

Spatial Data Infrastructure and Sustainable Development in the context of Nepal

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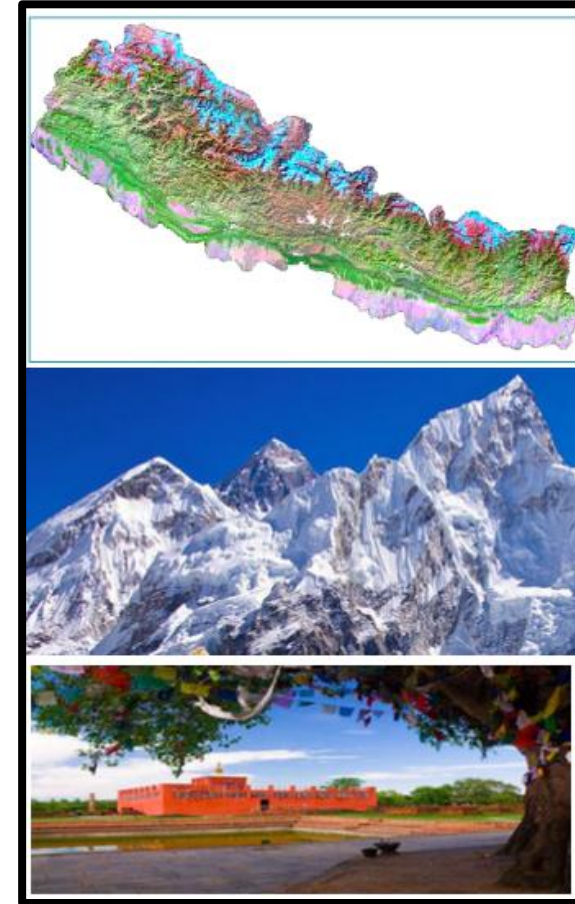


Presentation Outline

- Nepal in Brief
- NSDI initiatives and Nepal GeoSpatial Portal Development
- Geospatial Information products
- Issue of geo-spatial information & products
- Some snapshots of Earthquake 2015 and its effect in Various sector
- The Government Initiatives for reconstruction

