



EKACDM INITIATIVE NEWS LETTER VOL. 2
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EKACDM

ENHANCING KNOWLEDGE
AND APPLICATION
OF COMPREHENSIVE
DISASTER MANAGEMENT

Beyond 2017:
Cyclones, Floods & Business Continuity





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FIGURING OUT FLOODS

By Modeling Human Behaviour

“

Forty-one persons lost their lives. Houses were washed away,- crops destroyed, bridges wrecked, roads severely scoured, blocked or demolished and, indeed, even now, while the flood waters have receded from Leamington, Enfield, Exeter and Chigwell, the town of New Market still lies buried under 80 feet of water.

”

That excerpt from Ministry Paper No. 57/79 tabled in the Parliament of Jamaica in 1979 might very well have been describing anywhere in the Caribbean, and perhaps any other region populated by small island developing states.

“*Flooding is in fact the most frequently occurring hazard in the Caribbean*” said EKACDM Scholar Tracy-Ann Hyman when we caught up with her recently between assignments. While many incidents of flooding are related to extreme weather events like cyclones, the region also experiences short periods of intense rainfall which leave lasting adverse effects on lives, livelihoods and landscapes.

Such was this event on June 12, 1979 which inundated large sections of the north western parishes of Trelawny, Westmoreland, St. James, St. Elizabeth. 41 deaths were directly attributable to this deluge which severely displaced communities. According to that same ministry paper, *‘The Meteorological Division of the Ministry of Public Utilities estimates that over 85 billion gallons of water were released in this area within a 24-hour period and that the return period of this phenomenon varies from between*

50 to 150 years. The severe hydro-geological and drainage problems which ensued, were caused by the combination of this tremendous rainfall, together with the less spectacular, but very damaging rains which had been falling in the disaster area during April and May.’

The severity of this disaster led Ms. Hyman to focus her research enquiry on Debris Floods and their impact on communities with no early warning systems.

According to Ms. Hyman, the **EKACDM** scholarship is now enabling her to remodel the flood and examine the critical elements and extrapolate on likely casualties should there be a recurrence in a 2016-2018 context. The model as designed, allows for comparisons between 1979 and now in terms of population density and distribution, the landscape, and roadways.

“The scholarship accommodated trips and field work, facilitated data collection and cleared other operational and administrative expenses. So far I have been able to interview a range of persons in Cave, Westmoreland about that devastating 1979 flood.”

Westmoreland was chosen as her area of focus as the parish accounted for 31 of the 41 deaths reported after the flood rains ended.

Methodology

The centrepiece of the methodology is agent-based modelling – a tool rarely used in the Caribbean. *“It’s like artificial intelligence, we create a model of an individual, ascribe characteristics and demographic attributes...import that to a computer-based programme and simulate their likely movements and activities during a selected period of a similar flooding event”*, Hyman explained.

All movements of this ‘agent’ are tracked over a specific time of the day. It would include routines like going to work, returning home, and social engagements – just like snippets of a typical day. *“We actually went out there, drove the distance, timed our movements, and then plugged those numbers into the model, so that we could capture accurate mobility patterns of residents,”* she added.

These movements were informed by the current self-reported activities of the interviewees who still live in the previously affected Westmoreland

communities. The computer-generated model uses these routine movements that assume that no flooding was expected, and from that reveals the likely levels of exposure if they were to caught unaware today.

Immediate future

We put the question to Tracy-Ann – “What is your immediate concern?”

“As a researcher and project manager, my immediate goal is to verify the viability of the model so that it will be incorporated into any future funded projects in the Caribbean as a problem-solving mechanism in planning.” She replied instinctively. “Tweaking the model, getting it up to a certain level of robustness, that it can be used to predict outcomes across the English-speaking Caribbean”, Hyman added.

Rethinking vulnerability

Vulnerability is often used loosely to refer to geographic areas or wide social categories. It’s an intuitive response to declare low lying areas as being particularly susceptible to flooding, but this understanding does not actively consider that not every occupant would have the same level of vulnerability, nor would the same person be equally vulnerable throughout each day.

