NATIONAL EMERGENCY RESPONSE DATA ANALYSIS TOOL (NERDAT)

A Tool for Post-impact Response Decision Making

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Jamaica's Socio-Economic and Physical Context

The island's regional setting together with its physiographic setting places it at risk from several natural hazards. These include hurricanes, landslide, tsunamis, earthquakes and flooding. The most frequently occurring hazards in Jamaica are landslides and flooding and over the last five years several of these incidents have occurred and have caused serious dislocation of families, damage to infrastructure and disruption in economic activities.

Data indicates that over the past century approximately 20 hurricanes have passed within a distance of 400km of Jamaica. These hurricanes range from category 1 to category 5. This translates to approximately 1 hurricane every 5 years. 60% of theses hurricanes fall equally in the category 1 and 2 strengths.

Over a decade the country has experienced approximately 12 adverse events resulting in over J$87 billion (US**$**995,243,613.9 at current exchange rate). These have had varying degrees of impact on the economy. For example, damage from hurricane Ivan in 2004 represented 8% of GDP of the previous year. This is significant for an economy that is not very diverse and dependent mainly on bauxite, tourism and agriculture.

The country also has high poverty rates and this together with the frequency of hazards makes it especially important for response to be timely and targeted at the most critically impacted. The National Emergency Response Data Analysis Too (NERDAT) facilitates this desired objective.

Origin of the idea

The Initial Damage Assessment methodology was introduced in the Caribbean region in 2000 through the USAID/OFDA based on its success in Latin America. The national disaster office was able to implement and train local assessors in the methodology. While there were numerous challenges in implementing the methodology, its usefulness as a post-impact decision-making tool was especially highlighted in 2007 when Hurricane Dean affected the island. The National Disaster Office through support from UNDP deployed assessment teams in critically affected areas.

The UNDP assisted the National Emergency Operations Centre (NEOC) with the analysis of the data collected from the assessors. The assessment team at the time comprised mainly donor agencies, assessors from the National disaster office and partner agencies that were trained in IDA methodology. Based on this experience the idea of developing a data analysis tool was introduced by the UNDP. ODPEM immediately began working on this project. To facilitate the development of the tool the UNDP and ODPEM assembled a small number of agencies had data sets that were crucial to the analysis. This included the Statistical Institute, the Social Development Commission and the Jamaica Red Cross.

Lessons Learned from Hurricane Dean

The Hurricane Dean experience was very useful in highlighting a number of areas in which data collection and analysis can be improved. Data analysis at the time was done using Microsoft Excel. This software, though useful, was ineffective in facilitating any kind of meaningful analysis for response. At the time analysis was only being done of the levels of damage sustained by

buildings, mainly residences. This did not provide sufficient information required for humanitarian assistance within the first three days post-impact. Additionally, the ODPEM needed to identify a standardized tool that would be easy to use in an emergency situation as this would allow data analysis to be retained by the (NEOC). These two requirements lead to the creation of NERDAT.

Description of NERDAT

NERDAT is a tool for analysing data from the initial damage assessments to better inform decision-making especially within the first 48 hours of the post impact phase. On the basis of this assessment it is possible to make a projection of needs. The tool integrates pre-impact data with IDA assessment data to enable better decision-making.

The IDA methodology has four levels of damage ranging from level 1 (no significant damage) to level 4 (destroyed). These levels are arrived at in a very systematic way using standard definitions for each level and a simple decision tree that a local community assessor can use. Depending on the level of damage certain inferences can be made regarding the impacted population. To allow these inferences NERDAT integrates the levels of damage with pre-impact data such as total population in a community, number of persons per household, number of vulnerable population, average size (sq. m) of each dwelling and construction material and associated construction costs per square metre.

When analyzed with the IDA assessment data allows the NEOC within 48 hours to get a better indication of the number and percentage of population displaced, vulnerable population displaced, estimated reconstruction cost for damaged houses and shelter capacity required for displaced persons. On the basis of this assessment, needs lists are generated manually. NERDAT can help the NEOC:

- Determine priority areas for action
- Guide Welfare and Relief Deployment
- Identify long and short term needs - water , sanitation, tarpaulins, food, comfort items
- Projection of island wide impact on housing
- Determine magnitude of the event
- Identify areas which may need to be declared disaster areas
- Medium to long term reconstruction needs
- Estimate of medium and long term shelter needs

Benefits

The tool boasts many benefits including being web-enabled to facilitate remote users using and reporting information in a timely manner. Parishes (municipalities) will be able to access the tool via a username and password and so will be able to analyze data at the community or municipal level. Collectively the NEOC will be able to assessment impacts to housing at the national level.

