

# EKACDM

ENHANCING KNOWLEDGE  
AND APPLICATION  
OF COMPREHENSIVE  
DISASTER MANAGEMENT

*Foundations, Quakes &  
Sustainable Livelihoods*





L-R

**Taneque Heslop** - Initiative Associate  
**Dr. David Smith** - Co-Principal Investigator  
**Dr. Barbara Carby** - Co-Principal Investigator  
**Dr. Elvis Nurse** - Initiative Manager

## PRODUCTION AND EDITORIAL TEAM

**Dr. Elvis Nurse**  
**Dr. David Smith**  
**Taneque Heslop**

Gerrard.Leighton.Mac Consultants  
Gerrard McDaniel  
Jean-Pierre Kavanaugh  
Dwayne Milford

## CONTACT EKACDM

EKACDM Initiative  
c/o Disaster Risk Reduction Centre (DRRC)  
13 Gibraltar Camp Way  
The University of the West Indies – Mona Campus  
Kingston 7, JAMAICA

Telephone: (876)-977-5508 Fax: (876)-977-1658  
Email: [ekacdm@uwimona.edu.jm](mailto:ekacdm@uwimona.edu.jm)

---

# Don't Underestimate 'Small' Climate Impacts



Initiative Manager, Dr. Elvis Nurse, bringing greetings to participants of the January Workshop



Consultant from the ReThink Social Development Team making a presentation on the Frameworks and Policies developed



Participants from all over the Caribbean came together for the two day workshop, held at the Knutsford Court hotel

**K**ingston, January 23, 2018—SMALL ISLAND developing states (SIDS) were cautioned this week to recognise the threat of seemingly small climate-change impacts such as sudden or sustained rain events, even as they prepare to contend with larger events, including extreme hurricanes.

“We worry about disasters like the Haiti earthquake ... or look at what happens with the Category 5 hurricanes in the region last year. A large storm hitting our countries can create up to a year’s damage or more ... We should also be worried about less spectacular events,” said Dr David Smith, coordinator of the Institute for Sustainable Development at the University of the West Indies.

He was addressing more than 20 participants from nine islands at the

opening ceremony of a two-day workshop, titled ‘Mainstreaming Gender Sensitive Strategies, Manuals and Policy Guidelines in Comprehensive Disaster Management (CDM) for the Caribbean’, on Tuesday.

“(With) repeated small events ... a tropical storm ... it raining every day since September as it has been doing in Jamaica ... what you have is a continual eroding of the progress we want to make,” Smith said.

With islands like Jamaica and Fiji losing a significant amount of their gross domestic product to climate impacts, he said that climate resilience building was more important now than ever to enable a stronger response to climate change and its impacts.

The workshop forms a part of a series of

wrap-up activities under the Enhancing Knowledge and Application of Comprehensive Disaster Management (EKACDM) Initiative, a five-year project funded by Global Affairs Canada.

The EKACDM Initiative is aimed at establishing an effective mechanism for managing and sharing knowledge in comprehensive disaster management, able to be used by various stakeholders across the Caribbean.

It also supports the implementation of the regional Comprehensive Disaster Management (CDM) Framework 2014-2024 of the Caribbean Disaster Emergency Management Agency and will help to support training for the public and private sectors, and civil society groups.

*SOURCE: Earth Day, Jamaica Gleaner*



**Anna Tucker-Abrahams, Research Analyst, Office of Disaster Preparedness and Emergency Management (ODPEM)**

**How Will the CaribEViz software add value to your current work once deployed?**

It will allow for more accurate seismic modelling and the ability to identify high-risk buildings, especially outside of the corporate area. Currently there is only data available for Kingston, but her plan is to work alongside the parish disaster offices to capture and input data at that level into

the CaribEViz, so that there’s national-level data.

**What was your key takeaway from the workshop held in December at the CDM, outside of the “hiccups”?**

The user-friendliness of the software (the fact that the learning curve isn’t steep).

