

Exploring Household-centred Approaches for Stormwater Management in Caribbean Islands

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Outline of Presentation

INTRODUCTION

- Increased Urbanization
- Traditional Management Approach
- Impacts of Improper SWM
- Governance
- Climate Change

LITERATURE REVIEW

- Research Aims
- Methodology
- Proposed Outputs

PRELIMINARY FINDINGS

- Document Reviews
- Interviews
- Surveys



Introduction

For the Caribbean:

- Flooding is the hazard most frequently experienced by 75% of Caribbean islands (Collymore 2007).
- The number of persons affected by flooding has increased although the number of deaths has decreased



Source: *Barbados Daily Nation* newspaper- Oct. 01, 2010

<http://www.nationnews.com/articles/view/flooded-in-a-flash/>

Introduction

For the Caribbean:

- In 2007, the region suffered \$US 10 billion in economic losses from weather related events representing over 13% of gross domestic product (GDP)” (Simpson et al. 2009).



Source: Caribbean Development Bank website

<http://198.246.230.18/titanweb/cdb/webcms.nsf/AllDoc/DBDAE468CA5CD03D04257398004DC84C?OpenDocument>

Introduction

Rationale for Research:

- Very little documentation in the scholarly domain on the topic in the Caribbean
- Existing literature is fragmented and does not reflect an integrated approach
- Need for research that documents the existing state of water-related issues (governance, public awareness and infrastructure design)
- Understanding what currently exists in the governance structure will set the foundation for knowing how to modify the structure to include stormwater as a resource

Introduction

Research Aims:

- To understand the existing governance structure for stormwater management in order to determine if it is adequate and what changes may need to be made to more effectively address management of this hazard.
- To document the attributes, behaviour, attitudes and beliefs of householders regarding stormwater management and governance and their potential role in the governance framework

Literature Review

Traditional Management Approaches:

- Remove stormwater off the property as quickly as possible
- Little regard for downstream effects (eg. Flooding, marine pollution)
- Use of inappropriate design guidelines from industrialized, temperate countries
- Upgrade of drainage infrastructure has not kept up with increasing urbanization



Source: Chesapeake Bay Program, Stormwater Runoff (http://www.chesapeakebay.net/issues/issue/stormwater_runoff)

Literature Review

Governance:



Source: Jamaica Observer newspaper- February 03, 2012
<http://www.jamaicaobserver.com/tools/cartoons/ed-cartoon-feb-03-2012>

The Study Country

Selected Country:

– Barbados

- Most eastern Caribbean island
- Classified as Small Island Developing State (SIDS)
- Hurricane season: June to Nov
- One of the most densely populated in the world (17th)
- One of the most water scarce in the world (15th)
- Heavy rain causes flash floods



Methodology

- Mixed methods approach-
 - Mixed methodology = multi-strategy research = integrated methods = multi-method research = combined methods research (Denscombe 2007)
 - Combines quantitative and qualitative methods
 - Benefits:
 - Improves the accuracy of the research; provides a more thorough view of the research topic; assist with developing the analysis; assist with sample selection; compensate for the strengths and weaknesses of each chosen method
 - Underpinned by a pragmatic worldview-
 - Concern with understanding the research problem and using all approaches to achieve that.

Methodology

Data Collection:

- Document reviews

to identify a preliminary set of actors in the formal stormwater governance framework

- Semi-structured interviews

with stakeholders (government agencies, non-government agencies (NGOs), professional organizations, donor agencies etc) in the three countries to determine their roles in the framework and the other stakeholders with whom they interact, as well as their characterization, role, responsibility and source of empowerment. Snowball sampling will identify additional stakeholders.

- Interviews with key informants

- Sample surveys

of householders in select communities encompassing open and closed-ended questions to householders in select communities in the three countries. Random sampling of respondents.