“The research wants to address a **moving vulnerability**. You may be more vulnerable in the morning, but far less so in the evening...hence the agent-based modelling, tracking circumstances against the hazardous factors and see who is most vulnerable during what periods” Ms. Hyman explained.

By her account, the process is very high touch. It involves detailed data collection over a 7-day period, then running the model across the times of main activity in the day and across a week, after which any significant trends are identified

and analyzed relative to fluctuations in vulnerability. “Based on a fine-tuned simulated flood model, we could then predict ‘X’ number of likely fatalities, ‘Y’ number of persons marooned, and ‘Z’ persons likely to be safe (free from harm) in their current surroundings, or injured.”, she outlined.

Ms. Hyman is quick to point out that this sensitivity in data creation comes at a heavy price. By her account, agent-based modelling is extremely tedious, time-consuming and costly, which is why the **Global Affairs Canada** funded scholarship is so invaluable in underwriting the costs of this vital process.

The EKACDM Legacy

Although the sample site is Westmoreland in Jamaica, when tested and proven, she hopes the model will become a tool applied regionally. Before it gets to this point, the model must first be validated across several data sets – historic, recent and projected. Ms. Hyman has a clear sight on her intended trajectory. “I am in that testing phase now, were I am trying to validate the model. Once the model can prove itself in at least two more significant events, then it may be replicated regionally”

2017 season created many samples, both as by products of an unusually active and devastating hurricane season (Dominica and Barbuda being the worst hit) and in flash floods from outlier periods of intense rainfall in Southern Trinidad (October) and Montego Bay, Jamaica in November.

While modelling cannot affect the frequency or intensity of natural hazardous events, Ms. Hyman points to the real value for planning, both for mitigation and recovery. “If we had data like this last year, it would have supported search and rescue teams

in the most effective deployment of resources, speeding up human recovery. The number of casualties might have been mitigated based on an adjustment of work schedules and preferred routes based on the recorded vulnerability differences based on the time of day.”

In terms of the built environment, the modelling can also factor into decisions about the approvals of construction permits, based on the vulnerability of proposed building sites, or the design of roadways based on the relative susceptibility of some corridors.

Emerging Insights

One significant insight from the results of modelling so far is the time of the week that public vulnerability peaks. When the model was run from 4 p.m. - midnight, Friday had the most fatalities, when compared to a Tuesday or Saturday.

Ms. Hyman cautions that the model might have yielded different findings had we compared say a Friday and a Saturday morning. “In essence this suggests also that the time of day is a more critical consideration than the day of the week.”

An interesting insight was also that the current model (run in 2016) showed more women dying than men, whereas more men died than women in the 1979 floods.

Another major insight identified by Ms. Hyman is the need to breach the traditional academic silos in preference for an interdisciplinary approach to peel back the layers for a proper examination of vulnerabilities. “In this regard, one special measure is that we have incorporated human movement in the flood models. The typical geographic approach is about the movement of water across the topography, the relief etc. We have now inserted the movement of agents to get not just the areas that are likely to be flooded, but who will be

impacted.”

Proud that it is integrated into ONE model, Hyman believes that this enhances its odds of becoming a permanent feature in Disaster Risk Reduction in the Caribbean. *“I think this model as it is further developed will continue to bring out certain things we might have missed before, and that is one of the reasons that I am so excited about it”*, she beamed.

Constraints

No project, country or institution has unlimited resources, and this model is admittedly very labour intense, tedious and required frequent visits to locations quite far removed from the researcher’s base in Kingston. *“Then there’s the computer programming – you must be constantly coding and adjusting, and it’s also quite sensitive because the slightest error can throw things off and have a negative impact the validity of findings. We can’t have that”*, Hyman added resolutely.

