Technical Advisory Mission
September 2013,
Cook Islands

Geospatial Database for the GeoDRM System

Nitin Kumar Tripathi, PhD
IDD Consultant, ESCAP
Coordinator, Remote Sensing and GIS FoS,
Asian Institute of Technology
Thailand nitingeo77@gmail.com

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific
GEO-REF Information Sharing Platform for Disaster Management

Content

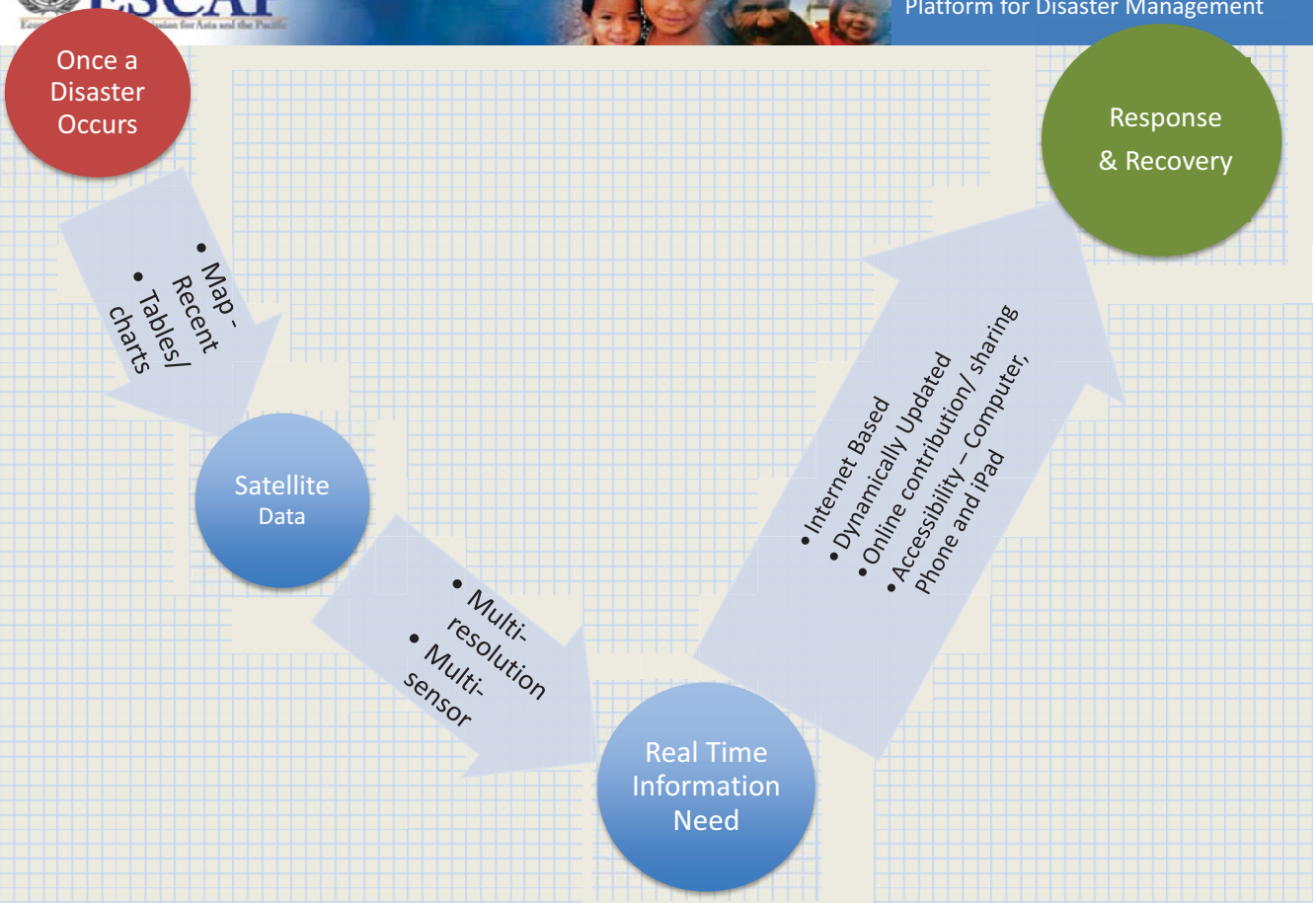
Geospatial Database for the GeoDRM System

- Introduction
- Overall framework
- Georeferencing
- Georeferenced Disaster Management System user interface

Geospatial Database for the GeoDRM System

Introduction

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific
GEO-REF Information Sharing Platform for Disaster Management



Disaster Type	Remote Sensing Data	GIS Data	Statistical/ Demographic Data	Ancillary Data for modeling and early warning
Drought	Regional Mapping/ Monitoring: MODIS, NOAA District Level: Landsat, SPOT, IRS-1C, Resourcesat, Theos For Soil Moisture: Radar (ERS, JERS, RADARSAT) Weather Satellite: GOES (Geostationary Operational Environmental Satellites), METEOSAT (METerologicalSATellite), GMS, INSAT	Landuse/ Landcover/ Topographic: Rivers/ Streams, reservoirs, lakes, ponds, Soil Type, Contour Maps, DEM, Admin boundary, Roads, Railways, Airports/helipads, Seaports, Agriculture Climate: Humidity, Rainfall, Temperature, Evaporation, Soil moisture, reservoirs, Admin boundary,	Population, Population density, Avg Family size, Sources of Food, Food transportation methods, Ecology, Crop parameter	Plant water stress, Drought & Non Drought periods data at local scale, Water management plan