It has a very simple, easy to use user interface that makes it suitable for use in a crisis situation under extreme pressure. It also offers the following benefits:

- Can handle large volumes of data
- Web-based application increases accessibility to remote users
- Automatic update of database from remote locations
- Better decisions for response and prioritization of needs
- Quicker decisions (48 hr required turnaround time)
- Enhances Data integrity
- Data processing available in a central location for remote users without internet access

Scope

Currently IDA methodology is designed for buildings but the concept can be applied across other sectors. Adapting the methodology for other sectors will require amendment to the definitions of each level and the decision tree.

Opportunities

The tool facilitates analysis at the community, municipal and national levels. It is integrated with the GIS and therefore can display the analysis spatially in addition to using charts and graphs. The tool is still in its development phase and has not had the opportunity to be tested in a real adverse event. The current capabilities can be enhanced but requires additional funding support to complete its development.

NERDAT can be replicated in any region that uses the IDA methodology with very little or no modification. Several Caribbean territories have expressed an interest in the tool and ultimately the tool will be shared within the region.

To further broaden the use of the tool and facilitate more rigorous spatial data analysis, several GIS professional including GPS mappers have been trained in the IDA methodology and have so far conducted mapping during Hurricane Dean.

The tool and the outputs can be used in scenario planning, to inform land development, public education and awareness raising and designing early warning systems.

Challenges

The tool is web-based and therefore depends heavily on the internet. In the event of an islandwide loss of internet service, the tool cannot be utilized.

The island is divided into over 700 communities. A number of districts make up these communities but geographic boundaries have not been demarcated for these districts. Historically it is often a district within a community that is critically impacted. The tool is designed to integrate community level data which can often skew the analysis if only one district is affected.

Some municipalities lack the capacity and so the support staff required to undertake the data input and run analysis. In such situations the proposal is to draw on community volunteers with very basic knowledge in computing to support the Parish Emergency Coordinators.

The tool is expensive to develop. Currently funding is being sought to develop a complete product.

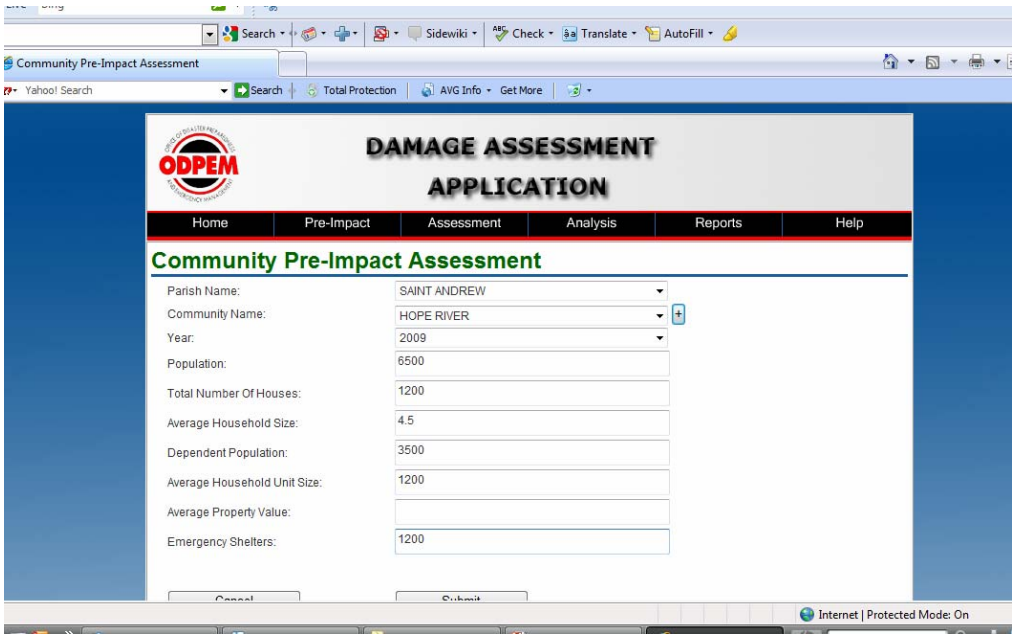
Next Steps

Prior to the start of the 2010 season it is expected that the tool will be ready for a full roll-out if Jamaica is impacted. However certain functionalities will not be available and these are proposed to be added at a later date. These include:

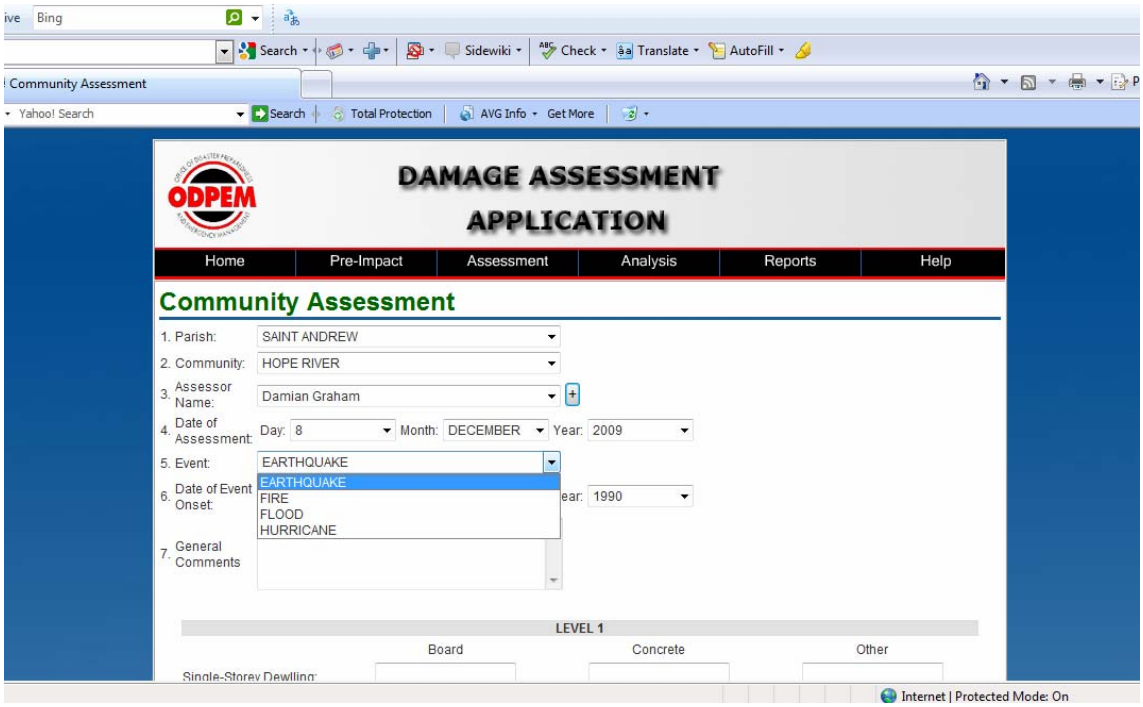
- A Needs analysis component of the tool which generates a needs list based on the analysis
- Development of a database to support the tool. This database will contain all the pre-impact data and will automatically populate the pre-impact fields when the community name is selected
- Include additional features which will allow historical data to be used in pre-impact scenario planning
- Integration of GIS to facilitate the inclusion of spatial representation of data. Already IDA is the starting point for the National Emergency Response GIS Team (NERGIST). This team will be deployed to undertake mapping in the critically impacted areas and will be including IDA mapping in their responsibilities.
- Advocate for the definition of district boundaries
- Replicate among CEDMA participating states

