted the online survey with 503 persons actually completing it. The online survey provided a cost-effective approach to increasing the number of household-based respondents surveyed through the face-to-face method. The online version also provided an opportunity to detect the level of climate change knowledge, attitudes and practices of Jamaicans who are online and would most likely use social media and other internet technologies to (1) enhance their knowledge about climate change; and (2) engage in information-seeking behaviours regarding climate change. The online component provided an opportunity to explore key online strategies that could be incorporated into the overall comprehensive communication strategy.

The online survey service, Qualtrics, was used to collect data. A hyperlink to the survey was promoted on popular social networking sites such as Facebook and Twitter. A link was also placed on the Planning Institute of Jamaica's (PIOJ) website. To encourage online survey participation, respondents completing the survey were given an incentive of J$100 cell phone credit after they finished answering all questions presented in the online survey.

The survey was publicised by the PIOJ Communications Department so that prospective respondents would be sensitised to its importance and anticipate being involved in the data collection. A press release was disseminated to various media houses and a short description of the project was also placed on the PIOJ's website. (See Appendix G).

Sample Design for National Household Survey: The sample design for the survey was a three stage stratified random sample design in which the first stage was a selection of Primary Sampling Units (PSUs), and the second stage a selection of a specified number of dwellings from each PSU. At the third stage, a household was selected within the targetted dwelling and a

responsible member of the selected household over the age of 14 years was asked to answer the questionnaire.

Sample Frame: The frame from which this sample was selected was the list of all Enumeration Districts (ED) identified in the 2001 Population and Housing Census. The Enumeration Districts are independent geographic areas that share common boundaries with contiguous enumeration districts and are organised into a national grid for data collection purposes. Enumeration Districts are designated as Primary Sampling Units (PSUs) when they satisfy a minimum size requirement of eighty (80) dwellings.

Stratification: The PSUs were stratified by Urban and Rural to create two mutually exclusive strata from which estimates for each sub-population could be calculated. The stratification of the PSUs into urban and rural demarcation ensured that:-

i) Reliable estimates could be obtained from both urban and rural areas and
ii) The collected data could be analysed both at the national level as well as by urban/rural breakdown.

Sample Selection: In the first stage sample selection, a total of 120 Primary Sampling Units were randomly selected with probability proportional to size (PPS). (Size for this selection refers to the number of dwellings in each PSU). The PPS sampling technique ensures that larger PSUs have a greater probability of selection. The second stage selection involved the use of circular systematic sampling to select 15 dwellings from each PSU selected in the first stage. This sampling procedure allowed each dwelling to have a known and equal probability of selection. Table 2 illustrates the distribution of number of dwellings sampled by parish. Appendices B and C display a list of sampled communities and their distribution on a map of Jamaica, respectively.

Respondent Selection: A respondent was selected from a household in each of the sampled dwellings. Each interviewer was provided with general descriptions about the household from which the person to be interviewed was to be selected. For example, if the dwelling had only one household, then the respondent was selected from that dwelling. If a dwelling had multiple households, the largest household in the dwelling was selected for interviewing. In cases where the selected household no longer resides in the dwelling, then the next largest household was selected.

Only persons over the age of 14 years were eligible for interview. The birthday selection method was used to determine which member of the household over the age of 14 years should be interviewed. The birthday method identified the household member who was next in line to have a birthday, as the selected respondent. If the selected household member was unavailable to be interviewed, the next eligible person was taken. With this method, 1484 persons agreed to participate and complete the survey.

Table 2: Distribution of Dwellings per Parish

Parish	PSUs Sampled in Survey			Final number of dwellings selected	Actual number of dwellings surveyed
	Urban	Rural	Total		
Kingston	4	0	4	60	31
St. Andrew	18	2	20	300	252
St. Thomas	2	4	6	90	89
Portland	2	4	6	90	56
St. Mary	2	4	6	90	90
St. Ann	2	4	6	90	72
Trelawny	2	2	4	60	42
St. James	4	4	8	120	94
Hanover	2	2	4	60	60
Westmoreland	2	6	8	120	119
St. Elizabeth	2	6	8	120	104
Manchester	4	6	10	150	122
Clarendon	4	6	10	150	143
St. Catherine	14	6	20	300	210
Total	**64**	**56**	**120**	**1800**	**1484**

For the sector surveys, purposive and snowball sampling was done within six sectors that would be greatly affected by climate change or had the potential to assuage the effects of climate change. The sectors surveyed were agriculture, the built environment and human settlements, energy, health, tourism and water. With this approach, 276 sector representatives completed the survey.

For the online survey, respondents were sampled using a snowballing technique on social media sites such as Facebook and Twitter. Respondents were persuaded not only to complete the survey, but also to share the online link to the survey with their online friends and encourage them to complete the survey while online. This approach resulted in 503 persons completing the survey online.

Qualitative Focus Groups

Qualitative investigation allows for more detail than quantitative investigation alone can provide. The quantitative nature of the KAP provides details on exactly "what" people know, do or perceive about climate change, while qualitative investigation – precisely because it

allows for open-ended discussion - is able to address the questions of "how" and "why" these practices and perceptions exist.

Although the quantitative investigation clearly forms the main framework or skeleton for any survey results, the qualitative component is meant to complement or provide more flesh on the bones, so to speak, and should capture more personal and anecdotal data that helps to round out the complete picture of the investigation. It also helps to contextualise the quantitative results and provide a deeper understanding of why specific practices and attitudes may exist.

For this KAP survey, the qualitative component employed a total of ten focus group discussions with different targeted audiences following the structure of the quantitative investigation. Six different sectoral focus group discussions were held and four different community sessions were also completed as follows in Table 3.

Table 3: Focus Groups According to Sector/Community, Date and Number of Participants

Focus Group	Date	Number of Participants
Sector Groups:		
1. Energy	July 10th	5
2. Agriculture and Fisheries	July 10th	3
3. Water	July 12th	3
4. Construction – (Built Environment/Human Settlements)	July 12th	10
5. Health	July 12th	3
6. Tourism	July 16th	3
Community Groups:		
1. Portmore Residents	July 12th	8
2. Farmers - Spring Village	July 13th	8
3. Young People – Port Maria	July 13th	9
4. Retired Persons	July 16th	8

A focus group moderator guided the discussion for each session which also employed the services of a dedicated note taker to capture the discussion as it occurred and audio recordings were used in each case to allow review and verification of results. The moderator guides are included in Appendix F.

Thrust of the Qualitative Investigations: For the sectoral groups, there were five main thrusts or objectives to the investigation. The inquiry sought to learn:

1. How the participants *believe climate change will impact* their sector overall (negatively, and perhaps also positively);
2. How *prepared they believe their own organisation is* to serve their client base and what specific steps are being taken;
3. How they perceive their *own role as a professional* in facilitating climate change;

4. What they understand the *climate change needs of their client base* to be; and
5. What they believe the *best mitigation and adaptation practices* to be for achieving climate resilience in their sector and why these are the best practices to adopt?

For the community focus groups, the objectives were as follows:

1. The extent to which people in the community have heard of the term "climate change"
2. Current perceptions and understandings of what climate change actually is and the impact they believe it may have (i.e., how climate change is defined in the minds of the respondents)
3. The degree to which respondents believe that climate change will affect them personally and how they perceive their personal level of risk to the impact of climate change
4. Steps and measures (changes in behaviour) that respondents may be taking to reduce their level of risk and ***why*** they are taking the steps they are and ***why they may not*** be taking other possible steps
5. The extent to which respondents perceive climate change risk affecting their broader community and which groups in their community may be more vulnerable than others
6. The extent to which respondents are aware of what the government of Jamaica is doing about climate change
7. Respondents' perception of roles and responsibilities to enhance climate resilience.

Eight of the ten sessions were held at the Planning Institute of Jamaica (PIOJ). Being based in New Kingston, this venue was deemed a central location easily accessible by participants. Two sessions were held in the rural communities of Spring Village, St. Catherine and Port Maria, St. Mary. Most of the sessions were conducted over a two-hour period. In two or three instances, however, participants were so animated with the discussion that they continued for up to three hours. The discussions were held at times that were determined to be convenient to most persons. All participants were asked to sign a consent release form that would allow the session to be audio-taped. To encourage participants to speak as freely and as frankly as possible, respondents were given the option of using a pseudonym if they so chose. Name cards were created using whatever name each individual preferred.

Constraints and Limitations

There were time constraints and this meant that the project, which was initially proposed and planned to be undertaken over a three-month period, had its data collection and analysis phase condensed to a three-week period. The reduced time frame available for data collection affected the response rate for some of the surveys, in particular the sector survey. Despite the time constraints, the research team was able to mobilise additional research assistants to efficiently conduct all the data collection activities within the reduced time-frame available for completion.

The sample for the national household survey was based on maps of Enumeration Districts (ED) identified in the 2001 Population and Housing Census as maps from the most recent census conducted in 2011 were not publicly available at the time the sample was designed for

the current study. Fieldworkers noted that there were changes to some selected areas such as a number of residential dwellings on the 2001 maps were now either replaced by commercial operations or vacant; some avenues within communities had name changes which proved challenging in locating some selected dwellings. This meant that target sample sizes could not be achieved in some areas. Regardless, the current household survey had a relatively high response rate of 82%.

There was a concern that the use of age 14, rather than an older age, in the birthday selection method, might have affected response to some questions. For example, some 14 year old respondents may not be able to answer questions regarding the type of insurance coverage on their homes. An analysis of the age of the household sample respondents revealed that only 1.2% of the respondents reported that they were 14 years old. Persons aged 14 to 18 years accounted for only 11.2% of the household sample. This relatively small portion did not affect the overall quality of the answers gathered in the quantitative survey.

As noted in the introduction to this document, it was expected that this 2012 survey would help to indicate any changes that had taken place since the conduct of the 2005 survey. Ideally, an assessment of the change between 2005 and 2012 would require having access to the 2005 data sets so that comparisons based on statistical tests could be made. However, the 2005 data set was unavailable and this affected the depth of the analysis that could be done to evaluate the change since 2005. Subsequently, only general comparisons were made between the 2012 findings and the results presented in the 2005 report. It must be noted that while the comparisons may suggest change, lack of access to the 2005 data set made it impossible to report if any of the changes were statistically significant. The comparisons presented in this report were done for questions that were asked in both 2005 and 2012 surveys and had the same response categories.

The qualitative component was also constrained by a few factors which are important to acknowledge so that the results can be appreciated in context. Time constraints in planning the focus groups limited the number of participants that it was possible to obtain for the sessions. This was especially true for the sectoral focus groups. Ideally, focus groups should have at least eight people and normally, persons would be invited to participate at least two weeks in advance of the actual session date. This protocol is particularly important for persons who work as civil servants and in the private sector as people need time to schedule their participation.

In this case, however, because CARIMAC was mobilised much later than had been expected, the team was put in the position of trying to invite participants only a day or two in advance. Many people could simply not accommodate this request within the turnaround time required. As a result, for some of the sectoral groups there were only three or four participants and this limited the range and representative nature of the responses obtained.

Despite these constraints, however, in all the sessions – very high quality discussion was generated and the team maintains a high confidence level in the results that were obtained and believes they do, in fact, reflect the current reality within each sector.

Chapter Summary

This chapter gave an overview of the quantitative and qualitative research approaches employed in the study. Quantitative surveys were done using a nationally representative sample of 1484 households. An online version of this survey was also done with 503 persons actually completing questionnaire. A quantitative survey was conducted with select sectors including agriculture, the built environment and human settlements, energy, health, water and tourism. A total of 276 sector representatives completed the survey. Six sectoral focus groups were conducted along with four community-based sessions to provide qualitative support for the quantitative findings. A discussion of limitations that affected the study was also presented in this chapter. Despite time and other constraints, the use of a multi-method research approach meant that the combined strength of all the methods compensated for the limitations associated with each method.

Results

In this chapter the results of the quantitative survey and qualitative focus groups are presented. First, the results of the national household and online surveys are presented. Next the findings of the sector survey are presented. For each of these surveys, the results are presented under specific headings: Knowledge, Attitudes, Practices and Media Usage. At the start of survey results presentation, there is a description regarding the demographic composition of the respondents. At the end of each section there is a description of the media usage habits of the respondents. Finally, the qualitative observations of the focus group discussions are presented.

National Household and Online Survey Results

Demographic Description: Fifty-two percent (52%) of the national household sample was female while 60% of the online sample comprised females. The average age of respondents was 38 years (standard deviation +/- 17 years). About a third of the sample (30.2%) had ages within the 14 to 25 year-old age category. The ages of respondents ranged from 14 to 89 years in the household sample. For the online sample, the respondents were generally younger with the average age of respondents being 25 years (standard deviation +/- 9 years); the majority of the sample (72.7%) was under 25 years old. The ages of the online respondents ranged from 12 to 78 years.

Persons living in all parishes of Jamaica were surveyed with the largest percentage of respondents (19.1%) in the household sample being from communities within Kingston and St. Andrew. Over half of the household respondents (55.5%) were single, while another 14.4% were in a common-law relationship and 21.5% were married. Most online respondents reported living in Kingston (26.6%) and St. Andrew (28.2%) and St Catherine (25.7%). Online participants were mostly single (76.3%), or in a common-law relationship (4.9%) or married (9.0%).

The categories for occupation used in this study were based on the International Standard Classification of Occupations (ISCO). The household respondents had various occupations with most being in jobs related to service and sales (10.9%), craft and related trades (9.0%) and elementary occupations (7.6%); 36.1% of the sample was unemployed at the time of the survey. For their occupational role, many online respondents had a professional job (23.9%), or were currently unemployed (23.5%) or had some other status such as being a student (25.6%).

The highest level of education completed by most household participants (55.4%) was the secondary level. For most online respondents (41.2%), the highest level of education completed was at the tertiary level (Bachelor's degree). Table 4 shows the frequency distribution of demographic variables for both online and household survey respondents.

Table 4: Frequency distribution of the demographic variables

Variables	Categories	Household		Online	
		Frequency	Percent	Frequency	Percent
Sex	Female	759	52.0%	286	60.2%
	Male	702	48.0%	189	39.8%
	Total	1461		475	
Age	14-25	420	30.2%	339	72.7%
	26-35	288	20.7%	79	17.0%
	36-45	242	17.4%	30	6.4%
	46-55	207	14.9%	9	1.9%
	56-65	131	9.4%	6	1.3%
	66-75	74	5.3%	2	0.4%
	76+	27	1.9%	1	0.2%
	Total	1389		466	
Parish of Residence	Clarendon	143	9.6%	15	3.1%
	Hanover	60	4.0%	3	0.6%
	Kingston	31	2.1%	127	26.6%
	Manchester	122	8.2%	12	2.5%
	Portland	56	3.8%	3	0.6%
	St. Andrew	252	17.0%	135	28.2%
	St. Ann	72	4.9%	9	1.9%
	St. Catherine	210	14.2%	123	25.7%
	St. Elizabeth	104	7.0%	5	1.0%
	St. James	94	6.3%	24	5.0%
	St. Mary	90	6.1%	8	1.7%
	St. Thomas	89	6.0%	7	1.5%
	Trelawny	42	2.8%	3	0.6%
	Westmoreland	119	8.0%	4	0.8%
	Total	1484		478	
Civil Status	Single	806	55.5%	358	76.3%
	Common Law	209	14.4%	23	4.9%
	Married	312	21.5%	42	9.0%
	Divorced	26	1.8%	4	0.9%
	Widowed	45	3.1%	2	0.4%
	Separated	29	2.0%	5	1.1%
	Not Stated	18	1.2%	18	3.8%
	Other	6	0.4%	17	3.6%
	Total	1451		469	

Variables	Categories	Household		Online	
		Frequency	Percent	Frequency	Percent
Occupation	Legislator/Senior Officer/Manager	15	1.1%	7	1.5%
	Professional	89	6.4%	111	23.9%
	Technicians and Associate Professionals	37	2.7%	39	8.4%
	Clerical Support Workers	45	3.2%	39	8.4%
	Service and Sales Workers	151	10.9%	27	5.8%
	Skilled Agricultural, Forestry and Fishery Workers	106	7.6%	2	0.4%
	Craft and Related Trades Workers	125	9.0%	2	0.4%
	Plant and Machine Operator and Assemblers	45	3.2%	2	0.4%
	Elementary Occupations	106	7.6%	3	0.6%
	Armed Forces Occupations	25	1.8%	4	0.9%
	Currently Unemployed	501	36.1%	109	23.5%
	Other	141	10.2%	119	25.6%
	Total	1386		464	
Highest Level of Education	Primary School	351	24.6%	11	2.4%
	Secondary School	791	55.4%	98	20.9%
	Associate A'Levels	136	9.5%	123	26.3%
	Bachelor's Degree	77	5.4%	193	41.2%
	Master's Degree	11	0.8%	28	6.0%
	Other	63	4.4%	15	3.2%
	Total	1429		468	

NB. The total sample size for the household survey was 1484 and for the online survey, 503. Differences in totals occur because of rounding.

The number of persons within a household for the face-to-face and online samples was fairly similar. Each dwelling selected in the household survey had an average of 3 adults (standard deviation +/- 1 adult) and 2 children (standard deviation +/- 2 children) residing in the household. Each online respondent stated that his or her house was occupied by an average of 2 adults (standard deviation +/- 1 adult) and 3 children (standard deviation +/- 1 child).

Respondents reported living for an average 23 years (standard deviation +/- 16 years) in their current communities. Online respondents reported living in their current community for an average of 13 years (standard deviation +/- 9 years).

Among currently employed adults, 52.1% reported working outside their community while another 47.9 % indicated they worked in the community in which they currently live. A majority of individuals who were students (83.9%) also noted that their schools were located outside of the communities in which they lived. Many online respondents (86.2%) worked outside the community in which they lived. An almost similar percentage who identified themselves as students (88.6%) in the online survey also attended school outside the community in which they lived.

While more than half of the household sample (56.2%) did not live near (that is less than 150 feet) to a flood plain (river side), coastline, low-lying area or on a steep incline, a relatively small number reported that they lived near a steep incline (17.3%), near a flood plain (10.6%), or near a low-lying area (9.7%). For those who did not live near to any of these areas, a majority (59.7%) still noted that they did not live close to an area that could be affected by climate-related disasters; 13.3% of household respondents reported that they did not know if where they lived could be affected by such disasters.

A fairly small number of online respondents stated that they lived near a steep incline (8.8%), near a flood plain (5.6%), or near a low-lying area (9.4%). Sixty-nine percent (69.4%) indicated that their house was not located near (that is, less than 150 feet) to any flood plain, low-lying area or steep incline. Of this number, a majority (48.3%) noted that they did not live close to a location that could be affected by climate-related disasters; 20.4% of online respondents said that they did not know if their current living location could be affected by such disasters.

Household respondents indicated that their houses were constructed mainly of concrete and blocks (74.7%) and wood (11.6%) or a combination of both (10.7%). Roofing material was mainly aluminum zinc or metal sheeting (63.9%) or concrete slab (29.5%). More than half the sample (57.2%) indicated owning the house in which they currently lived. However, only 14.7% reported having home insurance; 61.3% did not have insurance and another 24% did not know or were not sure. For those who had home insurance, only 28.6% stated they had insurance against climate-related events such as hurricanes or other natural hazards.

Concrete slab (44.3%) and zinc sheeting (32.6%) were the main roofing material used in the construction of online respondents' houses. Concrete and blocks (89.7%) were the main construction material for online respondents. A fairly equal number of online respondents either owned (36.5%) or rented (35.6%) the house which they occupied at the time of completing the survey. More than a third (36.2%) of online respondents reported having home insurance, with 42.9% stating they had insurance against climate-related events such as hurricanes or other natural hazards; 52.4% was not sure if their houses were insured against climate-related events.

Knowledge of Climate Change

Most persons in the household survey (82.6%) had heard the term "climate change" and had some idea of what it meant. A larger percentage of online respondents (94.2%) stated that they had heard the term "climate change". (See figures 1 and 2) The common theme from respondents' definition of climate change was that it was variation in global climate, temperature and weather patterns; about 56.4% of household respondents said this and about 73.5% of online respondents said this. Others in the household sample noted increase or reduction in the rainfall (3.6%); global warming (2.9%); changes in the environment (2.9%). When asked to give examples of the effects of climate change, drought and flooding were the two most common examples for both household and online respondents. Other examples included more intense or frequent hurricanes; earthquakes, increased air temperature, and rising sea level.

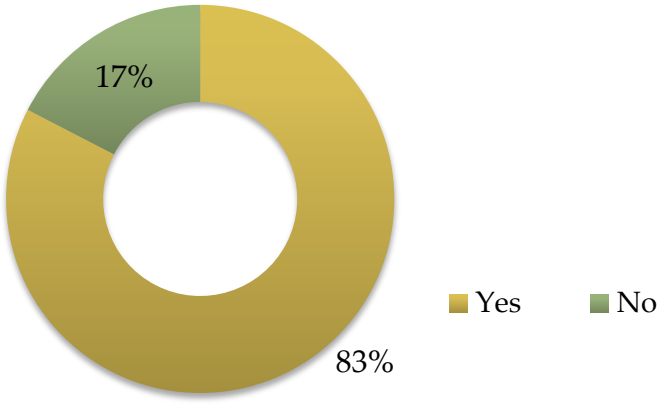

Figure 1: Frequency distribution of *household* responses to, 'Have you ever heard the term 'climate change'?'

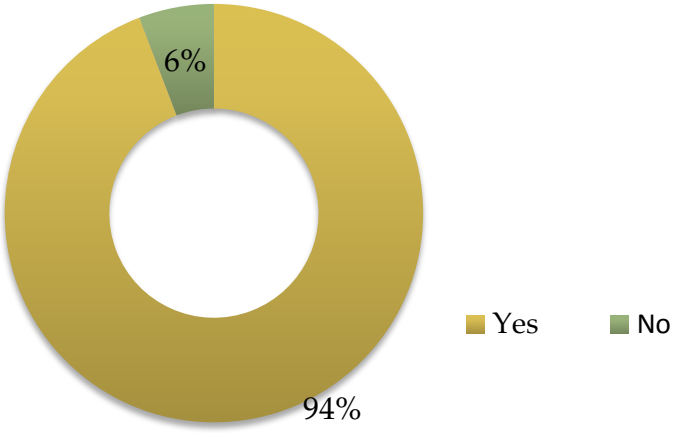

Figure 2: Frequency distribution of, *online* responses to, 'Have you ever heard the term 'climate change'?'

A cross-tabulation between household respondents' education levels and their hearing the term "climate change" revealed that there was a statistical difference (χ^2 (2)=38.865, p = .001) among respondents' education levels in relation to whether or not they had heard the term climate change. Compared to persons educated at the primary and secondary levels, persons who had completed tertiary level education were more likely to report in the household survey that they have heard the term climate change (See Table 5). A similar pattern was noted in the online sample.

Table 5: Relationship between education level and hearing the term "climate change" (based on household survey data)

		Education level		
		Primary	Secondary	Tertiary
Heard the term "climate change"?	Yes	73.2%	83.5%	93.3%
	No	26.8%	16.5%	6.7%
	Total	100.0%	100.0%	100.0%

More online respondents (27.0%) than household respondents (21.6%) thought that the government was doing something about climate change (see Figures 3 and 4). Among household respondents, less than half (41.3%) said they had a fair amount of knowledge about the government's response to climate change; another 38% said they did not know much about the government's response. Among online respondents, most (42.9%) said they did not know much about their government's response to climate change. About 30% on online respondents said they had a fair amount of knowledge about the government's response to climate change. Cross-tabulations revealed that there was a significant difference between persons living in urban and rural locations in relation to their knowledge of the government's response to climate change (χ^2 (4) = 10.973, p = .027). Persons in urban locations were more likely to report that they knew a fair amount (33.8%) or great deal (5.6%) when compared to persons living in rural locations (see Table 6).

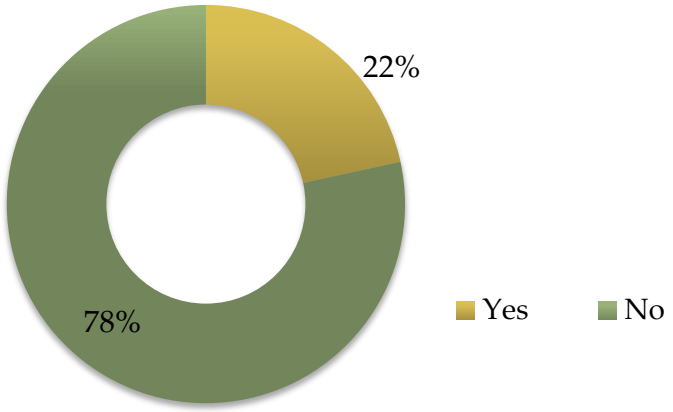

Figure 3: Frequency distribution of *household* response to, 'Do you think your government is doing anything about climate change?'

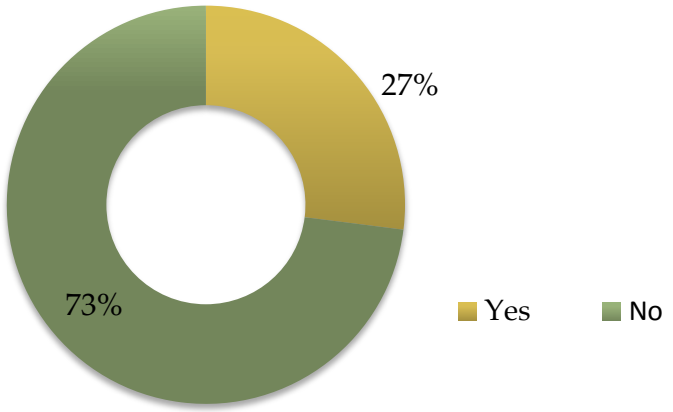

Figure 4: Frequency distribution of *online* response to, 'Do you think your government is doing anything about 'climate change'?'