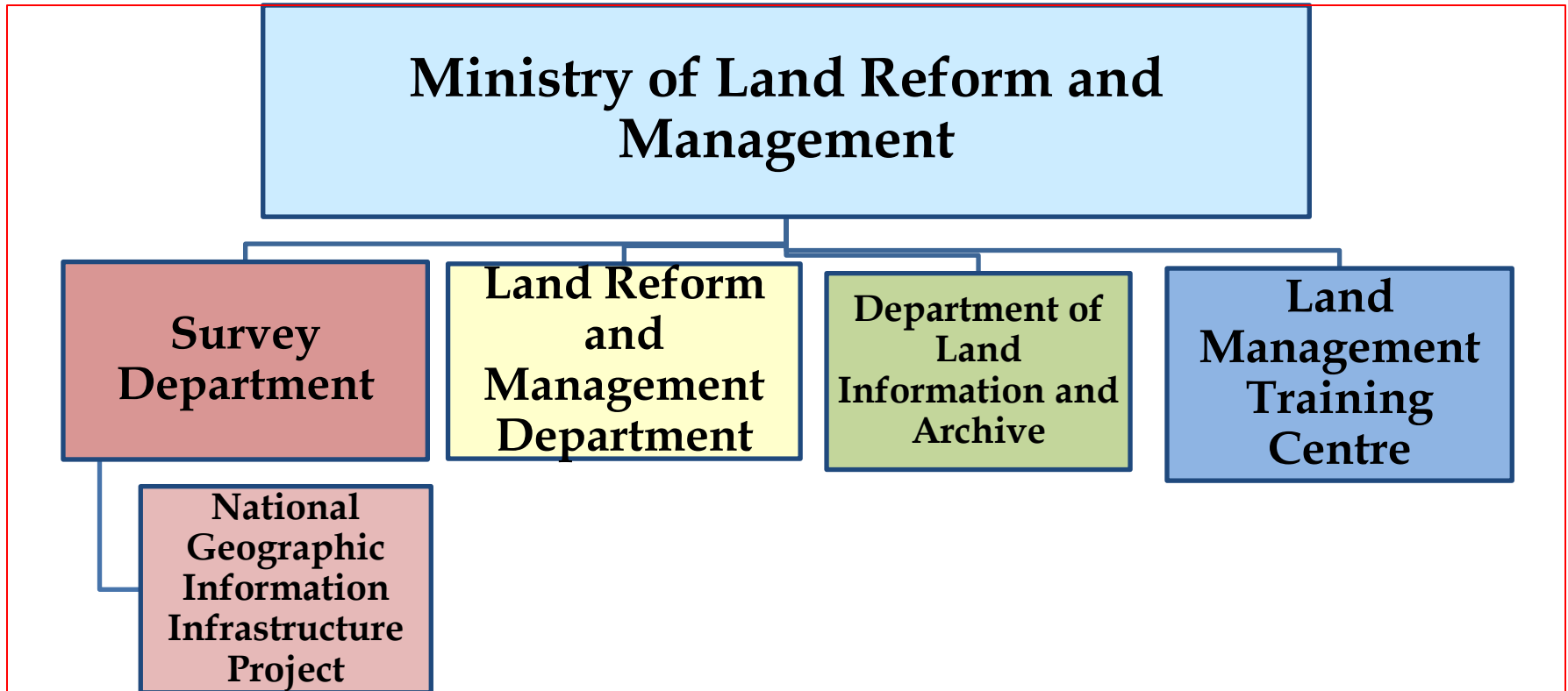
Nepal in Brief

- Landlocked Himalayan Country in South Asia bordered with China and India
- Area:147,181 Square Km
- Population: 26.6million (2011 Census)
- Geographically, there are 3 ecological belts i.e. Mountain, Hill and Terai.
- Rugged Topography



Source: Khandal,2008)

Organizational Structure



▪ Survey Department (NMO) is the nodal agency for developing NSDI in Nepal.

▪ National Geographic Information Infrastructure Project (NGIIP), as an NSDI initiative, was established in 2000 with the vision “*to strengthen planning and resource management in Nepal through the development of a geographic information infrastructure for the access of geographic and related data for decision-making*”.

NSDI initiative in Nepal..

- The main objectives are;
 - To reduce redundancy in geospatial data production
 - Participation of all spatial data producers in one platform
 - Sharing of available geospatial Information through one window

Nepal GeoSpatial Portal

- Nepal GeoSpatial Portal is being developed with the technical support of ICIMOD
- The development of the Nepal GeoSpatial Portal is the enhancement of previous NGIIP portal.
- This will be a single platform for all the important Geospatial Information about Nepal.



Topographical Data



Ortho Photo

Nepal GeoSpatial Portal

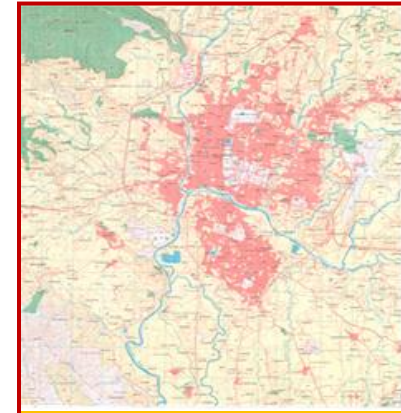
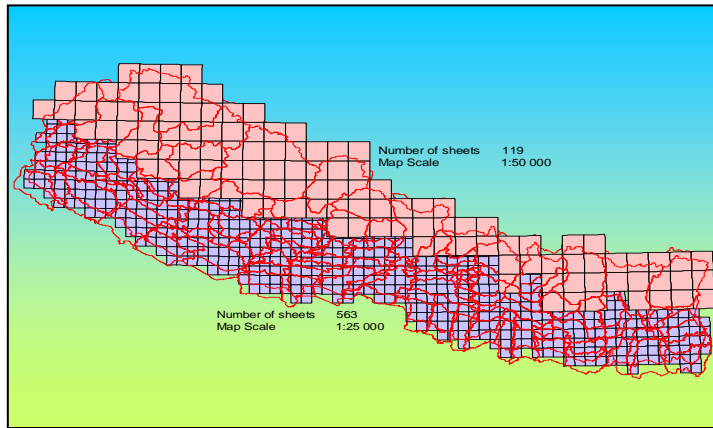
Main Features:

- Establishment of metadata
- Basic apps
 - Basic map viewer
 - Map sheet search
 - Control point search
 - Map viewer
 - Aerial photo index
- Users (spatial data producers) can upload the geospatial data produced by them and administrator (NGIIP) will check the data quality