# CaribEViz

## Seismic shift in Caribbean Disaster Risk Reduction and Recovery



Ilias Papadopoulos demonstrating how to use the CaribEViz software.

**I**t was a human tragedy of epic proportions...and the images of Haiti, January 12, 2010 are still firmly etched in our minds.

They were the remnants of a violent and devastating earthquake of magnitude 7, hitting much too close to home for comfort, right within in our shared Caribbean space.

While earthquakes are unpredictable, one can never escape a suite of haunting questions

- What is the state of our preparedness as a region?
- What could we have done differently to mitigate the impact?
- Could the response times and systems have worked better?

Here's another one. *"What if we had a mechanism, available across CARICOM to share information, and plugged into a robust platform that could answer*

*many of these questions?"*

Better still, *"what if this mechanism were to be affordable and constantly evolving through the collaborative effort of member states?"*

**Dr. David Smith**, coordinator of the ISD, UWI hits it squarely on the head with a simple but profound statement, *"If we know what's likely to happen, then we can plan for it better."*

*"Historically, the problem we have in the region,"* argues Machel Higgins, *"is that it is prohibitively expensive to collect the data that we need to get the sorts of results that we want."*

Currently a research assistant at Penn State University, he was formerly the Scientific Software Engineer, Seismic Research Centre, UWI, St Augustine Trinidad.

Enter **CaribEViz** to 'shake things up' by helping to rewrite this narrative of a shortage of reliable and timely

data available to policy makers and planners in the Caribbean. The emergence of CaribEViz was brokered by the **Institute for Sustainable Development (ISD)** at the University of the West Indies through its membership in a consortium of users of the **ERGO** Multi-hazards platform, developed by the University of Illinois.

**CaribEViz** is an open-source software that facilitates seismic modelling. It allows users to plug in parameters of any possible earthquake and produce a report of the simulated event within the selected geographic space. Apart from running simulations, it can provide better models for planning and development for emergency services and to predict likely earthquake effects. In that sense it is also a loss assessment tool.

What can it do? Dr Smith reels off an impressive menu of social goods, such as where to place disaster relief support centres, hospitals and

other essential services in any future development. *“It can predict structural damage to buildings (in terms of percentages), and by extension an estimated dollar figure cost in terms of structural damage to buildings and their contents”*

As it is currently designed, **CaribEViz** estimates the number of human casualties based on variables such as time of day. *“It can also make predictions on whether injuries will be severe or not”* he added.

Under EKACDM, the Caribbean team has therefore set about to modify the functionalities of **ERGO** to ensure that they are more relevant to us. This includes streamlined building classification, with user capability to modify those datasets within their own sphere of influence. This is now yielding a rich regional data set, curated by EKACDM and accessible to key partners in Disaster Risk Management across the Caribbean. *“This includes first responders, policy makers, city planners and search and rescue teams”* Dr. Smith explained. *“The information that is generated is useful, but only in the*

*hands of people who can do something about it”* he emphasized. It is free of cost to all users.

The compiled hazard information will be published by the Seismic Research Centre, leaving the onus on the stakeholders for proper and effective use. According to Machel Higgins , *“Anyone that is interested in answering the question, “What is my exposure to seismic hazards would have an interest in getting a richer data set... not just clouds of knowledge that may have overlaps or omissions”*

