

FIG

FIG WORKING WEEK 2017

Helsinki Finland

29 May - 2 June 2017

Presented at the FIG Working Week 2017,
May 29 - June 2, 2017 in Helsinki, Finland

Spatial Data Base for Hydropower Projects in Nepal (8667)

Punya Prasad OLI and Sushmita TIMILSINA (Nepal)

FIG Working week 17

**ISS: Geospatial Delivery of Public Facilities, Critical
Services and Infrastructure**

Time: 5/30/2017 4:00:00 PM

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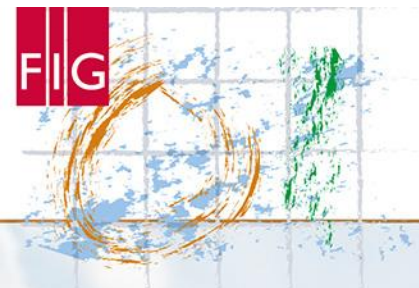


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<u>Area</u>	147,181 km ²
Population	26.5million (Census 2011)
• Water Area (%)	2.8



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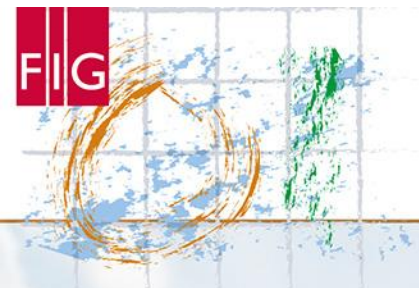


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Purpose of Presentation

- Nepal is facing shortage of electric power and having load shedding up to 3-8 hours/day since five years.
- It has total capacity of generation of 84000 MW hydropower.
- First hydropower project established in 1930 in Nepal
- It has only been able to produce around 800 MW hydropower at the moment and planning to generate 10,000 MW in a decade.
- Detail topographical, geological, seismic, hydrological, environmental, land acquisition (cadastral) data are also prerequisite for planning and construction a hydropower project.
- There is lack of publish standards for the purpose.
- Look for advice from experts.



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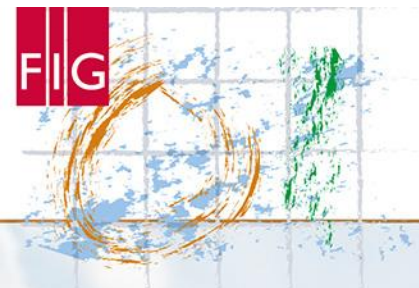


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Need of Standards of data base

- The scale of maps, contents and standard symbols or terminology are not uniform at different stages of development of HPP.
- The soil and geological classification are based on the names of localities. It will be difficult co-relate to national or international standards.
- Therefore, standard classification system of non topographical features are also needed to be developed as international standard level as well as guidelines for spatial data base and requirement studies for DPR/ tender document preparation are also in urgent need.



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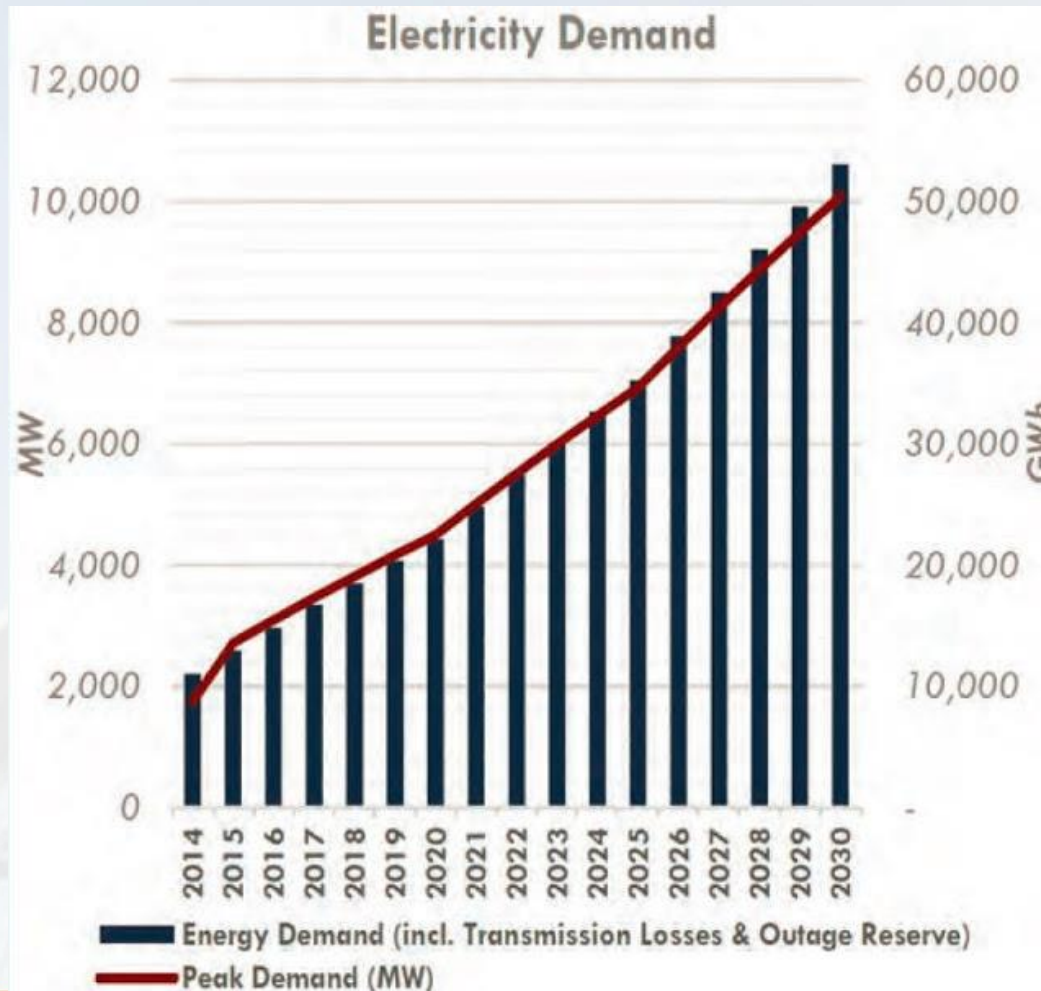