Geospatial Information products

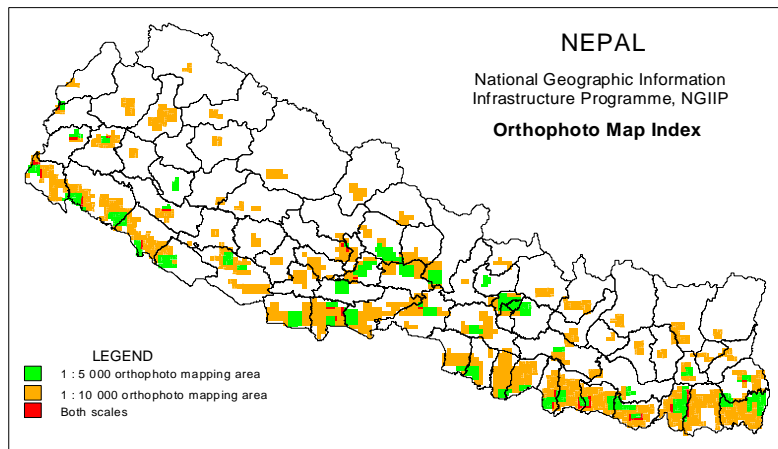
1. SERIES OF NATIONAL TOPOGRAPHICAL MAPS/ DATABASE

- Terai and Middle hills (scale 1:25000)
- High hills and Himalayas (scale 1:50000)



a topographical map sheet

2. ORTHO-PHOTO MAPS /AERIAL PHOTOGRAPHS

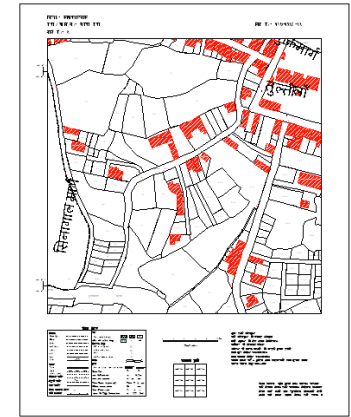
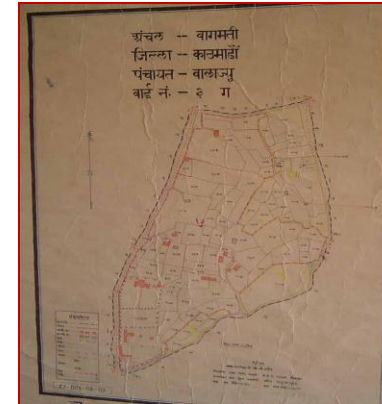
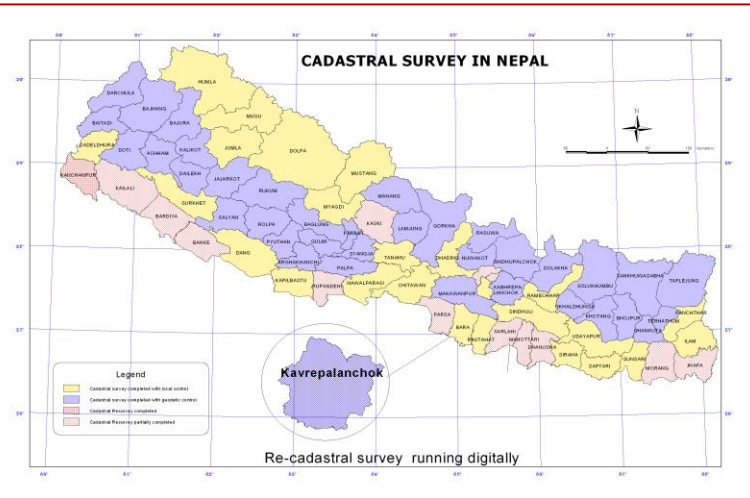


a Ortho photo map sheet

Geospatial Information Products..