Looking to the Future

While her focus for the foreseeable future is to fine tune the model for steady incremental improvements, Ms. Hyman is very clear about leveraging the next big wave. *“Moving through the 21st century and beyond, it’s really about artificial intelligence. Increasingly all decisions must be backed by hard data. I see this is a personal challenge to ensure the validity of this model, incorporating cutting edge innovations to secure acceptance and application across the world.”*

Her M.Phil. enquiry having recently been upgraded to a PhD Ms. Hyman remains highly motivated as she looks forward to completion in 2019. She is very much aware that this venture is quite literally a life and death matter for the people of the English-speaking Caribbean

ABOUT TRACY-ANN HYMAN

Anchored on the foundation of studies in Sustainability Science in Environment Systems at the master’s degree level,



Tracy-Ann Hyman

Tracy-Ann Hyman received the nod as the third scholarship recipient under the Enhancing Knowledge Application of Comprehensive Disaster Management (EKACDM) project in 2014.

She is currently pursuing a PhD in Environmental Management at the University of the West Indies in Jamaica, with a focus on flooding in Small Island Developing States (SIDS). This is viewed through the lens of human-environment interaction and agent-based model simulations. She also has interests in topics related to Urban and Rural Development, as well as Water Resources for the Caribbean region.

Enhancing Business Continuity Capacities for MSMEs

...a hedge against the economic impact of Hazards

One thing is sure after any natural disaster or emergency – it’s never business as usual... not just figuratively but quite literally.

With the typical damage or destruction of vital infrastructure and interruption of public utilities also comes disruptions in trade and commerce.

Loss of productive business hours can take a particularly hard toll on Micro,

Small and Medium Enterprises due to limited resources and by extension inadequate contingency measures, which can mean protracted delays in resumption of productive outputs.

This in turn can severely undermine the desired economic recovery in the aftermath of any disruptive hazard, because the MSME sector is critical in the Caribbean context. *“It accounts for roughly 70-85% of enterprise and*

around 70% of GDP in some countries.”, confirms **Dr. Indianna Minto-Coy, Senior Research Fellow, Mona School of Business and Management (MSBM)** at the University of the West Indies. Contribution to the labour force can be even more dramatic. *“In Jamaica, for instance, up to 90% of the employed population work in that sector”*, she further explains.

Given the significance of MSMEs in the



Dr Indianna Minto-Coy
Senior Research Fellow, Mona School of Business and Management

Caribbean it follows that any vulnerability in the sector, can severely undermine livelihoods. *“The sustainability of Caribbean economies therefore depends to a huge extent on how well the MSME sector performs”*, Dr. Minto-Coy notes.

“ Knowledge sharing through EKACDM will provide a level of mutual security to make the region as a whole more resilient. ”

The EKACDM Difference

As it now stands, there is a dearth of the data that could quantify the precise impacts of natural disasters on the MSME sector in the Caribbean. This accounts for the inclusion of the MSBM in the EKACDM partnership to plug that gap. *“We hope to shed light on and attract more resources to an area that is vastly in need of research”*, Dr. Minto-Coy explains. She adds that as mainly small island developing states (SIDS), the need is particularly pressing to facilitate proper planning.

Of great concern is the fact that the region is now experiencing what Dr.

Minto Coy characterizes as the increase of natural disasters – more active than normal hurricane seasons, dramatic flash floods in the south-east Caribbean as well as in Jamaica, earthquakes in Haiti, mingled with spots of severe droughts in several countries. This represents a continual unfolding of a range of scenarios from which each country can glean practical experience in managing these crises. Collectively, this represents the emergence of a powerful body of knowledge, directly applicable to the wider region. *“Knowledge sharing through EKACDM will provide a level of mutual security to make the region as a whole more resilient.”* Dr. Minto-Coy adds.

Business Continuity Planning

EKACDM has tapped into a series of training programmes to help identify practical business continuity measures, and cascade these into actionable disaster response plans. At least two have already been successfully completed in Jamaica and Belize in May and June 2018,

respectively.

At the policy level, Dr. Minto-Coy explains, the discussion about building resilience in the MSME sector tends to focus disproportionately on access to capital. While accepting that this is important, she stresses that the management of risk in the hotbed of hazards that is the Caribbean needs to enjoy greater emphasis. *“That is why over time, we hope to be able to train students and practitioners on how to build their own business continuity plans, and to embed recovery and continuity practices in their daily operations”*. She further argues that because of the small team sizes, it must

be a ‘lived’ part of their daily experience so that disaster recovery and business continuity planning becomes second nature.