Disaster Type	Remote Sensing Data	GIS Data	Statistical/ Demographic Data	Ancillary Data for modeling and early warning
Flood	Regional Mapping/ Monitoring: MODIS, NOAA District Level: Landsat, SPOT, IRS-1C, Resourcesat, Theos In case of clouds: Radar (ERS, JERS, RADARSAT) Urban Flooding: Geoeye, Digital Globe	Landuse/ Landcover/ Topographic: Rivers/ Streams, reservoirs, lakes, ponds, Soil Type, Contour Maps, DEM, Admin boundary, Roads, Railways, Airports/helipads, Seaports, Shelter places (hospitals/ religious places, academic buildings etc), Agriculture, Forest, Urban. Climate: Rain Fall, Temperature,	Population, House Types, No. of houses, Households, Income level	Hydraulic data, riverbedroughness, Sediment grain size, Hydraulic calculations, Surface roughness, Maximum water levels in Dams, Water management plan, Base flow,

Disaster Type	Remote Sensing Data	GIS Data	Statistical/ Demographic Data	Ancillary Data for modeling and early warning
Earthquake	District Level: Landsat, SPOT, IRS-1C, Resourcesat, Theos For large scale: High Resolution during earthquake or for damage assessment but NOT for monitoring	Geologic: Geology, Geostructural, Volcanic eruptions points, Landuse/ Landcover/ Topographic: Rivers/ Streams, reservoirs, lakes, ponds, Soil Type, Contour Maps, DEM, Admin boundary, Roads, Railways, Airports/helipads, Seaports, Agriculture, Forest, Urban. Facilities: Shelter places (hospitals/ religious places, academic buildings etc), Rescue points, Health facilities	Population, House Types, No. of houses, Households, Avg Family size	

Disaster Type	Remote Sensing Data	GIS Data	Statistical/ Demographic Data	Ancillary Data for modeling and early warning
Cyclone	Regional Mapping/Monitoring: MODIS Meteorological/ Weather Satellite: INSAT, GMS (Europe Geostationary Meteorological), GOES, MTSAT, HIMAWARI, Wind-Cloud 2,4, *GOMS, COMS, PCW*	Cyclone Dataset, Admin boundary maps, Rivers, Evacuation centers, Hospital, Academic Buildings Transportation network	Population, House Types, No. of houses, Households, Avg Family size	Historical cyclone data

Disaster Type	Remote Sensing Data	GIS Data	Statistical/ Demographic Data	Ancillary Data for modeling and early warning
Landslide	SPOT-5, ASTER, IRS-ID, Aerial Photographs, High resolution – Geoeye, Quickbird	Landuse/ Landcover/ Topographic: Rivers/ Streams, reservoirs, lakes, ponds, Soil Type, Contour Maps, DEM, Admin boundary, Roads, Railways, Airports/helipads, Seaports, Agriculture, Forest, Urban. Slope, Aspect, Flow direction Previous landslide hazard maps. Lithology, Lineament, Settlement, Rescue points, Health facilities	Population, House Types, No. of houses, Households, Avg Family size	Rainfall,

Geospatial Data - *Issues*

- Data Requirement: for frequent disasters
  - Data Availability: Status of existing data in high disaster risk LDCs, LLDCs and PIDCs.
  - Data Gap Assessment
- Compatibility: Is data compatible in GIS platform for information generation? Or it needs
  - Georeferencing necessity
  - Standards for georeferencing
- Data Warehousing: acquisition, storage and archival
- Data sharing: between line agencies/ departments

Georeferenced Geographic Information Systems

- Information extracted by integrated analysis of varied spatial data in Geographic Information Systems (GIS) Platform
- Main issues to create the Georeferencing System/ Platform:
  - Need of Georeferencing System/ Platform System Frame work
    - Several disaster prone countries such as Japan, China, India, Thailand etc. do have a georeferenced platform and very good capacity to handle the geospatial data in near real time.
    - But, the problem come in the case of many LDCs, LLDCs, and PIDCs where most of them are victim to frequent disasters and at the same lack such systems.
  - Components that need to be agreed
    - Overall framework of the Georeferenced Disaster Management System
    - Interface between system and data input personnel, decision makers, planners and people
    - Hardware/ software requirement of the system

UNITED NATIONS ESCAP
GEO-REF Information Sharing Platform for Disaster Management

Geospatial Data Freely Available

- Post disaster satellite data (Committed by China, India and Thailand through ESCAP mechanism)
- Stereo satellite data is also available from China and India at very fine resolution.
- Digital elevation model of 30m (SRTM) and ASTER DEM from Jaexa
- Climate Data (TRMM and several others)
- Forest Fire products (MODIS)
- Sea Surface Temperature (MODIS)
- Ocean current direction
- Bathymetric charts
- Landuse/ Landcover maps from Local Government or Non-Governmental organisations
- Hydrographic data from local organisations
- Statistical data from National Statistical Offices, CRED or Desinventor

Georeferencing - Definition

- Georeferencing defines the location of an object in three-dimensional physical space. That is, establishing its location in terms of standard map projections or coordinate systems.
- Georeferencing relates to both data model when establishing the relation between raster or vector images/ maps and coordinates but also when determining the spatial location of other geographical features.