3. CADASTRAL MAPS THROUGH THE COUNTRY

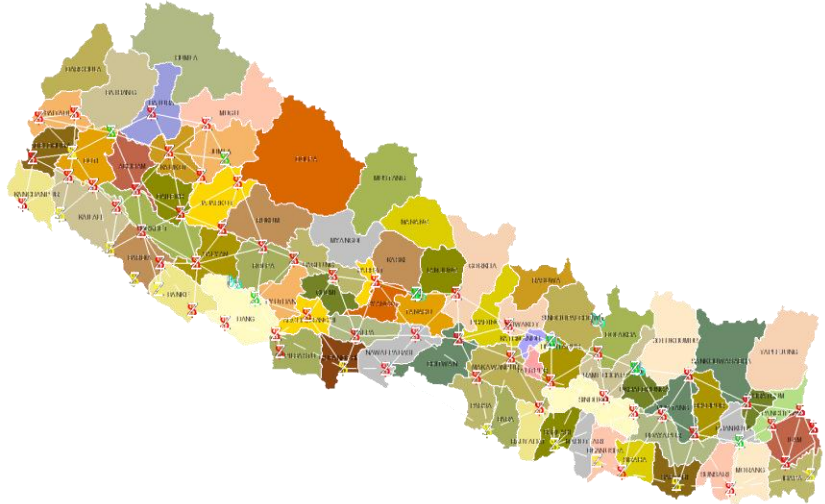
- Digitization and database development in all 104 offices



a cadastral map sheet (paper map/digital)

4. NATIONWIDE COVERAGE OF GEODETIC CONTROL NETWORKS

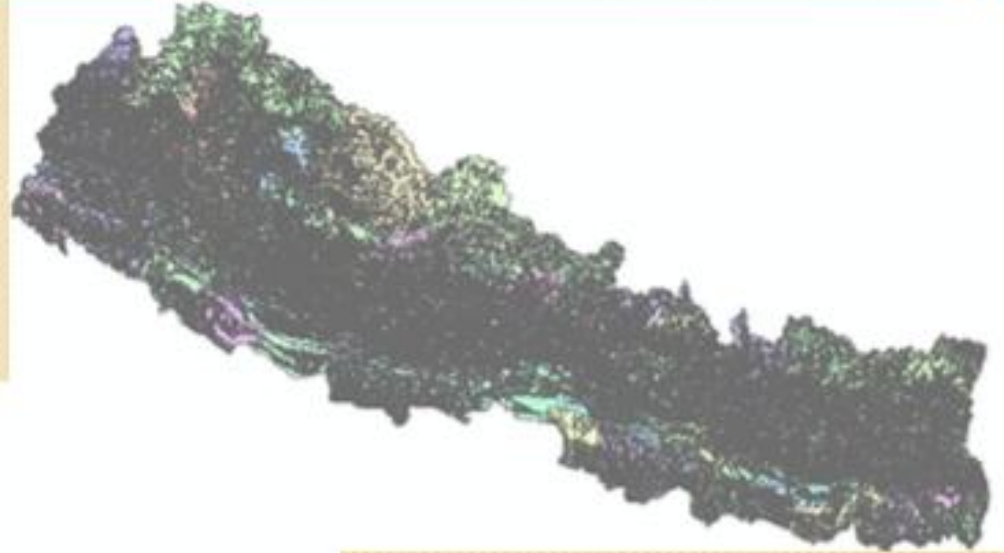
- HORIZONTAL
- VERTICAL
- AIRBORNE GRAVITY



Geospatial Information Products..

5. Nationwide Coverage Of Land Resource Maps/Database

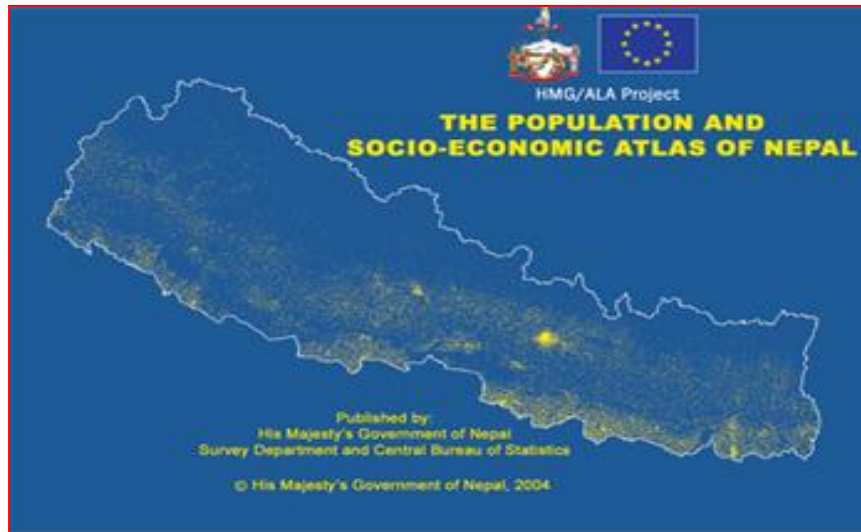
- Land use maps
- Land capability maps
- Soil maps



6. Digital Elevation Model

Geospatial Information Products..