Table 6: Relationship between location and respondents' knowledge of government's response to climate change (based on household survey data)

		Location	
		Urban	Rural
How much does respondent know about government's response to climate change?	Don't know/not sure	14.6%	12.8%
	Hardly anything	14.2%	15.8%
	Not much	32.6%	45.8%
	A fair amount	33.8%	22.2%
	A great deal	5.6%	3.4%
	Total	100.0%	100.0%

Regarding their community's risk associated with climate change, a majority of household respondents (37.3%) and online respondents (35%) also indicated they did not know much about their community's risk. A fairly similar percentage either knew a fair amount (21.2% online; 21.0% household) or hardly anything (26.4% online; 20.0% household) about their community's risk. There was also a significant difference (χ^2 (4)=11.071, p = .026) between males and females in relation to how much they knew about their community's risk associated with climate change (see Table 7). A similar pattern was also seen in the online sample with more males (26.6%) than females (17.6%) reporting that they knew a fair amount about their community's risk. Interestingly, persons living in rural locations, compared to those in urban locations were more likely to know a great deal about their community's risk associated with climate change (see Table 8). The difference was statistically significant (χ^2 (4) = 19.252, p = .0001)
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Table 7: Relationship between gender and respondents' knowledge of their community's risk associated with climate change (based on household survey data)

		Gender	
		Male	Female
How much do respondents know about their community's risk associated with climate change?	Don't know/Not sure	11.5%	15.4%
	Hardly anything	18.1%	21.7%
	Not much	38.8%	35.9%
	A fair amount	23.6%	18.4%
	A great deal	8.0%	8.8%
	Total	100.0%	100.0%

Table 8: Relationship between location and respondents' knowledge of their community's risk associated with climate change (based on household survey data)

		Location	
		Urban	Rural
How much do respondents know about their community's risk associated with climate change?	Don't know/not sure	16.6%	9.7%
	Hardly anything	18.7%	21.5%
	Not much	37.3%	37.3%
	A fair amount	20.9%	21.2%
	A great deal	6.5%	10.4%
	Total	100.0%	100.0%

Hurricanes (83.7%) and droughts (84.5%) were the commonly cited events that most household respondents associated with climate change. Floods (76.9%), increases in air temperature (74.9%), and global warming (73.6%) were also events that household respondents associated with climate change. Hurricanes (90.9%), floods (84.1%), sea level rise (84.3%), increases in air and sea temperatures (89.5%), more intense storm surges (82.6%), global warming (86.9%), droughts (88.5%), and climate variability (83.1%) were the commonly cited events that most online respondents associated with climate change. See Table 9 for further details.

Table 9: Household and online responses to "Do you associate any of the following with climate change?"

Household			Categories	Online		
Yes	No	Don't know/Not sure		Yes	No	Don't know/Not sure
67.8% (949)	21.7% (304)	10.4% (146)	Earthquakes	58.1% (264)	35.0% (159)	6.8% (31)
83.7% (1178)	9.2% (129)	7.2% (101)	Hurricanes	90.9% (418)	6.7% (31)	2.4% (11)
49.0% (637)	20.6% (267)	30.4% (395)	Increased greenhouse gases	73.9% (337)	16.4% (75)	9.6% (44)
61.6% (835)	28.1% (381)	10.3% (140)	Landslides	70.9% (319)	21.3% (96)	7.8% (35)
37.3% (491)	40.2% (529)	22.6% (297)	Volcanoes	38.0% (170)	49.0% (219)	13.0% (58)
76.9% (1068)	16.5% (229)	6.6% (91)	Floods	84.1% (385)	12.9% (59)	3.1% (14)
63.3% (833)	19.5% (257)	17.1% (225)	Sea level rise	84.3% (56)	12.2% (388)	3.5% (16)
74.9% (1014)	11.8% (160)	13.3% (180)	Increases in air and sea temperature	89.5% (411)	5.9% (27)	4.6% (21)
69.0% (924)	14.6% (196)	16.4% (220)	More intense storm surges	82.6% (376)	12.1% (55)	5.3% (24)
62.1% (844)	22.7% (309)	15.2% (206)	Health epidemics	62.3% (283)	24.4% (111)	13.2% (60)
73.6% (974)	10.8% (143)	15.6% (206)	Global Warming	86.0% (392)	10.3% (47)	3.7% (17)
40.9% (511)	19.4% (242)	39.8% (497)	Coral reef bleaching	60.3% (272)	20.0% (90)	19.7% (89)
84.5% (1163)	8.2% (113)	7.3% (100)	Droughts	88.5% (401)	6.4% (29)	5.1% (23)
69.8% (886)	11.5% (146)	18.7% (238)	Climate variability	83.1% (378)	8.8% (40)	8.1% (37)
43.1% (543)	28.3% (357)	28.6% (361)	Fish Kill	52.5% (238)	27.6% (125)	19.9 % (90)
58.6% (738)	13.7% (172)	27.7% (349)	Ozone hole problem	76.7% (348)	14.1% (64)	9.3% (42)
33.2% (363)	14.7% (161)	52.0% (568)	El Nino	48.6% (213)	16.7% (73)	34.7% (152)
22.3% (75)	25.8% (87)	51.9% (175)	No specific association	13.2% (36)	33.8% (92)	52.9% (144)
1.1% (17)	1.4% (21)	1.3% (20)	Other	8.5% (10)	34.2% (40)	57.3% (67)

Most persons correctly identified causes of climate change. From the list of possible causes presented on the questionnaire which included some inaccurate causes, land clearing (deforestation) and improper disposal such as burning garbage were the two most common selected causes with 80% of household respondents choosing these two responses as causes of climate change. Burning fossil fuels (87.4%); transportation and vehicle emissions (86.9%); land clearing (88.5%); poor industrial practices (88.7%) and improper garbage disposal (86.0%) were the most common selected items that online respondents thought were causes of climate change. (See Table 10.)

Table 10: Household and online responses to "Do you think any of the following causes climate change?"

Household			Categories	Online		
Yes	No	Don't know/Not sure		Yes	No	Don't know/Not sure
73.7% (1016)	15.0% (207)	11.2% (155)	Burning fossil fuels such as coal, oil, natural gas	87.4% (396)	6.4% (29)	6.2% (28)
36.9% (467)	21.1% (267)	41.9% (530)	Coral bleaching	52.3% (232)	21.8% (97)	25.9% (115)
76.6% (1062)	14.4% (200)	8.9% (124)	Transportation, such as driving a car, bus, or boat (Vehicle emissions)	86.9% (393)	8.2% (37)	4.9% (22)
80.0% (1114)	11.3% (158)	8.7% (121)	Land clearing (e.g.) deforestation)	88.5% (401)	6.8% (31)	4.6% (21)
67.8% (921)	18.2% (248)	14.0% (190)	Poor agricultural practices (e.g. overgrazing, pesticide misuse)	78.1% (353)	12.2 % (55)	9.7% (44)
79.3% (1080)	10.6% (144)	10.1% (138)	Poor industrial practices (e.g. factory emissions; improper waste disposal)	88.7% (401)	6.2% (28)	5.1% (23)
40.5% (536)	29.1% (385)	30.3% (401)	Electricity generation	60.3% (269)	17.5% (78)	22.2% (99)
80.4% (1118)	12.2% (170)	7.4% (103)	Improper disposal such as burning garbage	6.2% (387)	86.0% (28)	7.8% (35)
49.2% (614)	24.0% (300)	26.8% (334)	Sea level rise	55.6% (244)	27.6% (121)	16.9% (74)
2.2% (33)	1.4% (21)	1.5% (22)	Other	12.5% (13)	32.7% (34)	54.8% (57)

Attitudes to Climate Change

About half of respondents in both the online and household survey were very concerned about climate change. Specifically, 49.5% of household respondents were very concerned about climate change with another 31.2% being moderately concerned; 14.1% were not concerned at all. In the online survey, 44.8% were either very concerned and 48.7% were moderately concerned about climate change. (See figures 5 and 6.)

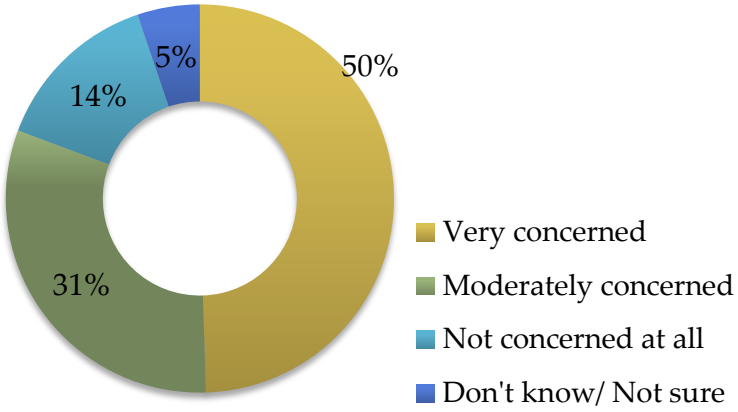

Figure 5: Frequency distribution of *household* responses to, 'How concerned are you about climate change?'

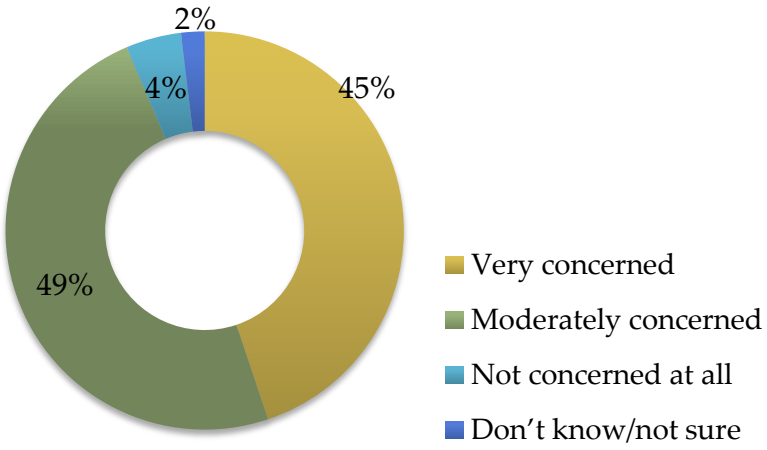

Figure 6: Frequency distribution of *online* response to, 'How concerned are you about climate change?'

Disaster management plans (75.6%), increased public awareness of climate change issues (72.6%), flood warning systems (72.2%), and public education on health-related impact of climate change (72.2%) were the most frequently selected categories rated as being very important in helping the household respondents' community deal with climate change. A similar set of activities were rated as being very important by online respondents.

Increased public awareness of climate change issues (78.8%), disaster management plans (75.2%), public education on health-related impact of climate change (74.8%) and increased research and development of renewable energy technologies were the most frequently chosen categories rated as very important in assisting the online respondents' community to address climate change.

While 37.2% of the household respondents felt that climate change was both man-made and an act of God, more persons indicated that it was an act of God (30.0%) than of man (25.6%). When asked their level of agreement with the statement "People have little or no control over climate change because it is an act of God", more persons either strongly disagreed (20.7%) or disagreed (27.7%) with the statement than those who agreed (23.5%) or strongly agreed (13.4%). Most online respondents (45.5%) also felt that climate change was both man-made and an act of God. However, more online persons indicated that it was man-made (44.8%) rather than being an act of God (3.7%). When asked their level of agreement with the statement "People have little or no control over climate change because it is an act of God", more persons online either strongly disagreed (39.8%) or disagreed (32.0%) with the statement than those who agreed (5.8%) or strongly agreed (2.7%).

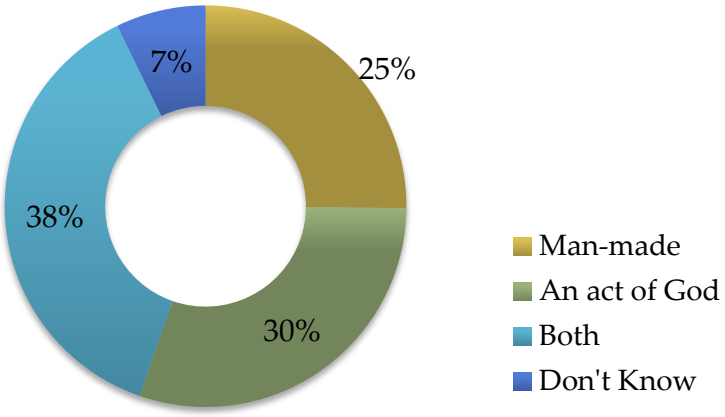

Figure 7: Frequency distribution of *household* response to, 'Is climate change man made or an act of God?'

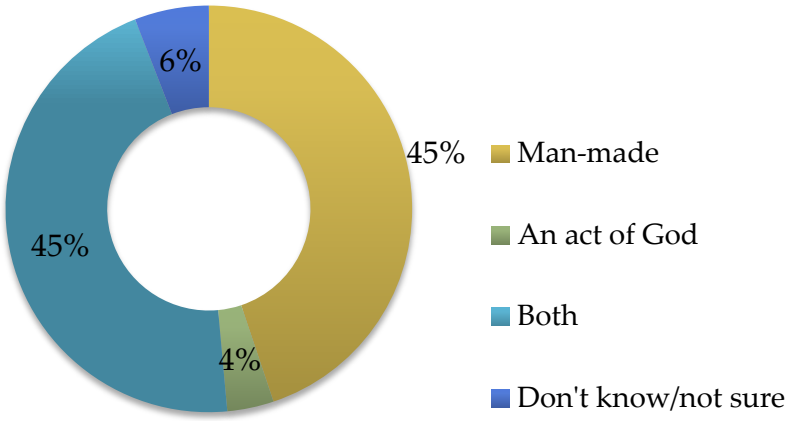

Figure 8: Frequency distribution of *online* response to, 'Is climate change man made or caused by God?'

In terms of the role that they, the Government and the country should play in addressing climate change, respondents were asked their levels of agreement with some statements. Table 11 presents a summary of the levels of agreement to the various statements. Over 80% of the respondents agreed (42.1%) or strongly agreed (44.3%) that the government should a take a stronger role in addressing the impacts of climate change on communities. In terms of paying more or tolerating some inconvenience to help preserve the environment, only 16.5% strongly agreed to doing this, while another 45.5% agreed. Many disagreed (37.2%) and strongly disagreed (29.5%) that there is nothing a small country like Jamaica could do about climate change. In fact, many agreed (46.1%) and strongly agreed (20.4%) that Jamaica should play a lead role in addressing climate change issues in the Caribbean.

Online respondents were also asked their levels of agreement with some statements regarding the role that they, the government and the country should play in addressing climate change. Their responses mirrored those of the household respondents. Table 11 gives an overview of the levels of agreement with the various statements. Generally, many online respondents strongly agreed that Jamaica should play a leading role in addressing climate change in the Caribbean region. Many also strongly disagreed with the statement that there is nothing a small country like Jamaica could do about climate change. While most persons agreed they would be willing to put up with some inconveniences to help preserve the environment; many also strongly agreed that the government should play a stronger role in addressing the impact of climate change on communities.

Table 11: Household and online respondents' level of agreement with statements about the role they, the Government and the country should play in addressing climate change

Household						Statements	Online					
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know/ Not Sure		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't Know/ Not Sure
2.3% (32)	3.7% (52)	5.3% (75)	42.1% (598)	44.3% (630)	2.4% (34)	My government (including local government) should take a stronger role in addressing the impacts of climate change on communities	1.3% (6)	3.1% (14)	5.5% (25)	30.0% (136)	58.4% (265)	1.8% (8)
8.6% (122)	13.0% (184)	12.1% (171)	45.5% (64)	16.5% (234)	4.2% (59)	I am prepared to pay a little more or put up with some inconvenience to help preserve the environment	2.9% (13)	6.6% (30)	25.6% (116)	40.2% (182)	20.5% (93)	4.2% (19)
29.5% (417)	37.2% (525)	5.4% (76)	17.0% (240)	6.2% (87)	4.7% (67)	There is nothing a small country like Jamaica can do about climate change	47.2% (213)	31.0% (140)	8.6% (39)	7.5% (34)	3.3% (15)	2.2% (10)
4.8% (67)	9.1% (127)	13.3% (186)	46.1% (645)	20.4% (285)	6.3% (88)	Jamaica should play a leading role in addressing climate change in the Caribbean region.	1.6% (7)	2.2% (10)	16.6% (75)	33.0% (149)	44.3% (200)	2.2% (10)
20.7% (289)	27.7% (387)	9.4% (132)	23.5% (329)	13.4% (188)	5.2% (73)	People have little or no control over climate change because it is an act of God	39.8% (179)	32.0% (144)	16.9% (76)	5.8% (26)	2.7% (12)	2.9% (13)

Approximately half the sample (51.0% household; 50.0% online) felt that climate change was extremely important for Jamaica, but only 39.2% (household) and 24.6% (online) felt it was extremely important for their community. When asked who should be mainly responsible for addressing climate change, while a majority of household respondents (37%) noted the government, an even larger majority (45.7%) noted that all of the agencies listed (government, business/industry, community organisations, private citizens, industrialised countries and UN organisations) should play a role. For the online sample, 63.5% noted that all of the agencies listed (government, business/industry, community organisations, private citizens, industrialised countries and UN organisations) should play a role. (See figures 9 and 10.)

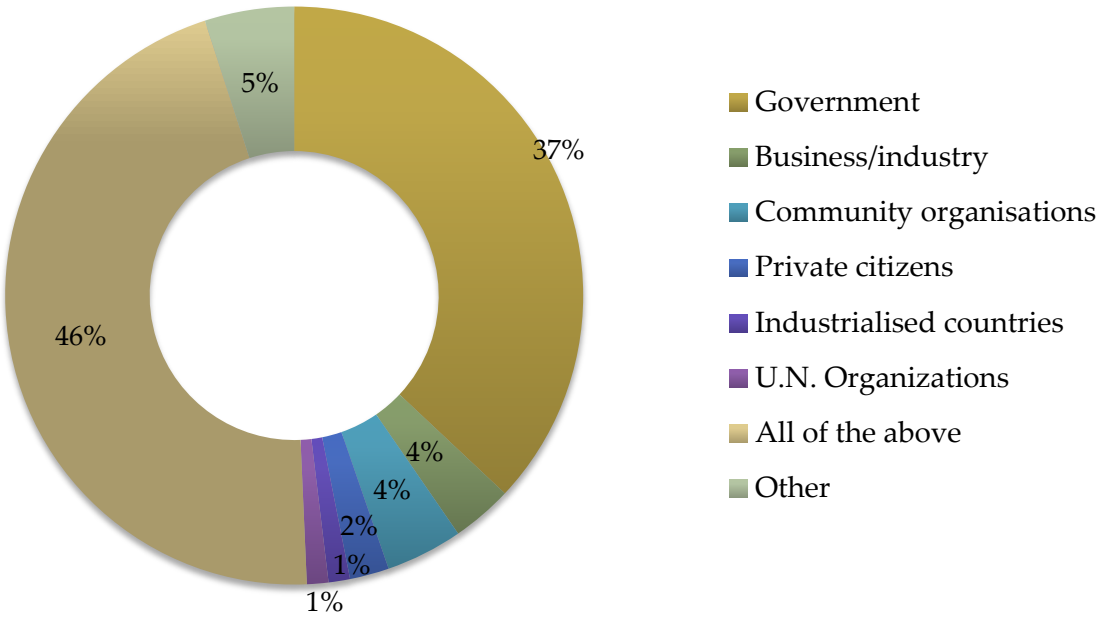

Figure 9: Frequency distribution of *household* response to, 'Who in your opinion is mainly responsible for addressing climate change?'

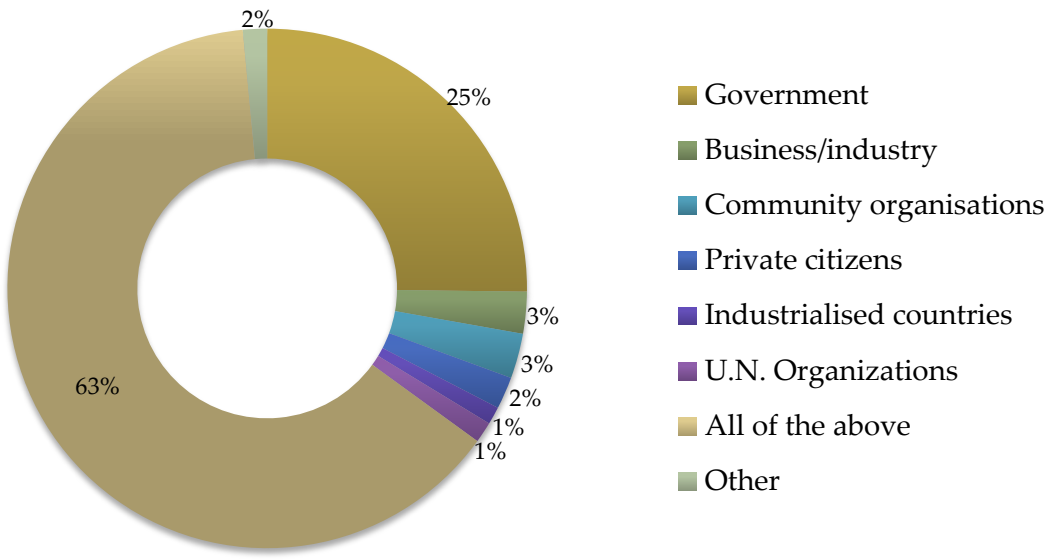

Figure 10: Frequency distribution of *online* response to, 'Do you think that Jamaica is adequately prepared to handle extreme events associated with climate change?'

Three-quarters of the household sample (75.2%) felt that Jamaica was not adequately prepared to handle extreme events associated with climate change. A larger portion of the online sample (82.9%) thought that Jamaica was not adequately prepared to handle extreme events associated with climate change. (See figures 11 and 12.) At the individual level, many household respondents noted they were either "somewhat prepared" (45.6%) or "not prepared" (39.2%) for climate-related hazards. Only 15.2% of household respondents perceived themselves to be "very prepared." In the online survey, the majority of respondents said they were "somewhat prepared" (62.7%) with the minority either being "not prepared" (26.6%) and "very prepared" (10.7%) for climate-related hazards.

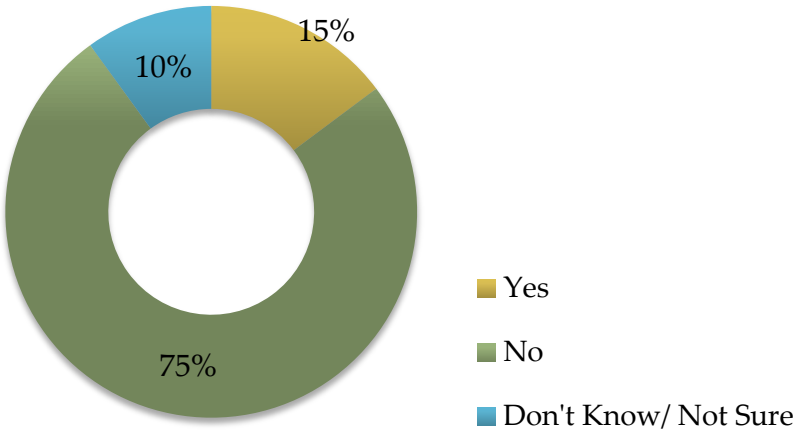

Figure 11: Frequency distribution of *household* response to, 'Do you think that Jamaica is adequately prepared to handle extreme events associated with climate change?'

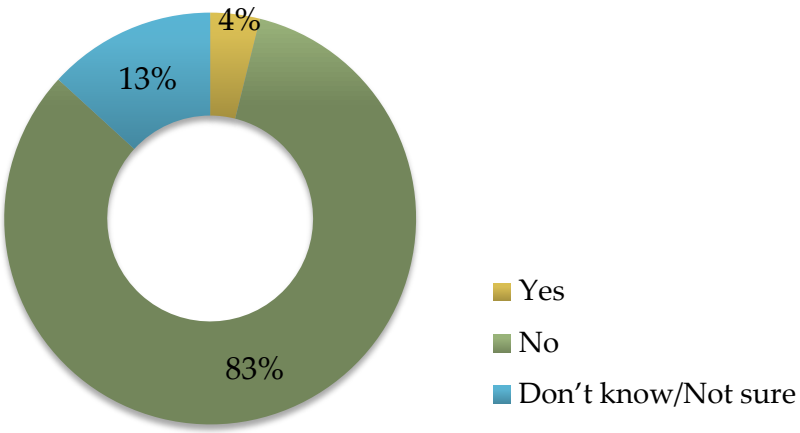

Figure 12: Frequency distribution of *online* response to, 'Do you think that Jamaica is adequately prepared to handle extreme events associated with climate change?'

A cross-tabulation of household respondents' education level and preparedness for climate-related hazards revealed that there is a statistically significant difference (χ^2 (4) = 12.845, p = .012) among persons of different education levels in relation to how prepared they were for climate-related hazards. Persons educated at the tertiary (50.7%) and secondary (47.4%) levels were more likely to report that they were somewhat prepared when compared to persons educated at the primary levels. See Table 12.

Table 12: Relationship between education level and preparedness for climate-related hazards (based on household survey data)

		Education level		
		Primary	Secondary	Tertiary
How prepared are you for climate-related hazards?	Very prepared	18.3%	14.6%	14.5%
	Somewhat prepared	37.2%	47.4%	50.7%
	Not prepared	44.4%	38.1%	34.8%
	Total	100.0%	100.0%	100.0%

Table 13: Relationship between gender and preparedness for climate-related hazards (based on household survey data)

		Gender	
		Male	Female
Preparedness for climate-related hazards	Very prepared	18.0%	12.6%
	Somewhat prepared	47.1%	44.1%
	Not prepared	34.9%	43.3%
	Total	100.0%	100.0%

There was also a significant difference (χ^2 (2) = 13.859, p = .001) between males and females in relation to how prepared they were for climate-related hazards. Males, compared to females, were more likely to report that they were very prepared or somewhat prepared for climate-related hazards (see Table 13). A similar pattern was observed in the online sample.

Regarding level of interest in finding out more about the impact of climate change on Jamaica, many persons in the online survey were either "very interested" (45.7%) or "somewhat interested" (47.9%). Likewise, many household respondents were either "very interested" (60.0%) or "somewhat interested" (30.2%) in finding out more about the impact of climate change on Jamaica.

Practices regarding Climate Change

Household respondents listed in order of priority three most important actions that should be implemented by Jamaica to adapt to climate change. For many persons, awareness and public education programmes (16.6%) were the highest on their list of three actions. Other commonly stated actions listed as the first most important included reforestation (7.0%), disaster preparedness (5.9%), better waste management techniques (5.7%), and conservation of resources (5.4%).

For the second most important actions, awareness and public education programmes (8.6%), conservation of resources (6.4%), better waste management techniques (5.1%) and disaster preparedness (5.1%) and reforestation (5.0%) were listed by respondents.

Disaster preparedness (5.4%), conservation of resources (5.1%), awareness and public education programmes (4.9%), better waste management techniques (4.1%) were listed as the third most important actions for Jamaica to implement to adapt to climate change. Table 14 summarises all actions as prioritised by household respondents.

Online respondents were asked to list the three most important actions that should be implemented by Jamaica to adapt to climate change. Many persons felt that public education and awareness programmes (24.3%) were the most important actions to be taken. Other lower ranking, but commonly stated actions listed as the first most important were conservation of resources (12.5%) and reduction in harmful emissions (7.6%).

