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Q8

Vulnerability is an essential element for defining disaster impacts and its threat to people. How and in what ways can vulnerability to disasters be characterized? Discuss different types of vulnerability with reference to disasters.

UPSC Civil Services Mains 2019 · GS III · 10 marks · Disaster Management

Disaster and disaster management.

Core demand of the question

- Define vulnerability as used in disaster impact
- Characterise how it is measured and discuss physical, social, economic, environmental and institutional types
- Keep a 10-mark length

Revision summary

Vulnerability is susceptibility created by social, physical and environmental conditions.

Impact equals hazard times exposure times vulnerability, minus capacity.

- **Types:** physical (houses, codes), social (gender, caste, age), economic (poverty, no insurance), environmental (degraded buffers), institutional (weak DMA).

Atlases, **Census**/SECC and Sendai indicators characterise it.

NDMA guidelines and local drills reduce it only if they reach the most exposed household.

Introduction

A hazard becomes a **disaster** only when it meets **exposed, susceptible people and assets**.

UNDRR and India's **National Disaster Management Authority (NDMA)** treat **vulnerability** as the conditions that raise that susceptibility - poverty, weak houses, caste exclusion, degraded slopes, or a missing early-warning last mile. Impact is not rainfall millimetres alone; it is rainfall times vulnerability.

Body**How vulnerability can be characterised**

- **Hazard × exposure × vulnerability** (and capacity) is the usual identity. Two villages under the same cyclone track can have different death tolls.
- Characterisation is **spatial** (hazard zonation, census wards), **social** (who cannot run, swim, or read a warning), and **temporal** (night flood, harvest season, tourist peak).
- **Tools:** vulnerability atlases, **Census** and **Socio-Economic Caste Census**, housing data, **Sendai Framework** targets, and **NDMA** / State DMA indicators. **NITI Aayog** SDG dashboards and **Finance Commission** disaster windows use the same logic when they allocate.
- **Dynamic:** a new flyover can cut flood vulnerability or raise it if it blocks a drain. Climate change shifts the hazard; **unplanned urbanisation** often shifts vulnerability faster.

Types, with disaster reference

- **Physical / structural:** kutchha houses in a cyclone (Odisha 1999 versus 2013 after shelters), unreinforced masonry in Himalayan quakes, schools on floodplains. Building codes and **NDMA earthquake and cyclone guidelines** target this type.
- **Social:** age, gender, disability, caste and minority status. Women and the elderly died in larger shares in several floods and the 2004 tsunami because warnings, boats and relief queues were not designed for them. Social vulnerability is also **literacy and language** of alerts.
- **Economic:** daily-wage and informal workers have no buffer; a week of **COVID** or a flood wipes the household. Lack of **insurance** (crop, house, livelihood) and of **MGNREGA** as a post-disaster wage floor are economic vulnerability. **PMFBY** and disaster relief manuals try to cut it.
- **Environmental:** deforested slopes (Kedarnath 2013, later Himalayan landslides), mined coasts, vanishing mangroves and wetlands. Ecosystems are the first defence; their loss is vulnerability created by development.
- **Institutional / political:** weak local bodies, delayed **State Disaster Response Fund** drawal, corrupt relief, and no rehearsal of **incident response**. **Capacity is the inverse of this type:** **NDRF/SDRF**, community volunteers, and mock drills.

Link

- Types overlap. A Dalit hamlet on a riverbank in a kutchha house is physical plus social plus economic vulnerability in one address.

Flow diagram

Hazard -> Exposure
 Exposure -> Vulnerability
 Vulnerability -> Physical social economic
 Vulnerability -> Environmental institutional
 Physical social economic -> Disaster impact
 Environmental institutional -> Disaster impact
 Disaster impact -> NDMA Sendai capacity

Conclusion

Vulnerability is the human and systemic weakness that turns a hazard into a disaster. It is characterised in space, society and time, and typed as physical, social, economic, environmental and institutional. **NDMA**, Sendai and local governments cut impact only when they reduce those types together, not when they only map the cyclone.

Facts & figures

UNDRR

Defines vulnerability as the characteristics that make a community susceptible to hazard damage.

National Disaster Management Authority (NDMA)

National Disaster Management Authority: guidelines on earthquakes, cyclones, floods and urban flooding that treat housing and last-mile warning as vulnerability tools.

Sendai Framework 2015-2030

Global compact to cut disaster mortality, affected people, and losses - all vulnerability outcomes.

SDRF / NDRF funds

Finance Commission disaster windows; slow or uneven drawal is institutional vulnerability.

PMFBY

Crop insurance that lowers economic vulnerability of farm households to drought and flood, if enrolment and payouts work.

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