7. SOCIO ECONOMIC ATLAS BASED
8. ON POPULATION CENSUS 2001/2011



8. THEMATIC MAPS

- ADMINISTRATIVE MAPS
- GEOLOGICAL MAPS
- PHYSIOLOGICAL MAPS

9. GEOGRAPHICAL NAMES

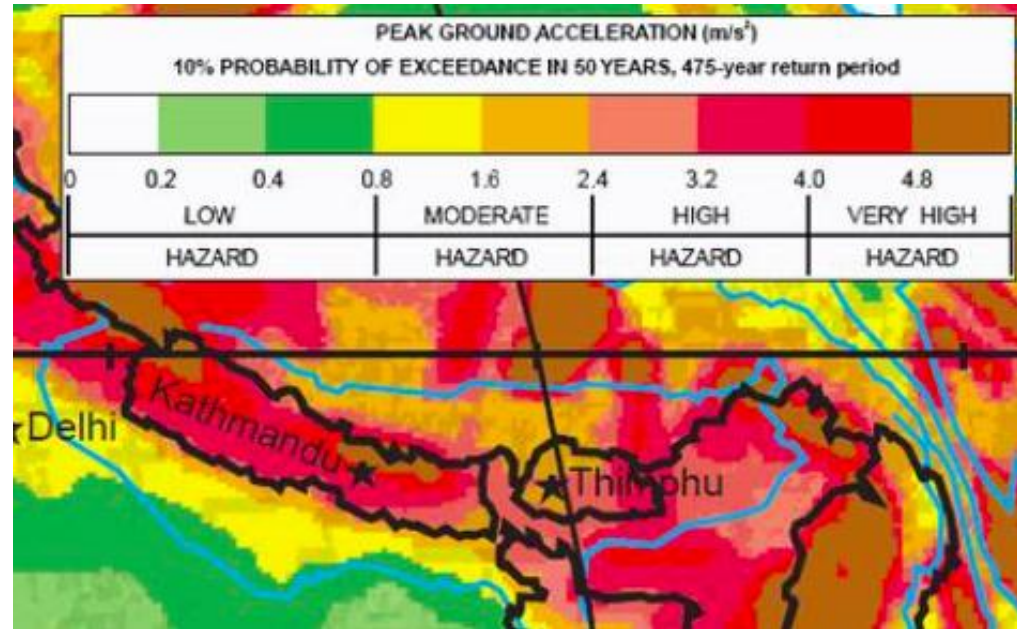
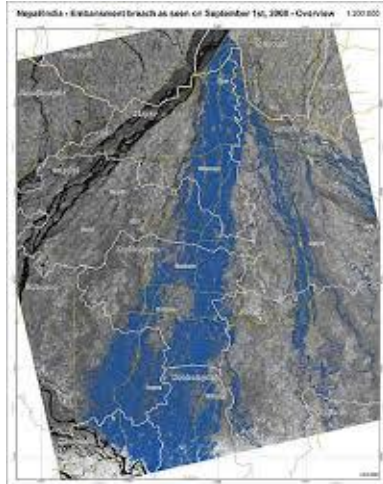
9. MANY OTHER PROJECT SPECIFIC GEOSPATIAL DATA

Issues on Geospatial Information

- Nepal has suffered from a decade long arm-conflict since 1996-2006
- Political Instability and long transitional period since 2007-2015,
- Recent Earthquake 2015 struck Nepal and again affected the 31 districts out of 75 districts)
- Despite of our efforts,
 - We could not be able to update our geospatial information and products in time thus are outdated. Now it demands updated and reliable geospatial information and products.

Nepal Vulnerable to Earthquake and natural

- Entire Nepal lies in the active seismic zone V and is prone to earthquake and topography is highly vulnerable to Floods and land slide during the monsoon.