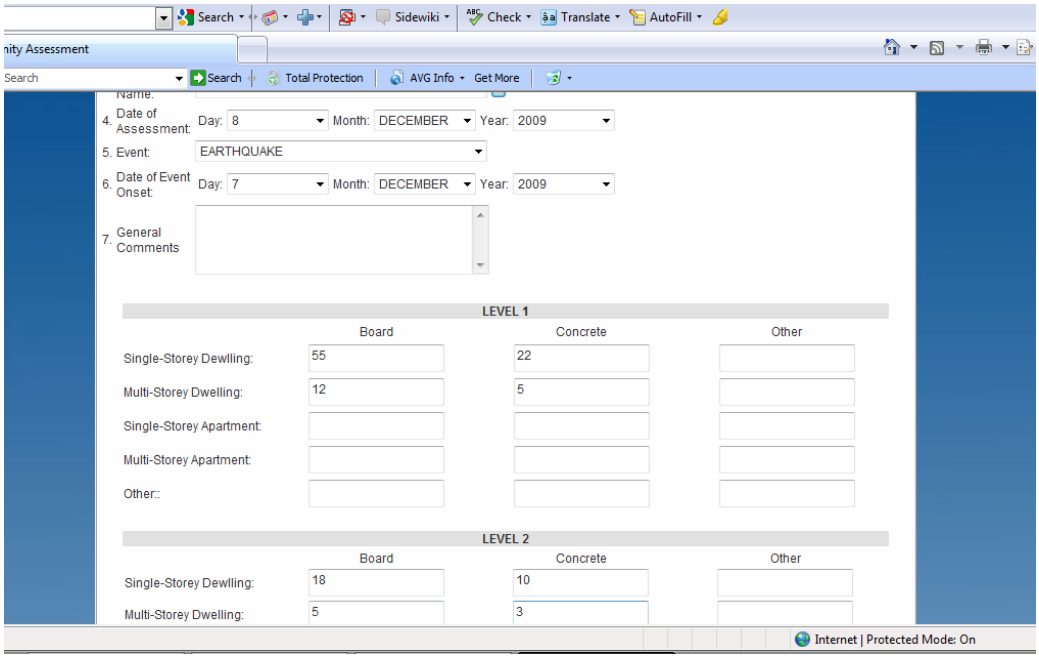
APPENDIX A – Screen Dumps of IDA Tool

Pre-impact User Interface/data entry screen

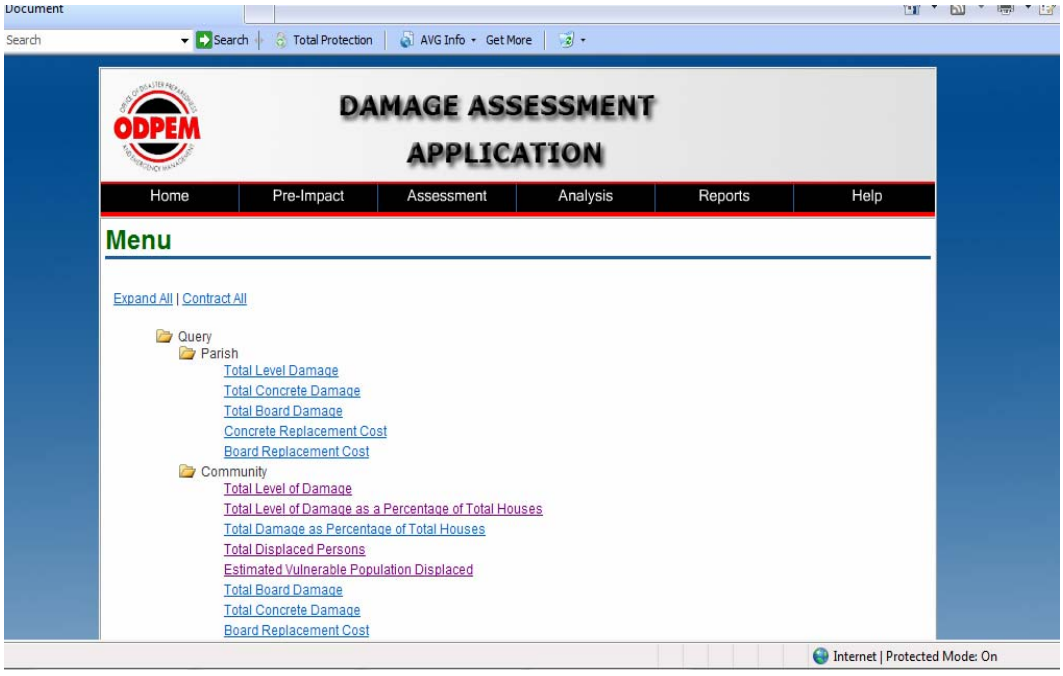


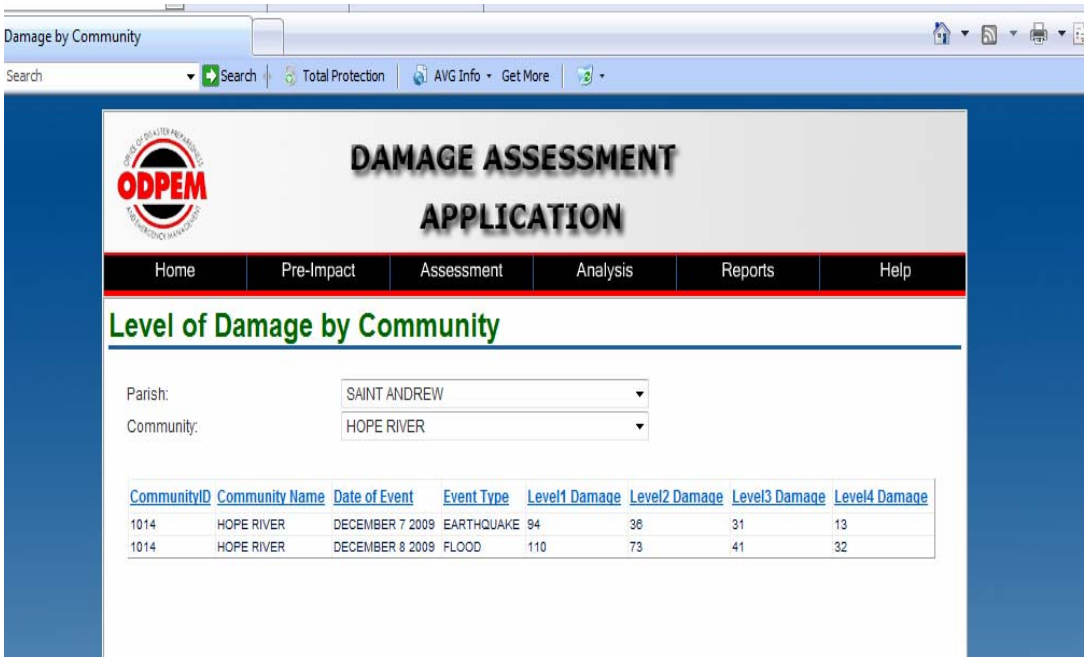
Data Entry Screen

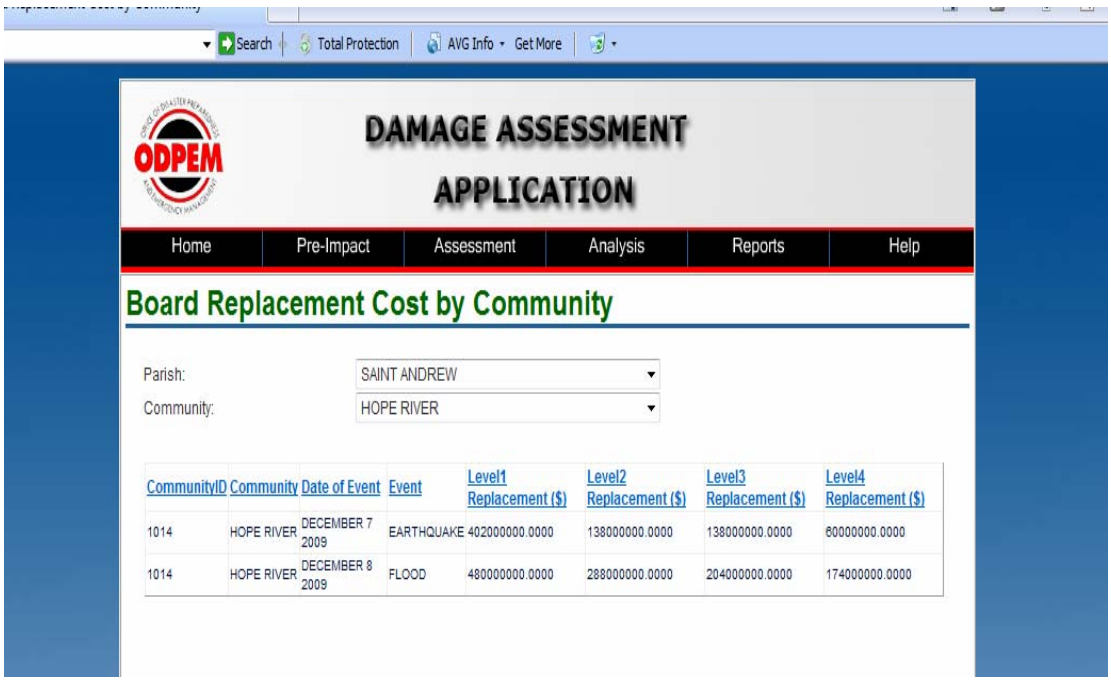




Data Analysis (Reports)




Damage by Community
Search
Total Protection
AVG Info
Get More
DAMAGE ASSESSMENT
APPLICATION
Home
Pre-Impact
Assessment
Analysis
Reports
Help
Level of Damage by Community
Parish:
SAINT ANDREW
Community:
HOPE RIVER
CommunityID
Community Name
Date of Event
Event Type
Level1 Damage
Level2 Damage
Level3 Damage
Level4 Damage
1014
HOPE RIVER
DECEMBER 7 2009
EARTHQUAKE
94
36
31
13
1014
HOPE RIVER
DECEMBER 8 2009
FLOOD
110
73
41
32


Search
Total Protection
AVG Info
Get More
DAMAGE ASSESSMENT
APPLICATION
Home
Pre-Impact
Assessment
Analysis
Reports
Help
Board Replacement Cost by Community
Parish:
SAINT ANDREW
Community:
HOPE RIVER
CommunityID
Community
Date of Event
Event
Level1 Replacement ($)
Level2 Replacement ($)
Level3 Replacement ($)
Level4 Replacement ($)
1014
HOPE RIVER
DECEMBER 7 2009
EARTHQUAKE
402000000.0000
138000000.0000
138000000.0000
60000000.0000
1014
HOPE RIVER
DECEMBER 8 2009
FLOOD
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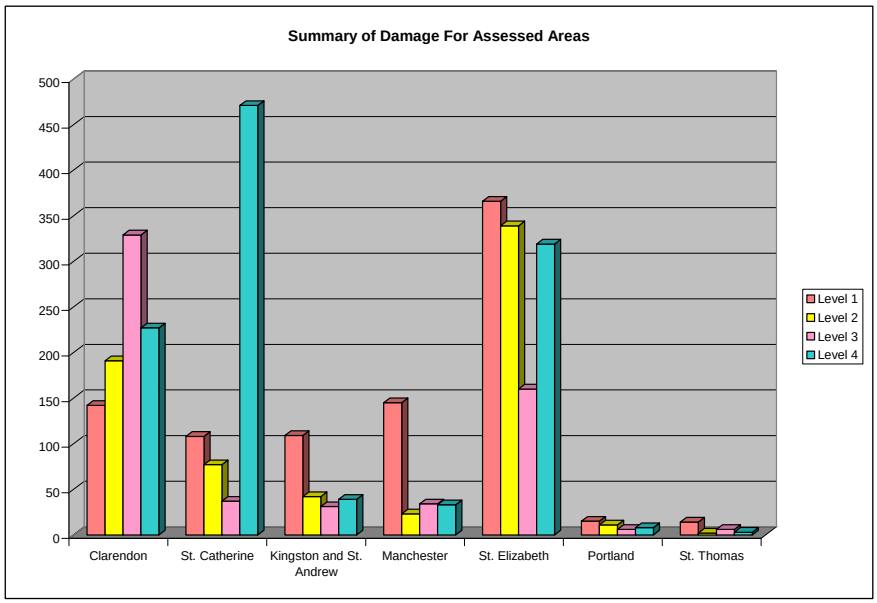
Charts


Summary of Damage For Assessed Areas
500
450
400
350
300
250
200
150
100
50
0
Clarendon
St. Catherine
Kingston and St. Andrew
Manchester
St. Elizabeth
Portland
St. Thomas
Level 1
Level 2
Level 3
Level 4