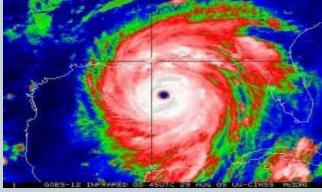
Assessing the Costs of Disasters on Jamaica's Infrastructure: Evidence from the Damage and Loss Assessment by the Planning Institute of Jamaica

Jamaica's Vulnerability to Natural Hazards









Methodology

- ECLAC Damage and Loss (DALA) Methodology
- Damage (replacement cost)
- Loss
- Damage + Loss = Total Cost
- Secondary effects also considered

Some Definitions:

• **Damage**: monetary value of partial or total damage to fixed assets, capital and inventories of finished and semi-finished goods, raw materials and spare parts that occur concurrently as a direct consequences of the natural phenomenon causing a disaster.

• Losses:

The effect on flows of goods that will not be produced and services that will not be provided after a disaster.

Secondary effects:

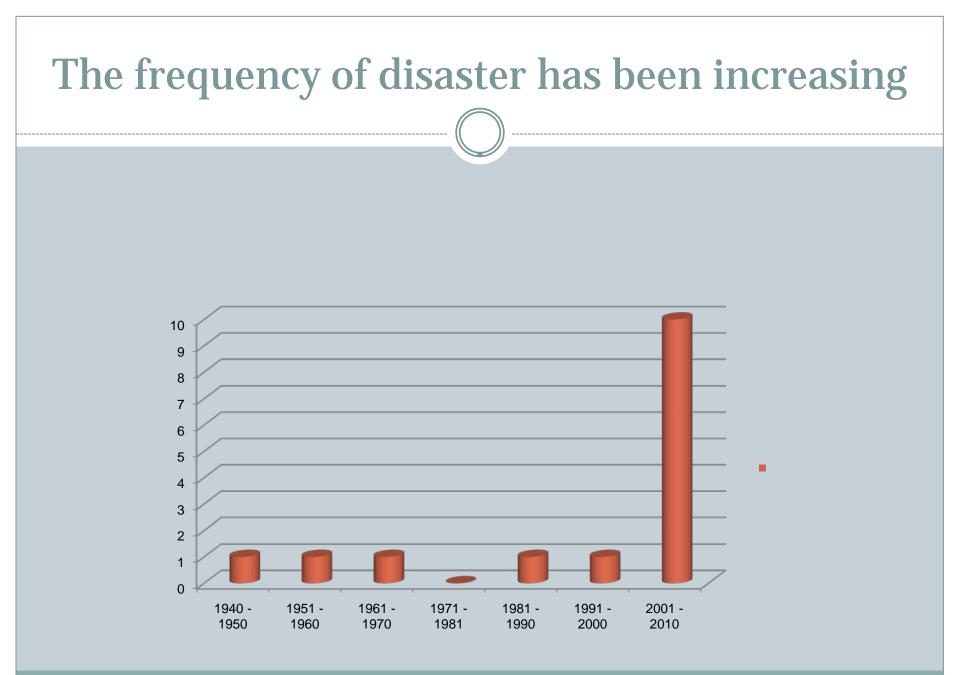
The impact on the overall performance of the economy, as measured through the most significant macro-economic variables.