Earthquake 2015, NEPAL

Saturday April 25, 2015 at 11:56, **7.6 Richter scale** and at 12:30, **6.6 Richter scale**

Sunday April 26, 2015 at 12:54, **6.9 Richter scale**

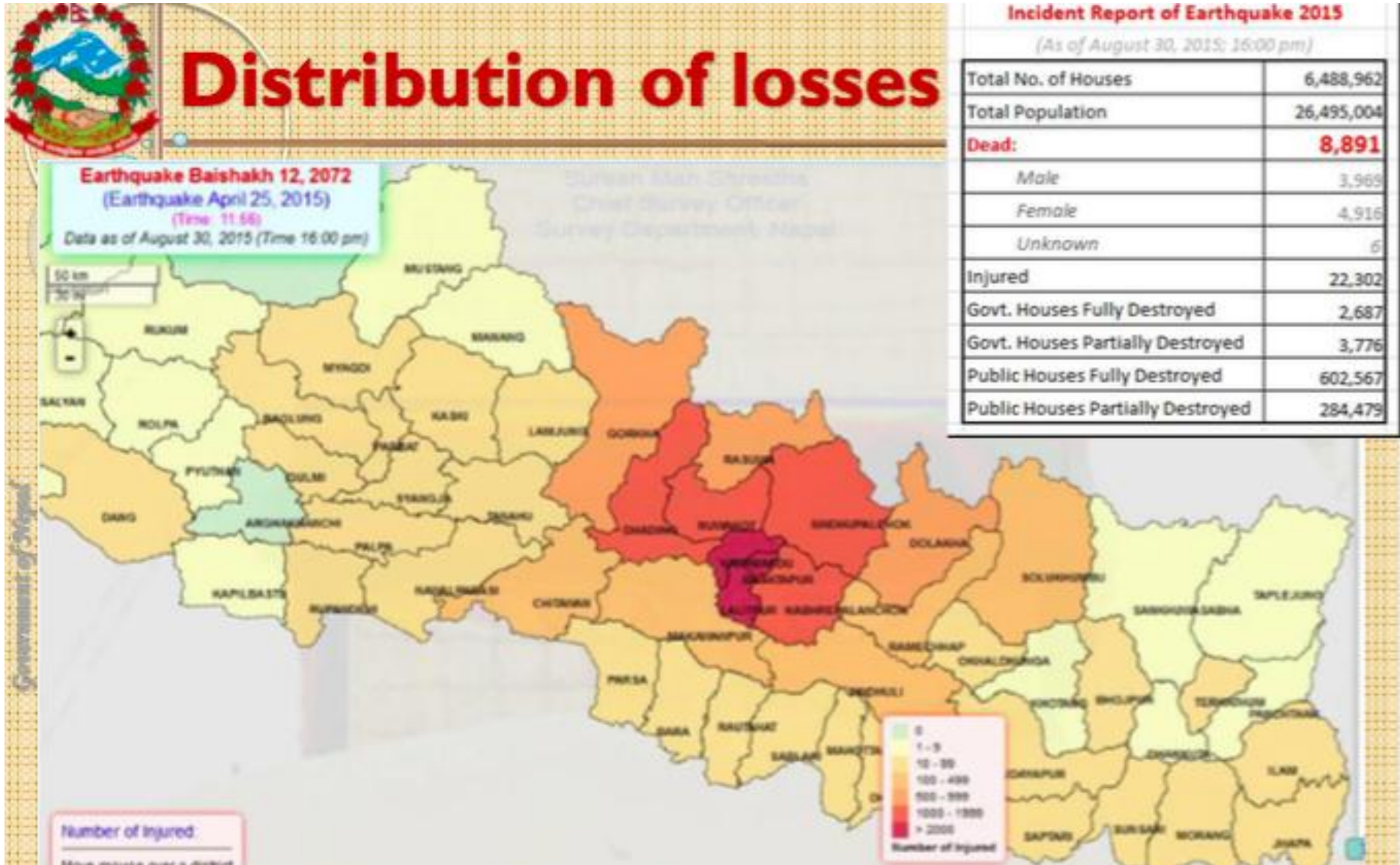
Tuesday May 12, 2015 at 12:50 **6.8 Richter scale**



Biggest Earthquake after 1934



Losses due to Earthquake 2015



Geospatial Information for Rescue and Recovery

- Pre and post disaster satellite images, maps and data were provided free to support Rescue and Recovery activities by many organizations
- Survey department : Vector Topographic Data of the earthquake-affected districts
- Satellite image by;
 - Digital Globe
 - Indian Space and Research Organization ;
 - Japan Aerospace Exploration Agency (JAXA);
 - NASA