Educational and training institutions have a powerful role to play in realising this culture change, as the universities and training institutions are ideally placed to encourage behaviour change and influence future business practices.

“ Knowledge sharing through EKACDM will provide a level of mutual security to make the region as a whole more resilient. ”

To capitalise on this opportunity, the ECKADM has engaged Dr Minto-Coy in designing gender-sensitive courses on business continuity and disaster risk reduction in the Caribbean.

As part of the development of course content, research will also be undertaken towards understanding the current practices and awareness around business recovery planning and disaster risk reduction among SMEs. Key sectors will include agriculture and tourism.

The EKACDM MSME Legacy

What is the vision for MSMEs in the Caribbean post-EKACDM?

Dr. Minto-Coy posits that the desired behaviour change runs counter to deep-seated culture. As such, there is no expectation of 100% behaviour change within the 2 years of their direct

involvement with the pilot projects.

The aim of this preliminary intervention, she explains, is to create a group of ambassadors who would have been trained in the importance of disaster risk reduction and management, and business continuity planning. “It is these ambassadors who will then be able to ‘evangelize’ to the rest of their colleagues in the MSME sector,” she says, explaining the rationale for the pilot projects. “These

will be the first batch of change makers within the MSME sector who can vouch for and advocate for building in DRM principles into their everyday activities.” Dr. Minto-Coy concluded.

The project involves the design of training modules for undergraduates and post graduate students on disaster risk reduction and business continuity among Caribbean SMEs. A pilot of the training is to be conducted at the end of Summer

2018. Practitioners will also be able to benefit from the training, given the intent to include options for owners and operators of MSMEs.

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The Caribbean... Moving Beyond 2017

“72,000 Dominicans lie on the front line in a war they did not choose with extensive casualties in a war they did not start”



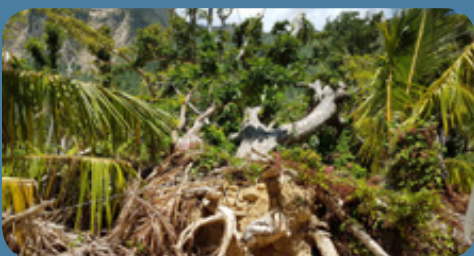
Dominica Recovery Post-Maria

On Saturday September 23, 2017, those words cut through the audience at the 72nd session of the General Assembly of the United Nations in New York as Dominican Prime Minister Roosevelt Skerritt laid out an impassioned case for global assistance to his nation after the devastation of hurricane Maria

only two years after a battering from tropical storm Erika. A December 2017 update on ReliefWeb, a digital information portal managed by the UN’s Office for the Coordination of Human Affairs (OCHA) said:

Four months after the hurricane, although the situation is normalising,

Dominica remains seriously impacted. Around 450 people still reside in collective shelters. Over 80% of houses still have inadequate roofing, about 15% children have not yet returned to school, 90% of the population does not have electricity, and a sizeable portion of the population is highly vulnerable after



TESTIMONY JAMAICA CONTINUITY

PATSY RUSSELL, is a CUSO Volunteer in Canada, sent to Guyana to lead the government's Small Businesses Bureau in the establishment of two business incubators in rural Guyana. She participated in the final Business Continuity Planning workshop in Kingston on the 21st and 22nd of May.

On the Business Continuity Imperative

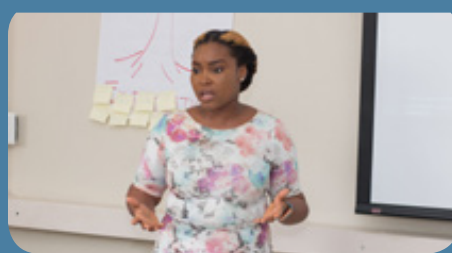
"What is critical for me is that we don't talk about this in Guyana at all. I don't even think larger businesses talk about it in Guyana, but for the small businesses it's even more critical, because it's a new phenomenon for them. Even if they do think about it, they just put it at the back of their minds, but it's something that is so important that they need to bring it back up they need to talk about it, and they need to formulate that business continuity plan."