### Stakeholder Training

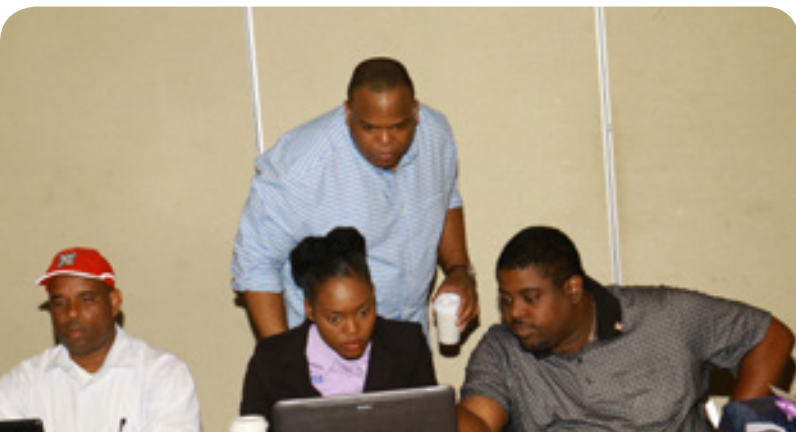
*“What would be ideal is to have a champion in every country to drive collection of these datasets and the analyses”,* Higgins argued. This has precipitated a programme of training regionwide. While echoing the views of trainees that **CaribEViz** is user-friendly, the training benefits from EKACDM support to smooth out the learning curve. The session includes practical hands-on use, as well as the population of supplementary data.

### The Vision

The hope is that **CaribEViz** will be adopted by all governments of island states, benefiting from not just the cost break of the software itself, but also relief from the time and trials invested in pan regional travel to collaborate on issues of mutual interest. Higgins argues that the best-case scenario is systemic incorporation of these findings into building codes and post event procedures to yield the type of preparedness required.

He continued *“all our countries are situated on active plate boundaries that produce earthquakes. Maybe it’s out of sight out of mind because of the long repeat period of earthquakes, like say 50 years, while most legislator only plan in 5 year cycles.”*

He agonized that, *“If Trinidad were to have an earthquake right now, it would go back to the stone age, with all of their industry. In Jamaica, Kingston has a significant fault running through the city. If an earthquake were to happen near the commercial or industrial centre, Jamaica would be set back 50 years based on preliminary projections.”*



(L-R) Shawn Charles - NADMA, SHERECE JAMES - Jam Habitat for Humanity, Stephan Sinclair - JSIF, being shown the functions of CaribEViz by Machel Higgins



CaribEViz Session

CaribEViz by the account of regional experts is a seismic shift in the right direction. So far, using available GIS data has allowed the software to operate at a very high resolution, giving users the ability to make predictions with fairly high accuracy. This would normally take very close collaboration and integration of efforts of several agencies using huge budgets. Referencing his current work on GPS and satellite in geodesy with respect to tectonics and seismic

hazards, Higgins explains, “Through **CaribEViz**, all this is made available to countries that would NEVER be able to do this given their lack of financial endowment.”

Coming full circle, Higgins concludes, “After Haiti, I know that none of us would like to see that kind of event in the region again, for which we are not adequately prepared. The Haiti 2010 earthquake should have been a clarion

call that this can happen in almost any Caribbean country, but I haven’t seen any traction in terms of building code law or aggressive public awareness. This needs to change.”

# Right Time, Right Place, Right Talent

Thalia Balkaran explores sustainable livelihoods as a hedge against devastating tropical cyclones



Coastline damaged by erosion. Photo Credit: Thalia Balkaran

If ever there was a time for updated research on the impact of tropical cyclones in the Caribbean, it would be now.

The wounds of a super active hurricane season in 2017 are still fresh. Hurricanes Irma and Maria beat particularly brutal paths through the Lesser Antilles, with

Barbuda and Dominica being among the worst hit.

With the undeniable effects of climate change, we can expect an increase in the intensity of such events in the future. This means not only increasing loss of lives, scale of damage to infrastructure and further derailment

of our economies — but more acute vulnerabilities for small and medium enterprises.

## Who will take this on?

Meet **Thalia Balkaran**, a Trinidad & Tobago national currently in the final year of her PhD programme in Environmental Management with a focus

on Disaster Risk Management. Based at the Institute of Sustainable Development on the Mona Campus of the University of the West Indies, Ms. Balkaran admits that the circumstances precipitating her current undertaking were quite fortuitous.