The respondents also listed the second most important actions as conservation of resources (17.3%), public education and awareness programmes (14.1%), disaster preparedness (6.6%), enforcement of environmental laws (6.2%) and reduction in harmful emissions (5.2%).

Conservation of resources (13.3%), public education and awareness programmes (11.7%) and disaster preparedness (6.6%) were stated as the third most important actions for Jamaica to implement to adapt to climate change. Table 14 gives a summary of all actions as prioritised by online respondents.

Table 14: Household and online respondents' ranking of the three (3) most important actions that should be implemented by Jamaica to adapt

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
247	16.6%	Priority 1	Awareness/ Public Education Programmes	Priority 1	122	24.3%
183	12.3%		Encourage Conservation of Resources/Encourage Soil Conservation/ Use Environmentally Safe Products		63	12.5%
105	7%		Reduction in Harmful Emission		39	7.6%
88	5.9%		Don't Know/ Other		22	4.4%
84	5.7%		Disaster Preparedness		21	4.2%
80	5.4%		Enforce Environmental Laws/Legislation on CFC's/Creation of Policy		19	4.0%
61	4.1%		Reforestation (Tree Planting)		15	3.0%
55	3.7%		Better Waste Management Techniques		10	2.0%
31	2%		Conduct Impact Assessment Studies/Conduct Research on Climate Change/Use of Technological and other non-financial resources for Climate Change Research		6	1.2%
22	1.5%		Collaboration of Government & PSOJ/ Government & other Governments, Regional & International Agencies		5	1.0%
17	1.1%		Budgetary Allocation/Funding/Financial Incentives		3	0.6%
11	0.7%		Development & Maintenance of drains/roads/bridges etc.		2	0.4%
128	8.6%	Priority 2	Encourage Conservation of Resources/Encourage Soil Conservation/ Use Environmentally Safe Products	Priority 2	87	17.3%
95	6.4%		Awareness/ Public Education Programmes		71	14.1%
83	5.6%		Disaster Preparedness		33	6.6%
76	5.1%		Enforce Environmental Laws/Legislation on CFC's/Creation of Policy		31	6.2%
73	5%		Reduction in Harmful Emission		26	5.2%
72	4.9%		Better Waste Management Techniques		23	4.6%

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
68	4.6%		Development & Maintenance of drains/roads/bridges etc.		12	2.4%
67	4.5%		Conduct Impact Assessment Studies/Conduct Research on Climate Change/Use of Technological and other non-financial resources for Climate Change Research		11	2.3%
33	2.2%		Budgetary Allocation/Funding/Financial Incentives		9	1.8%
27	1.8%		Reforestation (Tree Planting)		8	1.6%
17	1.1%		Collaboration of Government & PSOJ/ Government & other Governments, Regional & International Agencies		5	1.0%
15	1%	Priority 3	Encourage Conservation of Resources/Encourage Soil Conservation/ Use Environmentally Safe Products	Priority 3	67	13.3%
83	5.6%		Awareness/ Public Education Programmes		59	11.7%
80	5.4%		Don't Know/Other		49	9.7%
75	5.1%		Disaster Preparedness		33	6.6%
73	4.9%		Enforce Environmental Laws/Legislation on CFC's/Creation of Policy		27	5.4%
62	4.1%		Better Waste Management Techniques		26	5.2%
46	3.1%		Conduct Impact Assessment Studies/Conduct Research on Climate Change/Use of Technological and other non-financial resources for Climate Change Research		25	5.0%
38	2.6%		Budgetary Allocation/Funding/Financial Incentives		17	3.4%
33	2.2%		Reduction in Harmful Emission		16	3.2%
32	2.2%		Reforestation (Tree Planting)		14	2.8%
22	1.5%		Collaboration of Government & PSOJ/ Government & other Governments, Regional & International Agencies		5	1.0%
22	1.5%		Development & Maintenance of drains/roads/bridges etc.		2	0.4%

Note: The information presented in this table is based on responses to open-ended questions. Totals are not reported.

In terms of lessening or preventing the impact of climate change on their community, the main practice noted by respondents was that they disposed of garbage properly (22.5%). Planting trees (7.7%) and conserving resources (3.5%) were two common actions also stated. For practices done by the community to prevent or lessen the impact of climate change on the community, respondents also reported proper disposal of garbage (7.0%), reforestation (4.0%) and disaster preparedness (2.2%); a majority (28.4%) stated that nothing or very little was done by the community. A majority (31.7%) also stated that nothing or very little was done by Jamaica. For those who actually identified actions done by Jamaica, their responses included drain maintenance or cleaning drains and gullies (3.7%), and better waste management (2.6%). See Table 15 for a summary of actions done by household respondents to lessen or prevent the impact of climate change.

Further, many online respondents stated that proper disposal of garbage (16.5%), use of alternative sources of energy (16.5%) and conservation of resources (14.7%) were their main contributions to lessening or preventing the impact of climate change on their community. In terms of practices that the community does to prevent or lessen the impact of climate change, a number of respondents were either unsure of what was being done (21.8%) or thought that nothing or very little was being done (19.8%). Proper disposal of garbage (5.5%), environmental cleanliness (3.9%) and increase in awareness (3.9%) were also reported by respondents. Many respondents also either stated that they did not know about what Jamaica has done (28.4%) or stated that Jamaica has done nothing or very little (15.5%) to lessen or prevent the impact of climate change in their community. Apart from these, some online respondents stated public education programmes (7.9%) as a main action taken by Jamaica. Other responses included collaboration of environmental groups (2.3%) and conservation of resources (1.5%). See Table 15 for a summary of actions by online respondents taken to lessen or prevent the impact of climate change.

Table 15: Actions by online respondents to lessen or prevent the impact of climate change.

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
53	3.5%	By you	Conservation of resources	By you	74	14.7%
33	2.2%		Disaster preparedness		1	0.2%
335	22.5%		Dispose of garbage properly		83	16.5%
477	32.1%		Don't know/unsure		111	22.0%
15	1.0%		Educate and inform family and friends		17	3.3%
359	24.1%		No response		17	3.3%
6	0.4%		Observe building codes		1	0.2%
--	--		Other		28	5.5%
115	7.7%		Plant trees		8	1.5%
3	0.2%		Soil conservation		1	0.2%
5	0.3%		Use alternative source of energy		83	16.5%
20	1.3%	By your community/ Local Government	Conserve resources or energy	By your community/ Local Government	14	2.7%
33	2.2%		Disaster preparedness		4	0.8%
17	1.1%		Information/increase awareness		20	3.9%
22	1.4%		Keeping environment clean		20	3.9%
459	30.9%		No response		6	1.1%
422	28.4%		Nothing or very little		100	19.8%
20	1.3%		Other		11	2.1%
105	7.0%		Proper disposal of garbage (no burning)		28	5.5%
16	1.0		Reduce or avoid use of CFC's		0	0
60	4.0%		Reforestation		8	1.5%
205	13.8%		Unsure/don't know		110	21.8%
13	0.8%	By Jamaica / Central Government	Alternate source of energy	By Jamaica / Central Government	7	1.3%
40	2.6%		Better waste management		6	1.1%
--	--		Collaboration of environmental groups		12	2.3%
8	0.5%		Conducting researches		4	0.8%
14	0.9%		Conservation of resources		8	1.5%

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
15	1.0%		Disaster preparedness		2	0.4%
217	14.6%		Don't know/unsure		143	28.4%
56	3.7%		Drain maintenance/clean drains and gullies		2	0.4%
6	0.4%		Enforcement of environmentally laws		3	0.6%
529	35.6%		No response		--	--
471	31.7%		Nothing or very little		78	15.5%
14	0.9%		Other		13	2.5%
27	1.8%		Preserve or increase tree stock		1	0.2%
21	1.4%		Public education programmes		40	7.9%

Note: The information presented in this table is based on responses to open-ended questions. Totals are not reported.

Household respondents also stated what they have done to worsen the impact of climate change on their community. These included improper waste disposal such as burning garbage, deforestation and increased energy use. At the individual level many noted they had done nothing or were not sure (42.7%) they had done anything to worsen the impact of climate change. At the community level, a similar set of responses were given. And at the country level, negligence in garbage disposal, lack of environmental planning and protection as well as lack of public education, were listed as some actions that worsened the impact of climate change. Table 16 summarises actions done to worsen the effects of climate change on the community, by household respondents.

The majority of online respondents (32.4%) stated that they did nothing to worsen the impact of climate change on their community. Other responses were use of fuel that depletes the ozone layer (7.3%), increased consumption of energy (6.1%) and improper waste disposal (6.1%). On the community level, respondents felt that their communities had improper waste disposal practices (13.3%). However, the majority of respondents (19.4%) were either unaware or unsure of what was being done by the community. Finally, on the national level, many respondents (17.3%) said that they were unsure or unaware of what Jamaica has done to worsen the impact of climate change, while 8.1% felt that Jamaica did nothing to contribute to worsening climate change. Table 16 gives an overview of practices that have exacerbated the effects of climate change on the community, according to online respondents.

Table 16: Activities that household respondents say worsen the effects of climate change on the communtiy.

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
14	0.9%	By you	Deforestation	By you	3	0.6%
238	16.0%		Improper waste disposal (burning)		31	6.1%
10	0.6%		Increased energy use		31	6.1%
1	0.0%		Lack of interest in environmental issues		6	1.1%
466	31.4%		No Response		--	--
2	0.1%		Not complying with building codes		0	0%
634	42.7%		Nothing/ not sure		163	32.4%
--	--		Other		15	2.9%
2	0.1%		Poor soil conservation practices		1	0.2%
23	1.5%		Use of fuel that depletes ozone layer		37	7.3%
4	0.2%	By your community/ Local Government	Building without proper approval	By your community/ Local Government	9	1.7%
8	0.5%		Car emissions		5	0.9%
71	4.7%		Deforestation		14	2.7%
346	23.3%		Improper waste disposal(burning)		67	13.3%
4	0.2%		Lack of soil conservation		5	0.9%
498	33.5%		No Response		--	--
292	19.6%		Nothing		42	8.3%
--	--		Other		22	4.3%
52	3.5%		Pollution of Environment		22	4.3%
4	0.2%		Poor conservation practices		9	1.7%
0	0.0%		Tax evasion (money to assist problems)		2	0.4%
120	8.0%		Unsure/don't know		98	19.4%
19	1.2%	By Jamaica / Central Government	Allowing contamination of rivers/ seas etc	By Jamaica / Central Government	5	0.9%
19	1.2%		Destroying trees for development		7	1.3%
192	12.9%		Don't know/ unsure		87	17.3%
7	0.4%		Haphazard construction/ no impact assessment		6	1.1%
0	0.0%		Hillside erosion		0	0%

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
0	0.0%		Improper farming practices		0	0%
21	1.4%		Increased CFC's from imported vehicles		8	1.5%
48	3.2%		Lack of environmental planning and protection		31	6.1%
41	2.7%		Lack of public education		25	4.9%
23	1.5%		Limited maintenance of infrastructures		2	0.4%
108	7.2%		Negligence in the disposal of garbage		22	4.3%
579	39.0%		No response		0	0%
19	1.2%		Nothing		41	8.1%
--	--		Other		34	6.0%
8	0.5%		Reliance on fossil fuel		13	2.5%

Note: The information presented in this table is based on responses to open-ended questions. Totals are not reported.

Many respondents admitted that they have no idea or were not sure (10.7%) what could be done to prevent or lessen the effects of climate change on the community. Others suggested proper garbage disposal (11.7%), encouraging each other in the community (6.4%) and planting trees (4.2%) as some actions that could be done to prevent or lessen the effects of climate change. At the community level, additional responses included increased public awareness, keeping drains and gullies clean, resource conservation, and disaster preparedness. At the national level, most respondents suggested a major educational campaign (10.5%) among other activities such as maintaining and improving infrastructure (roads, bridges and drains), enacting laws to address pollution. Table 17 presents a list of actions suggested by household respondents that could be done to prevent the effects of climate change on the community.

In terms of what could be done to prevent or lessen the effects of climate change on the community, many online respondents (11.5%) stated increased awareness and consciousness of the dangers and effects as the main factors. Many respondents admitted that they have no idea or were not sure (11.3%) of what could be done to prevent or lessen the effects of climate change on the community. Other suggestions included proper garbage disposal practices (6.9%), recycling (2.7%) and reforestation (1.9%). When asked about actions the community could take, respondents listed increased awareness (11.7%), proper disposal of waste (10.7%) as main actions. Online respondents stated that at the national level, increased environmental awareness (11.7%) and proper disposal of waste (10.7%) were important in minimising the effects of climate change. Table 17 presents a list of practices recommended by online respondents that could be implemented to reduce the effects of climate change on the community.

Table 17: List of practices recommended by online and household respondents that could be implemented to reduce the effects of climate change

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
37	2.4%	By you	Become more conscious/aware of dangers and effects/ Be prepared/ knowledgeable	By you	58	11.5%
3	0.2%		Better construction to withstand effects/ roof, wall etc.		--	--
14	0.9%		Better environmental practices e.g. stop smoke, use of biodegradable products		--	--
42	2.8%		Clean drains/gullies/surroundings etc		--	--
4	0.2%		Compliance with regulations/guidelines		1	0.2%
16	1.0%		Conservation of resources (energy, water, fossil fuels etc)		38	7.5%
--	--		Disaster preparedness		3	0.6%
160	10.7%		Don't know/ Have no idea/Not sure		57	11.3%
95	6.4%		Educate community members/people on cc. Encourage others.		--	--
560	37.7%		No response		--	--
257	17.3%		Nothing/very little		26	5.1%
			Other		22	4.3%
15	1.0%		Participation in community activities/ Community groups		6	1.1%
174	11.7%		Proper waste disposal/stop burning garbage		35	6.9%
18	1.2%		Recycling		14	2.7%
6	0.4%		Reduction in ozone depleting emissions (e.g. carpooling)		9	1.7%
63	4.2%		Reforestation/Plant trees/ Cut down less trees		10	1.9%
1	0.0%		Solar/alternative/renewable energy		10	1.9%
19	1.2%		Use of less chemicals		5	0.9%

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
17	1.1%	By your community/ Local Government	Adherence to guidelines	By your community/ Local Government	6	1.1%
--	--		Avoid living in flood prone areas		2	0.4%
15	1.0%		Conserve resources (fuel, water)		13	2.5%
11	0.7%		Disaster preparedness		2	0.4%
148	9.9%		Don't know/unsure		50	9.9%
98	6.6%		Increased environmental awareness/ Education		59	11.7%
64	4.3%		Keep drains, gullies etc. clean		6	1.1%
609	41.0%		No Response		--	--
125	8.4%		Nothing		20	3.9%
			Other		25	4.9%
144	9.7%		Proper disposal of waste/stop burning		54	10.7%
5	0.3%		Provision of resources and/ Financial aid		--	--
8	0.5%		Recycling		12	2.3%
76	5.1%		Reforestation/ Don't cut down trees		12	2.3%
4	0.2%		Soil conservation		1	0.2%
7	0.4%		Solar/Renewable energy		6	1.1%
7	0.4%		Use environmentally friendly substances		4	0.8%
--	--	By Jamaica / Central Government	Adherence to guidelines	By Jamaica / Central Government	6	1.1%
--	--		Avoid living in flood prone areas		2	0.4%
43	2.8%		Assist the community/population financially etc.		--	--
79	5.3%		Better garbage disposal methods/stop burning		54	10.7%
15	1.0%		Conduct impact assessment study		--	--
--	--		Conserve resources (fuel, water)		13	2.5%
--	--		Disaster preparedness		2	0.4%
173	11.6%		Don't know/Unsure		50	9.9%
18	1.2%		Implement strategies to lessen impact		--	--
5	0.3%		Import fewer motor vehicles/ Lessen emissions		--	--

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
4	0.2%		Impose/enforce stricter building codes		--	--
--	--		Increase environmental awareness		59	11.7%
40	2.6%		Maintain/improve infrastructure (roads, bridges, drains etc.)		6	1.1%
157	10.5%		Major educational campaign/increase awareness		--	--
633	42.6%		No Response		--	--
93	6.2%		Nothing		20	3.9%
--	--		Other		20	3.9%
13	0.8%		Promote environmentally friendly substances		--	--
--	--		Recycling		12	2.3%
20	1.3%		Reforestation/tree planting		12	2.3%
27	1.8%		Review/enact laws to address pollution		--	--
14	0.9%		Seek alternative energy sources		--	--
1	0.0%		Seek international help to assist with problems/ partner with other organisation		--	--
--	--		Soil conservation		1	0.2%
--	--		Solar/Renewable energy		6	1.1%
--	--		Use environmentally friendly substances		4	0.8%

Note: The information presented in this table is based on responses to open-ended questions. Totals are not reported.

When asked what has prevented actions from being taken, household respondents noted ignorance (7.1%), lack of resources (1.4%) and lack of time (1.8%). Many also indicated they do not know or were not sure (7.3%). At the community level, lack of civic pride, lack of information, lack of financial resources were given as reasons preventing action from taking place. At the national level, a similar set of responses were given. Table 18 gives a list of reasons preventing action from being taken regarding climate change.

When asked about what has prevented individual action, the majority of online respondents (12.5%) said nothing prevented them, while others said that lack of time (3.7%), lack of information (3.3%) and lack of finances (2.9%) were the main deterrent. Many respondents (8.9%) were unaware and unsure about what had prevented community action. Additionally, a lack of finances (4.3%), lack of civic pride (3.5%) and a lack of information (3.1%) were some other reasons stated. At the national level, a similar set of responses were given. Table 18 also presents reasons given by online respondents for what has prevented action from being taken regarding climate change.

Table 18: Reasons given for inaction on climate change

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
109	7.3%	By you	Don't know/ not sure	By you	34	6.7%
5	0.3%		Don't think one person can make a change		1	0.2%
4	0.2%		Lack of communication		--	--
10	0.6%		Lack of community cooperation		4	0.8%
19	1.2%		Lack of finances		15	2.9%
13	0.8%		Lack of government support		5	0.9%
106	7.1%		Lack of information/ignorance		17	3.3%
15	1.0%		Lack of interest		9	1.7%
1	0.0%		Lack of recycling facilities& equipment		4	0.8%
22	1.4%		Lack of resources		8	1.5%
27	1.8%		Lack of time		19	3.7%
555	37.3%		No response		15	2.9%
266	17.9%		Nothing		63	12.5%
176	11.8%	By your community/ Local Government	Don't know/unsure	By your community/ Local Government	45	8.9%
94	6.3%		Lack of civic pride		18	3.5%
4	0.2%		Lack of direction/organisation		--	--
33	2.2%		Lack of finances		22	4.3%
21	1.4%		Lack of governmental support		11	2.1%
108	7.0%		Lack of information		16	3.1%
1	0.0%		Lack of recycling facilities/equipment		2	0.4%
754	50.6%		No response		15	2.9%
--	--		Nothing		10	1.9%
1	0.0%		Unavailability of time		2	0.4%
5	0.3%		Unaware of importance to human survival		9	1.7%
4	0.2%	Central Government	Lack of cooperation from citizens	Central Government	16	3.1%
21	1.4%		Lack of education/information about climate		13	2.5%
77	5.1%		Lack of finances		42	8.3%

Household		Categories	Actions	Categories	Online	
Frequency	Percent				Frequency	Percent
34	2.2%		Lack of resources		9	1.7%
0	0.0%		Lack of vision/forward planning		1	0.2%
616	41.5%		No response		15	2.9%
28	1.80%		Not a priority of government		10	1.9%
140	9.4%		Nothing		14	2.7%
3	0.2%		Partisan politics		4	0.8%
198	13.3%		Unsure/Don't know		60	11.9%

Note: The information presented in this table is based on responses to open-ended questions. Totals are not reported.

Media Usage

Household respondents reported that they occasionally (33.5%) or infrequently (31.7%) read or listen to or watch stories on climate change. Likewise, many online respondents reported that they occasionally (43.7%) or infrequently (34.1%) read or listened to or watched stories on climate change. Many (84.9% household; 76.0% online) stated that they would like to read, watch or listen to stories about climate change. See Figures 13 and 14.

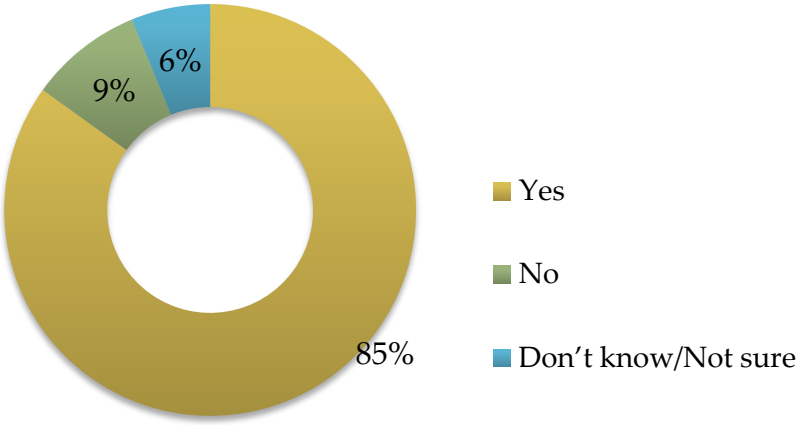

Figure 13: Frequency distribution of *household* response to, 'Would you like to read/listen to/watch stories on climate change?'

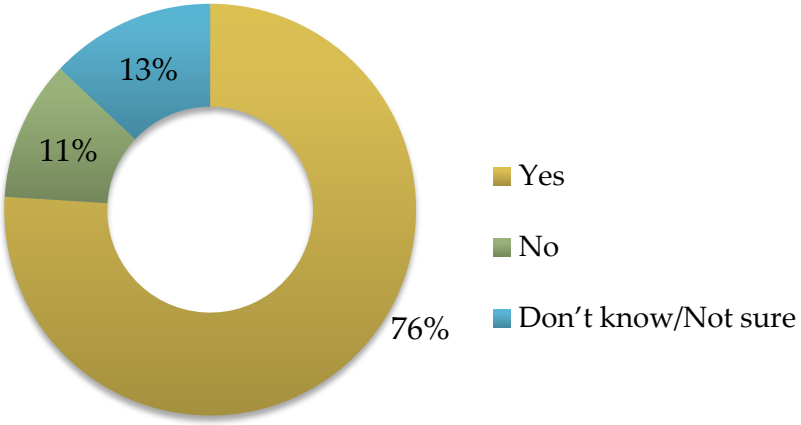

Figure 14: Frequency distribution of *online* response to, 'Would you like to read/listen to/watch stories on climate change?'

A cross-tabulation between household respondents' level of education and frequency of reading/listening/watching stories on climate change showed that there is a statistical difference (χ^2 (8)=21.757, p = .005) among persons educated at the primary, second and tertiary levels in relation to the frequency with which they read, listen or watch stories on climate change. See Table 19. Persons from the household sample with tertiary level education were more likely to report that they read, listen to or watch stories on climate change frequently when compared to those with primary and secondary education.

Table 19: Relationship between education level and frequency of reading/listening/watching stories on climate change based on household survey data)

		Education level		
		Primary	Secondary	Tertiary
Frequency of reading/listening/ watching stories on climate change	Frequently	17.8%	19.1%	20.4%
	Occasionally	30.1%	31.7%	41.7%
	Infrequently	32.8%	33.2%	28.4%
	Never	16.6%	13.9%	5.7%
	Don't Know/Not Sure	2.7%	2.1%	3.8%
	Total	100.0%	100.0%	100.0%

Persons participating in the household survey noted that they got their information on climate change from television (80.1%), radio (57.7%), newspaper (37.3%), the internet (22.5%), schools (17.2%) and friends or family (16.4%). Online respondents stated that they received climate change information from television (70.8%), radio (43.5%), newspaper (48.7%), the internet (66.2%), schools (31.2%) and videos (21.1%). See Table 20.

The three most effective actions for delivering information on climate change included: television (94.2%), radio (76.7%) and newspapers (38.6%). Online respondents stated that the three most effective channels for delivering information on climate change included television (85.3%), radio (46.4%) and the internet (25.1%). See Table 21.

Table 20: Sources for information on climate change

Categories	Household		Online	
	Frequency	Percent	Frequency	Percent
Television	1161	80.1%	356	70.8%
Radio	829	57.7%	219	43.5%
Newspaper	526	37.3%	245	48.7%
Website/Internet	309	22.5%	333	66.2%
Community Groups	77	5.6%	29	5.8%
Lectures/Workshops	51	3.7%	95	18.9%
Pamphlets/Brochures	90	6.6%	102	20.3%
Posters	98	7.1%	79	15.7%
Videos	115	8.4%	106	21.1%
Schools	240	17.2%	157	31.2%
Friends/Family	227	16.4%	101	20.1%
Faith based Organisations	62	4.5%	13	2.6%
Government	104	7.6%	40	8.0%
Mailing	26	1.9%	25	5.0%
Cell Phones/Smart Phones	122	8.9%	59	11.7%
Town Criers	24	1.7%	10	2.0%

Note: The information presented in this table is based on a multiple response question. Totals are not reported.

Table 21: Ranking of the THREE MOST EFFECTIVE sources for information on climate change

Rank	Categories	Household		Online	
		Frequency	Percent	Frequency	Percent
First Most Effective	Television	1289	94.2%	399	85.3%
	Radio	28	2.0%	20	4.3%
	Websites/Internet	14	1.0%	16	3.4%
	Newspapers	10	0.7%	6	1.3%
	Community Groups	7	0.5%	7	1.5%
	Friends/Family	4	0.3%	1	0.2%
	Lectures/Workshops	3	0.2%	4	0.9%
	Pamphlets/Brochures	3	0.2%	3	0.6%
	Schools	3	0.2%	2	0.4%
	Faith based Organisations	3	0.2%	-	-
	Cell Phones/Smart Phones	3	0.2%	-	-
	Total	1367		458	
Second Most Effective	Radio	1011	76.7%	217	46.4%
	Websites/Internet	102	7.7%	99	21.2%
	Newspapers	100	7.6%	61	13%
	Community Groups	29	2.2%	11	2.4%
	Schools	21	1.6%	27	5.8%
	Television	10	0.8%	-	-
	Posters	9	0.7%	9	1.9%

Rank	Categories	Household		Online	
		Frequency	Percent	Frequency	Percent
	Friends/Family	8	0.6%	5	1.1%
	Videos	6	0.5%	9	1.9%
	Cell phones/Smart phones	6	0.5%	1	0.2%
	Pamphlets/Brochures	5	0.4%	5	1.1%
	Government	5	0.4%	2	0.4%
	Lectures/Workshops	3	0.2%	9	1.9%
	Mailings	2	0.2%	1	0.2%
	Town Criers	1	0.1%	-	-
	Total	1318		456	
Third Most Effective	Newspapers	486	38.6%	68	14.6%
	Websites/Internet	231	18.3%	117	25.1%
	Schools	124	9.8%	77	16.5%
	Cell phones/Smart phones	97	7.7%	64	13.7%
	Community Groups	89	7.1%	16	3.4%
	Friends/Family	50	4%	8	1.7%
	Government	38	3%	38	8.2%
	Posters	30	2.4%	15	3.2%
	Videos	27	2.1%	14	3.0%
	Lectures/Workshops	18	1.4%	14	3.0%
	Pamphlets/Brochures	18	1.4%	8	1.7%
	Faith based organisations	18	1.4%	7	1.5%
	Other	16	1.3%	5	1.1%
	Town Criers	9	0.7%	1	0.2%
	Mailings	5	0.4%	4	0.9%
	Television	2	0.2%	-	-
	Radio	2	0.2%	-	-
	Total	1260		456	

When respondents were asked if they would like to make any additional comments about getting information from the media on climate change, most were eager to respond. Quite a number of respondents suggested the use of television in advertising climate change messages, announcing any news on climate change and create interesting and comedic programmes that would help to capture the attention of the audience on this issue. Others suggested social media tools such as Facebook and Twitter along with a web site. A number of respondents believed that other forms of media such as posters, billboards, cell phones and even YouTube videos could be used to spread the information across the island. Some also suggested getting the government involved to educate the public on this issue through the use of JIS features, for example. Not only were there pleas for the government's involvement, but also the involvement of the private sector.