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Introduction Mapping Scale

- Topographical survey for hydropower project area of
 - dam site, Bathymetric survey and power house areas are surveyed at the scale of 1:500 - 1:2000;
 - reservoir and Tunnel axis, environmental study and Transmission line at the scale of 1:2,500 - 1:5,000.
 - Bathymetric survey/ cross section survey is carried out using total station at 20-50m interval.
 - The accuracy of establishment of ground control points at feasibility stage is better than 1:10,000 and DPR stage is about 1: 100,000 and
- General geological maps prepared at the scale of
 - 1:25,000 of entire area,
 - 1:500 -1:2,000 of dam site and power house sites, and
 - 1:5,000 of engineering geological maps.
- The recent satellite imagery and stereo photography are also used for interpretation of geological features in regional scale.



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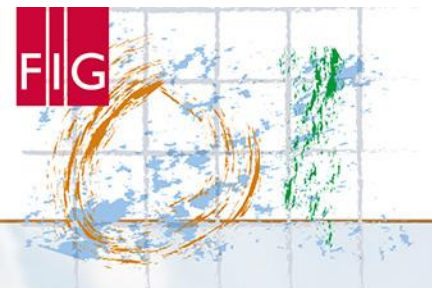


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Present Situation of Mapping (1)

- Topographical map coverage of Nepal is available at the scale of 1:25,000 -1:50,000
- 3rd order trigonometrical control points at about 5 km interval and precise level at an interval of 2 km along the main highways are exist.
- Earthquake of 2015 disturbed the position of these points (up to 1-3 m)
- Cadastral survey was carried out at the scale of 1:500 - 1:4800 of the country and is updated daily by local offices as and when transaction and mutation of parcels occur.



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Present Situation of Mapping (2)

- Land resources maps – Land utilisation, land system and land capability maps were produced at the scale of 1:50,000 and geology maps at 1:125,000 and climatic maps at 1:250,000 - 1:2,000,000
- Land resources maps are being compiled at the scale of 1:10,000 and about 25% of Nepal will be completed in this year 2017.
- “Guidelines for Study of Hydropower Projects” Department of Electricity Development 2003 which lacks the Specification for detail project report(DPR)/ tender document preparation.



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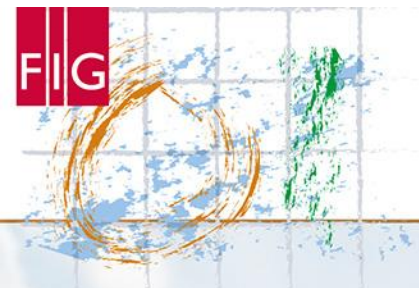


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Problems

- Rugged topography with forest
- Lack of access road and other facilities
- Intervisibility problem
- Unavailability of Suitable topographical Maps and BMs



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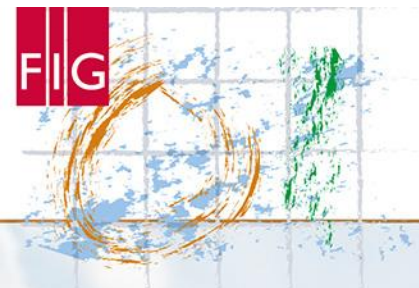


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Methods

- Establish ground control points and to connect national system by DGPS
- Detail survey by LiDAR technique or field survey (small area) using total station
- Environmental, geological and other survey using imagery
- Field verification and checking carried out



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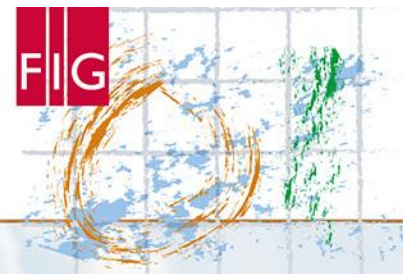