Geospatial Information for Rescue and Recovery

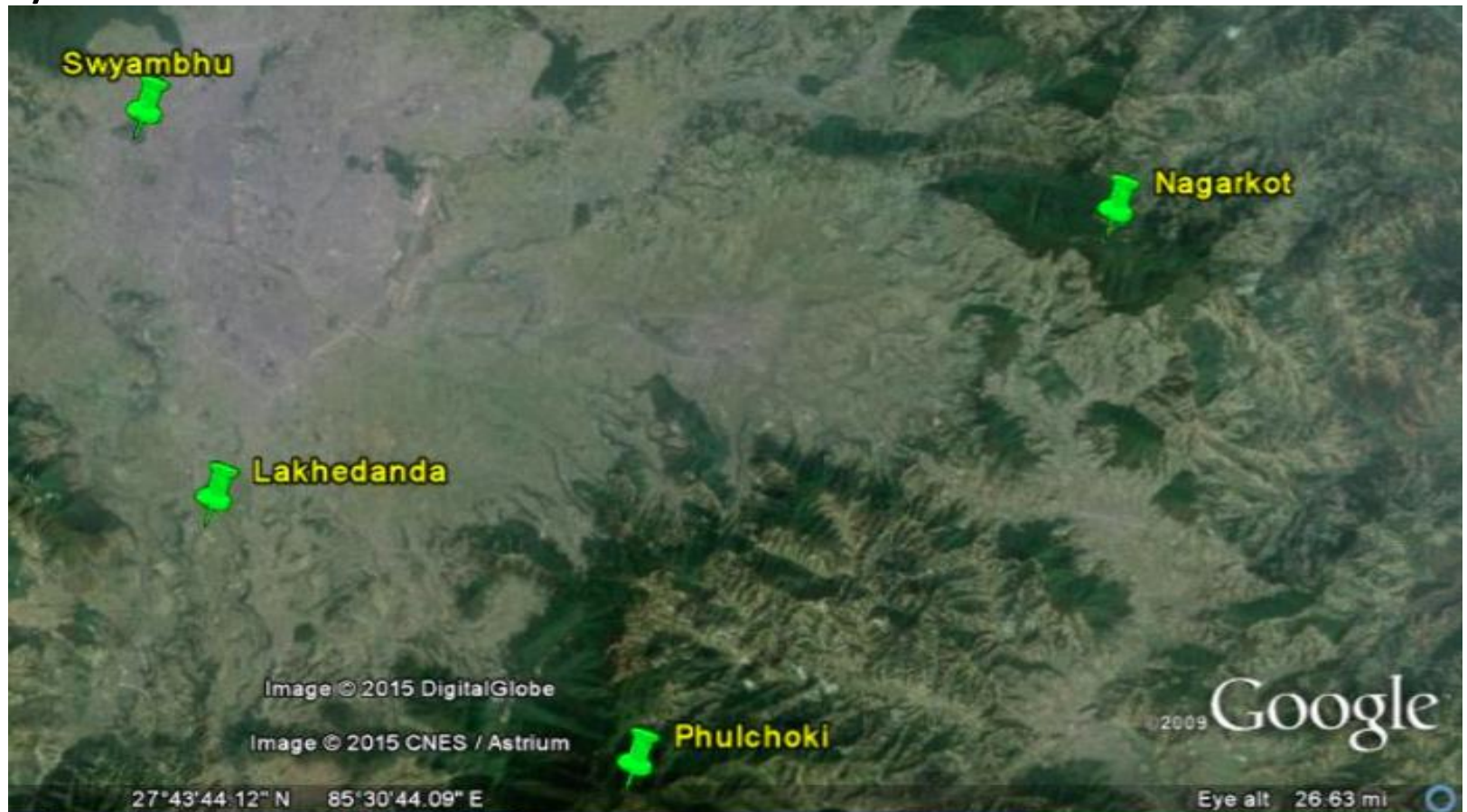
- Many National and International organizations involved to prepare maps and information and disseminated information online to support Rescue and Recovery

- DoS
- NEOC
- DOMG
- ICIMOD
- UNHCR
- UNOCHA

- SERVIR Global; (NASA and USAID Project)
- USGS
- British Geological Survey (BGS)
- NASA
- ESRI
- Sentinel ASIA
- OSM, KLL
- TOMNOD
- Many others

A preliminary study on Shifting of territory

- A preliminary study of displacement due to earthquake was carried out by Survey Department, after the Earthquake, with Observing 5 higher order control points around Kathmandu valley



A preliminary study on Shifting of territory ..