One online respondent replied that in order for people to obtain information from the media, the information being given needed to be brief, bold and truthful. Another online respondent stated that in order to send information through the media about climate change, one needed to be aggressive. Some respondents suggested that climate change should be constantly advertised through the electronic media—television or radio—or should be the topic for a documentary. Others stated that climate change should be promoted to the public through the use of billboards and posters. A good number of online respondents pointed out the use of social media and the internet as valuable ways to get information out to the public on climate change. Respondents also pointed out the use of parties and events, texts and even road marches to spread the word about climate change to Jamaicans.

Sector Survey Results

Demographic Description: The sector survey targeted organisations within six sectors. Most participants represented the agricultural (25.7%) and tourism (23.2%) sectors. More private sector organisations (68.6%) completed the survey than public sector entities (25.8%); about 6% of respondents represented non-governmental organisations or considered themselves quasi-public sector. The organisations included in the study varied in size, with 40.7% having between 10 and 49 employees and 33.6% having fewer than 10 workers. Persons speaking on behalf of their organisations were mostly in senior officer or management (57%) positions or considered themselves professionals (33%). Table 22 gives details.

Table 22: Frequency distribution of demographic variables for sector survey respondents

Variables	Categories	Frequency	Percent
Sector	Public	59	25.8%
	Private	157	68.9%
	Other	12	5.2%
	Total	228	100.0%
Sector	Agriculture	70	25.7%
	Built Environment & Human Settlements	28	10.3%
	Energy	18	6.6%
	Health	50	18.4%
	Tourism	63	23.2%
	Water	22	8.1%
	Other	21	7.7%
	Total	272	100.0%
Number of employees in organisation	Under 10	90	33.6%
	10 – 49	109	40.7%
	50 – 99	26	9.7%
	100 – 499	29	10.8%
	Over 500	14	5.2%
	Total	268	100.0%
Occupation of organisation representative interviewed	Legislator / Senior Officer / Manager	156	57.1%
	Professional	92	33.7%
	Technicians & Associate Professionals	2	0.01%
	Clerical Support Workers	10	4.0%
	Skilled Agricultural, Forestry & Fishery Workers	13	5.0%
	Total	273	100.0%

NB. The total sample size for the sector survey is 276. Differences in totals occur because of rounding.

Knowledge of Climate Change

Ninety-seven percent (97.4%) of sector respondents indicated that they have heard of "climate change". When asked to define the term, many noted that it related to variation in climate globally, temperature or weather patterns. Respondents were also asked to differentiate between the terms "mitigation" and "adaptation". About 22% indicated that they were not sure, but about 19% were able to explain adaptation while 15% were able to explain mitigation. Over a third of the sample (38.5%) reported that they did not know much about the government's response to climate change. Another 20.1% indicated that they had a fair amount of knowledge about the government's response. A cross-tabulation revealed that there was a significant difference (χ^2 (10) = 22.216, p = .014) in knowledge levels regarding the government's response across the different sectors. About 64.7% of persons in the energy sector reported that they knew at least a fair amount about the government's response to climate change when compared to the other sectors. See Table 21. More public sector respondents (54.7%), when compared to those in the private sector, reported having at least a fair amount of knowledge about their government's response to climate change. The difference was significant (χ^2 (2) = 14.387, p = .001). See Table 23.

Table 23: Knowledge of government's response to climate change according to sector

		Agriculture	Construction	Energy	Health	Tourism	Water
How much do you know about your government's response to climate change?	Hardly anything	20.0%	33.3%	0%	22.0%	27.8%	26.3%
	Not much	36.4%	42.9%	35.3%	58.5%	51.9%	42.1%
	At least a fair amount	43.6%	23.8%	64.7%	19.5%	20.4%	31.6%
	Total	100%	100%	100%	100%	100%	100%

Table 24: Knowledge of government's response to climate change according to private/public sector

		Private Sector	Public Sector
How much do you know about your government's response to climate change?	Hardly Anything	25.8%	11.3%
	Not much	48.4%	34.0%
	At least a fair amount	25.8%	54.7%
	Total	100%	100%

About a third of participants (31.7%) had a fair amount of knowledge of their organisation's risk in terms of effects resulting from climate change. A cross tabulation showed that those in the energy sector (88.9%) followed by those in the agricultural sector (64.1%) were more likely to report that they knew about their organisation's risk in terms of effects resulting from climate change. The difference was significant difference (χ^2 (10)= 18.813, p = .043). See Table 25.

Table 25: Knowledge of organisation's risk in terms of effects resulting from climate change according to sector

		Agriculture	Construction	Energy	Health	Tourism	Water
How much do you know about your organisation's risk in terms of effects resulting from climate change?	Hardly anything	9.4%	21.7%	0%	15.9%	18.6%	15.8%
	Not much	26.6%	26.1%	11.1%	29.5%	42.4%	36.8%
	At least a fair amount	64.1%	52.2%	88.9%	54.5%	39.0%	47.4%
	Total	100%	100%	100%	100%	100%	100%

Table 26: Knowledge of organisation's risk in terms of effects resulting from climate change according to private/public sector

		Private Sector	Public Sector
How much do you know about your organisation's risk in terms of effects resulting from climate change?	Hardly anything	11.5%	7.1%
	Not much	33.1%	12.5%
	At least a fair amount	55.4%	80.4%
	Total	100%	100%

There was a significant difference (χ^2 (2) = 10.947, p = .004) between private and public sector in relation to knowledge about their organisation's risk associated with climate change. As seen in Table 26, respondents in the public sector knew at least a fair amount (80.4%) about their organisation's risk when compared to those in the private sector who knew at least a fair amount (55.4%).

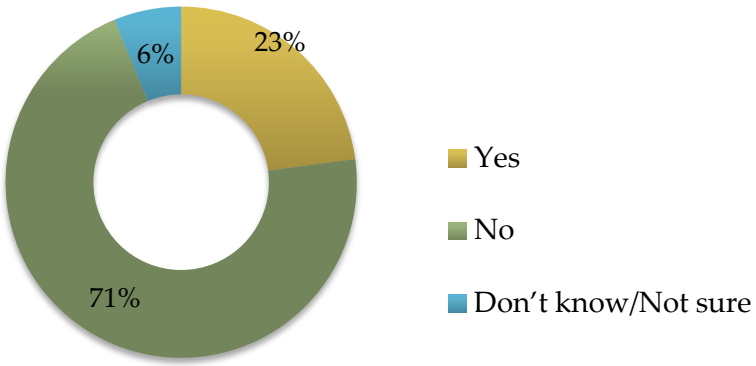

Figure 15: Frequency distribution of sector response to, 'Does your organisation have members of staff who are responsible for climate change issues?'

Less than a quarter (22.9%) of the respondents indicated that their organisation had members of staff who were responsible for climate change issues. On average, these organisations had about 6 persons (standard deviation +/- 6 persons) responsible for climate change; the median number of persons was 3 and the mode was 1. The number of persons responsible for climate change ranged from 1 to 30. Two large organisations, one with between 100 and 499 employees and the other with over 500 employees indicated they had 150 and 600 persons respectively who were responsible for climate change issues. The responsibilities of these individuals are outlined in Table 25.

Table 27: Sector representatives' areas of responsibilities

Responsibilities	Agriculture	Construction	Energy	Health	Tourism	Water	Overall
Adaptation to CC	--	3.57% (1)	--	--	1.59% (1)	4.55% (1)	2.9% (8)
Educating staff and increasing awareness	11.43% (8)	--	22.22% (4)	6% (3)	1.59% (1)	9.09% (2)	6.16% (17)
Research and Development	10% (7)	3.57% (1)	5.56% (1)	--	-	9.09% (2)	5.8% (16)
Implementation of policies to mitigate the effects of CC	--	--	--	2% (1)	3.17% (2)	4.55% (1)	3.26% (9)
Environmental Preservation	1.43% (1)	7.14% (2)	16.67% (3)	--	7.94% (5)	--	4.71% (13)
Preparedness for and respond to disaster	1.43% (1)	3.57% (1)	--	4%	--	--	1.45% (4)
Surveillance Systems	1.43% (1)	--	11.11% (2)	2% (1)	6.35% (4)	--	3.99% (11)
Representation	1.43% (1)	--	--	--	1.59% (1)	4.55% (1)	1.45% (4)
Conservation on energy use and the use of energy related processes	1.43% (1)	--	--	--	1.59% (1)	--	1.09% (3)
Human Health safety and vector control	1.43% (1)	--	5.56% (1)	2% (1)	--	--	1.09% (3)
Don't Know	--	--	--	--	--	--	0.36% (1)
No Response	72.86% (51)	85.71% (24)	61.11% (11)	86% (43)	80.95% (51)	81.82% (18)	78.62% (217)

Attitudes to Climate Change

Most organisations participating in the study felt that climate change adaptation and mitigation initiatives were very important (51.7%) or important (24.4%) to their organisation.

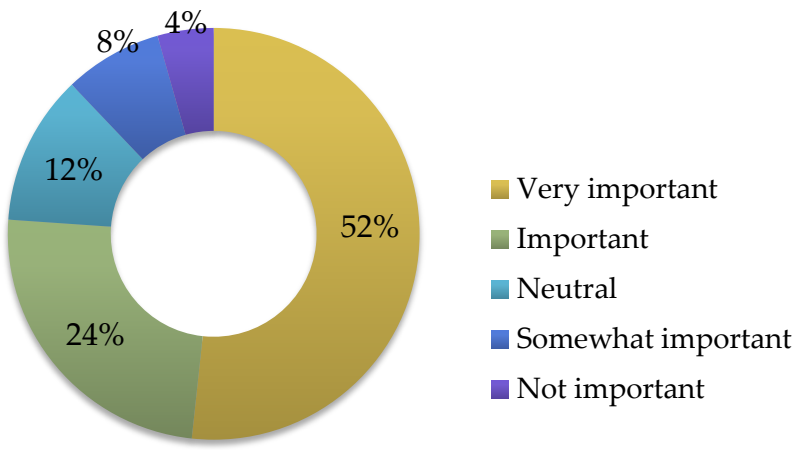

Figure 16: Frequency distribution of sector response to, 'Rate the importance of climate change adaptation/mitigation initiative to your organisation.'

A further breakdown by sector as shown in Table 28 indicates that the health (60.0%), agriculture (58.0%) and energy (56.3%) sectors were the ones with the highest proportion of the sample rating climate change adaptation and mitigation initiatives as very important to their organisations. The construction sector was the sector with the lowest proportion (28.6%) indicating that climate change adaptation and mitigation activities were very important to their organisation. A large majority of the sample also felt that climate change adaptation and mitigation were very immediate to their organisation (38.3%), to their sector (50.6%) and to Jamaica (53.9%). See Figures 17, 18 and 19.

Table 28: Importance of climate change adaptation/mitigation initiative to organisations

Categories	Agriculture	Construction	Energy	Health	Tourism	Water	Overall
Very important	58.0% (40)	28.6% (8)	56.3% (9)	60.0% (30)	53.2% (33)	50.0% (11)	51.7% (140)
Important	18.8% (13)	28.6% (8)	31.3% (5)	26.0% (13)	27.4% (17)	18.2% (4)	24.4% (66)
Neutral	10.1% (7)	17.9% (5)	6.3% (1)	6.0% (3)	6.5% (4)	18.2% (4)	11.8% (32)
Somewhat important	5.8% (4)	14.3% (4)	--	4.0% (2)	12.9% (8)	9.1% (2)	7.7 (21)
Not important	7.2% (5)	10.7% (3)	6.3% (1)	4.0% (2)	--	4.5% (1)	4.4 (12)
Total	100.0% (69)	100.0% (28)	100.0% (16)	100.0% (50)	100.0% (62)	100.0% (22)	100 (271)

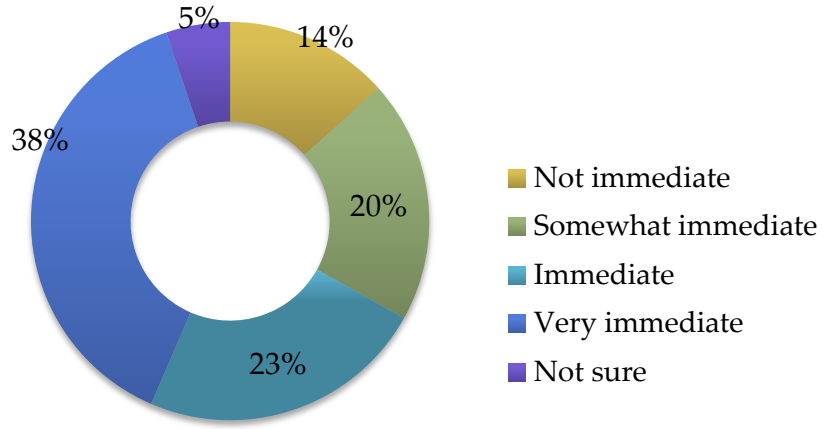

Figure 17: Frequency distribution of sector response to, 'State the level of immediacy regarding the following question: How immediate of an issue is climate change adaptation/mitigation to your ORGANISATION?'

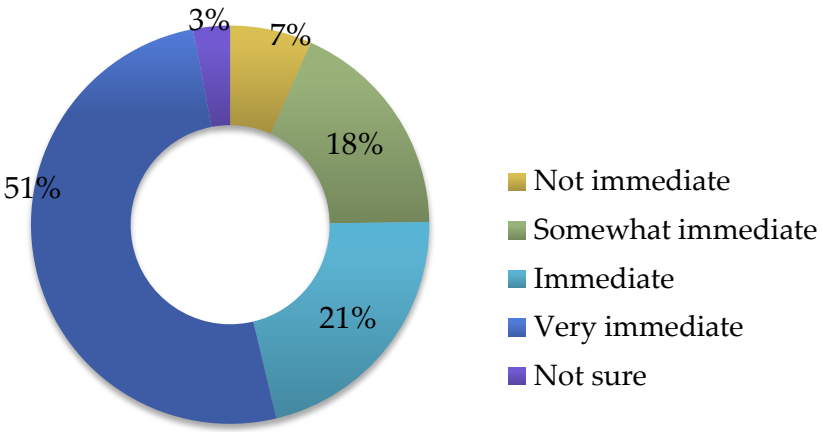

Figure 18: Frequency distribution of sector response to, 'State the level of immediacy regarding the following question: How immediate of an issue is climate change adaptation/mitigation to your SECTOR?'

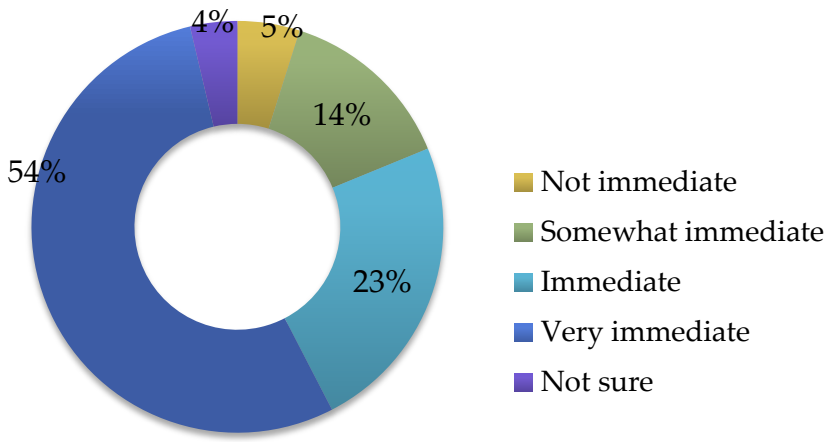

Figure 19: Frequency distribution of sector response to, 'State the level of immediacy regarding the following question: How immediate of an issue is climate change adaptation/mitigation to JAMAICA?

Many respondents (85.2%) felt that the government should assist their sector in adapting to or mitigating the effects of climate change. See Table 29. A further breakdown shows that the water (95.5%), tourism (95.2%) and energy (93.8%) sectors were the ones with the highest proportion of respondents indicating that the government should assist their sector. Specific actions or ways in which the government could assist organisations are given in the section of "Practices regarding Climate Change".

Table 29: Sector representatives' feeling on whether government should help their sector in adapting to/mitigating the effects of climate change

Categories	Agriculture	Construction	Energy	Health	Tourism	Water	Overall
No	2.9% (2)	14.3% (4)	6.3% (1)	28.0% (14)	1.6% (1)	--	8.5% (23)
Yes	86.8% (59)	75.0% (21)	93.8% (15)	70.0% (35)	95.2% (59)	95.5% (21)	85.2% (230)
Don't know/Not sure	10.3% (7)	10.7% (3)	--	2.0% (1)	3.2% (2)	4.5% (1)	6.3% (17)
Total	100.0% (68)	100.0% (28)	100.0% (16)	100.0% (50)	100.0% (62)	100.0% (22)	100.0% (270)

Practices regarding Climate Change

About two-thirds of the respondents (68%) indicated that their organisation had a role to play in managing the possible effects of climate change on Jamaica. For those organisations playing a role in managing climate change, a number of actions were described. These are presented in Table 30. For those organisations that did not see themselves playing a role, various reasons were given for this; these included:

- the work that was done or the sector in which the organisation falls do not directly relate to climate change;
- lack of information about how the organisation could play a role;
- having no control over climate change;
- a collective effort is required;
- climate change is not obvious;
- lack of resources;
- lack of interest;
- organisations' small size.

In terms of current practices being adopted to address the effects of climate change, some organisations noted that they were not doing anything (12.7%). Others noted they engaged in conservation of energy-related processes and other resources (7.9%); waste management (7.9%); education and awareness with the assistance of training (10.9%). These three were the most commonly cited examples of current practices. Other current practices included research and development; collaboration with various groups; preparedness; environmentally friendly practices and implementation of policies and regulations relating to containing the effects of climate change. A detailed breakdown of the current practices in place to address the effects of climate change, according to each sector, can be seen in the Appendix I.

The strength of these current practices being adopted by the organisations were that they promoted efficiency and provided environmental protection, provided exposure in terms of educating employees, and prepared the organisation to have a speedy recovery after a climate-related event. Some respondents (15.9%) indicated there were no weaknesses associated with the main measures they were using to address the impact of climate change. For those which had weaknesses, they related mainly to lack of sufficient resources and ineffective communication. A breakdown of strengths and weaknesses associated with the practices can be seen in the Appendix I.

Table 30: Roles organisations can play in managing the effects of climate change

Categories	Agricul-ture	Construc-tion	Energy	Health	Tourism	Water	Overall
Ensure environmentally friendly practices	12.8% (9)	21.4% (6)	22.2% (4)	16.0% (8)	28.5% (18)	27.2% (6)	14.8% (41)
Adapt to and mitigate the effects of CC	5.7% (4)	7.1% (2)	5.5% (1)	--	1.5% (1)	13.6% (3)	4.3% (12)
Collaborate with various groups to combat CC	7.1% (5)	--	--	--	4.7% (3)	9.0% (2)	7.6% (21)
Research as well as develop-ment of alternative energy	8.5% (6)	10.7% (3)	33.3% (6)	2.0% (1)	--	--	9.4% (26)
Implementation of CC policies and laws	5.7% (4)	--	22.2% (4)	6.0% (3)	1.5% (1)	--	3.6% (10)
Educate and inform on the public on CC	28.5% (20)	17.8% (5)	22.2% (4)	30.0% (15)	7.9% (5)	22.7% (5)	18.8% (52)
Conservation on energy use and energy-related processes	1.4% (1)	3.5% (1)	11.1% (2)	2.0% (1)	11.1% (7)	--	5.4% (15)
Waste Management	1.4% (1)	10.7% (3)	5.5% (1)	14.0% (7)	12.7% (12)	13.6% (3)	9.0% (25)
Surveillance Systems	1.4% (1)	3.5% (1)	--	2.0% (1)	--	--	0.3% (1)
Health and Safety	--	--	5.5% (1)	8.0% (4)	1.5% (1)	--	0.7% (2)
Don't know/ Not sure	4.2% (3)	--	--	--	1.5% (1)	4.5% (1)	2.5% (7)
Other	7.1% (5)	--	--	2.0% (1)	4.7% (3)	4.5% (1)	4.7% (13)
No Response	30.0% (21)	35.7% (10)	11.1% (2)	38.0% (19)	38.1% (24)	27.2% (6)	32.9% (91)

Note: The information presented in this table is based on responses to open-ended questions. Totals are not reported.

Many respondents (67.2%) felt that their organisations could identify strategies to improve their operations to address climate change issues; 18.3% indicated they could not identify strategies, while another 14.6% were not sure or did not know. A cross tabulation indicated that organisations within the public sector, when compared to those in the private sector, were more likely to report that their organisation could identify strategies to improve its operations to address climate change issues. The difference was significant (χ^2 (1) = 6.976, p = .008). See Table 31.

Table 31: Organisation's ability to identify strategies to improve its operations to climate change issues according to private/public sector

		Private Sector	Public Sector
Do you think your organisation can identify strategies to improve its operations to address climate change issues?	Yes	72.7%	90.6%
	No	27.3%	9.4%
	Total	100%	100%

Examples of various strategies that organisations could identify to address climate change issues and effects included:
- Collaborate with external groups
- Conserve on resources
- Educate and inform staff members on climate change issues
- Effective waste management
- Effective management and surveillance systems
- Environmentally friendly practices
- Increased preparedness
- Implementing recommendations
- Internal efficiency
- Research and development

Less than a third of the respondents (27.9%) noted that climate change issues are included in their business, corporate or strategic plan; 16% did not know or were not sure. Many respondents were unable to describe fully how these climate change matters were incorporated into their organisations' budget; those who responded gave answers which suggested that between 5% and 30% of their budget was allocated to climate change issues. A cross tabulation showed that there was a significant difference (χ^2 (1) = 7.808, p = .005) between the public and private sectors in relation to the inclusion of climate change issues in the organisations' planning. About 52.5% of public sector respondents indicated that climate change was included in their planning while only 28.7% of private sector respondents noted that this was done.

Table 32: Private/Public sector organisation's inclusion of climate change issues in their planning

		Private Sector	Public Sector
Are climate change issues included in your organisation's business/corporate/strategic plan?	Yes	28.7%	52.5%
	No	71.3%	47.5%
	Total	100%	100%

In terms of sectors which were most likely to include climate change issues in their planning, the energy sector had the highest proportion of respondents (66.7%) indicating that they included climate change matters in their planning. The cross-tabulation in Table 33 gives further details. The difference across sectors was significant (χ^2 (5) = 11.149, p = .049).

Table 33: Inclusion of climate change issues in organisations' planning according to sector

		Agricul-ture	Construc-tion	Energy	Health	Tourism	Water
Are climate change issues included in your organisation's business/ corporate/ strategic plan?	Yes	37.1%	26.9%	66.7%	22.9%	27.5%	38.9%
	No	62.9%	73.1%	33.3%	77.1%	72.5%	61.1%
	Total	100%	100%	100%	100%	100%	100%

A majority of respondents (65.5%) noted that in order to improve their abilities to participate in climate change adaptation and mitigation activities, they would require financial assistance from the government. Other requirements included access to good data for planning purposes (59.8%); more technical support including staff (47.5%). See Table 34. A breakdown according to sector showed that many respondents in the agriculture, energy and tourism sectors wanted financial assistance followed by access to good data for planning purposes. For the energy sector, the need for access to good data was selected by the same amount of respondents as the need for policy and legislation. For the health sector, access to good data was chosen by most respondents in that sector followed by the need for financial assistance. In the water sector, respondents indicated a need for access to good data along with legislation and policy. Most respondents in the construction sector noted that they needed administrative and more technical support.

Table 34: Requirements for improving public/private sectors' ability to participate in climate change adaptation/mitigation activities

Categories	Agriculture	Construction	Energy	Health	Tourism	Water	Overall
Financial assistance from the government	78.6% (55)	39.3% (11)	55.6% (10)	64.0% (32)	68.3% (43)	63.6% (14)	65.6% (181)
Administrative support	27.1% (19)	42.9% (12)	33.3% (6)	36.0% (18)	30.2% (19)	45.5% (10)	33.3% (92)
More technical support (including staff)	52.9% (37)	57.1% (16)	33.3% (6)	44.0% (22)	44.4% (28)	63.6% (14)	47.5% (131)
Greater number of environmental programmes	40.0% (28)	7.1% (2)	33.3% (6)	44.0% (22)	38.1 (24)	59.1% (13)	38.4% (106)
Access to good data for planning purposes	64.3% (45)	32.1% (9)	50.0% (9)	70.0% (35)	54.0 (34)	72.7% (16)	59.8% (165)
Policy/Legislation	45.7% (32)	17.9% (5)	50.0% (9)	38.0% (19)	25.4 (16)	72.7% (16)	37.3% (103)
Other	12.9% (9)	3.6% (1)	5.6% (1)	8.0% (4)	17.5 (11)	4.5% (1)	10.9% (30)

Note: The information presented in this table is based on a multiple response question. Totals are not reported.

