Ignoring Local Ecology

Inviting Disaster Risk

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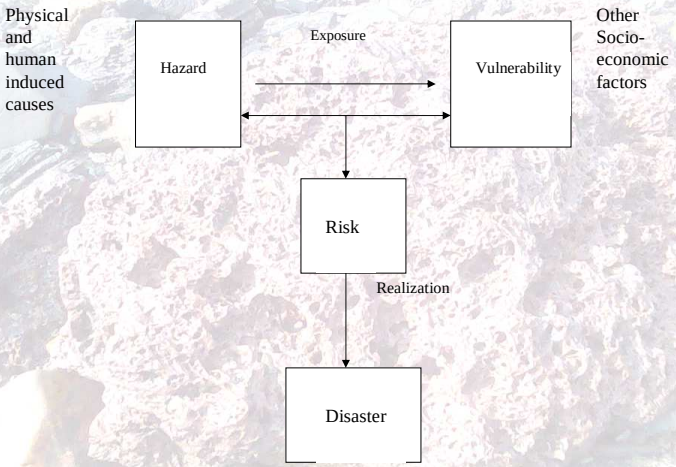
- **Natural Ecology of a place is often neglected during city planning/development planning**
- **The whole idea of ecology and environment in our plans and policies are very narrowly construed.**
- **Repairing an ecosystem from the damage sustained from development projects usually means fastest growing economically important vegetation cover rather than the original natural mixed species.**
- **This alters the entire ecosystem resulting in chaos and disbalance affecting a long chain of visible and non-visible activities.**
- **The ecological factors such as topography, the microclimate, the soil variation, the natural streams, the *nallahs*, the vegetation, the ponds an lakes, the rocky surfaces, even the desertic patches need to be understoo**
- **Each of our cities have its own natural heritage. Indiscrimate development, disconnectedness from our natural systems and lack of understanding about the delicate balance of the various components of the system is threatening and destroying the very basis of our survival**

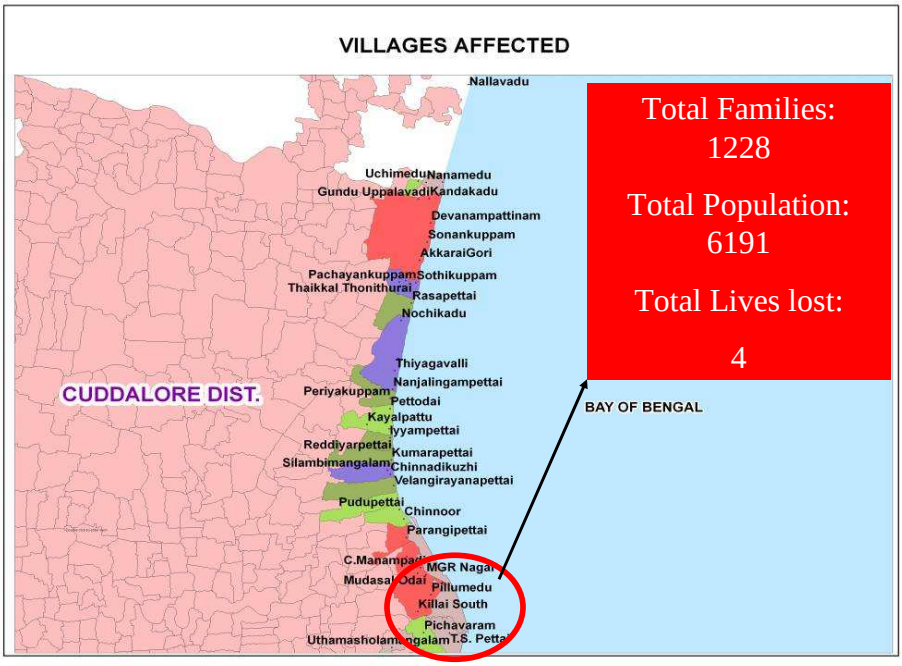
- **Disaster risk is accumulating everyday through inappropriate development interventions.**
- **Disasters are embedded in routine decisions and behaviour**
- **According to Mileti (1999) "Disasters are designed"**
- **The event is natural (flooding, earthquake), the hazard is present. Coming in its way unprotected, unprepared, makes one vulnerable. Puts the person/community/building at risk.**
- **The risk if realized…results in disaster**

Hazard, Vulnerability, Disaster Linkage



Mangroves

- Found in the inter-tidal zone between sea and land in the tropics and sub-tropics, mangrove forests play a vital role in stabilising shorelines and protecting against Tsunami, cyclones and erosion.
- The Orissa super-cylone 1999 washed away several villages and claimed more than 10000 lives. The Bhirarkanika Wildlife Sanctuary, the second largest mangroves of the country saved numerous villages and thousands of lives.
- Indian Ocean Tsunami has claimed thousands of lives all along the Eastern coastline of the country. Pichavaram Mangrove forest protected the hamlets T.S Pettai, Vadakku Pichavaram, Therkku Pichavaram, Meenavar colony, MGR Nagar and Kalainagar against the Tsunami.
- Mangrove trees in rows located close to the sea got uprooted due to the impact of Tsunami, beyond that there was no damage.
- The Mangrove forest effectively cut down the velocity of the Tsunami and subsequently its impact.