*"I was actually wrapping up my MPhil degree for submission of my final paper, because although I had my eyes set on doing a doctorate, I did not have the funds to continue."*, Ms. Balkaran explained. It was then that she responded to a call for scholarship by EKACDM and succeeded in her bid to become the 2015 awardee.

She immediately set her sights on adding to the regional body of knowledge in an area of disaster risk management where there was a clear gap. Ms. Balkaran noted that while the Caribbean had no dearth of research on the impact of disasters on tourism sector, the dimension of sustainable livelihoods was under explored. She then zoomed in on the vulnerabilities of small and medium enterprises to these events.

*"I wanted to find ways in which governments of the region could craft policies and support systems for some of the smallest operators within the hospitality sector – like the sole operator in traditional craft."*, she explained. *"I picked two islands in the region, each with two destinations for my enquiry"*

Negril and Runaway Bay in Jamaica, along with Crown Point and Speyside in Tobago then became parts of her extended laboratory for the next three years. This involved intense and extensive field work.

*"Not only did the EKACDM scholarship cover my tuition and allied costs, it has enabled me to attend and actively participate in two international Disaster Risk Management (DRM) conferences. In 2016 I presented in the Bahamas on my current research, and then in the summer of last year (August 2017) I delivered a paper in Iceland on DRM and sustainable livelihoods in tourism in small island developing states (SIDS)"*

In the interest of greater understanding of the problem, Ms. Balkaran's inquiry utilized mixed methods. There was a qualitative component involving in depth interview with members of the most directly affected populations. On the quantitative side, Ms. Balkaran attempted to weigh the critical factors pre and post a hazardous event by developing a tourism livelihoods vulnerabilities index. One of the main aims of the quantitative work was to measure livelihood vulnerability across sites to allow comparison of sites and components (which is referred to in the other line as disaggregated data), this was done through the development of an index to measure vulnerability. *"This is the only way I believe I could be able to recommend targeted and viable solutions. To make the index more sensitive, I then disaggregated data by factors such as economic, financial, public utilities, social networks and institutions"*, she explained. This allowed her by a comparison of vulnerabilities to

assign a score to each one.

### What's next?

The aspiring Dr Balkaran expressed excitement at the fact that her final paper will have an impact in the field of Disaster Risk Management. *"In the next 5 years, I am hoping that my study would have contributed directly to the body of knowledge governing DRM in the region."* She enthused. Specifically, she wants the findings and recommendations to reach the right ears and eyes that can influence their inclusion in national policy. *"I would love to know that this EKACDM scholarship would have enabled me to play a significant role in disaster risk reduction as the proposed measures are adopted and applied across the region especially within small and medium enterprises."*

While Thalia Balkaran wants to be the architect of robust templates on sustaining livelihoods in tourism, she is very clear about the role of partnerships and wide public engagement.

*"It is critical as a region that we focus on DRM, not just as a government undertaking. We will not fully succeed unless it gets to the grassroots level, in the communities, among groups, and at the family table. We need to have open discussions about this within the school system from primary /secondary all the way up to tertiary."*, she concluded.



**Thalia Balkaran,**  
EKACDM Scholarship Recipient

# Blueprints For Success

powered by YOUR inputs  
(EKACDM Gender-Sensitive policy and operational manuals)

In the Caribbean, apart from the fact that tropical cyclones once bore exclusively women's names (1953-1978) and that urban myth characterizing 'male' hurricanes for being particularly brutal, we rarely think gender when we contemplate preparedness, response or recovery to hazards.

Under the basic premises that women and men experience the totality of life from different and often complementary perspectives, EKACDM has acknowledged that its 'enhancement of knowledge' on disaster management would not be sufficiently comprehensive without the incorporation of a gendered perspective.

Funded by **Global Affairs Canada** and implemented by the UWI's Institute for Sustainable Development (ISD) the



**Professor Opal Palmer Adisa,**  
Director - IGDS, UWI

EKACDM Initiative has undertaken inclusive research to develop a suite of training manuals. These are purposed to assist Caribbean policymakers and practitioners integrate gender sensitivity into policy development in various sectors.