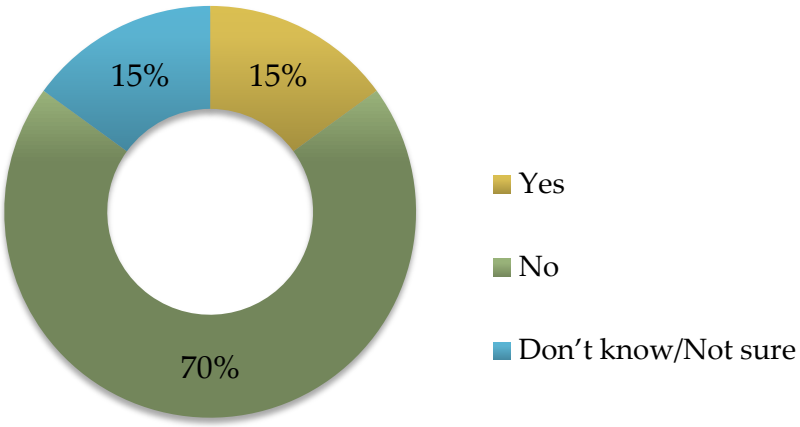

Figure 20: Frequency distribution of sector response to, 'Is your organisation involved in any way in the development of government policies on climate change?'

Only 15% of the organisations were involved in the development of government policies; another 15% were not sure or did not know. There was a significant difference ($\chi 2$ (1) = 21.805, p = .001) between the public and private sectors in relation to their involvement in the development of government policies on climate change. About 39.0% of public sector organisations indicated they were involved with the development of government policies while 8.8% of private sector respondents noted that they did this. Twelve percent (12%) of all respondents had existing policies to address climate change issues. Examples of these policies included environmental management and recycling, health and wellness, protection of natural resources, proper waste management and disposal, energy conservation and disaster management.

Earlier it was noted that 85.2% of the respondents felt that the government should assist their sector in adapting to or mitigating the effects of climate change. Specific ways in which the government could assist are outlined in Table 35. Public education programmes, financial assistance and policies and legislation were some of the most frequently cited ways in which the respondents felt the government could help.

Table 35: Ways in which the Government can help public/private organisations adapt to climate change

Categories	Frequency	Percent
Public education programmes	102	36.9%
Financial Assistance	60	21.7%
Administrative support	33	11.9%
Policies and legislation	32	11.5%
Other	18	6.5%
Environmental Programmes	13	4.7%
Consultancy/ Dialogue	12	4.3%
Don't Know/unsure	10	3.6%
Reducing the cost of energy/renewable energy	7	2.5%
Early warning systems and disaster management plans	6	2.1%
Incentives	6	2.1%
Technical support	5	1.8%
No response	3	1%

Note: The information presented in this table is based on responses to open-ended questions. Totals are not reported.

In terms of collaboration, a little over a quarter (26.3%) of the organisations indicated that they currently collaborated with other organisations on climate change issues. Collaborating activities included mainly meetings with other organisations and community groups, conferences and workshops. There was a significant difference ($\chi 2$ (1) = 36.297, p = .001) between the public and private sectors in terms of their collaboration with other organisations. See Table 36. About 67.4% of public sector respondents reported that they currently collaborated with other organisations regarding climate change matters. There was also a significant difference (χ^2 (5) = 30.849, p = .001) among sectors in relation to their collaboration with other organisations. The agriculture and energy sectors had the highest proportion of respondents stating that they coordinated with other oganizations. See Table 37.

Almost fourteen percent (13.9%) of organisations considered themselves leaders in their sectors who coordinated other organisations' activities on climate change issues. More specifically, 27.1% of respondents in the public sector said they were leaders who coordinated other organisations. About eleven percent (10.8%) within the private sector noted they were leaders. Coordinating activities included playing an advisory role, information sharing, organising meetings, sponsorship, conferences and workshops, outreach programmes.

Table 36: Organisations' current collaboration with other organisations on climate change issues according to sector

		Private Sector	Public Sector
Does your organisation currently collaborate with other organisations on climate change issues?	Yes	19.1%	67.4%
	No	80.9%	32.6%
	Total	100%	100%

Table 37: Breakdown of organisational collaboration on climate change issues by sector surveyed

		Agriculture	Construction	Energy	Health	Tourism	Water
Does your organisation currently collaborate with other organisations on climate change issues?	Yes	50%	19.2%	53.3%	20.0%	9.4%	37.5%
	No	50%	80.8%	46.7%	80.0%	90.6%	62.5%
	Total	100%	100%	100%	100%	100%	100%

A majority of organisations (67%) reported that they have been affected economically because of climate-related events. The main types of economic effects included loss of sales/revenue (40.6%); increased overall costs (37.3%); increased infrastructural damage (32.2%) and absenteeism or displaced staff (31.5%). A breakdown of the economic effects by sector can be seen in the Appendix I.

Participants indicated how a number climate change issues have affected their sector or organisation and they stated how these have affected their sector/organisation. The list of climate change issues presented to the respondent included the following:

- beach erosion;
- changes in weather patterns;
- decrease in fresh water supply;
- drought;
- effects on flora and fauna;
- flooding;
- food supply;
- health issues;
- increased air temperature;
- loss of coastal vegetation;
- loss of electricity supply;

- sea level rise;
- stronger hurricanes/more hurricanes; and
- stronger winds.

From this list, most respondents chose stronger hurricanes/more hurricanes (72.1%); drought (66.0%); stronger winds (64.3%) and changes in weather patterns (64.1%) as events that affected their organisations. In terms of how these events affected their organisation, respondents noted that the stronger hurricanes, for example, caused flooding and beach erosion, affected crops and livestock, affected staff attendance and destroyed infrastructure. Details of how each climate change issues affected the organisations that participated in the survey can be seen in Appendix I.

Organisations identified possible actions they could take to mitigate or adapt to the effects of climate on their particular sector. Mitigation activities identified by respondents included:

- Increasing knowledge and awareness through effective communication
- Reduction in ozone depleting emissions/ alternate energy
- Erection of more disaster resilient infrastructure and enforcement of building codes
- Research and development
- Strategic planning and policy implementation
- Environmental preservation
- Effective waste management
- Financial assistance
- Preparedness

Adaptation activities identified by the respondents included:

- Increasing knowledge and awareness through effective communication
- Finding alternate energy source
- Erecting more disaster resilient infrastructure and enforcing building codes
- Research and development
- Strategic planning and policy implementation
- Encouraging environmentally friendly practices
- Improving waste disposal practices
- Financial assistance to assist with climate change related issues
- Conserving resources
- Collaboration with external partners

A breakdown of mitigation and adaptation actions suggested by respondents according to their sector can be seen in Appendix I.

Participants also noted the climate change issues they expected to affect them in the next five years. They also stated how they think these issues would have an impact on them. Respondents were presented with a list of climate change events or issues which included:

- beach erosion;
- changes in weather patterns;
- decrease in fresh water supply;
- drought;
- effects on flora and fauna;
- flooding;
- food supply;
- health issues;
- increased air temperature;
- loss of coastal vegetation;
- loss of electricity supply; and
- sea level rise.

Drought (61.7%), changes in weather patterns (61.2%), increased air temperature (55.7%), flooding (55.4%), and decrease in fresh water supply (54.7%) were the five climate events most selected by respondents as events that would affect them within the next five years. It was noted that drought would affect their sector or organisations by affecting food supply; affecting agriculture (crops and livestock); causing heat and bush fires; posing health problems. Changes in weather patterns would affect respondents through increased natural disasters; increased flooding; intense rainfall – all of which would also affect staff attendance. More examples of how each respondent felt climate change issues will affect their organisations in the next five years can be seen in Appendix I.

Media Usage

Organisations cited traditional and new media as common sources of information on climate change. Most organisations (66.7%) reported that they got their information from web sites on the Internet. Others indicated that they received information from newspapers (55.1%); television (53.6%) and radio (50.7%). See Table 38.

In terms of the three most effective channels for delivering information on climate change to their organisations, sector respondents noted that television (52.4%) would be the first most effective channel, followed by radio (32.4%) and then websites/Internet (27.2%). See Table 39 for details on ranking of media channels.

Table 38: Sector information sources on climate change

Categories	Agriculture	Construction	Energy	Health	Tourism	Water	Overall
Television	42.9% (30)	46.4% (13)	50.0% (50)	52.0% (26)	66.7% (42)	59.1% (13)	53.6% (146)
Radio	44.3% (31)	32.1% (9)	44.4% (8)	58.0% (29)	66.7% (42)	50.0% (11)	50.7% (140)
Newspapers	44.3% (31)	50.0% (14)	50.0% (9)	62.0% (31)	71.4% (45)	40.9% (9)	55.1% (152)
Websites/Internet	62.9% (44)	60.7% (17)	66.7% (12)	64.0% (32)	79.4% (50)	54.5% (12)	66.7% (184)
Community groups	20.0% (14)	10.7% (3)	16.7% (3)	6.0% (3)	4.8% (3)	9.1% (2)	11.2% (31)
Lectures/Workshops	21.4% (15)	10.7% (3)	33.3% (6)	14.0% (7)	15.9% (10)	13.6% (3)	18.5% (51)
Pamphlets/Brochures	15.7% (11)	3.6% (1)	33.3% (6)	16.0% (8)	15.9% (10)	4.5% (1)	16.3% (45)
Posters	11.4% (8)	7.1% (2)	11.1% (2)	12.0% (6)	9.5% (6)	9.1% (2)	10.5% (29)
Videos	7.1% (5)	--	22.2% (4)	10.0% (5)	17.5% (11)	--	11.6% (32)
Schools	10.0% (7)	3.6% (1)	--	6.0% (3)	1.6% (1)	4.5% (1)	5.1% (14)
Friends/Family	10.0% (7)	7.1% (2)	27.8% (5)	26.0% (13)	38.1% (24)	9.1% (2)	20.3% (56)
Faith based organisations	8.6% (6)	--	--	4.0% (2)	4.8% (3)	--	4.3% (12)
Government	35.7% (25)	17.9% (5)	55.6% (10)	28.0% (14)	11.1% (7)	13.6% (3)	25.7% (71)
Mailings	8.6% (6)	3.6% (1)	--	8.0% (4)	6.3% (4)	--	5.8% (16)
Cell Phones/ Smart Phones	11.4% (8)	--	11.1% (2)	24.0% (12)	6.3% (4)	4.5% (1)	10.9% (30)
Town Criers	4.3% (3)	--	--	6.0% (3)	3.2% (2)	--	2.9% (8)
We get no information on Climate Change	14.3% (10)	21.4% (6)	--	10.0% (5)	11.1% (7)	4.5% (1)	11.6% (32)
Other	27.1% (19)	10.7% (3)		8.0% (4)	3.2% (2)	9.1% (2)	13.0% (36)

Note: The information presented in this table is based on a multiple response question. Totals are not reported.

Table 39: Sector's ranking of the THREE MOST EFFECTIVE CHANNELS for delivering information on climate change

Rank	Categories	Frequency	Percent
FIRST most effective	Television	140	52.4%
	Websites/Internet	33	12.4%
	Radio	30	11.2%
	Newspapers	25	9.4%
	Other	16	52.4%
	We get no information on Climate Change	7	2.6%
	Lectures/Workshops	5	1.9%
	Community groups	4	1.5%
	Posters	2	0.7%
	Mailings	2	0.7%
	Cell Phones/ Smart Phones	2	0.7%
	Pamphlets/Brochures	1	0.4%
SECOND most effective	Radio	77	32.4%
	Website/Internet	53	22.3%
	Newspapers	47	19.7%
	Lectures/workshops	23	9.7%
	Others	8	3.4%
	Pamphlets/brochures	7	2.9%
	Community Groups	6	2.5%
	Posters	4	1.7%
	Government	4	1.7%
	Mailings	3	1.3%
	Schools	2	0.8%
	Friends/Family	2	0.8%
	Videos	1	0.4%
	Town criers	1	0.4%
THIRD most effective	Website/Internet	61	27.2%
	Newspapers	33	14.7%
	Pamphlets/brochures	22	9.8%
	Others	21	9.4%
	Lectures/workshops	13	5.8%

Rank	Categories	Frequency	Percent
	Cell phones/smart phones	13	5.8%
	Friends/Family	12	5.4%
	Community Groups	10	4.5%
	Schools	10	4.5%
	Government	10	4.5%
	Videos	8	3.6%
	Posters	4	1.8%
	Mailings	4	1.8%
	Town criers	3	1.3%

Note: The information presented in this table is based on a multiple response question. Totals are not reported.

Focus Group Results

Community Focus Group Discussions

As indicated in the methodology, the main topics of discussion for the community focus groups were as follows:

1. The extent to which people in the community have heard of the term "climate change"
2. Current perceptions and understanding of what climate change actually is and the impact community members believe it may have (i.e., how climate change is defined in the minds of the respondents)
3. The degree to which respondents believe climate change will affect them personally and how they perceive their personal level of risk as it relates to the effects of climate change
4. Steps (changes in behaviour) that respondents may be taking to reduce their level of risk and why they are taking the steps they are and why they may not be taking other possible steps
5. The extent to which respondents perceive climate change risk affecting their community and which groups may be more vulnerable to the effects
6. The extent to which respondents are aware of what the government of Jamaica is doing about climate change
7. Respondents' perception of roles and responsibilities to enhance climate resilience

Four distinct community groups were consulted. These included young people from Port Maria; residents of Portmore, retired persons from the Kingston Metropolitan Region (KMR); and farmers and fishers in Spring Village. The participants in each focus group are described:
- Port Maria group: The nine participants for the Port Maria focus group were all young women aged between 18 and 25 years of age. One was employed part-time, but most were unemployed and were students. Four of the nine had children.
- Portmore group: The Portmore focus group entirely consisted of Portmore residents of different ages.
- Retiree Group: This group consisted mainly of retired, returning residents who are members of a national non-governmental organisation that serves the needs of retired persons in Jamaica.
- Spring Village Group: Members of the Spring Village group were all rural residents who were either fishers or farmers.

Based on thorough review of all the notes taken and the audiotapes recorded, a set of high confidence conclusions can be drawn with regards to the community responses. These are discussed below.

Knowledge of Climate Change

Perceptions of Climate Change

There was a reasonably high level of understanding of climate change and reasons for its occurrence. While not necessarily using scientific terminology, across all four groups, people described climate change as "changes in the weather pattern and seasons over time".

The impact of climate change was generally understood. The list of effects that respondents personally noted included increased hurricanes, storms, floods and drought; changes in seasons; shorter (crop) growing periods, longer droughts; increases in the incidence of tornadoes; hotter days; sea level rise – especially along the Palisadoes corridor; heavy rainfall, when it comes; and drying up of rivers.

The Spring Valley group reported hearing that there were cases of "snowfall" in Jamaica. On occasion, farmers at higher elevations recounted instances of "frost burning their crops" and it was thought that this phenomenon might be what was being referred to. Further probing and investigation of these individuals' perception indicated that they were, in fact, quite firm in their belief that they had witnessed "snow" in the area. This may be the one incorrect observation of all the responses given.

Overall, however, these findings suggest that there has been an increased level of awareness of climate change as a term since the 2005 KAP survey was conducted.

Reasons for Climate Change

Participants also exhibited a fairly good understanding of the reasons for the occurrence of climate change. The main reasons given included: (1) too much deforestation and failure to replant trees; (2) too much use of charcoal; (3) over industrialisation; (4) too much burning of greenhouse gases and fossil fuels; (5) over use of fossil fuels for vehicles. More generalised responses include too much pollution and global warming.

Participants were aware that while there are measures that Jamaicans can put in place to reduce the island's own carbon footprint, it was also recognised that climate change is mainly caused by actions within large, industrialised developed countries. So, even if Jamaica puts in place measures to mitigate climate change, these will not considerably slow the effects. There was recognition that one way or another, the country would have to prepare to cope with the impact of climate change.

At the same time, it was recognised that all Jamaicans should do whatever they can to reduce emissions. However, there was also recognition that not everyone was in a position to take action. For example, those who earn a living by cutting down trees and burning charcoal may have no alternative unless they receive assistance. So, there are some steps that can be taken relatively easily, while others are not so straightforward or will be longer-term in nature.

Impact of Climate Change

Respondents also had a clear understanding of the types of impact and effects that climate change would have as many indicated that they had personally witnessed effects such as flooding; hurricanes; hotter weather; increased incident of diseases; increases in insect pests; drying up of rivers and streams; decreases in crop production; decreases in honey bee populations; sea level rise; changes in timing for crop production; movement of wildlife that is out of the ordinary (such as crocodiles); increased landslides and soil erosion; increased road erosion; loss of life and property; tiles popping off bathroom walls because of heat extremes; and beach encroachment.

Additional personal experiences with climate change impact cited were increased experiences of heat rash; cracking of the earth; storm surge on Hellshire beach and increased dust in the air.

At the same time, participants also recognised that some of these effects were exacerbated by human action. Improper garbage disposal in drains and gullies was felt to contribute to flooding as was deforestation and the improper installation of drains.

Building of homes in gullies and hazard-prone areas was also stated as a factor that increased the impact of climate change on communities. The illegal building of homes in zones where there should be no construction was cited. So too was the disregard for the building code itself. Building houses too close to each other was also viewed as one factor that contributed to the adverse effect of climate change.

Perceived Impact of Inaction on Climate Change

Participants articulated several clear ideas of what would happen if climate change effects are not properly addressed. They showed a high level of awareness of the main effects. These included: increased food prices and food insecurity; higher costs for most goods and services; greater vulnerability; conflicts over water scarcity and distribution; loss of the tourism sector; likely increased health risks and incidence of disease; greater social instability because people will be forced to move; and loss of value in land and home ownership – especially in Portmore.

Identification of Vulnerable Groups and Persons

The community respondents accurately identified groups of people who are most vulnerable to climate change impact. Among those identified were:

1. The poorest people in communities
2. Homeless people who have nowhere else to go
3. Squatters and informal settlers – especially in tourist areas
4. Women with children (especially the young and unemployed women) and those who care for the sick
5. Persons with disabilities
6. The sick
7. The elderly
8. Persons living next to storm drains and along river banks

9. People in Portmore and those with homes and businesses close to the coast
10. Farmers – especially small farmers with limited land and resources
11. People whose houses are built on land with poor soil type – such as marl that absorbs too much water
12. Persons with no insurance (most people)
13. Unemployed inner-city youth

Knowledge of Government Actions and Responses

There was little concrete evidence of awareness of what steps and programmes the government might be putting in place to address climate change. The one exception was with regard to action to improve government housing schemes to be more disaster resistant, and therefore more climate change resilient. Generally, people felt that more should be done at all levels and for all aspects of preparedness. There was no mention, for example, of the recently constituted Ministry of Water, Land, Environment and Climate Change.

Practices

Respondents suggested that building climate change resilience will require the promotion and adoption of key adaptation practices and strategies to reduce risk. The key strategies and practices that community respondents in the focus group sessions identified as being most important were: (1) starting vegetable gardens; (2) recycle plastic bottles and bags – reduce, reuse and recycling; (3) preserve produce; (4) composting; (5) proper garbage disposal; (6) stopping littering; (7) allowing grass to grow along contours and hedgerows; (8) replanting trees at a rate of two for every one cut down; (9) revival of tree planting traditions such as planting the navel-string and tree when a child is born; (10) protecting groynes and infrastructure; (11) living more modestly; (12) using mosquito nets to reduce vector borne illness; (13) checking water storage areas for mosquito larvae; (14) car pooling and taking the bus; (15) reporting breaches when one sees them happening; (16) produce more organic food and use less chemicals and pesticides on farms; (17) reduce electricity consumption – conserve energy; (18) look out for neighbours more and (19) educate oneself.

Longer term adaptation practices that will require more resources and learning

For the long term, community respondents suggested building groynes and gabion baskets to train rivers and drains; installing water guttering and water harvesting technologies at home; and switching to renewable energy sources, as the best ways to adapt to climate change.

Actions that will require more resources and government interventions

Additional longer term actions were also cited as being more the responsibility of government to implement. These included the need to enact the building code and educate people as to why it is important; enforcement of the building code; moving people out of vulnerable areas; and the promotion of animal wastes for bio-fuel.

Awareness of Lines of Credit and Funding Sources for Climate Change
There was extremely limited awareness at the community level of possible sources of funding or credit to implement climate resilient measures – both at the household and community level.

The practice of obtaining insurance for disasters was virtually non-existent. If persons have vehicles, they have car insurance, but insurance to protect against floods, drought, landslides or hurricanes was non-existent.

Respondents overwhelmingly indicated a desire and willingness to retrofit houses or property so that they could implement solar technology water harvesting, but the cost of credit in almost all cases was felt to be prohibitive. Formal loans from banks or from the National Housing Trust (NHT) were too expensive.

The main forms of financing mentioned were: informal partner schemes; loans from family and friends; and remittances from abroad. Trying to save a bit of money for a rainy day or disaster was also mentioned as doable if people had an income, but would not be adequate in most cases, given the high cost of living and lack of employment opportunities.

It was felt that some farmers/fishers might have a level of insurance if they were members of cooperatives or producer organisations, but this too was felt to be low. Access to community funded projects to support readiness, such as through EFJ, GEF-SGP, JSIF or other sources was largely not mentioned, with the exception of the group in Spring Village.

Attitudes
There were strong feelings and attitudes with regard to just how willing Jamaicans would be to become prepared for climate change. Several cultural attitudes need to be changed. Several of these were also cited by the sectoral respondents as well.

For one, the desire for so called "heavy houses" – large concrete block structures that many people cannot really afford, but want in order to have social status needs to be challenged. Social status is a major hindrance in the culture that needs to be addressed. A change in culture is needed so that people will see the value of climate friendly homes. At the same time, people are concerned about crime and security – and this will trump any thoughts about building a home that may be more climate change friendly, but less secure.

Disrespect for the building code was felt to cut across all levels and classes of society. Many people disobey the building code and will try to get around the rules if they can. This was a very important attitudinal change that needs to be addressed.

A further attitudinal change cited by community members was the need to foster community spirit and collaboration. They felt that a single-minded mentality usually prevails. Climate change resilience will require greater community spirit and cooperation.

There is a strong perception that "government should do everything" and provide hand-outs. With no alternative livelihood, people perceive no reason to stop cutting down trees or live on river banks unless there is government assistance or incentives. This attitude also needs to change. In part there is also a belief that alternatives are not really viable. People see no alternative to unsustainable practices if they help to enhance their livelihood and they honestly do not think they have any other option.

Interestingly, although many of the respondents felt that they were at risk from climate change, they did not think others took the risk seriously enough. Unless a disaster happens to you directly or you suffer directly from the effects of climate change, they did not think others in their community were adequately sensitised to the risks involved.

Perception of Personal Risk

The type of climate change risk that people felt affected them personally, varied from group to group. Those who had had direct experience with flooding and/or hurricanes felt their risk was high. This was higher for Portmore residents, retired persons and Spring Valley residents. In Port Maria, participants who had personally experienced a hurricane or flood, expressed the view that they were at risk, while others without personal experience felt they had a lower level of risk.

Roles and Responsibilities

Despite the low level of awareness of what the government might be doing, there was some evidence that participants knew what the correct role of specific agencies ought to be in the process. They also understood what their roles should be. The key government agencies that were identified as having a role in climate change readiness included the Parish Councils, Solid Waste Management Authorities, the Forestry department, the Office of Disaster Preparedness and Emergency Management (ODPEM), the National Water Commission (NWC), the Rural Agricultural Development Authority (RADA), the Ministry of Agriculture and Fisheries (MOAF), Ministry of Health (MOH), Health Clinics and the National Environment and Planning Agency (NEPA).

Non-governmental organisations (NGOs) were also identified as having an important role to play in climate readiness. The Caribbean Coastal Area Management Foundation (CCAM) was one entity that was cited as having an important role. Chambers of Commerce were seen as somewhat important.

It was further suggested that youth clubs, parent-teacher associations (PTAs) and sports clubs could all be harnessed to shoulder some of the burden for community involvement.

Churches were seen as having a very important role in promoting awareness as were schools. Retired persons – who have so much knowledge and wisdom – are an additional resource that should not be forgotten.

Participants felt quite strongly that they all had a role to play and that they could put steps in place to cope with climate change now, but these steps were limited without additional programmes and investment.

Preferred Media Channels and Approaches

Respondents generally indicated that all forms of communication should be used to enhance public awareness and education about climate change at the community level. However, there were some specific suggestions that were highlighted:

- The use of sports champions such as Asafa Powell
- Facebook and social media
- Traditional alternative media – such as puppets and drama
- Face-to-face meetings and discussions to encourage dialogue – through churches, schools, etc.
- Teaching parents through children.
- Prime time news
- Restart JIS visits to communities
- Pamphlets and fliers

Sectoral Focus Group Discussions

The main topics of discussion for the sectoral focus groups were:

1. How the participants ***believe climate change will impact*** their sector overall (negatively, and perhaps also positively);
2. How ***prepared they believe their own organisation*** **is** to serve their client base and what specific steps are being taken;
3. How they perceive their ***own role as a professional*** in facilitating climate change;
4. What they understand the ***climate change needs of their client base*** to be; and
5. What they believe the ***best mitigation and adaptation practices*** to be for achieving climate resilience in their sector and why these are the best practices to adopt?

A total of six sectoral groups were consulted including: (1) energy (2) water (3) construction (built environment and human settlements); (4) health (5) tourism (6) agriculture. These sectors were selected because they are particularly vulnerable to climate change and because they will demand specific actions under the Pilot Programme for Climate Resilience. Representatives in the sectoral focus groups included persons from the public service, private sector, the donor community, teaching and training institutions and the non-governmental organisation community as well. A more detailed description of the members of each group is given:

Agricultural Sector: Representatives in the agricultural sector focus group were from agricultural commodity boards, research institutions, extension services, as well as professionals with particular agricultural expertise in soils.

Construction Sector – Built Environment and Human Settlements: The ten members of the Construction Sector focus group consisted of engineers, architects, parish council representatives and civil servants, lecturers from engineering faculty, surveyors, mortgage lenders, and developers.

Energy Sector: The five members of the energy sector group were representatives of national energy research agencies, energy training institutions, energy utility providers and community funding agencies that support alternative energy community-based projects.

Health Sector: Members of the health sector focus group were largely drawn from government agencies, government health service providers, and from non-governmental agencies with mandates related to health and disabilities.

Tourism Sector: Likewise, the tourism sector focus group's participants were mainly from related government ministries and related state agencies that are involved in managing tourism lands and/or providing support for tourism products.

Water Sector: The three members of the water sector focus group represented agencies that manage water resources, and water utility providers to the business, home and agricultural sectors.

Based on thorough review of all the notes taken and the audiotapes recorded, a set of high confidence conclusions can be drawn. The findings for each individual sector are presented in the following order:

- Agriculture,
- Construction (built environment and human settlements),
- Energy,
- Health,
- Tourism, and
- Water.