Methodology

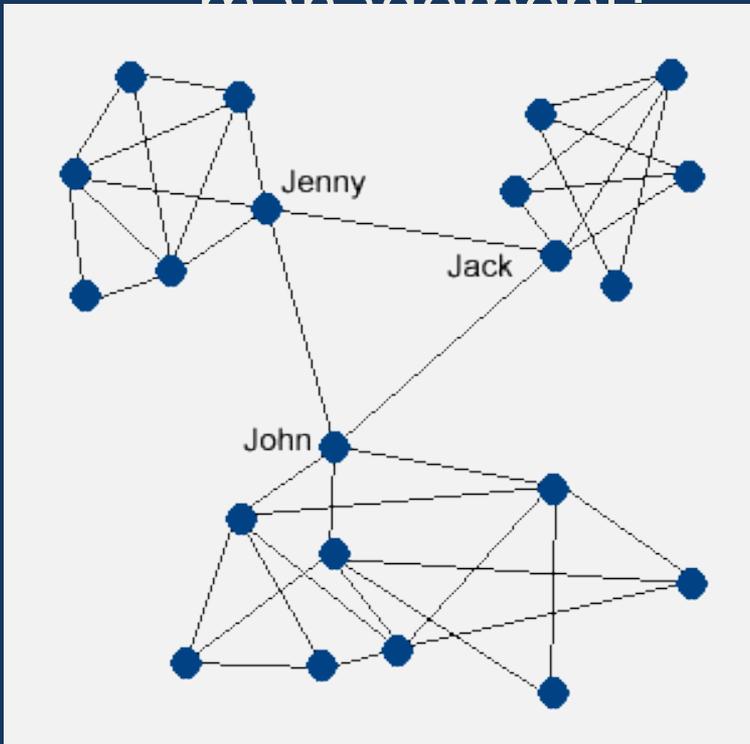
Governance Questionnaire Outline:

- General Information on the organization
- Characterization of the organization
- Roles and responsibilities of the organization
- Interaction between organizations
- Autonomy
- Enabling environment
- Public awareness and interactions with households

Methodology

Analysis:

- A network diagram representing the existing governance structure for stormwater management:



Complete Network Analysis

- Nodes = actors
- Lines = Interactions
- Centrality = measure of location
 - Degree Centrality = # of direct connections a node has
 - Betweenness Centrality = # of shortest paths from all nodes to others that pass through that node
 - Closeness centrality = # of steps needed to access every other node from a given node

Preliminary findings

Document Reviews

- Enabling Environment
 - 2 MEAs
 - 3 policies
 - 11 laws
- Institutional Roles
 - 1 government agency responsible for SW issues
 - 13 other agencies with varying roles in SWG
- Management Instruments
 - 4 building regulations
 - No instruments for social change or to ensure efficiency

Preliminary findings

Interviews

- Summary of NodeXL metrics

Type of Centrality	BIA	BOT . Gdn s.	BW A	CD B / Env iron	CIM H	CZ MU	DE M	Drai nag e	EPD	GO VTS	NH D	T&C DP O
In-degree	0	1	5	0	4	7	3	12	8	4	2	9
Out-degree	5	5	0	7	9	5	5	14	7	0	6	7
Betweenness	253.5	43.1	9.0	511.3	1662.9	187.1	122.6	672.0	877.3	882.0	173.6	475.2
Closeness	0.006	0.006	0.006	0.007	0.008	0.007	0.007	0.008	0.008	0.007	0.006	0.007
Eigenvector	0.016	0.043	0.052	0.011	0.055	0.071	0.043	0.096	0.079	0.010	0.050	0.078

Highest indegree= Drainage Div, T&CDPCO, EPD, CZMU

Highest outdegree= Drainage Div., CIMH, T&CDPCO, EPD

Highest betweenness= CIMH, Govts, EPD, Drainage Div

Highest Eigenvector= Drainage Div.

