



Vulnerability Index calculation: tutorial

CM 615



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Need for computing vulnerability index



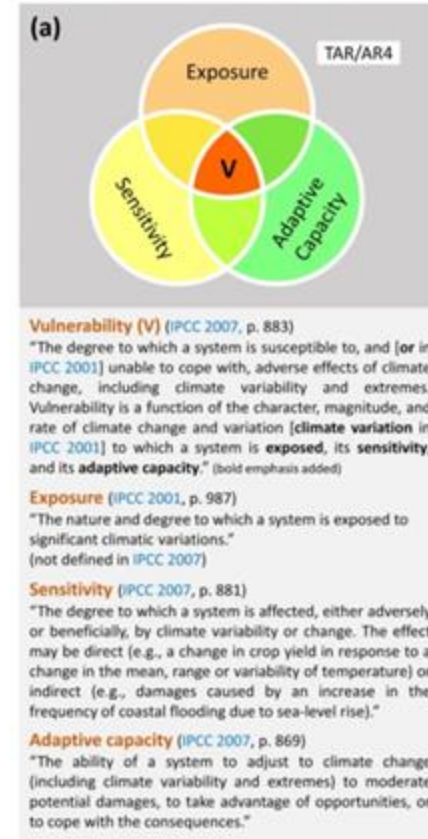
<https://www.mapsofindia.com/maps/india/cyclone-prone-areas.html>

Vulnerability Index

Vulnerability Index measures a country's exposure, sensitivity and ability to adapt to the impact of climate change.

$$\text{Vulnerability} = (\text{Exposure} * \text{Sensitivity}) - \text{Adaptive capacity}$$

$$\text{Vulnerability} = (\text{Exposure} - \text{Adaptive Capacity}) * \text{Sensitivity}$$





Steps to compute vulnerability index

Step 1: Selection of variables for each sub-index (Exposure, sensitivity and adaptive capacity)

Step 2: Data collection

Step 3: Data normalisation

Step 4: Data aggregation

Step 5: Final result

Step 6: Interpretation



Data normalisation

Positively affecting factors:

$$x_{ij} = \frac{X_{ij} - \underset{i}{\text{Min}}\{X_{ij}\}}{\underset{i}{\text{Max}}\{X_{ij}\} - \underset{i}{\text{Min}}\{X_{ij}\}}$$

Negatively affecting factors:

$$y_{ij} = \frac{\underset{i}{\text{Max}}\{X_{ij}\} - X_{ij}}{\underset{i}{\text{Max}}\{X_{ij}\} - \underset{i}{\text{Min}}\{X_{ij}\}}$$



Data aggregation

Averaging over sub indicator: Exposure, Sensitivity and Adaptive capacity

Vulnerability index = (Exposure * Sensitivity) - Adaptive capacity



Assignment

1. Compute state-level vulnerability assessment considering at least five states of India.
2. Compare the level of vulnerability based on exposure, sensitivity and adaptive capacity.
3. State which factors need more focus to reduce the level of vulnerability

Variables





Data

1. Exposure:

Precipitation: Frequency of >95 percentile and <5 percentile

Temperature: Frequency of >95 percentile and <5 percentile

1. Adaptive capacity: Data is provided (If necessary random data can be generated for other variables, if you want to include any)
2. Sensitivity: Data is provided (If necessary random data can be generated for other variables, if you want to include any)



Report structure

1. Introduction
2. Data and methods

2.1. Data

2.2. Methods

2.3. Study area

1. Results
2. Interpretation
3. Conclusion