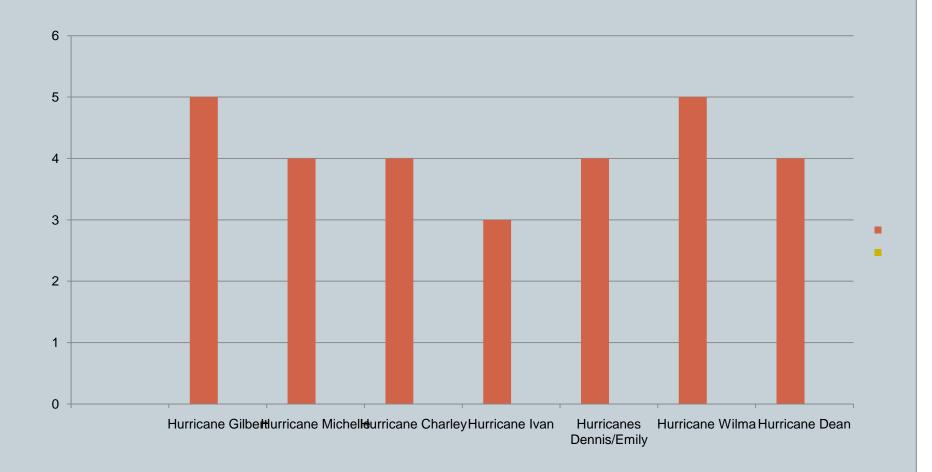
Disasters - Some Recent Trends

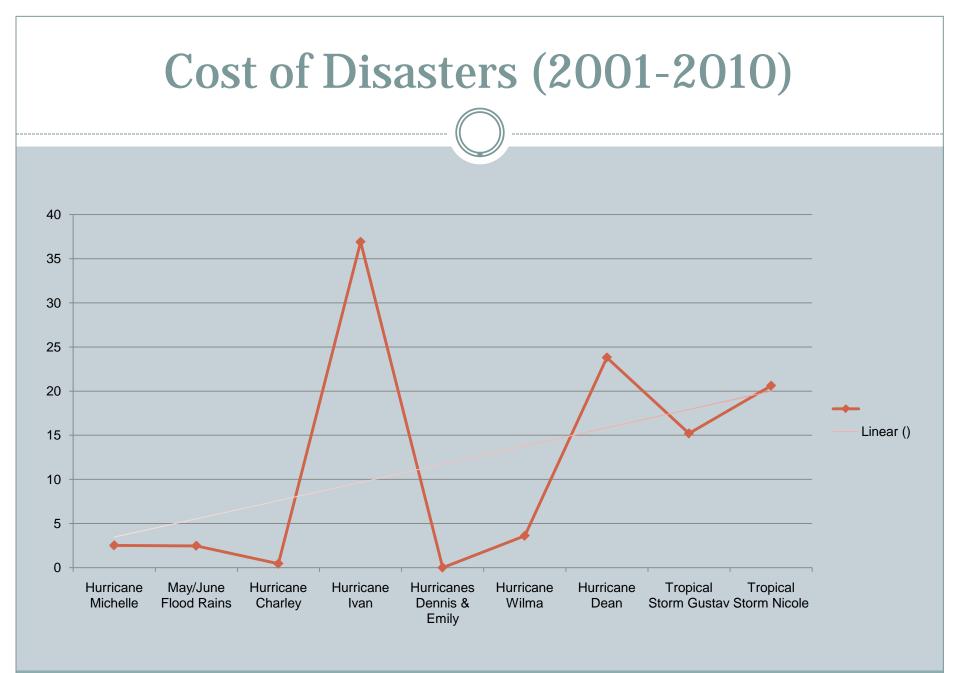
Selected natural disasters in Jamaica and their impact

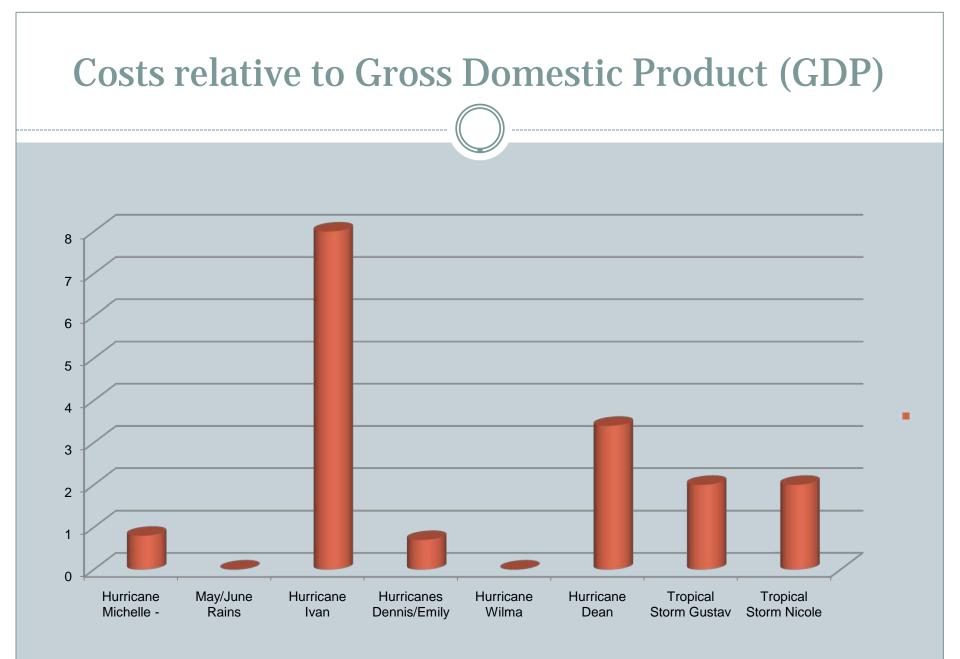
		(())				
EVENT	Year	Category	Cost (\$JB)	Impact (% GDP)		
Hurricane Michelle	2001	4	2.52	0.8		
May/June Flood Rains	2002	-	2.47	0.7		
Hurricane Charley	2004	4	0.44	0.02		
Hurricane Ivan	2004	3	36.9	8.0		
Hurricanes Dennis & Emily	2005	4	5. 98	1.2		
Hurricane Wilma	2005	5	3.6	0.7		
Hurricane Dean	2007	4	23.8	3.4		
Tropical Storm Gustav	2008		15.5	2.0		
Tropical Storm Nicole	2010		20.6	1.9		
		Total	111.81			