Direct Application

Guyana is also going 'green tech' in a big way, and we are actively supporting this through challenges for Guyanese youth aged 18-35 years. Each of the 12 winners is awarded GY\$1M to expand any aspect of their business, once it's environmentally friendly and linked to technology.

One of the reasons I am happy to be here

FROM THE BUSINESS WORKSHOP



WORKSHOPS

is that Jamaica has a tradition of business incubation. At the end of this trip I would like to be able to use nuggets from the information exchange with Jamaican incubators to enhance our programme in Guyana. We don't take sufficient advantage of pan regional wisdom by knowledge sharing.

Looking at the process as enveloping key business activities, not just 'a something that's optional'. Those who have borrowed money from the bank, will benefit from better risk profiles and become more attractive clients.

The longer view – greater formality and streamlining

"A lot of the small businesses on the ground are informal. At the Small Business Bureau in Guyana, we are trying to get them back into the formal sector and try to let them see the benefits of so doing. They often see it as a penalty – extra costs, including taxation. (laughs) But you know what? The sensible ones who want to move forward now realize that if your business does not go formal, you're not going to expand...and even if it does expand, it will all come crashing down at some point in time. They are beginning to realize that being formalized not only helps them, but also supports the community and that synergy typically leads to business expansion."

losing their main source of livelihood (OCHA 20/12/2017).

Though a special case, Dominica was certainly not alone in an exceptionally active season of cyclones and flooding in the Caribbean. Within CARICOM, the other extreme case was Barbuda, the smaller twin island of Antigua.

Michael Bittle, Managing Director of the Institute for Business Continuity Training (IBCT) has spent the last couple of decades working in the Caribbean to support micro and small businesses develop business continuity plans that can not only mitigate the loss of life and property, but can fast-track economic recovery.

Earlier this year while delivering three business continuity planning workshops for EKACDM, he explained that he was struck by the extent of the impacts of last year's extreme weather events., *"While Jamaica and the rest of the western part of the region got off lightly in 2017, Barbuda showed me the absolute*

some pessimism about seeing any dramatic change in the short to medium term. "Only a quarter of the population has gotten back to the island, I would say it's doubtful that the rest of the original residents can even make it back anytime soon." He added.

He juxtaposes this with Dominica, where while there was still clear evidence of significant damage, Bittle was a bit more optimistic. *"I would say that probably life will get back to normal if no other major event occurs over the next 2 or 3 years."*

By mid-July, Dominican Journalist **Nester Phillip** was also expressing cautious optimism, particularly concerning progress with social readjustment *"Generally, the country is trying to pick up the pieces. The government, regional and international community is taking a multi sectoral approach to the recovery effort. Recently, the Ministry of Education started a training-of-trainers workshop to empower teachers to deliver psycho-social support."*

a big part of the solution can be met by proper planning and preparedness." He explained.

The progress has also been hamstrung by a significant shortfall if the power supply. Although 70% of the power grid is back up, only 30% of the businesses and homes have been reconnected. *"It's very clear that business is NOT as usual in Dominica."*, Bittle concluded.

Floods to the south, floods to the north

Non-cyclone related flooding also wreaked havoc elsewhere in the region.

In October, barely a month after Maria made landfall in Dominica, Trinidad and Tobago suffered its own extreme weather event when during its traditional Divali celebrations, several communities in north east, central and southern Trinidad experienced severe flooding. More than 24 hours of heavy sustained rainfall also led to established water courses breaching their banks, and some communities being marooned by



I am glad I went to Barbuda in the day time. If I had gone there in the night, I would have been terrified.



devastation that a category 5 hurricane can inflict on any country."

He used imagery like that of Prime Minister Skerrit in his post 2017 eye witness account. *"I am glad I went to Barbuda in the day time. If I had gone there in the night, I would have been terrified. It looked like a bomb war zone – the news that you see from Syria. The buildings were only half standing. People were just basically sitting around, doing nothing."*

By Bittle's account, not much had changed after six months as the recovery has moved at snail's pace. He expressed

On the other hand, the economy is likely to languish for a bit longer because of the heavy blows sustained by the business sector. Michael Bittle is certain that sustaining training in business continuity planning could mitigate such a fall out in the future.