Mumbai Flood 2005

- **July 26th witnessed 944 mm rainfall in Mumbai, a city used to heavy monsoons which claimed 1058 lives and 451 other rain related deaths.**
- **The reasons are many, Unprecedented rainfall; but more than that, the damaged local hydrology and unluckily high tide at the same time which reverted back the storm discharge.**
- ***Meethi Nadi*, Mumbai's stream houses slums, expansions of factories and other built up structures.**
- **The local streams and nallahs which carried away bulk of the rainwater have in recent times mysteriously disappeared.**
- **Reclamation around the mouth of *Mithi Nadi* has constrained the natural streamflow**
- **Mangroves at Seori, Cuffe Parade, Versova, Oshiwara, Lokhandwala, Madh Islands and all along the coastline are getting depleted**
- **The wetlands (which acts as sponge/buffers against flood) of Vasai-Virar and Bhayander have disappearred under the sealed cemented urban surfaces**

Natural Hazards, Ecology and the City

- **Natural earth and meteorological processes are hazardous, cause inconvenience, expenses or physical danger to humans only if they or their works or possessions are in the wrong place at the wrong time.**
- **Human occupance of hazardous terrain stems from the fact that such terrain are "usually" not hazardous. (intermittent processes)**
- **For reasons such as necessity, lack of choice, ignorance, greed or conscious acceptance of risk, people in increasing numbers are building houses on floodplains or in the bed of intermittent streams, excavate and steepen unstable mountain slope, clear away mangroves and shelterbelts and so on.**
- **Urbanisation, through the construction of buildings, paved roads decreases the infiltration capacity, causing a huge flood in a short lag time**
- **Small stream channels and its courses are no where to be found in cities as they are all buried beneath tall buildings. The risk is profound if adequate care has not been taken to make it liquefaction proof.**

Plight of Delhi

Delhi and it environs and an innumerable Indian towns and cities in deep slumber need to wake up and introspect, before a huge calamity strikes.

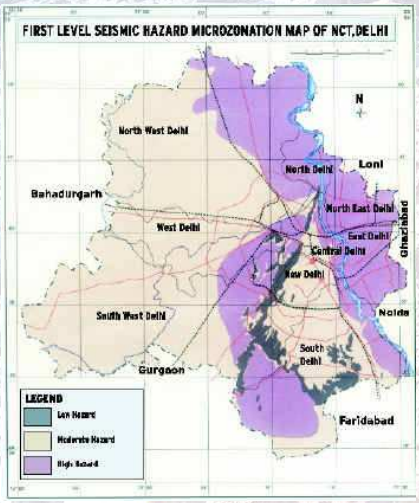
The Yamuna floodplain known to be vulnerable to earthquakes is growing vertically with increasing construction activity for extremely high density multistory apartment complexes.

Delhi is prone to the liquefaction of soil during a quake as it has been built on alluvial, sandy soil along the Yamuna.

Liquefaction occurs when fine-grained soil loses its strength due to the quake and turns into mud. The fluid mud is incapable of supporting buildings, resulting in severe tilting or collapse.

Eicher's adaptation of SOI's Ancient Map of Delhi

Earthquake Risk

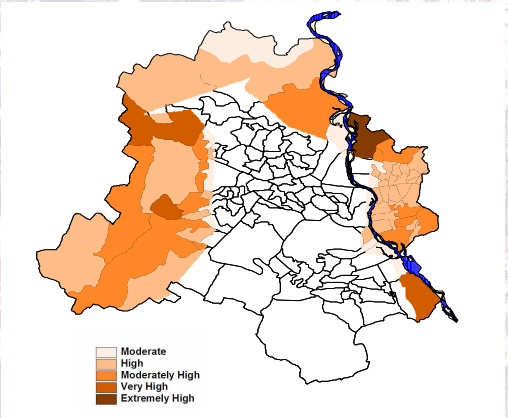


Source: Earthquake Risk Evaluation Centre, IMD

Earthquakes in Delhi's History

Date	Focal depth (km)	Magnitude
1720, 15 July	-	6.5
1803,1 September	-	6.8
1809	-	6.0
1842, 16 January	-	5.5
1842, 5 March	-	5.5
1956, 10 October	-	6.7
1960, 27 August	109.0	6.0
1966, 15 August	5.0	5.6

Vulnerability to flood




Thank You