Spatial Data for Disaster Risk Mapping, Reduction and Response

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Data for Disaster Management

Data :

- Spatial and non-spatial data (field data should be linked to relevant maps to show information in the form of maps and use for map based modelling)
- Data should cater both, pre and post-disaster requirement
- Baseline data
- Near real time data

Spatial data

- Baseline data
- Utility and Infrastructure data
- Disaster specific data
- Thematic data on terrain and natural resources
- Near-real time satellite data and thematic maps

Baseline data

- Baseline data is reference data on top of which theme specific data layers can be added.
- Pre-disaster stage: identify hazard prone areas, inputs for risk management, early warning and preparedness activities
- Response stage: identify location of hazard, population affected, demographic details etc.

Baseline data

Data	Description	Relevance to Disaster management
Administrative units	National, province/state, district boundaries to the locations of towns and villages	Data on administrative units and the village locations in GIS format is crucial in all phases of disaster management. This remains a base layer to which other data is linked such as demography, socio-economic data and amenities/services etc.
Demography	All details about population and its distribution based on age, sex, education etc.	Demographic data provides magnitude of population at stake. Source of this information is often statistical services of the country.
Socio-economic details	Education, occupation, income, assets and comprehensive information based on household survey	Socio-economic information provides important basis to understand the social and economic status of the population in the area at risk.
Amenities	Rescue services including army, fire, police etc., medical services, schools, communication, gas stations etc.	Information on about amenities helps understanding the resources available in the area under risk or area affected which can be mobilized during disaster.

Utility and Infrastructure data

- Data about utility and infrastructure is critical while planning risk reduction and response

Data	Details	Relevance to Disaster management
Transport network	Entire transport network including roads and other modes of transport that reaches villages	Updated transport network provides critical information during response stage about access to disaster affected area
Electricity network		Electricity is the one of the essential utility in order to continue rescue efforts. Data on electricity network is important input in disaster management plans at local level.
Cadastral details	Maps at cadastral level showing linked with land records	Cadastral mapping using high resolution satellite data is common practice. Such data provides critical input to the humanitarian agencies and the Government for determining loss of productive land or land owned by displaced families and determine compensation
Region specific utility network	Gas pipelines, oil pipelines, canal network, bridges etc.	Data on utility and infrastructure helps identify vulnerability associated with these critical facilities and services; and in planning the responses during disaster situation.

Disaster-risk specific data

- Often, disaster-risk is expressed in terms of risk maps and related data. This data should be linked to the relevant maps so that it can be visualized in spatial forms.
- Additional data on actors or agents in charge or who support particular activities can be collected by local administrators with involvement of communities. It can include list of NGOs, social groups, community groups etc. that are active in disaster situation.
- It can include information on the important resources that can be moblised in case disaster strikes.

Thematic data on terrain and natural resources

- Satellite data, combined with topographical maps, provides excellent data source for preparing thematic maps.
- These thematic maps derived from satellite-based data are one of the crucial input mapping of a range of hazards including, flood and storm surge, erosion and landslide, fire, storm, and so forth.
- These data layers when combined with ancillary data would help in producing maps related to predict risks of floods, erosion, landslides, fire, storm, draught, seismicity etc. Such maps provide scientific inputs for planning the preparedness, response and mitigation activities.

Thematic data on terrain and natural resources

Data	Details	Relevance to Disaster management
Elevation and slope	SRTM global elevation data at 90 m resolution are available which are generally useful for risk mapping. Medium resolution DEM at 30 meters resolution are available from ASTER. High resolution DEMs can be obtained from aerial data or simply derived based on the contour maps. Slopes can be derived using elevation data.	Elevation is most essential information for hazard zonation and utility of elevation data depends on the its resolution or scale at which it is derived. For mitigation purpose, high resolution DEM can be obtained from other sources.
Landuse	Various levels of landuse maps are available based on the scale of remote sensing images used for landuse mapping. Landuse depicts details about agriculture, forests, wastelands, barren lands, settlements, water bodies	Landuse maps help in assessing resources at stake in case disaster strikes. It also provides inputs for scientific modeling for risk assessment and to identify risk-management measures.
Forestry types	Forest types and additional attributes such as data on composition of forests, biodiversity, biomass etc.	Forest is one of the important environmental parameter, specially in controlling flood, coastal process etc. Detailed forest type maps can provide valuable inputs in risk assessment.
Geology	Rocks, minerals and geological features faults, lineaments etc.	These maps provides inputs assess a variety of hazards such as landslides, earthquakes, and floods to some extent. Such maps are used in the case of preparedness planning. It also provides inputs in mitigation planning during planning of critical facilities.
Soil	Soil type, texture, depth etc.	Soil maps can provide important inputs in the case of landslides and other types of mass movements.
River and drainage network	Water bodies, rivers, drainage network	These maps are used to elaborate hazard maps related to floods, as well as during response and post disaster stages.
Geomorphology	Landforms	Information on landforms is

Near-real time satellite data and thematic maps

- During response stage, near real time coverage from satellite helps to provide areas affected by disasters.
- The spatial toolkit should have provision for interpretation of near-real time satellite data and integrating thematic maps prepared based on near-real time satellite data.
- Near-real time satellite data is effective in covering floods, earthquakes, landslides, mudslides, damages due to cyclones. Usefulness of information depends upon the resolution of satellite data.
- The link http://www.space-risks.com/SpaceData/index.php?id_page=5 provides information on the satellites and sensors that are available to provide information related to disaster management.

Near-real time satellite data and thematic maps

Data	Details	Relevance to Disaster management
Crop monitoring	Crop types (cereals, orchards, cash crops etc.), type of agriculture (irrigated, rainfed etc.), cropping intensity, crop vigour and health. MODIS, SPOT (Vegetation 2 sensor), IRS-WIFS provide dynamic information on NDVI which is helpful to assess crop extent and condition.	Agriculture map provides many parameters that can be used in understanding impact of disasters like drought. It also provides data for a more precise assessment of damage of crops in terms of financial loss in case of disasters. NDVI information provides inputs for preparedness planning at national scale.
Snow cap monitoring	Number of satellites (like MODIS) have high revisit frequency and provides extensive coverage to monitor snow cover.	In mountainous countries, amount of snow fall determines if country would be facing draught or floods.