By his account, there was a clearly observable difference between those enterprises with active plans and those without. *"Over half the hotels in Dominica have not reopened yet, because they were not adequately prepared. However, those who had invested in proper roofing and building supplies – they're back up and running. So that demonstrates that*

landslides. Residents in the affected areas said it was like the ghost of Bret, the cyclone which had hit earlier last year in June.

As 2017 wound down, the weather events did not. In late November in Jamaica's 2nd city of Montego Bay, within four hours the skies dumped the equivalent of about a month's rainfall on the city during peak business hours. The town centre was submerged and flowed into adjoining residential and commercial districts. While there was no reported loss of life, the event exacted a heavy toll on livelihoods and put a pressure on the public purse to reallocate resources

“ Although 70% of the power grid is back up, only 30% of the businesses and homes have been reconnected. “It’s very clear that business is NOT as usual in Dominica ”

otherwise earmarked, for recovery efforts.

The call to action by Dominican Prime Minister Skerritt still echoes as midway through 2018, the ghosts of a very active season for cyclones and floods in the

Caribbean slowly recede. “Let these extraordinary events elicit extraordinary efforts to rebuild nations sustainably”.

What is abundantly clear is that the legacy of EKACDM is even more relevant as rebuilding must also include the

infrastructure for a robust information sharing platform.

Planning To Survive & Thrive

Normalizing Business Continuity Plans

According to a 2016 special report by the Caribbean Development Bank on Micro, Small and Medium Enterprises (MSME), this sector accounts for most of private enterprises in the Caribbean and ‘contributes more than 50% to Gross Domestic Product and employment. The sector also contributes significantly to female employment, poverty reduction and social stability.’

An earlier World Bank report suggests

as high as 70%, and when aggregated into the wider pool of Latin America, 60% of the active labour force work for enterprises with 5 or fewer employees.

Apart from their individual vulnerabilities due to small size and impaired capacities, the risk is multiplied across the fragile economies of the Caribbean which remain vulnerable to a menu of external shocks in the form of various hazards.

The question is then; how do we

For **Michael Bittle, Director of the Institute of Business Continuity Training (IBCT)** – a huge part of the answer is Business Continuity Planning and timely execution. Bittle, who has been doing business continuity training in the region for nearly two decades says that the Caribbean seems to be moving in the right direction.

‘In the last few months, I’ve noticed a significant increase in the levels of

“ there’s a decided lack of preparedness by small businesses and other organizations around being ready for what’s gonna happen next. ”

that, given the informality of the Caribbean’s private sector and the subsequent under reporting of data, self-employment in the region could be

collectively mitigate the impacts of economic derailment when blindsided by hazards leading to disasters?

awareness of the need for Business Continuity planning – how to keep businesses running, no matter what. However, there’s a decided lack of

preparedness by small businesses and other organizations around being ready for what's gonna happen next.'

EKACDM in partnership with the governments and the MSME sectors of targeted countries recently facilitated a series of workshops which were especially timely after the devastating experiences of 2017 in relation to floods and cyclones, particularly in Dominica and Antigua/Barbuda. *"This is of significant concern to me, it has been for several years, which is why I have been so happy to be involved in this project"*, Bittle declared.

From informal conversations and reportage, Bittle expressed concern about the prevailing expectation, among SME's that governments should primarily be responsible for rebuilding businesses post-disaster.

"As if when a small business can get free loans or grants, that that's gonna fix the problem." Bittle believes this view is misguided. *"the challenge is that those of us in this business know that money doesn't solve the problem at all. What we need is to have our organizations better prepared."*

“ money doesn't solve the problem at all. What we need is to have our organizations better prepared ”

He believes Business Continuity Planning (BCP) is the best guard against disaster-induced bankruptcy, by allowing businesses to recover more quickly from the adverse effects of any natural or man-made hazards that may occur.