Agriculture sector focus group findings

Participants in the agricultural sector focus group discussion identified several ***important negative climate change impacts*** that would affect their sector. They knew that food security will be greatly threatened because changing rainfall patterns will make it difficult to plan production. Water will be scarce. Outbreaks of plant diseases and pests will increase food insecurity yet further.

As was the case with all the other sectoral groups, participants in the agricultural sector group also strongly felt that government services, and especially extension services and government services will be greatly stretched and that the sector as a whole will require much more of the national budget if it is to become climate ready.

On the upside, within the sector several important positive spinoffs from climate change were identified by stakeholders for this sector. The ***most important positive impacts*** from climate change on the agriculture sector identified included the fact that climate change will provide new niche markets for some sub-sectors in agriculture. It will force/push some in the sector to seek new opportunities in neutraceuticals, for example, or in organic production. It will also force the entire sector to think outside the box and look for new opportunities. It will force the sector to be more water and energy efficient and cost conscious.

Other respondents felt that climate change will make the sector more "technological" which may attract youth.

It may force people to value food security and to better appreciate where their food comes from. Others felt that it may also force the country to do more genetic research and to develop our own climate friendly germ plasm and seed banks which in turn may hold marketing opportunities.

Overall, with regards to climate readiness, participants felt that their agency played an important role in research, in identifying alternative livelihoods within the sector, and in training farmers to adapt and to become climate resilient and to change their behaviour. They also indicated that they definitely play a critical role in policy formation and public awareness.

As to how ready they felt their own organisations were to help prepare the sector, respondents indicated that certain solid steps had already been taken to prepare a national Agricultural Disaster Risk Mitigation (ADRM) plan; to help prepare five pilot communities; to train extension officers in climate change and how to communicate with farmers through the MAJIC project. So overall, readiness had improved.

However, more work was needed in tissue culture, germ plasm and in alternative livelihood options for the sector.

Several ***challenges and obstacles*** to climate change preparedness face the agriculture sector including having too few, and too overworked, extension officers.

Once again, political interference was also identified as an obstacle. Participants voiced some frustration at the fact that "every time we change political administration, we change consultants and programme priorities" and have to start over.

Another important obstacle voiced in this sector was the need for greater understanding of climate change at the technocrat level.

In order to improve their ***agency's readiness to help the sector prepare*** for climate change, several additional suggestions were recommended.

First, respondents indicated that change needs to be staggered and not implemented all at one time. Climate change adaptation should be implemented from one level to the next, in a systematic way. As climate change involves all sectors, a planned approach is needed.

Although strategies like tissue culture are important, in the agricultural sector climate change adaptation needs to be more strategically integrated into the overall agricultural industry. Farmers constantly quarrel that even though they follow good practices, they still lose money in the market. So there is a need to ensure that each aspect of the value chain is developed, especially the farming sector, so that the benefits of climate change adaptation can be seen and enjoyed.

In agriculture, adaptation is slow but by making changes permanent it would be more effective in slowing the negative impact of climate change.

More resources for research and germ plasm research are needed.

A long term rather than short term planning and implementation horizon is needed.

Once again, participants also talked about the importance of political leadership and the need to avoid political interference. It was strongly suggested that Jamaica needs the kind of political leadership that will take the decisions that are right not for the short term (five years), but for the long haul. Direct quotes included: "A much stronger political stance on some of these things will be necessary, a sacrificial position that says 'Even if I am not able to take an initiative through, the next administration or my successor will take this thing through."

As was the case for several of the other sectors, respondents in the agricultural sector also strongly suggested that there was greater need for inter-agency cross collaboration and cooperation. Better collaboration among CASE, RADA, UWI, Ministry of Agriculture, through the Commodity Boards, research entities such as the SRC, was identified as being important.

As far as the ***next five years*** are concerned, the most important measures and practices to be implemented were identified as:

- Agroforestry for retaining natural resources, composts, bio-digestion (using animal waste to create energy), wind energy (convert small energy to wind energy)
- Dry water farming
- Reduce monoculture and plant more crops to reduce plant disease. (More warmth via climate change means more chance of animal/plant disease)
- Using biomass fertilizer and biofuels
- Greater awareness. It is critical for an understanding of climate change and its impacts to be disseminated across the nation
- Composting - another important practice that will help to reduce burning
- Wind energy
- Protected (green house) agriculture
- Water harvesting
- Involvement of farmers/fishers in data collection

With regards to ***awareness and knowledge of funding sources*** to support client climate change adaptation within the agriculture sector, it was recognized that there was an insurance system in place for bananas, but little available for farmers. The Caribbean Risk Insurance Fund (CRIF) is starting to go there, but this was seen as still new.

The most ***vulnerable groups*** identified within the agriculture sector identified by respondents include small farmers and fishers primarily. Farmers on steep slopes were particularly identified as were fishers on vulnerable coast lines.

Key gaps in knowledge identified as priorities for communication within the agriculture sector were very similar to those identified in the other sectors. Key messages included:

1. Personal responsibility. The average citizen should be storing water and consider more efficient use of water.
2. Recycling – Pet Bottles
3. Enforcement (sanction) - a lot of what works in other jurisdictions is because of the application of sanctions; we need to do that here too. Make the penalty suited to the action.
4. The messages on climate change should get back to the basics regarding how do day-to-day activities have an impact - instead of some highfalutin things
5. More focus should be on education at the early childhood stage. It is there at the primary stage, but not sustained at the secondary level so there is message erosion, because messages are not reinforced
6. Climate change is here and will be here for a very long time. Reinforce the point that climate change does make the existing problems that we are not addressing, worst.
7. Messages need to be developed for different audiences- rural and urban

With respect to appropriate ***communication channels and media*** that the group felt should be recommended to enhance awareness of climate change within the agriculture sector, the following were suggested:

- Internet sources should be used but radio is still an important medium as well as print. The Farmer's Almanac is still very popular amongst farmers.
- SMS (short message service such as texting) is appropriate for basic awareness. If a farmer needs to get certain information from the MET Office, then you are talking about a different media: one-on-one. The nature of the message should determine the channel used.
- Community Groups are important ways to reach people. Community meetings should become more informal. People already have information but they do not know it is related to climate change as they do not know how to term it. Talk about climate change but you need to get it down to the layman terms. Public education efforts should focus on what an individual do. It should be interactive with the people. Interactive communication is important - talk to people on a one-on-one level, break down the message to their level. You need to go in with an attitude that says - "yes, I am coming to tell you this...but I am also coming to learn from you"
- Social events are needed to get more interactive with persons and convey message on climate change. People (and children) can learn quite a bit from fun-days where they get to interact with various media such as "global warming booths" and agricultural products.
- Public relations activities should be done for different audiences e.g. Farmers and their children-essay competitions, radio programmes, brochures, websites and the church. The church is one institution that isn't approached often enough.

Construction (Built Environment and Human Settlements) sector focus group findings

A very "lively" discussion was had in the focus group dealing with construction/human settlement/built environment. The ***most important negative climate change impacts*** felt to affect the construction sector most directly included the destruction of coral reefs that will in turn damage the road system and infrastructure. It was recognized that severe coastal road damage due to storm surge and rising sea levels would occur.

As was the case with both the energy and water sectors, the construction sector also felt that climate change would require a drastically increased infrastructure budget.

Re-rationalisation of the development/building approval process would be required as poor area choices for new developments will worsen climate impacts. Poor land practices (deforestation, use of prime agricultural land) would also worsen climate impacts, it was felt.

There would be greater demand for competent parish council approval processes in the face of current approval enforcement and regulations which are now inadequate.

Respondents all felt that lack of respect for the building code will worsen climate change impacts unless it is enacted and unless new climate friendly building methods and materials are identified and unless enforcement capacity increases. With this will be the need to retrain professionals and change engineering and architectural curricula to better reflect climate realities.

As was the case with the water and energy groups as well, the construction sector also felt there was need for an improved line of credit for homes and business to allow retrofitting for climate change adaptation. This was felt to be especially among more vulnerable and poorer households.

The ***most important positive impacts*** from climate change on the construction sector identified by the participants include the generation of new demands for services and skills and new niches for architects, engineers and project management professionals. They also felt it would create new training opportunities and curricula and would create new market demands to make the entire built environment sector "go green".

When asked how ***important they felt their own agency's role*** was for improving climate change preparedness in the sector, respondents indicated that demand on the construction/built environment sector will be great, therefore all the key agencies and professionals in the sector will play very pivotal roles. In the short term, demand will be greatest on engineers and architects and government organisations such as the National Works Agency. But increased demand for training curricula and for trained parish council professionals will also be critical. Climate change will strain existing infrastructure and construction and therefore, promotion of the building code will also be critical.

While their roles were deemed to be very important for climate readiness, as far as the ***readiness level within their own respective agencies*** was concerned, for the most part this was not as high as they would like. Two main reasons were cited. The inadequate level of readiness within the sector was attributed, in part to the fact that the building code exists but is not enacted. This is the major drawback to readiness. Another factor limiting readiness was felt to be the fact that the parish council planning approval staff were not sufficiently trained.

Lack of readiness was linked to ***perceived challenges and obstacles*** faced by the construction sector. Once again, the primary obstacle identified was the fact that the building code has not yet been enacted. With regards to the approval process itself, participants complained that the cost of training parish council planning staff, which is currently done by the Bureau of Standards, is too prohibitive, so it does not happen as it should.

Another constraint to a climate friendly approval process is that parish councils no longer have the in-house engineers or planning staff that they used to have in the past. Approval processes were also felt to be far too slow.

Architects and engineers do not have a 30-year plus horizon which is what is needed now to be climate ready.

Cultural attitudes were also identified as a constraint. High class ambitions, it was felt, trickle down to everyone. Everyone wants a big house with all the high carbon footprint "bells and whistles." But this was felt to be no longer affordable for Jamaica. A lot of public awareness work is needed for attitudes to change and for more climate friendly types of construction to be cultural acceptable.

Similarly, it was felt that in Jamaica, developments and building designs were not driven by what is most appropriate, but by what developers want to do and can get away with. This also results in lack of a spatial planning approach and respect for geography. It was suggested that Portmore is testimony to this fact. There are some areas people should not live in. These should be no build zones. But such hard choice decisions are also often "hot potatoes" politically and longer-term interests often lose over short-term political interests. Political interference and corruption hinders proper approval processes. "Big people" always get through, it was suggested.

Another related constraint was the lack of enforcement with regard to weight restrictions for the nations' roads. Road infrastructure deteriorates because trucks are too heavy and weight restrictions are not enforced. With climate change, this type of damage will be even less affordable than it is now.

In order to ***enable their agencies to do a better job*** for advancing climate readiness, respondents perceived several measures. First and foremost they felt that the building code needed to be enacted and enforced and that greater public education was needed about the code.

They also felt it was important to first widen perspective and current understanding of what "infrastructure" is within the Jamaican culture. They also felt that architects and engineers should resist the request to work on cost driven projects – in other words, they should design what should be the best buildings and infrastructure and then find funding – not the other way around.

Respondents also felt that spatial planning should be centrally coordinated and that there should never ever be approval for developments like Portmore. They also felt that someone should be held accountable for the fact that Portmore was ever approved and that developers who violate approvals should be embarrassed and publicly shamed in the press.

Steps also have to be taken to resist demands to build on most fertile land. The example of the new Caymanas development was cited as an example since it is using one of the most fertile land areas in Jamaica and is also prone to flooding. Respondents found it ironic that just above the Caymans plain there is infertile, limestone land that will never flood and which would be much more appropriate for development, but because it would be more expensive to do so, it will not be considered.

A further critical step that needs to be addressed to improve climate resiliency within the sector is the need to build the capacity of the Parish Councils. Every Council should be re-equipped with residential surveyors, engineers and planners. Parish Councils also need increased staff for enforcement and to be able to follow up with those developers who do not build to code or to approval.

When asked to identify the ***most important measures and practices*** to be implemented within the construction sector to advance climate resiliency over the ***next five years***, construction sector respondents suggested a number of measures that closely echoed the constraints they had identified. These included:

1. Enacting the building code. Enforce the building code.
2. Raise the Palisadoes road.
3. Retrofit existing housing designs for ways to keep cool.
4. Look at alternative building materials – reconsider wood construction.
5. Integrate rain water harvesting in every home and building
6. Implement standards for water structure and roads. No laws at present for these.
7. Build the capacity of parish council officers and planners to use the building code.
8. Re-instate trained engineers, architects and designers in all Parish Council approval offices.
9. Enforce and monitor once approval has been granted for any type of development, construction or infrastructure project.
10. Need to make use of our traditional cultural knowledge
11. Encourage tree planting and green environments within every development plan.

12. Public education at primary level and sustain. Change thinking to conserve.

The ***most vulnerable groups*** identified within the construction sector were the hotel/tourism sector; all householders and everyone who drives on the road.

In terms of financing and credit sources for homes and businesses to improve their buildings and infrastructure, respondents identified individual home equity loans from banking institutions and from the NHT. They further suggested that for businesses, energy audits should be done so that private sector entities could get a loan at concessionary rate.

With regards to the ***key gaps in knowledge*** for which priority messages for communication should be promoted, two were identified. These included (1) promotion of the building code and increased awareness about no-build zones; and (2) the need for cultural changes and personal responsibility.

Construction sectoral participants identified training and one-on-one sessions with sector professionals as the most important communication channel for this audience, while public service announcements on prime-time mainstream media, use of social media and the internet were felt to be more appropriate channels for the wider public.

Energy sector focus group findings

The ***most important negative climate change impacts*** reported by participants to affect the energy sector most directly included the need to urgently provide better energy infrastructure (such as grids and energy production plants) since it was felt that current infrastructure is not adequately maintained and will be vulnerable.

It was also felt that the national budget will be severely impacted as energy adaptation and mitigation will require greater financial resources. Competition for scarce government resources would become even more severe and there will also be increased demand for energy from increasingly competitive different sources.

Another urgent need identified was to balance the increasingly popular demand for renewable energy sources with the need to maintain and improve the current electricity grid. Balancing strategies to satisfy immediate needs while also considering future needs would be extremely challenging.

Participants also stressed that because of climate change there would be much greater need for collaboration among different government agencies that generally speaking do not normally collaborate well together.

With regards to ***positive opportunities that climate change might bring***, participants felt that climate change would definitely create new jobs and new opportunities and more creative job arrangements that would better attract young people. They also indicated that climate change would demand creation of new technologies and would thus spur innovation.

In addition, they felt that climate change is already bringing a positive shift to green energy technologies, but that this should not be focused only on solar energy. There was need to look at the broad spectrum and include wind and biofuels as well.

As far as how representatives perceived their own ***agency's role*** in climate change preparedness, because the types of agencies represented were variable, they had different responses. Overall, because energy is seen as absolutely essential to the proper functioning of all other sectors, they felt they had a very critical role to play. For the government agencies, they felt their role was quite critical especially with regards to policy formulation. The energy service providers clearly saw their role as important since most Jamaicans are on the grid and need energy. The other representatives felt their role was more important with respect to community preparedness and training. All felt they had a critical role to play in public education and awareness about energy and climate change.

With respect to how 'ready' they felt their own agency was at present to play this role, respondents all replied that they were somewhat ready, but that most of the climate-readiness had been focused on going "green" and becoming energy efficient within their own

organisations primarily. Only two described themselves as already playing their role with respect to training and/or community preparedness. At the same time, all felt that while they had made some progress with regards to education and awareness, they needed to do much more work in this respect but could not because of challenges they faced.

With regards to what ***is needed in order for their agency to do a better job re: climate readiness*** respondents suggested that removal of barriers and promotion of incentives and tax breaks for adoption of energy efficiency was needed among clients so there would be more uptake of energy efficient measures and greater individual investment in energy efficiency. The need to improve on available technology already, and implement budget for energy and livelihoods was also cited. The creation of affordable energy solutions was also identified.

Also important, given the challenges faced by the sector, was the need for more inter-agency synergy and coordination. Each agency does what it is good at but not what needs to be done therefore synergy and union needs to be brought into consideration.

The need to enact and enforce the building code to include energy efficient measures was also identified as a priority within this sector.

Financial realities loomed large in this sector as well. High staff turnover was attributed to lack of pay. It was strongly felt that improved pay was needed to keep talented people in place.

Participants also felt that it was very important for the public to be educated on how the current JPS grid works and what can realistically be accommodated with regards to renewable energy linked to the grid.

Likewise, representatives from the public sector agencies felt that more work needed to be done to educate the public as to what the government was doing to promote energy efficiency.

There was also agreement that the sector needed less political interference and that this was especially important in the light of climate change.

Also very importantly, public education was needed to promote the energy policy so people understand it easily.

One very important need that the discussants felt was also necessary was the promotion of existing loans and lines of credit that people can access to retrofit their homes and businesses. They felt that the NHT needs to be made more aware that by giving more loans to people to improve their energy efficiency, they will have more monthly money to put towards their mortgage.

Some of the ***perceived challenges and obstacles*** to climate change preparedness faced by the energy sector were identified as lack of sufficient financial resources to keep and maintain

trained staff. High turn over results because remuneration is generally low and once staff receive training they often leave to become consultants. The slow replacement and upgrading of infrastructure was also identified as a major challenge for the sector as a whole.

Also stressed was the impact of political interference on the sector. It was felt that changes in political parties often change good research work and progress made because new incumbents do not want credit to be given to predecessors. But good research takes time and a long-term view for the country is missing among political directorate. In the face of climate change, this was no longer seen as affordable.

Another major challenge identified by the sector was weak inter-agency collaboration. Agencies that should collaborate across sectors do not do so well enough. There was also greater need for cross-agency recognition of what each other is doing.

Lack of enforcement of the building code was also identified as a hindrance to energy efficiency. Likewise, cultural attitudes were identified as a major impediment to energy conservation. It was felt that people do not believe in energy conservation. They believe energy should be free or very cheap.

Respondents further identified the need for, or lack of, tax incentives and tax breaks for the sector to spur innovation and adoption.

Another important obstacle was the need for more trained people – even at the community level – to do energy audits.

Planning horizons also need to be changed in the face of climate change. Current practice seems to focus on a short-term rather than longer-term horizon. This is no longer an affordable option in the face of climate realities.

Another interesting obstacle discussed was the seeming "confusion" between what JPS can do – and the importance of the grid – versus what renewable energy technologies can really provide. In other words, popular perception seemed to be growing that JPS is no longer relevant at all. But in fact, Jamaica cannot do without the grid altogether. The need to move into alternative and renewable energies will not be sustainable without proper respect and recognition that the grid, and JPS's private sector role in operating the grid, should be maintained.

Likewise, there is also need for greater clarity on the appropriateness of alternative energy options and their suitability for different markets. Solar energy options are not necessarily affordable or suitable for all energy consumers.

With regards to the most important/best ***measures and practices*** to be implemented within the energy sector over the next five years respondents suggested that: (1) agriculture needs to become energy smart in irrigation and green house or protected agriculture; (2) the

transportation sector needs to be overhauled and made more energy efficient. Incentives need to be given for smaller vehicles, use of biofuels, car-pooling, riding bikes. Mass transportation promoted; (3) rain water harvesting needs to be encouraged across the board, as well as solar and wind energy; (4) public awareness and education is needed at the very youngest level to change cultural attitudes and (5) garbage recycling and "trash to energy" schemes need to be encouraged.

On that note, however, with regards to what ***knowledge of funding sources*** existed to support client climate change adaptation within the energy sector, participants primarily identified: (1) the NHT; (2) family loans or informal partner saving methods; and (3) the Jamaica National Building Society (JNBS) as the key sources of credit for promotion.

Participants did, however, also recommend that the national budget would have to be adjusted to focus more on ways to help with climate resilience and that there should definitely be the creation of incentives to promote energy mitigation measures.

The ***most vulnerable groups*** identified within the energy sector included farmers and fishers (especially small farmers). Special measures needed would be solar pumps for these persons. Youth were also identified as being vulnerable, especially in more vulnerable communities. The poor and lower income families who have less access to credit were also cited, as were vulnerable communities (i.e., communities in at-risk or hazard-prone areas).

The key gaps in knowledge identified as priorities for communication within the energy sector that were identified echo the recommendations cited above. Key messages or communication topics recommended by the group included:

- Government alone is not responsible for dealing with climate change. We all have a role to play
- Awareness of the energy policy
- More emphasis on energy conservation
- More awareness on alternative sources of fuels
- Messages related to the need for the grid
- More awareness of how Jamaica's energy policy compares to those of their countries, and not only those in the Caribbean
- Solar and wind energies are not the right solution for everyone. If your monthly bill is below a certain level, it won't make economic sense for you
- More awareness of Vision 2030 as it pertains to energy consumption

The ***communication channels and media*** recommended to enhance awareness of climate change within the sector included (1) fairs and exhibits, (2) environmental calendar day events; (3) Green Expo; (4) mainstream news; (5) social media; (6) messages on utility bills; and (7) post offices.

Health sector focus group findings

Respondents in the health sector focus group identified several ***negative climate change impacts*** that climate change would bring. They indicated that there would no doubt be damage to health infrastructure and services. Increased demand on health services will be a problem as they are already understaffed.

Increases in vector borne disease such as malaria, dengue and also diseases such as asthma would also result. Increased food insecurity due to climate change would also trigger related impacts on health as people would have more costly food, or less availability of food and their health would suffer as a result.

With the increases in health related impacts, increased need for blood would challenge the sector's ability to obtain a sufficient supply. There would thus be an even greater need for mobile blood donation clinics.

Persons with disabilities (physical and mental) will be exacerbated and yet there is insufficient recognition of their needs now, let alone with further climate change impacts.

Mental health would likely also suffer. Climate change impacts on livelihoods will raise stress levels.

Lastly, they felt that climate change would definitely bring demand for the health budget to be increased.

Unlike the other sectoral discussions, respondents did not feel that there would be any real ***positive impacts*** from climate change on the health sector other than the fact that health issues may get greater visibility and the needs of persons with disabilities vis-à-vis climate change might also get greater recognition.

However, as was the case with the water, energy and construction sectors, representatives from the health sector also ***felt that the sector was critical*** to climate change resilience and that their individual agencies had a very important role to play in achieving resiliency. Government representatives felt they had a very particular and important role to play in shaping health policy, in education, in preparedness and in emergency response.

As far as how ready they felt the sector was to respond and how ready their own organisations were to play this important role, mixed responses were received. Government representatives felt that by now having a national strategic plan for emergency response and an emergency response unit in place, this better equipped them to respond to climate change. They felt that the sector was now pretty ready to deal with vector borne diseases that climate change would bring. But in terms of preparedness for dealing with increased blood demand, much more needed to be done on the collection front.

Some of ***the challenges and obstacles*** that limited their readiness included an over-reliance on volunteers (this was for the blood donation/collection weakness). Another point raised by government representatives suggested that they can recommend policy but not legislation, and this was a weakness.

Cultural taboos which discourage the donation of blood were also identified as being particularly challenging for achieving the level of blood donation that will be required.

It was also strongly felt that the lack of inclusion of persons with disabilities and their needs in considering preparedness for the sector was a gross oversight that needed to be corrected.

To enable their agencies to do a better job at preparing the sector for climate change, health respondents suggested that more resources were required to improve their capacity and greater support was needed for health inspectors to assist in making households climate/health friendly.

Incentives and subsidies to promote vector control methods – especially in poorer and more vulnerable households were also cited as being very important.

When asked what were the ***most important measures and practices to be implemented over the next five years*** to help make the sector more climate ready, participants made several different recommendations, most of which were public awareness in nature. In fact, participants recommended that there should be a policy and regulation that all media should give the government two hours per day to do a free public education related to health issues.

The first topic for public awareness cited was the need for greater public education on the climate change health impacts that can be expected. There is limited knowledge about climate change and the best way to improve this is to educate the population.

Continuing with the importance of public education, it was further felt that for vector borne diseases a sustained public educational programme was required and that promotion of simple, preventative practices using messages such as “Use a mosquito net”; “Check for mosquito larvae” and “Cover water storage tanks” would go a long way in addressing much of the climate change impacts that are expected.

Similar simple promotion of kitchen gardening was also thought to be very important.

More education was also needed to encourage people to donate blood and to counter the cultural taboos that limit people from doing so as were messages to promote good and affordable nutrition so that people would be healthy enough to donate blood, if needed.

Other public awareness efforts, it was suggested, should focus on the need to protect health infrastructure in the face of climate change.

And lastly, participants felt that persons with disabilities needed to be harnessed as activists for climate change awareness and for preparedness.

Within the health sector group, with regards to ***awareness and knowledge of funding sources*** to support client climate change, it was generally recognized that people need good health insurance across the board, not just for climate change. As far as preparing their homes to be healthier (vector free) or to conserve water, participants only identified the NHT as a possible source of financial resources or credit.

The m***ost vulnerable groups*** identified within the health sector included different clients but mainly the elderly, children, and the disabled and single female parent households.

When asked to identify the ***key gaps in knowledge*** that should be prioritised for ***health communication***, most of the responses reinforced those that have already been priorities above. These include simple steps to limit vector borne disease; greater awareness of the links between health and climate change and what risks are at stake; the need to stay healthy and donate blood if needed; staying food secure by planting kitchen gardens and so on. Additional messages were also identified to support the needs of the disabled in a more direct way.

As far as ***recommended communication channels*** and media to use for such messages, participants recommended the following:

1. Develop a message to the blood donors aimed at dismissing myths. Use Digicel/Flow to get the information out. Design programmes for the schools to increase awareness. This should be a specific campaign
2. Health education officers and health inspectors. Both health education officers and health inspectors are the frontline officers that work directly with community people and householders on the ground. The job of health inspectors, for instance, is to investigate incidences of vectors such as mosquitoes at the community and household level. Health education officers are charged with promoting specific health messages at clinics and in the wider community. Their job is to serve as the first line of communication for health education. As such, their capacity to communicate climate change related messages needs to be supported and enhanced so that the public understands the impact that climate change will have on health and will begin to make behavioural changes to mitigate these impacts.
3. Blind persons listen to the radio more than any other group. Increasing the size of print materials is necessary for this community (visually impaired). Audio CDs should be placed in school libraries. Deaf persons use visuals and text a lot. For intellectual disability, use dramatization (or display the concept in the message). Persons with physical disabilities do not read a lot, therefore encourage a playwright to do a real live dramatic piece on climate change. Host competitions among students from the different schools including school for the disabilities.

4. Interpersonal communication is very effective for reaching individuals, especially rural communities and in reaching health care providers.
5. A communication workshop should be designed for community health workers where doctors and nurses ensure that they are aware of climate change and pass on the message to their patients. Training is costly but once it is realized it will sustain itself.
6. Targeting parents with disabled children to ensure that the parents are also informed can help to reemphasize the effects of climate change

Tourism sector focus group findings

As was the case with the other sectors, the tourism sector participants were also asked to identify what the ***most important negative climate change impacts*** affecting their sector were. Unanimously they felt, that the sector as a whole would be very severely impacted and that it was exceedingly vulnerable. Tourism coastal properties will be inundated and damaged. Insurance costs will skyrocket making Jamaican tourism product less competitive. Overall costs of operation will increase with increased energy, food and water costs.

