

# Development of Impact-based Matrices

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9th WMO/Meteo-France RA I Tropical Cyclones Training  
Course

# Matrix Development

Instructions: Develop matrices for your location:

- Hazards
- Impacts
- Response

Hazards are categorized according to the stages in which they appear following an event and whether they are directly attributed to the hazard source, or indirectly through a combination of other hazards.

- **Primary Hazard Phenomena** occur as a result of the process itself. For example, ground shaking during an earthquake. These lead to Primary Hazard Impacts, such as building collapse and utility pipeline rupture.
- **Secondary Hazard Phenomena** occur only because primary Phenomena has caused them. For example, soil liquefaction as a result of earthquake ground shaking, drought as a result of prolonged periods of hot weather or pest infestation as a result of prolonged or seasonal rainfall. Secondary impacts may include infrastructure damage (flood impacted bridges and potholes following a cold spell), lack of irrigation for crops, and reduced crop harvests induced by pest swarms.
- **Tertiary Hazard Phenomena** occur as a result of Primary and Secondary Phenomena. Often these exhibit long term effects. These include things like loss of habitat caused by a flood, permanent changes in the position of river channel caused by flood, crop failure caused by a pest infestation, induced by prolonged or seasonal rainfall etc. Impacts associated with tertiary hazards are often harder to quantify and have significant duration. Examples include, food chain disruption and loss of species due to habitat reduction, increased long term probabilities of flooding associated with geometry and course alterations and famine.

# Hazard Matrix – Barbados Example

| Associated Hazards Matrix - Source Event: Heavy Rainfall |                             |   |
|--|-----------------------------|---|
| Primary  | Secondary                   | Tertiary  |
| Heavy Rain Events  | Flooding and Flash Flooding | Roads flooded, homes destroyed, evacuation of persons needed. Possible landslide hazards, crop failure. Health and Safety of Population |

# Hazard Matrix

| Associated Hazards Matrix - Source Event: |           |          |
|---|-----------|----------|
| Primary                                   | Secondary | Tertiary |
|   |           |          |

# Impact Matrix – Barbados Example

| Impact Matrix: Rainfall  |   |   |  |
|--|---|---|--|
| Minimal Impact   | Minor Impacts   | Significant Impacts   | Severe Impacts   |
| <p>Transportation</p> <p>Wet roads and higher likelihood of accidents</p> <p>Localized disruption to traffic</p> | <p>Localized pooling and flooding of roads</p> <p>Occasional accidents and associated disruptions and increased travel times</p> <p>Minor public transportation disruptions</p> | <p>Localized flooding and damage of roads with significant delays and disruption to traffic</p> <p>Accidents and associated disruptions and increased travel times</p> <p>Significant disruptions to public transportations</p> | <p>Widespread flooding and damage of roads with dangerous driving conditions</p> <p>Multiple accidents and associated disruptions and increased travel times</p> <p>Most public transportation significantly delayed</p> |

# Impact Matrix

| Impact Matrix: |               |                     |                |
|----------------|---------------|---------------------|----------------|
| Minimal Impact | Minor Impacts | Significant Impacts | Severe Impacts |
|                |               |                     |                |

# Response matrix – Barbados Example

| Response Matrix: Rainfall               |   |  |   |
|---|---|--|---|
| Very Low - Business as usual            | Low - Be Aware  | Medium - Be Prepared   | High - Take Action  |
| Monitor for changing weather conditions | <p>Stay out of flood waters</p> <p>Evaluate inventory of emergency supplies (food, water, medical supplies), Prepare to restock supplies at the beginning of season</p> <p>Be aware of localized flooding of roads and properties in [...locations...]. Impacts include occasional accidents, associated disruptions, increased travel times, and land slippages.</p> | <p>Stay out of flood waters</p> <p>Check emergency supplies, purchase additional supplies if needed, fill gas tanks, etc.</p> <p>Be prepared for localized flooding of roads and properties in [...locations...]. Impacts include accidents, associated disruptions, increased travel times, land slippages could block roads.</p> | <p>Stay out of flood waters</p> <p>Prepare to use emergency supplies, acquire additional supplies if possible, fill gas tanks, preposition food and emergency supplies for post event</p> <p>Avoid walking or driving through moving water</p> <p>Seek safer/higher ground if in [...locations...]</p> <p>Monitor for changing weather conditions</p> |

# Response matrix

| Response Matrix:             |                |                      |                    |
|------------------------------|----------------|----------------------|--------------------|
| Very Low - Business as usual | Low - Be Aware | Medium - Be Prepared | High - Take Action |
|                              |                |                      |                    |