According to co-principal investigator of the EKACDM, Dr. Barbara Carby, *"These are very practical 'how to' guides for those who wish to seamlessly integrate gender considerations into both policy and best practices in the comprehensive management of risks and disasters in the region"*

The manuals are targeted at decision-makers. *"This is to get the attention of the executives with the actual power to change things."*, Dr Carby explains.

As the preface in the manuals reinforce, Comprehensive Disaster Management (CDM) takes a more participatory approach to Disaster Risk Management. *It emphasizes partnerships with national, regional and international disaster stakeholders, including key sectors such as public and private sectors, economic sectors, civil society, vulnerable groups, the general population and regional and international partners.*

In that regard, the ISD has partnered with another regional entity, the **Institute for Gender and Development**

**Studies** (IGDS) to benefit from a more holistic approach to DRM. The timing of the main deliverables has been hailed for its increased relevance and utility in the Caribbean, particularly in relation to tourism and its ongoing battle with natural disasters.

Professor Opal Palmer Adisa, University Director of the Regional Coordinating Unit of the IGDS reasons. *"Given the devastation of the most recent hurricanes Irma and Maria; given that climate change is a reality; given that in the past we have not paid close attention to gender or ability or age when planning disaster management, given that gender justice and parity are buzz words, it is not surprising that the tourist industry is taking stock to ensure that they are poised to address all of the needs of both locals as well as tourist in the advent of any unforeseen disaster, and in keeping with current demands and trends that include gender justice."*

For policymakers and DRM practitioners in Antigua and Barbuda, Barbados, Dominica, Grenada, Guyana, Jamaica, Saint Lucia, Saint Vincent & the Grenadines, and Trinidad & Tobago, these manuals will mean the ready availability of standardized, tangible references for application in most likely scenarios they might be asked to consider.



Among other things, the manuals will enable end users across the 9 EKACDM states to:

- Understand key concepts linked to gender, gender mainstreaming, gender analysis, climate change and disaster risk management;
- Understand the principles of Comprehensive Disaster Management, and apply these to policymaking in the any of the five economic sectors that have been prioritised in the EKACDM Initiative; Use gender mainstreaming strategies and tools to integrate gender-sensitivity in CDM generally and specifically in the implementation of the CDM Framework 2014–2024; and
- Adapt the manual to integrate gender sensitivity in CDM policies and plans in the any of the five economic sectors that have been prioritised in the EKACDM Initiative.

The manuals are currently being considered by representatives of the targeted end user group, and Professor Palmer Adisa is pleased with the progress. *“The manuals and guides that the IGDS, Mona Unit prepared for the EKACDM are both comprehensive and readable, and in keeping with both international as well as local guidelines.”*

For her part, Dr. Carby issued a caution, *“This is not just about women, as men and women have different challenges. Therefore, it is critical for the final product to benefit from evidence for targeted planning.”* She cited one example from Guyana, which suffers frequently from flooding. In this scenario, it was discovered that the men were getting leptospirosis while the women were not. Why? Dr. Carby explained, *“The men, by custom are*



Dr. Barbara Carby,  
Co-Principal Investigator, EKACDM

*the ones who stay behind to protect property, resulting in direct sustained exposure to flood waters”*

The implications for planning, Dr. Carby offered might be the construction of better shelters. *“Perhaps to facilitate better accommodation of personal effects such as critical equipment, domestic animals etc”*, she added.

Why the emphasis on tourism and agriculture? For one, these are the sectors with the widest and most significant impact on the small vulnerable economies, often supporting other sectors in harsh times. *“In addition, much work has already been done in these sectors. The main operatives are already so sensitized in DRM and CDM, so this really complements work previously done.”* Dr Carby added.