Likewise, tourism demand for water resources and energy and food will face increasing competition and demand from other sectors.

As a result, they felt that that tourism market will change. Demand will change if northern countries get warmer. Climate change related health impacts will also impact tourism. If there is greater risk from vector borne illnesses in tropical climates, or if the coral reefs are damaged and sea level rise affects beaches, there may be much less demand for Jamaica's tourism products.

Increased energy costs and airfare will increase costs to travel for Jamaica's product and if climate change brings warmer weather to northern countries they may be less inclined to travel south.

As far as ***positive impacts*** that might arise for the sector as a result of climate change, the only thing that was cited was the fact that climate change may bring more attention to the sector and help make it more disaster and climate change resilient.

Participants in this focus group were mainly drawn from government agencies. In terms of their perception of the ***importance of their own role*** in helping to make the sector more climate resilient, respondents felt that overall – the sector as whole – was vitally important to the Jamaican economy - both in terms of employment and foreign exchange. So it needs to be a priority sector in climate change preparedness.

As was the case with the energy, water and health sectors, the tourism representatives saw their own role as being especially important at the policy level and with regard to public education and awareness. They felt they had an important role to play in bringing stakeholders together and in brokering/relaying among different stakeholders.

However, they also felt that they could only advocate and not execute or implement policy recommendation and this was seen as a drawback. Ultimately, individual tourism product operators had to implement and they were unfortunately, not part of the focus group discussion.

Perceived challenges and obstacles to climate change preparedness faced by the tourism sector included challenges in maintaining beaches for "free" as the public expects. With climate

change, beach maintenance will become increasingly expensive. Also noted were the lack of incentives for implementing climate friendly measures on property. To prepare properly for climate change, tax breaks and incentives will be needed to help the sector prepare, as will sources of inexpensive credit to help private sector tourism entities retrofit with energy and water conservation technologies.

At the same time, it was also noted that within the sector, some players (especially foreign interests) have only a short-term horizon. They are not interested in long term climate impacts. So they become part of the problem rather than part of the solution.

In order for the sector to ***be better prepared and to overcome some of these obstacles and challenges***, respondents felt that greater awareness within the sector as a whole would help and that a climate change adaptation strategy for the sector was also needed.

In order to improve the sector and help make it more climate resilient, tourism sector respondents in the focus group recommended the following as the most important measures and practices to be implemented over the next five years. These include:

- Artificial reef construction
- Energy conservation programmes
- Greater involvement in beach management
- Training and awareness of property staff
- Water conservation technologies and strategies
- Beach set back controls
- Lion fish consumption and collaboration with fishers
- Protection of mangrove resources and sea grass beds

As far as being aware of possible ***funding sources*** to support client climate change adaptation within the tourism sector, it was acknowledged that tourism operators currently have only regular private sector bank loans to access. The previous EAST project provided some resources for 'going green' but that was over many years ago and those programme funds no longer exist.

The ***most vulnerable groups*** identified within the tourism sector were essentially identified as all hotel and tourism operators on the coasts since sea level rise will affect them directly.

With respect to the ***key gaps in knowledge*** identified as ***priorities for communication messages*** within the tourism sector, the following recommendations were made:

- Messages and knowledge about artificial reef construction
- Promotion of energy conservation programmes
- Promotion of community involvement in beach management and the benefits to tourism operators of community beach management
- Training and awareness of property staff in climate change matters and issues

- Promotion of additional water conservation technologies and strategies – both among owners, and among hotel guests
- Promotion of beach set back control requirements and promotion of the benefits they will bring to operators in the long-term
- Promotion of lion fish consumption and collaboration with fishers
- The importance of protecting mangrove resources and sea grass beds

In order to reach stakeholders within the tourism sector, it was recommended that local tourism association networks, mainstream media and social media would be the ***most effective communication channels.***

Water sector focus group findings

For the water sector, the ***most important negative climate change impacts*** identified was the overall decrease in precipitation and hence ground water supply that climate change will definitely bring. This in turn, it was felt, would lead to severe impacts on agricultural production because of changes in rainfall patterns and would likely decrease production over all. Water resources will diminish and become more scarce and this in turn will bring increased demands for scarcer water resources from competing interests possibly leading to conflict.

With sea level rise, saline intrusion into water wells and underground resources will happen. The effects of climate change will be worsened or exacerbated due to weak water infrastructure (pipes and pumps) and distribution networks. Extreme weather events such as flooding will damage the already compromised infrastructure further.

Extreme flooding events will lead to further siltation of coral reefs due to increased water runoff from hillsides into seas.

Despite these negative impacts, participants also felt that some ***positive impacts*** would also occur for the sector. Respondents felt that climate change will bring more attention to the water sector which is now currently undervalued in the minds of the public generally. They also felt that with greater attention being paid to water, higher regulatory standards to protect water resources might also be introduced and could lead to greater control in irrigation and greater rationalisation of water use.

They likewise felt that with water becoming an increasingly scarce resource due to climate change, there would be greater incentive for people to improve rain water harvesting and perhaps the introduction of more climate friendly building code practices and requirements. With it, climate change will bring greater ingenuity and innovativeness to address water issues, and this will also generate new public-private partnerships.

All of the participants in the focus group were representatives of government agencies and ***felt that their agency played a very critical role*** with respect to climate change preparedness. All government agencies with water mandates are critical to climate change adaptation, they asserted, because "water is life" and everyone else needs water which will be severely impacted by climate change.

In terms of just ***how ready they felt their own agency*** currently was to play this important role, responses were likewise consistent. They felt that overall they knew what needed to be done and were ready to play their role, but needed greater capacity building, more staff and more financial resources to do so effectively.

In fulfilling this important role, respondents also perceived some very real ***challenges and obstacles***. Chief among these was the need for greater inter-agency collaboration. Data storage

and maintenance was also identified as a major challenge as the sector has experienced incidences of extreme data loss in the past.

Vandalism and damage to water gauges and measurement equipment was also cited as an important constraint.

Human resource issues were also felt to be a critical constraint as there is currently insufficient resources to keep and maintain committed staff. Nor are there sufficient measures to bring in new staff as older staff retire. Additionally, it was felt that unless climate change indicators were included in job descriptions, it will not get sufficient attention from the staff that are in place because they have competing responsibilities.

The need to upgrade aging water infrastructure will pose serious challenges as climate change impacts mount, it was felt.

The final two constraints mentioned were attitudinal and culture in nature. They felt that there is a culture of not reporting leaks as only 70% of water leaks are reported and when they are, they are not adequately addressed. This was in part, it was suggested, because generally, Jamaicans do not have a full appreciation for the true cost of water.

In order for their organisation to overcome these challenges and to be ***better prepared to play their part in climate readiness***, respondents felt that proper archives and records needed to be better kept for monitoring and evaluation purposes. More data collection was needed and greater community involvement in monitoring and evaluating of rainfall resources was also important. Likewise, greater capacity was identified for doing monitoring properly and for enforcement.

Human resource capacity also needed to be re-examined. It was felt that there was need for more staff and more specialised trained staff; remuneration for staff needed to be improved in order to keep trained people; and also climate change indicators and tasks needed to be included in job descriptions. More work also needed to be done to train and sensitise staff about climate change as well.

The re-rationalisation of water resources also needed to be considered. Allocations to the cruise ship sector need to be reconsidered to look at what the real cost to the country are in providing that service to the cruise ship industry.

Climate readiness would also not be possible unless improvements in water infrastructure were urgently addressed. Bad wells needed replacing, as did bad pipes and canals.

Cultural attitudes also needed to be addressed through the promotion of messages about the real cost of water as there is no incentive to conserve at current costs.

Lastly, to truly play their role properly, representatives also strongly insisted that any political interference in the sector was completely unacceptable.

To prepare the sector for climate change, the ***most important measures and practices*** to be implemented within the water sector over the next five years identified were:

Infrastructure

- Community monitoring of rain gauges and involvement in rain data collection
- Aquifer recharge
- Need improved infrastructure, wells, pipes and canals.

Home Consumption

- Water conservation
- Water harvesting
- Regulations and enforcement to prevent wastage at homes, businesses and on farms.
- Changes to the building code to encourage water conservation
- Rewards for homes and businesses that include water conservation and harvesting
- Rainwater harvesting and storage should be part of any new development before approval is given
- Create laws that buildings have storage facilities to capture rain water

Agricultural Use

- Promotion of more affordable drip irrigation methods and on-farm water harvesting technologies
- Promote dry farming methods where possible
- Encourage irrigation at night – not during the day
- Need for legislation that all farms have some type of water harvesting system.
- Need for renewable sources of energy to pump water. Need to get away from fuel based sources.
- Greater training of farmers in sustainable irrigation and penalties if not adopted. Timer controlled distribution of irrigation water.
- Employ alternative energy sources for water pumping

Cultural Attitudinal Changes

- Need to change the culture in NWC to find/account for water and deal with leaks when they happen
- Proper pricing of water. Price needs to be re-examined so water can be realistically valued and attitudes changed.
- Need greater reporting of leaks and responses for fixing them when reported
- Need to lower demand through looking at competitiveness of demand, harvesting, drip irrigation, night-time irrigation to lessen evaporation during day and allow plants to absorb more water.

With regards to ***knowledge of funding sources*** to support client climate change adaptation within the water sector, the respondents primarily identified NHT and JNBS as sources of credit, but did say that more should be done to promote community-based government project initiatives for water user associations such as those that have been supported under the FAO-EU irrigation initiative.

The ***most vulnerable groups*** identified within the water sector were farmers and vulnerable households.

The key ***gaps in knowledge*** identified as priorities for communication within the water sector include:

- The high cost of water
- Messages to promote water conservation and harvesting and
- Cultural changes to value water.

Most of the same communication channels that the Energy Sector group identified were also echoed in the water sector group. However, they also suggested that the best way to communicate with farmers was largely through community groups and farmer groups.

Chapter Summary

This chapter presented the results of the household and online quantitative surveys followed by the results of the sector survey. Tables with frequencies and cross tabulations, as well as pie charts were used to illustrate some of the quantitative results. Next the focus groups results were presented. The findings from four community-based focus groups were presented first. These were followed by the findings from the six sectoral focus groups. The sector focus groups results were presented according to each sector in the following order: agriculture, construction (built environment and human settlements), energy, health, tourism and water.

Analysis

In this section, the findings of the survey and focus group are discussed. Given that the actual data set for the 2005 study was inaccessible, comparisons are made between the 2005 KAP study and the current study, where appropriate and possible, by relying on information presented in the final report of the 2005 study. There is particular focus on assessing changes that have taken place within the public sector given their important role and responsibilities in serving Jamaicans when it comes to matters of climate change. As such, a detailed comparison is made between the 2005 KAP study public sector respondents and those of the current study.

Taken together, the quantitative survey results and focus group findings tend to point to some interesting observations. The surveys indicated fairly high levels of knowledge about climate change with the various samples (household, sector, online). This high level of awareness was also confirmed in the qualitative investigations. Comparatively, the online and sector samples seemed to have comprised more highly educated persons and so it is not surprising that their knowledge levels of "climate change" was above 90%. Some 94.2% of online respondents and 97.4% of sector respondents indicated that they had heard the term, while over 70% provided an explanation which had the theme change/variation in climate globally, temperature and weather patterns. More specifically, 70.6% of the sector sample, gave an explanation with this theme while 73.5% of online respondents gave an explanation reflecting the idea of differences in weather patterns.

The household sample, which had a wider variation in education levels, with most persons completing secondary level, also had a fairly high level of knowledge about climate change, with 82.6% indicating that they knew the term, but only 56.4% indicating an explanation of the concept as change or variation in climate globally, temperature or weather patterns. A cross-tabulation which explored the relationship between education levels of household respondents and their hearing the term "climate change" showed that there was a significant difference among respondents' education levels in relation to whether or not they heard the term "climate change". Persons who completed tertiary level education were more likely to report having heard the term. This suggests that education levels should be considered a key segmentation variable when planning any communication-based intervention.

In comparison to the 2005 KAP survey, there has definitely been a change in levels of knowledge of the term "climate change". In the 2005 KAP survey, while only 3.9% indicated that they did not know, or were unsure about the term, an overall 77.9% were able to provide an accurate interpretation of the concept (BRAC, 2005, p. 7).

Many respondents from the household (78.4%) and online (73%) surveys indicated that they did not think the government was doing anything about climate change. This finding was echoed in both the qualitative community-based and sectoral discussions. While this lack of awareness of what the government is doing might point to a general lack of interest in climate change matters, it is interesting to note the respondents still felt very concerned about climate change;

49.5% of the household sample and 44.8% of the online sample were very concerned about climate change. Compared to the 2005 KAP study, the 2012 study indicates that the level of concern has reduced over the years. In 2005, it was reported that 62.6% of respondents then reported that they were very concerned about climate change (BRAC, 2005, p. 18). In 2012, only 49.5% of the household sample and 45% of the online sample reported being very concerned about climate change. The challenge for any public education or campaign strategy will be to translate this apparent reduced level of concern into an increased interest in matters such as knowing about one's community's level of risk associated with climate change.

Based on the qualitative investigation, however, there is a considerable level of awareness of "community risk factors" that can serve as a foundation for such an approach. The focus groups pointed to participants being more aware of their community's level of risk when they had had a personal experience with a fairly extreme climate change event such as flooding or hurricanes. In contrast, from the quantitative survey, many indicated that they did not know much about their community's level of risk; 37.3% of the household sample and 35.2% of online respondents did not know much about their community's risk. Even in terms of their residential location, survey respondents seemed unaware as to whether they were living close to an area that could be affected by climate-related disasters; 13.3% of household respondents and 20.4% of online respondents stated they did not know if they were living close to an area that was susceptible to climate-related disasters.

A majority of respondents (52.1% of household respondents and 86.2% of online respondents) also indicated that they worked or went to school (83.9% of household students and 86.2% of online students) outside of the community in which they lived – a situation which has implications for an emergency situation requiring evacuation.

There were significant differences between respondents' location (urban/rural) and gender (male/female) in relation to their knowledge of their community's risk associated with climate change. Males were more likely to report that they had at least a fair amount of knowledge about their community's risk. Persons living in rural locations were more likely to report that they know a great deal about their community's risk associated with climate change. This has implications for audience segmentation strategies when planning communication-based interventions.

The relatively low numbers of persons (28.6% of household respondents and 42.9% of online respondents) reporting that they have home insurance against natural hazards and other climate-related events is another cause for concern. This is exacerbated by observations made in the focus group discussions where participants noted that home insurance, as well as loans to make one's dwelling more climate resilient, were financially prohibitive. Survey respondents from the household sample, as well as the sector sample, pointed to a lack of financial resources as a hindrance to implementing actions or strategies that would help them to adapt to climate change events or mitigate the impact of such events.

The attitude of many Jamaicans toward climate change seems to be positive, in that many expressed that they were very concerned about it and were interested in finding out more about the impact of climate change on the country; 60% of household respondents and 45.7% of online respondents were very interested in finding out more about climate change issues. While most (82.9% of online and 75.2% of household respondents) indicated that Jamaica was not adequately prepared to deal with the effects of climate change, at the individual level, most respondents (45.6% of household and 62.7% of online respondents) reported they were somewhat prepared for climate-related hazards. Cross tabulations between household respondents' preparedness and their education level (primary/secondary/tertiary) and gender (male/female) showed some significant differences across the various categories. Persons educated at the tertiary and secondary level were more likely to report that they were somewhat prepared for climate-related hazards compared to those at the primary level. Males were more likely to report that they were somewhat prepared for climate-related disasters.

Even though persons reported varying levels of individual preparedness, for some there seemed to be a general feeling that it was the government which should be mainly responsible for climate change. Even in cases where persons indicated that all entities (government, business/industry, community organisations, private citizens, industrialised countries, and so on) should be responsible, there was still a feeling that the government should bear the greatest responsibility; 37% of household respondents and 25.2% of online respondents felt that the government should be mainly responsible for climate change while 85.2% of sector respondents felt that the government should assist their sector in adapting to or mitigating the effects of climate change.

This perception was echoed in the focus group discussions. However, in these discussions – especially those at the community level – people did indeed identify actions for which they could take personal responsibility without relying on government. Future campaign efforts must address this issue by convincing members of the society that they have a role to play in addressing climate change issues. Individuals as well as various organisations will need assistance in determining the roles that they can play in responding to climate change.

It appears overall therefore, that this perception has remained relatively the same since the 2005 KAP survey. Then, 68.4% of adult respondents believed that the government should bear the primary responsibility for climate change (BRAC, 2005, p.22). There is still a strong perception that government should be primarily responsible.

The quantitative sector survey revealed that some organisations felt they had no role to play, given that their modus operandi was not directly connected to the environment or other climate-related matters. For some who clearly had a role to play, it was felt that they were not adequately prepared to fulfil that role. This is in contrast, however, to the qualitative focus group discussions that were conducted. In these sessions, respondents clearly felt that their organisations had very important roles to play in climate resilience. Qualitative findings also

indicated that sectoral groups felt they were taking strong steps to execute their responsibilities and play their role, in spite of challenges and constraints.

While there might be a fair amount of knowledge among the general population regarding climate change, the range of responses about certain practices garnered from the household surveys points to an area that needs addressing. It is interesting to note that when asked to describe actions that should be adapted to address climate change, or what actions could be implemented to prevent or lessen the impact of climate change on one's community, a common theme found in the household survey was that of waste management and garbage disposal. In the 2005 study, a similar result was found with a majority of respondents noting that disposing of garbage properly was one action that could prevent or lessen the impact of climate change on their community (BRAC, 2005, p. 27). In the 2012 survey, most respondents seemed to be very concerned about the burning of garbage and the blocking of gullies and drains exacerbated by improper garbage disposal practices. Addressing these behaviours would seem to be a logical starting point for any communication intervention, but there is a greater challenge presented here – that of educating Jamaicans to recognise that lessening the effects of climate change involves much more than refraining from burning garbage and the proper management of waste disposal. The discourse on actions that can be implemented to prevent or lessen the impact of climate change needs to move beyond garbage disposal matters. This discourse can only change with carefully considered strategies which rely heavily on appropriate use of media.

Media Usage

In the 2005 KAP, 48.3% reported occasional exposure to climate change topics in the media (BRAC, 2005, p. 38). In the current study, there was a slight decrease to this figure. Most household and online respondents stated that they occasionally (33.5% household; 43.7% online) read, listened to or watched stories on climate. While this figure may be low, many (84.9% household; 76.0% online) were willing to read, watch and listen to stories about climate change. This willingness to pay attention to content regarding climate change augurs well for any future campaigns about climate change issues. In terms of current sources of information on climate change, the most common sources cited in 2005 was television (96.5%), followed by radio (81.5%), newspaper (65.4%) and then internet (21.6%). In 2012, the current sources have remained the same for household respondents: television (80.1%), radio (57.7%), newspaper (37.3%) and internet (22.5%). However for online respondents, the ranking was slightly different, with television first (70.8%) followed by internet (662%) then newspapers (48.7%) and radio (43.5%). Sector respondents also showed preference for the internet (66.7%) as their source for information on climate change, followed by newspapers (55.1%), television (53.6%) and radio (50.7%). In 2005, sector respondents' current source of information mirrored the household respondents' preference of 2012 with television, radio, newspaper and internet being the four commonly cited sources (BRAC, 2005, p. 39).

Radio and television were considered to be the most effective channels for delivering climate change messages in 2005 (BRAC, 2005, p. 40). In 2012, respondents were asked to state the three most effective channels and they chose in a similar fashion like respondents from 2005. For household respondents the three chosen were television, radio and newspapers; for online respondents, television, radio and internet were chosen. Sector respondents also chose television, radio and internet as the three most effective channels for communicating climate change. While the survey results point to the use of mostly traditional media (radio, television, newspaper) and some relatively new media such as the internet, focus group discussants were more likely to make suggestions about how these media should be used. For example, some focus group participants suggested the use of prime time slots as well as the use of popular personalities. Other suggestions from focus groups included the use of interpersonal communication strategies which involved communities meetings and other forms of alternative media such as drama, road march, and other special events. The use of social media was also an important suggestion made regarding the types of media to use for delivering messages about climate change. The mix of media and communication strategies to be employed for future campaigns will require serious consideration as there are many actions that must be promoted to address all the issues surrounding climate change.

Indeed, there are many actions that can be taken that address climate change. Both household and sector surveys, as well as focus group discussions, point to the need for more collaboration and coordination at all levels of society. This is one action emphasized in suggestions made by the public sector. Further comparisons between the public sector respondents from 2005 and those from the 2012 study give a sense of the changes which have occurred over the years in relation to that sector.

Comparing 2005 and 2012 Public Sector Respondents

Twenty five percent (n=59) of the sector survey respondents indicated that their organisation was within the public sector. Of these public sector participants, most represented the agricultural (37.9%) and health (37.9%) sectors. Although 35.1% of public sector organisations had between 10 and 49 employees, the organisations were mostly large with 31.6% having between 100 to 499 employees and 17.5% having over 500 employees. Job titles indicated a broad spectrum of professions across the International Standard Classification of Occupations (ISCO) including senior officers/managers, professionals, clerical support workers, and skilled agricultural, forestry and fishery workers. The mean duration of time that public sector participants have held their posts at their current organisation is 6 six years.

In 2005, 53.5 % of the entities reported that they had members of staff who were responsible for climate change issues while 40% reported that they did not have anyone with this responsibility and 6.7 % did not know or were not sure (BRAC, 2005, p. 51). Similarly in this survey, 49.2% of the entities reported that they had members of staff who were responsible for climate change issues while 39% reported that they did not have anyone with this responsibility and 11.9 % did not know or were not sure.

Based on the qualitative discussions with public sector representatives, this has changed somewhat. The Ministry of Agriculture and Fisheries, for example, now has a dedicated climate change staff member within RADA. The other agencies represented did not indicate whether or not they had specific staff members dedicated to climate change per se, but in the case of the Ministry of Health, staff have been dedicated to deal with emergency and disaster response and it was felt that this portfolio would likely include climate change.

For the most part however, the approach within most of the public sector agencies represented appears to be more of mainstreaming climate change preparedness throughout their individual organisations, rather than delegating responsibility to specific staff members. Respondents clearly indicated that climate change preparedness was part of everyone's responsibility and that they would like to see climate change indicators reflected in all job descriptions so that the work that staff undertake could be properly accredited and accounted for. In other words, climate change readiness should be completely integrated throughout all roles and responsibilities.

In 2005, the number-range of staff members with responsibility for climate change within organisations was one to four persons (BRAC, 2005, p. 51). In this survey this number-range was much broader: respondents indicated as little as one staff member and as much as six hundred staff members. Nevertheless, most public sector organisations in this study (n=14) had between 1 to 10 persons on staff with climate change responsibilities and overall, 40% (n=24) of public sector respondents indicated that their organisation had members of staff with responsibilities for climate change. Examples of staff responsibilities included:

- Increasing awareness of specific climate change among stakeholders
- Developing and evaluating programmes regarding climate change issues
- Research and monitoring
- Teaching; planning and executing training and workshops

Compared to the 2005 survey, a greater percentage of persons thought climate change adaption/mitigation initiatives were 'extremely important' and 'important' to their organisation. In 2005, "just over a half (53.3 %) of the respondents felt that climate change was 'extremely important' within their organisation. A further third felt that it was important, while the remaining felt that there was a neutral feeling within their organisation towards climate change" (BRAC, 2005, p. 51). In this survey, 60.3% thought it very important; 22.4% thought it important and 8.6% had a neutral stance.

In 2005, there was universal agreement of all the respondents that each of their organisations had a role to play in adapting to climate change. Some of the reasons given as to what this role could be included: -

a. Provide a mandate
b. Beneficial to industry and country
c. Affect country

d. Ensure availability of potable water
e. Develop and sustain environment nationally
f. Human safety

Based on discussions with public sector representatives in the 2012 qualitative focus groups, all of the government agencies strongly confirmed that they had a very critical role to play in climate change preparedness and that they were now actively doing so. Interestingly, the two most important roles that all public sector representatives suggested they played, outside of their specific mandates, were with regard to policy formulation and public education.

The other main critical responsibilities identified as being important for climate readiness were directly related to the specific mandates of individual governmental agencies. In the case of agencies involved in water provision and distribution, it was also ensuring water quality, managing demand and supply, maintaining water infrastructure, encouraging water conservation and regulation and enforcement.

For health, the key roles identified were in vector control, health promotion, and emergency response.

For energy, state agencies also mentioned the importance of research to promote new energy technologies and to encourage energy conservation – not only at the household and business level, but also within the transportation sector.

Within the construction sector, representation of public sector agencies was much more mixed with private sector, parish council and professional associations. But in this case, the most critical climate change roles and responsibilities for government agencies were identified as: (1) enactment of the building code; (2) promotion of the building code; (3) revision of the building approval process; (4) enforcement; and (5) building capacity of planning and approval officers.

For the agricultural sector, the most important roles of government agencies in preparing for climate change were identified as: (1) farmer training and education; and (2) research to identify climate smart crops, technologies, alternative farming practices, and possible alternative agricultural livelihoods.

The role of government agencies in the tourism sector appeared to be the weakest of the six sectors. Here, public sector representatives felt that they also had an important role to play in policy and in public education, but that they could do little in the way of actual execution or implementation as this was the role of private sector tourism operators. They felt they could encourage and facilitate, but not actually implement climate mitigation or adaptation practices/technologies.