Preliminary findings

Interviews

- Network Diagram

KEY

Colours:

Green= Govt. Dept.; Blue=

Prof. Org.; Aqua=NGO;

Purple=Donor;

Orange=Other

Shape:

Circle=Named Org.;

Square=Active Player

Size:

Dot=Not Interviewed;

Medium=No Mandate;

Large=Have Mandate

Connecting Lines:

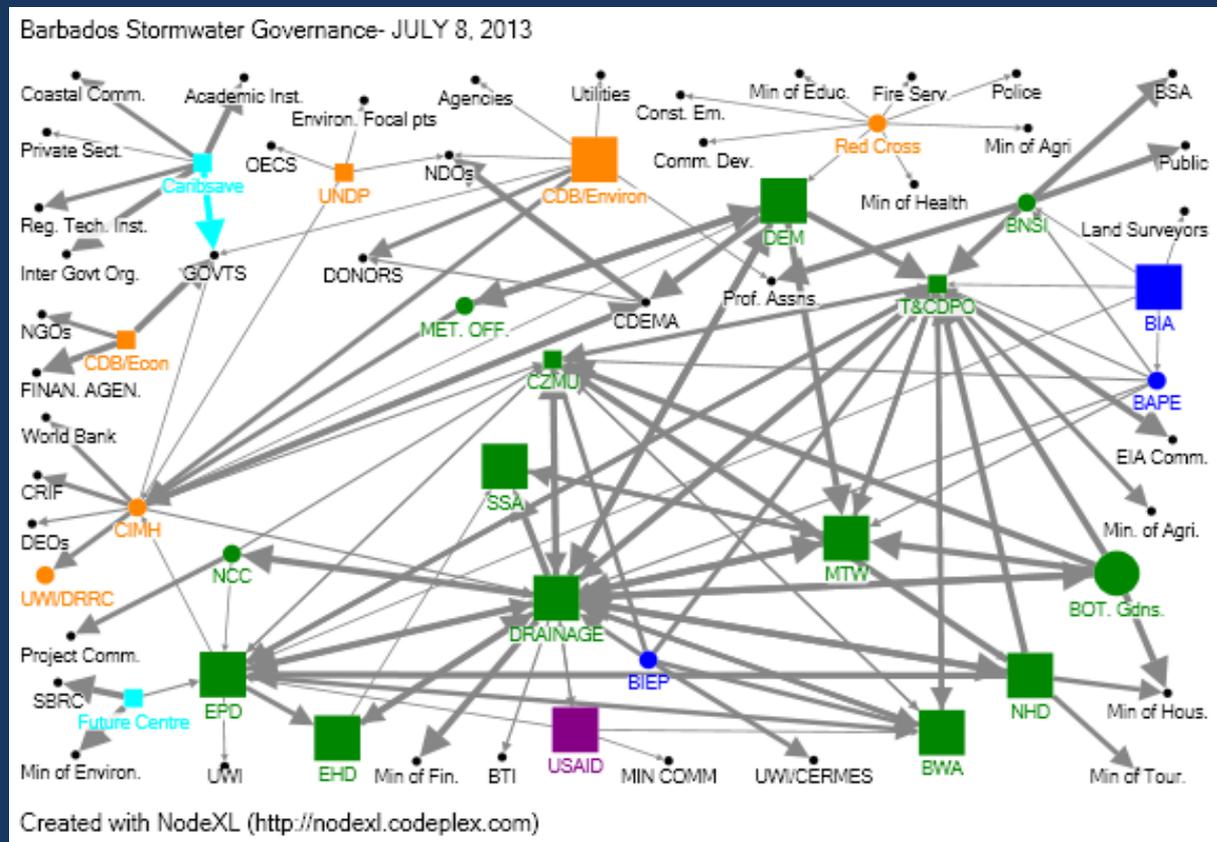
Thin Line= communication /

cooperation; Medium Line=

coordination / collaboration;

Thick Line= partner / fully

linked



Thank you all for coming and listening!