Intensity of Storm events has been increasing









IMPACT ON THE INFRASTRUCTURE SECTOR

Infrastructure - definition

 Systems and assets, whether physical or virtual the destruction of which would have debilitating impact on national economic security, national public health or safety, or a combination of both (Paromak 2005)

Based on the Damage and Loss (DALA) methodology developed by ECLAC Infrastructure includes:

- Transport and Communications road network and ground transport, water and air transport infrastructure, telecommunications, coastal infrastructure
- Drinking Water and Sanitation drinking water supply systems, waste water disposal systems, solid waste disposal systems
- Energy electricity, petroleum sub-sectors

Characteristics of key Infrastructure

Sub-sector Some Characteristics						
Sub-sector	Some Characteristics					
Transport	 Jamaica has 21000 kilometres of roads. This includes freeways, primary roads (a), secondary roads (b), parochial roads and unclassified road. The National Works Agency has a total of 736 bridges in its database of various types including: steel beams; arch; concrete girders; and truss. 					
Energy	 The energy infrastructure comprises: Four main power lines located at St. Andrew – Rockfort; Kingston Hunts Bay; St. Catherine Old Harbour Bay; St. James – Bogue, all are coastal locations. Eight hydro-electric plants located at St. Elizabeth – Maggoty; St. Ann Upper White River; St. Ann Lower White River; St. Ann Roaring River; Trelawny Rio Beuno A; Trelawny Rio Bueno B; St. Andrew Rams Horn; St. Andrew Constant Spring; one wind farm; St. Elizabeth Munro Wind Farm 					
Water Supply Facilities	•Water Supply infrastructure water storage plants e.g. Mona Reservoir, Water treatment plants e. Mona Treatment Plant, Water supply facilities e.g.Yallahs Pipeline Scheme; pumping stations, and sewerage treatment plants					

Some Factors Contributing to Infrastructure Damage

- Age of infrastructure
- Design Standards
- Location
- State of Repairs/Maintenance
- Environmental Conditions

Cost of Disasters by Sector (2001 – 2010)

- Social Sector
- Infrastructure
- Eonomic Sectors
- Environment
- Emergency Operations