In both surveys there was widespread agreement that respondents' public sector organisations had a role to play in adapting to or managing the possible effects of climate change on Jamaica. Much of the roles given in the 2005 survey were reaffirmed in this survey and related to:

- Ensuring sound/safe equipment, products and practices relating to for example, patient care
- Sharing best practices
- Advocacy
- Policies and legislation
- Research into practices and professional expertise
- Public awareness, communication
- Instituting training
- Care for the environment and protection of Jamaica's resources

Unlike the 2005 survey (p. 52) where most public sector respondents (26.7 %) were either unable to say whether their organisation was actually involved in any aspect of adaptation to climate change, or indicated that their organisation was not directly involved (13.3 %), or had no involvement (13.3%), 71.1% of public sector respondents in the 2012 survey were able to indicate current practices which their organisations used to address the effects of climate change. There has clearly been a change here and this is supported by focus group findings where all of the public sector entities that participated indicated that their agencies were indeed involved in climate preparedness. Some of these practices included:

- Safety officers on staff to offer training and guidance
- Meetings, discussions, conferences, 'sensitization sessions' etc.
- Research and modelling of climate change related scenarios in planning and teaching
- Education of staff and public via for example, newsletters
- Training and implementation in sustainable best practices within sectors, e.g. eco-tourism, sustainable-fisheries, painting homes white to reflect sunlight, protected agriculture, shaded agriculture, inter-cropping, and water conservation
- Disaster management plans
- Energy conservation, implementation of renewable/sustainable energy solutions
- Recycling and reduction of paper use
- Use of mitigation literature

In 2005, the strengths of actions being taken to address the effects of climate change were "they are environmentally safe; the company building is safer for staff; increased energy conservation; reduced costs; better disaster preparedness; reduction of waste and pollutants; and increased level of awareness among employees" while "the main and only weakness identified was that these practices are expensive and difficult to maintain" (BRAC, 2005, p. 44). These same strengths and weaknesses were reaffirmed in this study in addition to, better monitoring/

tracking of resources being mentioned as a strength, and lack of structured programmes being mentioned as a weakness.

In 2005, the strengths of current actions being taken were seen as serving to: increase the awareness of strategies and costs; improving the livelihood of residents and communities; the development of marine activities; and, reducing the financial burden. Weaknesses were identified as: their high costs of these measures and the lack of resources to implement preferred strategies.

Based on discussion in the 2012 sectoral focus groups, the key strengths of current actions led by public sector agencies seem to have broadened considerably since 2005. More concerted efforts are being made on specific strategies to promote climate resilience such as energy conservation, alternative energy technologies, water conservation and harvesting strategies and technologies; protected agriculture and so on.

In 2005, the main constraints to the effective implementation of current strategies were seen mainly as a lack of financial and other resources, as well as unwillingness to change existing practices.

While inadequate financial realities were once again identified by public sector representatives in the focus group discussions as being a critical impediment to playing their ideal role in climate preparedness, several other constraints were also identified.

Among these included lack of adequate numbers of personnel; lack of sufficient remuneration to keep qualified staff resulting in high staff turnover in many cases; lack of inter-agency collaboration and cooperation; short-term rather than long-term planning horizons; and interestingly – political interference. Also cited in several instances were cultural attitudes that posted obstacles to, for example, energy and water conservation; respect for the building code; willingness to build climate friendly homes; donate blood and other key practices that will need to be encouraged among the Jamaican pubic if the country is to become more climate resilient.

In four sectors (energy, water, agriculture, and construction) the lack of incentives (such as tax breaks) and appropriate financing or sources of credit, was also identified as a major stumbling block to expanding uptake of recommended climate change adaptation technologies.

In 2005, "fully 40.0 % of the agencies reported that they did not have any existing policies to address climate change issues" (BRAC, 2005, p. 51). In this survey, 55.4% reported lack of policies, 26.8% did not know or were not sure whether policies existed in their organisation. From the 17.9% that confirmed the existence of policies, the following were named:

- Disaster Management Plan
- Energy Conservation Policy

- Policy on Garbage Disposal, Transportation Management, Energy Conservation, Safety And Security
- Mental Health Act, 1997
- Natural Energy Policy and Related Sub-Policy On Biofuels; Carbon Treaty; Renewable Energy; Waste to Energy
- Organic Policy, Vision 2030
- Planning For The Plant Health Policy

In 2005, "Fully two thirds of the respondents could not or were not prepared to suggest what strategies should be implemented in concerning climate change" (BRAC, 2005, p. 53). However in this survey, most respondents of public sector organisations (84.2%) thought that their organisation could identify strategies to improve its operations to address climate change issues and effects. A majority of these respondents (74.5%) were able to suggest such strategies:

- Energy audits; replacement of and maintenance of energy consuming equipment e.g. servicing air condition units frequently during period of high temperatures
- Improvement on efficiency of internal production/manufacturing processes
- Seek help externally and form climate change related committees internally.
- Seek relevant information, e.g. weather data, risk management, geo informatics
- Reduce, reuse, recycle; proper disposal of waste
- Put climate change into corporate plan and allocate staff and budget

Fifty percent of public sector organisations in the 2012 survey said they currently collaborate with other organisations on climate change issues. In 2005, "just over 46%" of the respondents indicated that presently there was collaboration among the ministries, departments and agencies on climate change issues (BRAC, 2005, p. 53). In response to the question 'How do you collaborate?' public sector personnel in this study mentioned their organisation's relationships with other public and quasi-public sector organisations such as government ministries, agencies, parish councils, as well as NGOs, academic institutions and regional and international agencies.

Although the comparison between the 2005 study and the 2012 survey indicate that there may have been a relatively small increase from 46% to 50%, the discussions with public sector representatives in the focus groups suggests this slight increase may be misleading. In four of the six sectoral groups (water, energy, construction and agriculture), lack of inter-agency cooperation was highlighted as a very critical weakness. Participants indicated that while there were good personal relationships across agencies, in practice, inter-agency collaboration was very poor. This especially affected the country's ability to adequately monitor and collect data with regards to climate change, to budget scarce financial resources, and to implement cross-cutting actions.

The fact that all sectors suggested that the national budget would be severely compromised because of climate change, but that their specific sector was worthy of a greater portion of budgetary resources, means that resolving inter-agency collaboration issues and improving mechanisms for doing so are even more urgent than they were in 2005.

In 2005, the following were put forward as suggestions on how various public sector agencies could be integrated to address climate change issues.

- Close monitoring of programmes,
- Collaboration - Ministry and agencies
- Evaluations of current environmental strategies,
- Collaboration at national level on measures to combat climate change,
- Having regular meetings,
- Dissemination of information on climate change, and
- Budgeting for the implementation of climate change measures.

These specific suggestions were not directly discussed with public sector participants in the focus group discussions, but based on the constraints identified above, they would seem to be as relevant today.

Conclusion

Overall, this study supported the need for an increase in public education and awareness activities as respondents from the various samples made suggestions about amplifying activities carefully designed to make Jamaicans more aware of the issues surrounding climate change. It also indicated that improvements in awareness have been made since 2005.

Future communication-based interventions will have to move beyond merely sharing information and spreading awareness, and now focus as well on promoting specific behavioural practices that are feasible for most of the population to implement.

Respondents indicated various media channels that could be used in promoting such positive behaviours. Suggestions have been made regarding the various approaches that could be used. Based on the findings of this study, it is safe to conclude that Jamaicans expect to see more campaigns targeting climate change issues in the future. This study, no doubt, will serve as a baseline to assist in evaluating the success of prospective efforts addressing climate change matters.

Recommendations

Communication-based interventions should take the following into consideration when planning a response to address the current levels of knowledge, attitude and practices:

1. even though many persons are aware of the term "climate change", there still needs to be more public education about the meaning of climate change and its impact on individuals, communities and Jamaica. Some persons are still not aware of the risk factors associated with climate change at their community level. The qualitative investigations suggest that improved climate change knowledge definitely exists at the community level, and that community spokespersons may be the best to communicate such messages. Community members also need to play a more active role in climate change data monitoring.

2. while most persons indicate that they are very concerned and very interested in climate change matters, there is still the notion that the government must take the main responsibility for addressing climate change. While the government can play a leading role in Jamaica's response to climate change, individuals and organisations must be convinced that they also have a role to play. Campaign messages may need to help in defining those various roles and behaviours which individuals and organisation can feasibly implement.

3. many survey respondents cited actions regarding proper garbage disposal as one which they could individually do to help prevent or lessen the effects of climate change. While other actions were suggested, there is a need to expose persons to a wider range of actions which can be implemented in addressing climate change issues. The suggestions from the focus group discussions offer a lead in terms of what types of messages could be promoted to encourage personal action and responsibility. Community members in the focus groups identified several concrete steps that individuals and households can take to reduce their own risk and also help to adapt to climate change. Besides the 2005 KAP recommendation to "stop burning garbage", in this study, several recommendations were made in the qualitative findings including practical suggestions such as: (1) using mosquito nets and checking water sources for vectors; (3) improving food security through kitchen garden production; (4) sorting and recycling of garbage; (5) retrofitting homes to conserve water; (6) installation of alternative and renewable energy sources (if made affordable through credit schemes); (8) car pooling and taking of public transportation; (9) reviving tree planting traditions; and (10) respecting the building code; among other actions.

4. across all three surveys, there was the suggestion by respondents that there is a need for more awareness and public education activities. While traditional, alternative and social media were suggested as the ways to reach audiences, there was also the suggestion that messaging must be very creative and bold to hold everyone's attention and ultimately

persuade them adjust their behavioural practices by either maintaining climate resilient behaviours or changing practices that exacerbate the situation.

This was supported by the qualitative recommendations, but they also stressed the need to using participatory methods including participatory drama and radio in several instances. For the technical learning that will be part of climate change adaptation, the traditional methods of face- to-face learning, on-site demonstrations, extension staff training (health, agriculture) and so on should also be considered.

To challenge entrenched cultural attitudes, more use needs to be made of traditional knowledge and folk culture which respected Mother Nature and encouraging observing natural phenomena leading to wisdom about climate change.

Communication capacity building will be required across all key sectors that are to play a pivotal role in climate resilience.

Sectoral Recommendations

With regards to how to help the public sector, private sector and non-governmental sector be better prepared to play their role(s) in achieving Jamaica's resilience, several key recommendations can be concluded from the qualitative sectoral focus group discussions. Several of these recommendations require institutional reforms if they are to be effective.

For one, there is much greater need for inter-agency collaboration and partnership in implementing climate readiness strategies. This was a need identified in the 2005 KAP survey, but it clearly still needs to be addressed. The urgency of climate change demands greater inter-agency collaboration (including private and public partnerships) if climate resilience is to be achieved. For this to happen however, specific indicators and reporting evidence to support collaboration need to be mandated and institutionalised. In other words, agencies must be able to prove collaboration or be held accountable.

This is especially true given that all sectors clearly understand the importance of their role and believe that greater financial resources will be required to help them fulfil their mandates, while they also recognized what severe financial constraints face the country as a whole. Without budgetary increases, efficient and clearly delineated mechanisms for inter-agency collaboration will be even more critical.

A further institutional and budgetary consideration which cannot be overlooked, however, is the need to ensure that climate change reporting indicators are also included within the job descriptions of public sector staff and that staff are remunerated at least well enough to keep them. Climate change will bring new and lucrative opportunities outside of the public sector, and unless there is adequate remuneration within the public service to keep trained staff motivated and incentivised, they will leave and go to work as consultants in the private sector.

Ultimately, the approach that has been operative is "penny-wise" but "pound-foolish" as the adage goes and the country will end up paying more for climate change adaptation if remuneration and staffing issues are not addressed adequately.

Related to these same budgetary realities, the qualitative sectoral assessments also strongly recommended the need for incentives (tax breaks, credits and/or financing) that would better enable private sector and householders to adopt climate change best practices and technologies. If the country is to become climate resilient, in spite of budgetary constraints, some concessions do need to be made to enable the private sector and householders to retrofit and invest in climate friendly solutions.

This is especially true for vulnerable communities. Special financing arrangements need to be found to enable these communities to prepare.

Another very important recommendation from the sectoral discussions that must be stressed is the need for the country as a whole to have a long-term preparedness view with regards to climate change that will not be subject to political interference. Too often, short-term political agendas hijack the longer term measures that need to be bravely taken. This is no longer affordable. A non-partisan climate change agenda must be reached that all partners sign on to so that climate resilience can be possible. A pro-Jamaican climate change agenda must be non-negotiable.

Joint Qualitative Recommendations - Both Sectoral and Community Suggestions

One common recommendation from both the community and sectoral respondents is the need to enact, promote and enforce the building code so that appropriate development takes place across the board and so that people in all sectors become more respectful of climate friendly building code recommended recognitions.

Bibliography

Association of Caribbean Media Workers (ACM). 2005. *Mainstreaming Adaptation to Climate Change (MACC) Project: A Handbook for Concepts and Issues in Climate Change, Global and Regional Perspectives.* Retrieved from http://www.acmediaworkers.com/archive/publications/20050000-ClimateChangeHandbook.pdf

Bloomquist, K., Machila, R. (2009). *God, creation and climate change: a resource for reflection and discussion. The Luteran World Federation*. Retrieved from www.lutheranworld.org/What.../DTS-Climate_Change-web.pdf

Broad, G., Campbell, D., Frazier, T., Howe, P., Murtinho, F and Reyes Hernandez, H.2010 *Visualization of slow-developing hazards: influencing perceptions and behaviors to facilitate adaptation planning*. Puerto Rico. Retrieved from http://monauwi.academia.edu/DonovanCampbell/Papers/267592/Visualization_of_Slow-Developing_Hazards_Influencing_Perceptions_and_Behaviors_to_Facilitate_Adaptation_Planning

Brody, S., Grover, H and Vedlitz, A. 2012. Examining the willingness of Americans to alter behaviour to mitigate climate change. *Climate Policy, 12*(1), 1-22. Retrieved from http://dx.doi.org/10.1080/14693062.2011.579261

Brooke, C. (2008). Conservation and Adaptation to Climate Change. *Conservation Biology*, *22*(6), 1471-1476. doi:10.1111/j.1523-1739.2008.01031.x Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=4&hid=113&sid=e5cb6da2-0f9e-4054-b5f7-c93c2f9458f4%40sessionmgr113

Bueno, R., Herzfeld, C., Stanton E., Ackerman, F. (2008). *The costs of inaction. The Caribbean and Climate Change*. Retrieved from http://www.sei-us.org/climate-and-energy/Caribbean_Inaction_Cost.htm

CANARI Christian Aid Tool kit: http://www.canari.org/documents/CAtoolkitEnglish.pdf

de Boer, J. 2007. Framing climate change and spatial planning: how risk communication can be improved. *Water Science & Technology 56(* 4) 71–78.IWA Publishing. Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=4&hid=122&sid=345c467a-e107-43ff-b112-8c799da19d12%40sessionmgr110

Environmental Engineering. 2012. Public 'needs climate info'. (2012). *Environmental Engineering, 25(3),* 4. Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=4&hid=113&sid=e5cb6da2-0f9e-4054-b5f7-c93c2f9458f4%40sessionmgr113

ESPACE Project. nd. *Planning in a changing climate: The strategy and supporting evidence CD-ROM. United Kingdom*. Retrieved from http://www.espace-project.org/part1/publications/ESPACE%20Stategy%20Final.pdf

ESPACE Project. nd. *Climate Change Communication Strategy: A West Sussex case study*. Retrieved from http://www.espaceproject.org/part1/publications/reading/WSCCClimateCommunications%20Strategy.pdf

Gamble, D., Campbell, D., Allen, T., Barker, D., Curtis, S., McGregor, D. and Popke, J. (2010). *Climate change, drought, and Jamaican agriculture: local knowledge and the climate record*. Annals of the Association of American Geographers. Retrieved from http://dx.doi.org/10.1080/00045608.2010.497122

Ihlen, Ø. (2009). Business and climate change: the climate response of the world's 30 largest corporations, environmental communication. *A Journal of Nature and Culture,* 3 (2), 244-262 Retrieved from http://dx.doi.org/10.1080/17524030902916632

IPCC, (2007): *Climate Change 2007: Synthesis Report. Contributing of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds)]. IPCC, Geneva, Switzerland.

Leiserowitz, A., Maibach, E., Roser-Renouf, C., & Hmielowski, J. D. (2012) *Climate change in the American Mind: Americans' global warming beliefs and attitudes in March 2012.* Yale University and George Mason University. New Haven, CT: Yale Project on Climate Change Communication. http://environment.yale.edu/climate/files/Climate-Beliefs-March-2012.pdf

Maibach E., Nisbet, M.,Baldwin, P.,Akerlof, K.and Diao, G. (2010). *Reframing climate change as a public health issue: an exploratory study of public reactions*. http://www.biomedcentral.com/content/pdf/1471-2458-10-299.pdf

Martinez, Rodrigo (Consultant). March, (2010). *"Economic and Community Vulnerability Assessment of Climate Change in Jamaica"*. Office of Disaster Preparedness and Emergency Management of Jamaica (ODPEM) and the Organisation of American States, Department of Sustainable Development (OAS), Washington, D.C.

Mortsch, L., Bradley, B., Andrey, J., Warriner, K., & Fisher, A. (2000) *A Survey of Climate Change Beliefs: A Case Study of the Canada Country Study Participants.* In D. Scott, B. Jones, J. Andrey, R. Gibson, P. Kay, L. Mortsch, K. Warriner (Eds.), Climate Change Communication Proceedings of an International Conference June 22-24, 2000, Kitchener – Waterloo, Ontario, Canada (pp. A1-16). Retrieved from http://publications.gc.ca/collections/Collection/En56-157-2000E.pdf

Nature Publishing Group. (2002). Communications arising: climate change-regional warming and malaria resurgence. *Nature 420.* Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=5&hid=113&sid=e5cb6da2-0f9e-4054-b5f7-c93c2f9458f4%40sessionmgr113

Nature Publishing Group. (2010). Climate of suspicion. *Nature 463* (7279). Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=5&hid=113&sid=e5cb6da2-0f9e-4054-b5f7-c93c2f9458f4%40sessionmgr113

Scott, D., Jones B., Andrey J., Gibson, R., Kay, P., Mortsch L. and Warriner, K. (2000). *Climate change communication: proceedings of an international conference*. Ontario. Retrieved from http://publications.gc.ca/collections/Collection/En56-157-2000E.pdf

Patchen, M. (2006). *Public attitudes and behaviour about climate change. What shapes them and how to influence them.* PCCRC Outreach Publication 0601, October 2006. www.purdue.edu/climate

Spoel, P., Goforth, D., Cheu, H. and Pearson, D. (2009). Public communication of climate change science: engaging citizens through apocalyptic narrative explanation. *Technical Communication Quarterly, 18*(1), 49–81. Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=4&hid=122&sid=345c467a-e107-43ff-b112-8c799da19d12%40sessionmgr110

Suarez, P., Ching, F., Ziervogel, G., Lemaire, I.,Turnquest, D., Mendler de Suarez, J. and Wisner, B. (2008). Video-mediated approaches for community-level climate adaptation. *IDS Bulletin* 39 (4). Institute of Development Studies. Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=4&hid=122&sid=345c467a- e107-43ff-b112-8c799da19d12%40sessionmgr110

Tashaskkori, A., & Teddlie, C. (2009). Integrating qualitative and quantitative approaches to research. In L. Bickman & D. J. Rog (Eds.), *The Sage Handbook of Applied Social Research Methods*. (pp. 283-317). Thousand Oaks: Sage.

United Nations ECLAC. (2011). *The economics of climate change in the Caribbean: summary report 2011.* Retrieved from http://www.eclac.org/portofspain/noticias/paginas/0/44160/Final_Caribbean_RECC_Summary_Report%5B1-3%5D.pdf

Walling, L., Robertson, A., Cumberbatch, J., Hutchinson, N. (2010). *Climate change and tourism in Barbados: an assessment of the perceptions of climate change risk and adaptation capacities in the tourism sector in Speightstown*. University of the West Indies, Cave Hill.

Wimmer, R.D. & Dominick, J.R. (2009). *Mass Media Research – An Introduction* (9th ed.). Boston: Wadsworth.

World Health Organisation (2008) *Advocacy, communication and Social mobilization for TB control: a guide to developing knowledge, attitude and practice surveys*. http://whqlibdoc.who.int/publications/2008/9789241596176_eng.pdf.

Yale University School of Forestry and Environmental Studies (2010, May 28). *Ever Heard of Climate Change? Over 40% of the world says "no".* [Video file]. Retrieved from http://www.youtube.com/watch?v=B3R6VE4EvnU&feature=player_embedded#!

Glossary

This glossary has been adapted from *Mainstreaming Adaptation to Climate Change (MACC) Project: A Handbook for Concepts and Issues in Climate Change, Global and Regional Perspectives* and *CANARI Christian Aid Tool kit.*

Adaptation. In the context of climate change, adaptation is the adjustment in natural or human systems in response to actual or expected climatic occurrences or their effects, which reduces harm or takes advantages of beneficial opportunities. For people, it means being ready for climate change by building capacity and putting measures in place to cope with and recover from the impacts of climate change. It also means preparing ourselves to live with any climate-induced change to our surroundings.

Alternative Energy. Energy derived from non-traditional sources (e.g., compressed natural gas, solar, hydroelectric, wind).
http://www.phoenix.edu/about_us/green_initiative/glossary_of_environmental_terms.html

Biodiversity. The variety of organisms found within a specified geographic region.

Bio-fuel. The joint name of fuels which originate from plants (biomass). This can include everything from wood and straw to refined biofuels such as pellets and ethanol. Biofuels are converted solar energy; plants transform solar energy into chemical energy in the form of different types of sugar. Biofuels are renewable because they can be re-created in a relatively short period of time once they have been used, as long as we do not consume more than we grow. Cutting down too many trees can have a negative effect on biodiversity. Peat is no longer regarded as a biofuel. http://www.esab.com/global/en/about/environmental-glossary.cfm
Liquid transport fuels made from biomass. http://www.epa.ie/irelandsenvironment/glossary/
A fuel that is made from (in whole or in part) renewable organic sources, such as rapeseed oil. These can include refined fuels such as ethanol and biodiesel as well as unrefined such as wood. http://www.bcliquorstores.com/files/LDB_environment_glossary.pdf

Carbon Footprint. A measure of the impact our activities have on the environment, especially climate change, often reported as the units of tonnes (or kg) of carbon dioxide each of us produces over a given period of time
http://www.epa.ie/irelandsenvironment/glossary/

Climate Variability. Refers to changes in patterns, such as precipitation patterns, in the weather and climate.

Climate. The average, or typical, weather conditions of a given area observed over a long period of time (usually 30 years or more).

Climate change. Any statistically significant, long-term modification (change) in the climate of a zone or region. Climate change may be caused by natural processes or by persistent changes in

the atmosphere or in land use caused by human activity. When the term is used to describe what is happening to the Earth today, it refers to the increase in the Earth's temperature and changes in rain, snow or other moisture from the atmosphere, caused by greater levels of CO2 and other gases in the atmosphere. The term 'climate change' is often used interchangeably with 'global warming'. The term 'climate change' is often used interchangeably with 'global warming'. However, 'climate change' is a better term because it covers many other changes, besides rising temperatures.

Coral Bleaching. Loss of colour of corals due to loss of the algae that live on them and provide their nutrients and colouration. Bleaching occurs in response to physiological shock as a result of abrupt changes in temperature, salinity (saltiness), and turbidity (amount of sediment present in the water).

Disaster Management. Disaster Management encompasses all aspects of planning for and responding to disasters, including the before, during, and after disaster activities. It refers to both the risk and consequences of a disaster.
http://www.odpem.org.jm/disastersdohappen/disastermanagementinjamaica/tabid/234/default.aspx

Droughts. A period of abnormally dry weather sufficiently long enough to cause serious effects on agriculture and other activities in the affected area.
http://weather.weatherbug.com/weather-glossary/D/Drought.html?zcode=z6286&lang_id=en-029

Ecosystem. A geographical area where a community of living (plants and animals) and non-living (climate, landscape) things interact together and affect each other.

Emissions. The release of substances (e.g. greenhouse gases) into the atmosphere.

Fossil Fuels. These are fuels produced by the remains of living organisms that built up underground over geological periods. Fossil fuels mainly consist of carbon and hydrogen and are also known as hydrocarbons. They are found in different states: liquid (for example, oil), solid (for example, coal, peat) and gaseous (for example, natural gas).

Global Warming. The progressive gradual rise of the Earth's average surface temperature thought to be caused in part by increased concentrations of greenhouse gases (GHGs) in the atmosphere. Also**,** See Climate change

Greenhouse Effect. The greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere (for example, water vapour, carbon dioxide, nitrous oxide, methane and ozone) trap energy from the sun.

Greenhouse Gases. The atmospheric gases that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. Water vapour (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), and ozone (O3) are the primary greenhouse gases in the Earth's atmosphere.

Hurricanes. A severe tropical cyclone having winds in excess of 64 knots (74 mph/119 kph). http://weather.weatherbug.com/weatherglossary/H/Hurricane.html?zcode=z6286&lang_id=en-029

Mitigation. Mitigation involves measures to reduce greenhouse gas emissions, by limiting activities that produce greenhouse gases, or to enhance the natural systems or sinks (see carbon sinks) that remove greenhouse gases from the atmosphere. Without mitigation, climate change would continue unchecked and would eventually outstrip all our efforts to adapt.

Reforestation. Replanting of forests on lands that have recently been harvested.

Renewable Energy. Energy obtained from sources such as geothermal, wind, photovoltaic, solar, and biomass.

Risk. Risk is the chance of injury, damage or loss defined as a measure of the probability and severity of an adverse effect to health, property, the environment or other things of value.

Siltation. Siltation is a process by which water becomes polluted as a result of fine mineral particles (silt or clay) in the water. Siltation is most often caused by soil erosion or sediment spill.

Vulnerability. The degree to which a natural, human or built system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extreme weather. Vulnerability depends on the scale or severity of the climate change effect, the extent to which the system is exposed, its sensitivity to changes, and its ability to adapt.

Weather. Short-term atmospheric conditions. Weather is measured by temperature, humidity, wind speed, atmospheric pressure, cloudiness and precipitation.

Gross Domestic Product. The total economic activity within national boundaries. http://highered.mcgraw-hill.com/sites/0070294267/student_view0/glossary_e-l.html

Pollution. Residual discharges of emissions to the air or water following application of emission control devices (EPA 1993b). http://www.gdrc.org/uem/ait-terms.html

Sustainable Development. Development which meets the long-term needs of poor people, while safe-guarding enough natural resources for future generations.

http://earthjournalism.net/sites/earthjournalism.net/files/resources/EJN_TOT_Climate_change_glossary2.pdf

Tropical Depressions. A tropical cyclone in which the maximum 1-minute sustained surface wind is 38 mph/62 kph or less. They form from a tropical wave or tropical disturbance.
http://weather.weatherbug.com/weatherglossary/T/Tropical%20Depression.html?zcode=z6286&lang_id=en-029

Tropical Storms. A tropical cyclone in which the one-minute sustained surface wind ranges 39-73 mph/62-117 kph. Tropical storms pose a threat to life and/or property in coastal areas.
http://weather.weatherbug.com/weatherglossary/T/Tropical%20Storm.html?zcode=z6286&lang_id=en-029

Waste Management. The management of waste collection, handling, processing, storage and transport from where it is produced to where it is finally disposed.
http://www.epa.ie/irelandsenvironment/glossary/

Water Harvesting. The principle of collecting and using precipitation from a catchments surface.
http://www.tn.gov.in/dtp/rainwater.htm