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Methodology

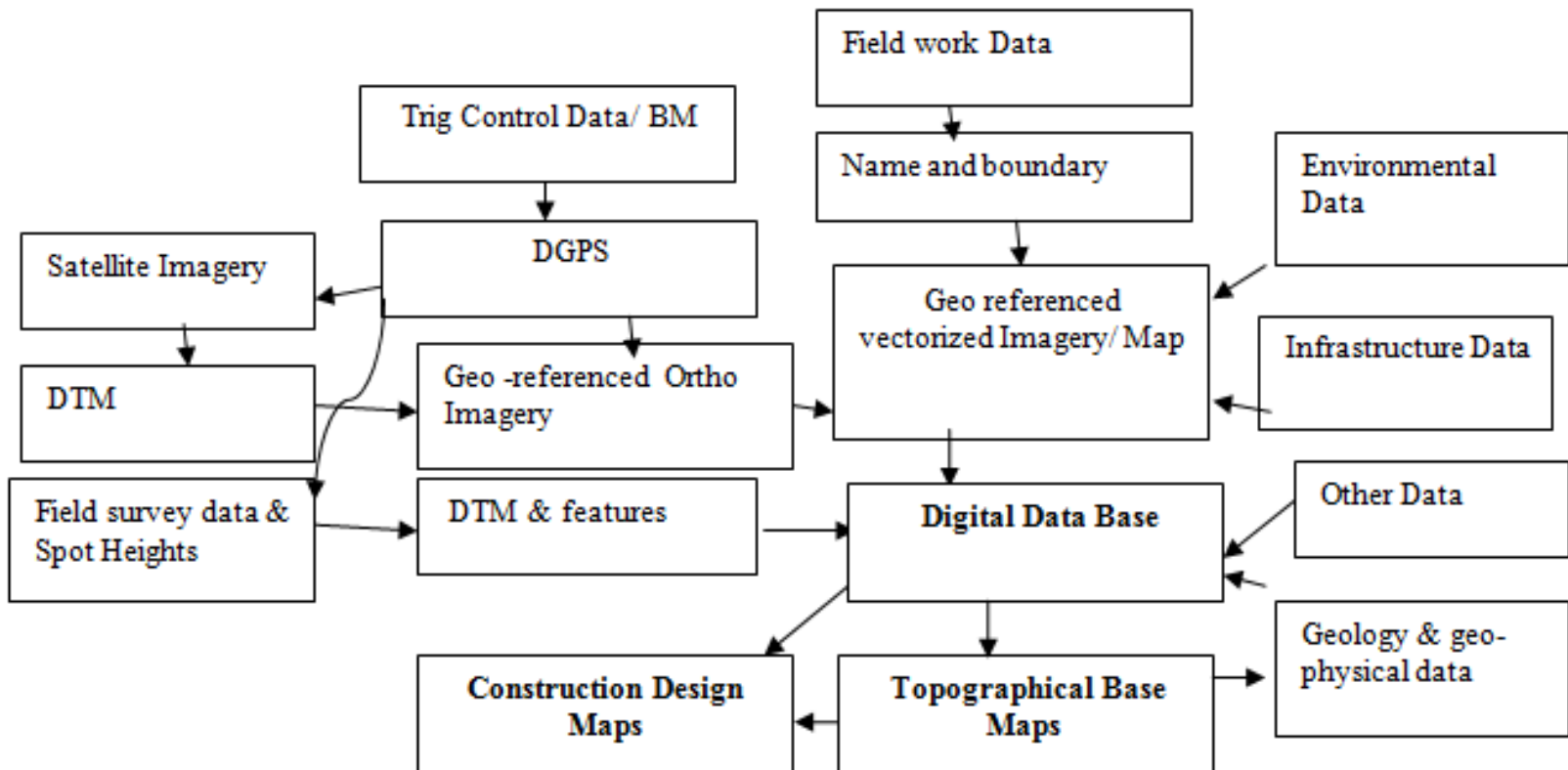


Figure 4: General Methodology



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Results

- Database or topographical digital map at required resolution are available for setting out of project design and monument for project construction
- Model of data base preparation, economy or sufficiency of project formulation and data requirement are assessed.



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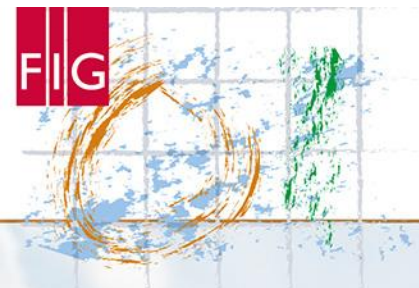


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Conclusion

- Many hydropower development projects are in various stages- feasibility, DPR and construction of development in Nepal.
- The scale of maps, contents and standard symbols or terminology are not uniform.
- The soil and geological classification are based on the names of localities. It will be difficult correlate to international standards.
- Therefore, standard classification system of non topographical features are also needed to be developed as international standard level and
 - guidelines for spatial data base and requirement studies for DPR/ tender document preparation are also needed urgently.
 - NICS is planning to develop Standards for this purposes



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Thank You



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