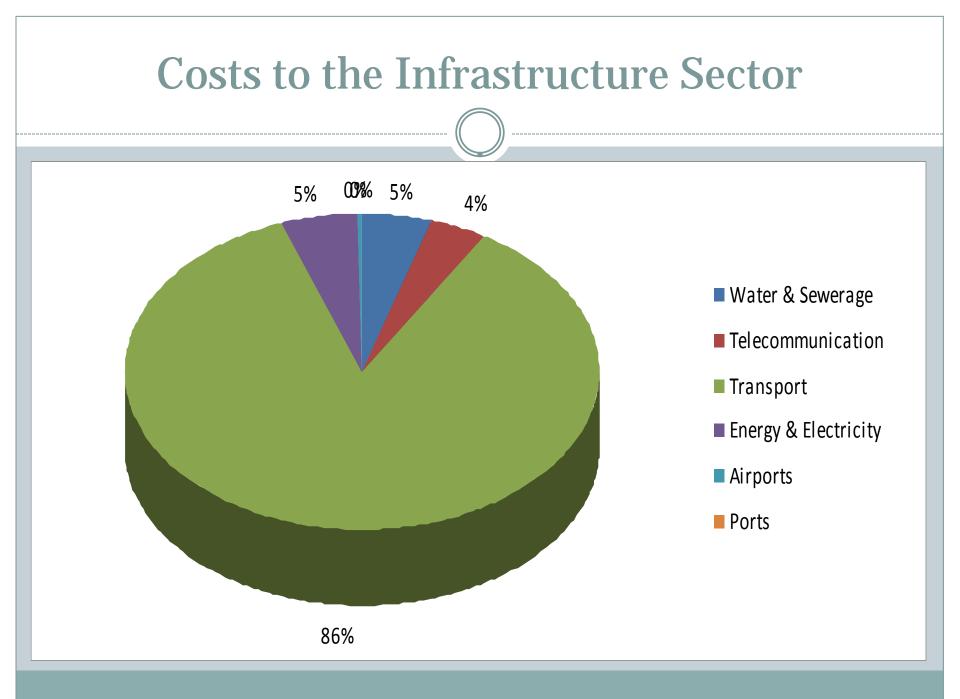
Costs to the Infrastructure Sector

				(())					
	H. Michelle 01	May/June Rains 02	H Ivan 04	H. Dennis/Emily 05	H Wilma 05	H Dean 07	TC Gustav o8	TC Niole 10	
Infrastructure									
Water & Sewerage	96	78.7	687.7	400	47.4	202	725	270	2506.8
Telecom	6.9	4.46	1535.3	42	30	197.68		136.9	1953.24
Transport	1577.5	1491.8	3225.9	4271.89	3199	2047.3	11530	17041.8	44385.19
Energy & Electricity	6.4	1.2	1397.9	70		1073.25	108	92.4	2749.15
Ports			120.1	11.56				1.8	133.46

TOTAL 51727.84

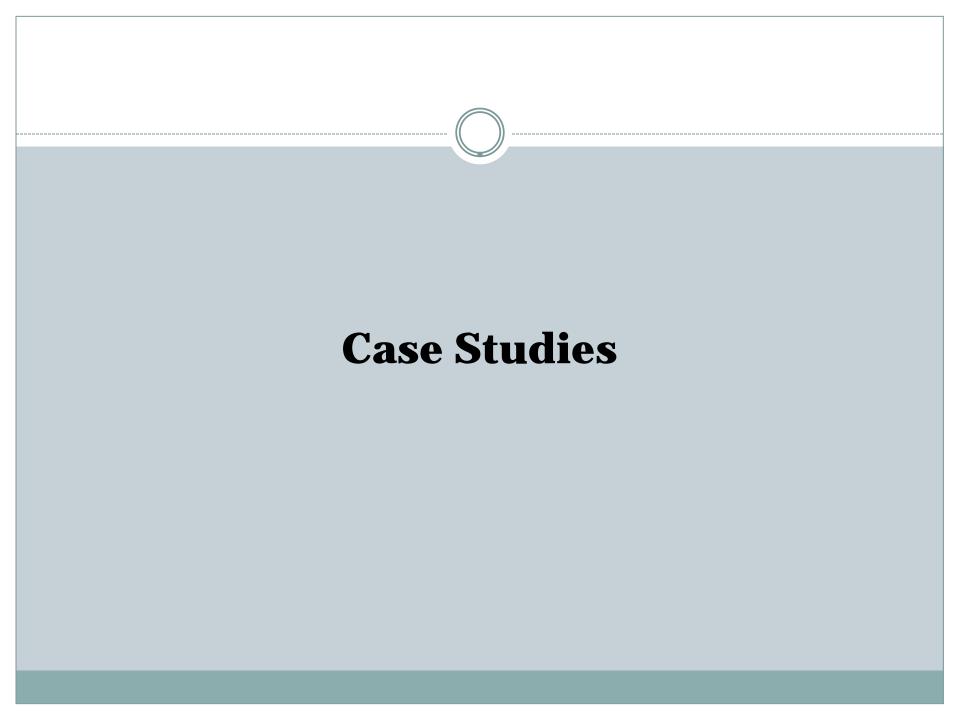
Costs to the Infrastructure Sector

- Total costs based on analysis of 9 events was estimated at \$ 111.37 b
- Of this, the infrastructure sector accounted for \$51.7b or 46 % of the overall costs. At \$44.4b, the transport sub-sector (roads and bridges) bore the brunt (86%) of these costs.



Secondary Effects

- Impact of GDP
- Inflation
- Debt Stock
- Budget
- Revenue
- Employment
- BOP



Hurricanes Dennis/Emily, 2005

- Hurricanes Dennis and Emily occurred within two weeks of each other
- Total damage was estimated at \$5 976.91 million or US\$96.87 million. This is equivalent to 1.2 per cent of the previous year's GDP.
- Infrastructure was the most affected area with damage and losses of \$4 826.05 million
- Damage to Transport roads and bridges accounted for \$4 271.89 million, or 71.5 per cent of the total cost.

Tropical Storm Nicole

- Total damage was estimated at \$18 089.0 million of which Infrastructure accounted for 88.0 per cent of the total cost. Damage to main roads and bridges was estimated at \$14 billion of which \$1.42 billion represented the preliminary cost to reopen blocked roads.
- A total of 543 main roads were impacted with St. Thomas accounting for \$1,542.2 million or 11 per cent of the total cost of the damage.
- Another \$1.9 billion was allocated to river training Cleaning and reconstruction of retaining walls of the Sandy Gully bridge accounted for 32.7 per cent (J\$4.6 billion) of the total cost of damage to the road infrastructure.

Tropical Storm Nicole