Point	Dx	Dy	DzGeocen)	Vector	Ell ht dif
Nagarkot	0.3208	1.7964	0.9673	1.824819	1.1584
Fulchoki	0.1788	0.9051	0.3903	0.922592	0.6312
Bungmati					
Lakhedada)	0.086	0.99	0.213	0.993728	0.77
Swyambhu	0.4551	1.5779	0.9512	1.642219	0.9828
Kumori	0.517	1.639	0.836	1.718607	1.093

- **The study showed that the territory was shifted by 1.42 m southwards slightly west and uplifted by 0.92 meter in an average.**
- **The maximum shift and uplift was noticed at Nagarkot among these five points**

Restoration of National Geodetic Networks

- According to the preliminary report, The displacement and uplifting of the territory demands further research on it and its restoration.
 - It will be interesting for the International Geodetic researcher to carried out a further detail research and study on it.
 - Dr. Christ Pearson(New Zealand) is studying about this displacement since a month.
 - The Ministry has given high priority on Restoration of National Geodetic networks and mapping infrastructures which is a backbone for all mapping and planning of other infrastructure.

The international sector can join the hands with providing their expert knowledge and technical support for the Restoration geodetic networks.

Reconstruction and Resettlements

Challenge:

- Reconstruction with the perspective of Planned, sustainable and safe human settlements and cities
- Sparse, scattered and unsafe human settlements has to be resettlements into a planned & safe area.

In this perspective, the role of integrated and updated statistical & geospatial information is particularly important for making it sustainable



- Damaged many settlements in 31 districts.
- Exits many unsafe settlements due to rock and land slide after Earthquake
- urbanizing rapidly .

Reconstruction of Damaged Infrastructure

- Many hydro-electric Projects, Roads, Government buildings, Schools, Hospitals and Health posts were badly damaged by the earthquake.



- Reconstruction of the Infrastructures are in the priority.
- The availability updated and reliable geospatial information will play a vital role to optimize the development investments and planning of infrastructures is important.

Reconstruction of Damaged Historic and Heritage site

Devastation

- The Reconstruction of the historic, heritage sites are in the government priority
- The integration of statistical and place based /geospatial information can play a vital role in the reconstruction of such historic and heritage sites.



Federal Structure

- We have now the new constitution recently promulgated on September 20, 2015.
- It is a historic event.
- According to the constitution, It has adopted Federal Structure with 7 Provinces.
- To better plan of federal, provincial and local structure and its boundaries demarcation, the role of updated geospatial information is vital among others.



Sustainable development Goals

- To achieve the sustainable development goals, and its effective implementation, the integration Geospatial data, socio-economic data and population census data has a vital role.
- This is particularly important in Nepal, where $\frac{1}{4}$ th of the total population lives below poverty line and Food insecurity is increasing.
- For the improved decision making and good policy formulation and its effective implementation, as well.



Government Initiatives

- For all these activities, and sustainable development of the country, updated Geospatial Information is the precondition. Thus Nepal Government has already formed “A high level Reconstruction Authority” has been formed and reconstruction process will be started soon. It has also given priority on;
 - Restoration and strengthening of national geodetic networks with the use of modern geo-spatial and space technology
 - Updating of the available geospatial data for making it reliable.
 - Strengthening of the resilience and adaptive capacity to climate induced hazards and natural disasters.
 - Enhancing the geospatial Capacity (Institutional level)

WELCOME TO NEPAL

INTERNATIONAL WORKSHOP ON “ROLE OF LAND PROFESSIONALS AND SDI IN DISASTER RISK REDUCTION: IN THE CONTEXT OF POST 2015 NEPAL EARTHQUAKE”

25-27 NOVEMBER, 2015
KATHMANDU, NEPAL

Organizers



Co-Organizers



Ministry of Land Reform
and Management



Survey Department



Land Management
Training Center

A joint event of FIG Commission 2 and ISPRS Commission IV

www.workshopnepal2015.com.np