2 QUESTIONS

We ran a two rapid-fire questions by Michael Bittle:

Q1: Describe the residual benefit of Business Continuity Planning (BCP)

A1: From a room of 40 small business representatives, if 5 of them walk out, having grasped the concept of BCP, in 3-4 years I would expect to see their businesses flourishing. The other 30-35, maybe this is their first-time hearing about BCP and they walk away feeling that somehow there is a magic bullet

or that somehow government can fix things for them, I would expect that In the same 3-4 year period, if they have to go through something like an Irma or a Maria, they'll simply be out of business. There will be no recovery for them.

Q2: What are the top 3 'takeaways' for the Caribbean MSME?

A2: The time to plan for the next event is NOW, don't wait until the hurricane or the earthquake or the flood has passed over.

Every business needs to do this if they want to survive, so don't sit around waiting for a handout from the government, or a loan. Every organization – whether it's a one-person business or whether it's a 1,000 people, every enterprise can take certain steps now to minimize the impacts of the next event. It is NOT rocket science, every business can do this ... there are only EIGHT steps in developing the BCP

“ It is NOT rocket science, every business can do this ... there are only EIGHT steps ”





Michael Bittle addressing participants at the “Business Recovery for MSME” workshop held on the 21st and 22nd of June 2018

EIGHT VITAL STEPS IN YOUR BUSINESS CONTINUITY PLAN*

- 1 Agree on the primary purpose and scope of the plan.
- 2 Perform a business impact analysis and risk assessment.
- 3 Develop strategies around those studies.
- 4 Design an emergency response plan. (at least assembly and evacuation)
- 5 Have an IT recovery protocol for all aspects of the business.
- 6 Test and exercise the plan (discover any gaps or kinks).
- 7 Tweak adjust & correct based on observations.
- 8 Update and improve at regular intervals.

**Plan can be satisfactorily completed within three months for multimillion dollar enterprises. For a small business it takes only 3 weeks to do your continuity plan.*

Antigua & Barbuda

HURRICANE IRMA September 6, 2017

Total Damage:
\$136M^{USD}

Damage centred in Barbuda:

90%
of buildings destroyed

20%
Barbudans have moved back

Antigua was virtually untouched

All 1800 of Barbuda's residents were evacuated to Antigua.
As of April 2018, only 400 persons had moved back.
The majority of them still live in makeshift housing.

Recovery Needs:
\$222^{USD}



Tourism:

Antigua - Minimal impact
Barbuda - Of 16 operators, only 1 was open



Agriculture:

27 operators surveyed (25 in Antigua, 2 in Barbuda)
- All are currently back in operation. Operators in Barbuda have suffered significant losses.



Fishing:

Pre-irma: 8 operators in Antigua, and 12 in Barbuda
Post-irma: 7 operators in Antigua, 5 in Barbuda
*Recovery costs around \$10,000 USD per boat.

Dominica

HURRICANE MARIA September 19, 2017

Total Damage:
\$931M^{USD}

100%
of surface crops lost

80%
available accommodations lost

44%
of Buildings Damaged/Destroyed

75%
of the Power Grid Destroyed

70%
of the country operating on sources of power outside of the grid.

58
beaches on the island,
all badly damaged



Agribusiness:

* 20 surveyed, 12 functioning (3 operating without power)
* All of them not insured
* 72% of employees laid off



Agriculture:

* Contributes 93.4 Million USD (17% of GDP)
* 7,000 people employed (21% of the workforce)
* 60% of farms - 5 acres or less
* 20% of farms 5-20 acres
* Women farmers were worst affected
* 76% experienced heavy losses.

Recovery

* 7 Million USD Disbursed through World Bank Grant Funding
* Seedling project established, over 150,000 seeds planted
* Local produce situation now normalized, fresh foods now available country-wide

Source:

Michael Bittle, M. C. (2018). Report on the experience of SMEs during the 2017 Hurricane Season gathered from Barbuda and Dominica. Institute of Sustainable Development, Disaster Risk Reduction Centre (DRRC). Niagra: IBCT.