The dream outcome Carby says is to engage and enlist MPhil students to identify and own a range of problems and eventually to produce actionable shared data. In the data-poor Caribbean, new insights often come as a very steep price. The EKACDM view is that as far as possible, cost should not be a barrier to the uptake of knowledge to enhance risk reduction. *“Therefore,*

*all project outputs will be logged with the Caribbean Disaster Emergency Management Agency (CDEMA), and on the website of the UWI’s Disaster Risk Reduction Centre (DRRC). There will be no access cost to the end user, thanks to the funding by Global Affairs Canada”*, she enthused.

The feedback so far to the manuals has been overwhelmingly positive for being iterative and directly reflected in recommended policy and operational instruments.

After careful review, Professor Palmer Adisa of the UWI’s IGDS-ICU concluded, *“These documents will allow anyone working in this industry to: 1. Ascertain what gender issues they have within the organisation and 2. Provide a solid framework to recognise the societal and cultural biases, and 3. Offers steps to take to realign the structures to ensure that gender parity is included in all strata of the organisation.”*

Now over to all interested parties in the Caribbean to ensure that this is reflected in subsequent analyses that the Caribbean has become more gender sensitive in our management of disaster risks, and ultimately a safer region in which to live and work.

# OAS / EKACDM

## collaborate to support resilience for SMEs in agriculture, tourism

“Many businesses in the Caribbean are simply not ready to face the next disaster”

**T**hat blunt assertion by Dr David Smith effectively pinpoints the challenge / opportunity dynamic which precipitated a special partnership between the Organisation of American States (OAS) and EKACDM.

Co-Principal Investigator under the EKACDM project, Dr Smith went on to explain that at the nexus of the arrangement is a shared goal to see greater resilience among small and medium enterprises in the Caribbean to disasters. “The central concern is how to help businesses get back on track as soon as possible after a disaster”, he explained.

Initiative Manager Dr. Elvis Nurse disclosed that this component reflects the bigger picture of the emphasis by funders **Global Affairs Canada** (GAC) on regional collaboration among stakeholders to build capacity for resilience and specifically within small and medium enterprises in Tourism and

Agriculture.

The OAS/EKACDM collaboration will support the training in development of business continuity plan (BCP) for SMEs in tourism and agriculture. This data will be gathered through surveys, workshops and documented experiences of the SMEs. The kits accompanying the training will include a range of communication products such as manuals and videos to enhance the efficiency of knowledge transfer.

When asked what the EKACDM/OAS collaboration will look like, Dr Nurse emphasized the focus on pan regional training. *“We are jointly hosting five ( 5) two-day regional workshops for SMEs within the Tourism and Agriculture sectors using business continuity planning (BCP) training material specifically developed for SMEs. To reflect the gender emphasis of the project, the persons selected to attend the workshops would reflect equal numbers of men and women to the extent possible.”*

The collaboration allows for greater coverage of SMEs impacted by hurricanes in the region, with the OAS and EKACDM taking different countries. For those SME operators who cannot be accommodated in one of the five sessions, access to the materials will be granted online.

In the long-term, this initiative is expected to strengthen the capacity of public policy makers, SMEs support institutions, private sector and other agencies, to promote and support business continuity planning in SMEs in the targeted sectors.

*“The hope is that by so doing we can, over time, build a culture of prevention and preparedness for disasters, giving special consideration to the impact of disasters on women and youth.”* Dr. Nurse concluded.



Dr. David Smith,  
Co-Principal Investigator, EKACDM



Dr. Elvis Nurse,  
Initiative Manager, EKACDM



# CaribEViz

Enhancing Knowledge and Application of Comprehensive Disaster Management (EKACDM) Initiative

## Background

CaribEViz is a seismic risk assessment platform, based on ERGO-EQ that was developed by the Seismic Research Centre (SRC) of the UWI in association with the University of Illinois. It is an output of the EKACDM Initiative funded by GAC.

CaribEViz was developed to provide stakeholders with a tool to help understand seismic risk in the region. The software can perform several analyses of risk using information on the seismic hazard, buildings and people. By combining these the software can estimate aspects of risk including potential fatalities, injuries, structural damage and effects on lifelines (e.g. health centres, water storage tanks). The software can provide a better understanding of the effects of probabilistic and deterministic events.

## Partners

The Seismic Research Centre and Mona Earthquake Unit at The University of the West Indies

National Centre for Supercomputing Applications, University of Illinois

The work was supported by a grant from the Government of Canada and builds on previous work supported by the World Bank



## Features



### Ergo-EQ Platform

Built exclusively on the Ergo-EQ Platform, allowing for precise and reliable data input and output, allowing for accurate assessments to be deduced for Caribbean islands.



### Visualizations

CaribEViz allows for shareable and editable visualizations of data including: earthquake impact simulations and building damage analysis.



### Population Dislocation Analysis



### Bridge Damage Analysis



### Interdependent Network Analysis (INA)



### Pipeline Damage Analysis



### Cross Platform Compatibility

CaribEViz can be installed on Windows, Mac OS X and Linux systems, providing seamless integration into any existing network.

## Benefits



### Planning

Coordinates planning and event mitigation, response and recovery.



### Analysis

Integrates spatial information to perform risk assessment and analysis.



### Connectivity

Connects information to practitioners and decision makers.



### Data

Provides a framework to add and update data and algorithms.



### Support

Allow for analysis of "What If" scenarios (Decision Support)





THE UNIVERSITY OF THE WEST INDIES

# CaribEViz

Enhancing Knowledge and Application of Comprehensive Disaster Management (EKACDM) Initiative

## Earthquake risk for Kingston

History: 1907 Earthquake

Magnitude **6.9**

Over **1200** Deaths

Damage of over **£2million**

Destroyed almost all the brick buildings

What if it happened again?

**200%** GDP loss

Damage of **US\$5.5 billion**

Reduction in production of goods and services of **US\$6.5 Billion**

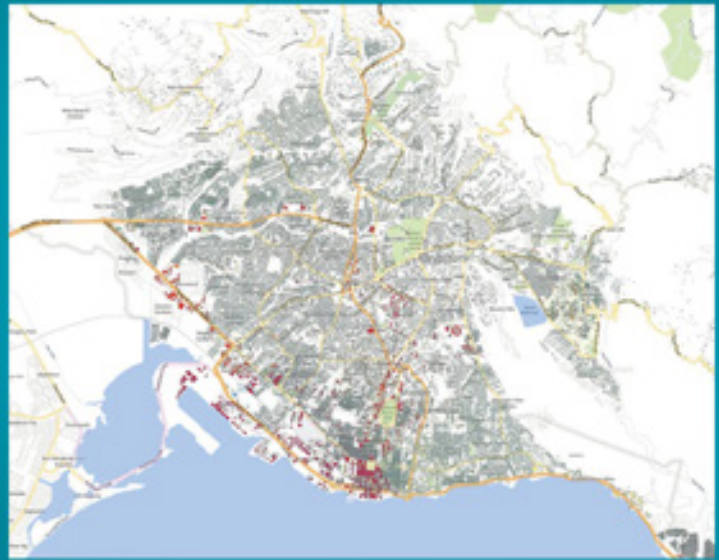
Up to **900,000** jobs could be lost for up to 5 months

What is the likelihood of this?

The University of the West Indies estimates that Jamaica is subject to medium-high seismic hazard

### A simulation of damage to buildings

more damage



## What could happen on Mona Campus?

less damage more damage



95 year event



475 year event



975 year event



2475 year event

## What can we do with the results?

### Retrofitting

pick buildings for retrofitting & assist in cost benefit analysis if the cost of retrofitting is known

### Teaching

generating scenarios to teach about earthquake impact

### Disaster response

realistic scenarios generated for emergency exercises & simulations.

## Next Steps

Build up a users group

Address comments

Do more training

Collect data