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Building National Data Infrastructure for Dynamic Risk Assessment:
Framework, Methodology, and Practice

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Outline

- Key Issues in Risk Assessment
- NDI Framework
- SIERA Methodology and Process
- SIERA/CSA Practice in Nepal

Key Issues in Risk Assessment

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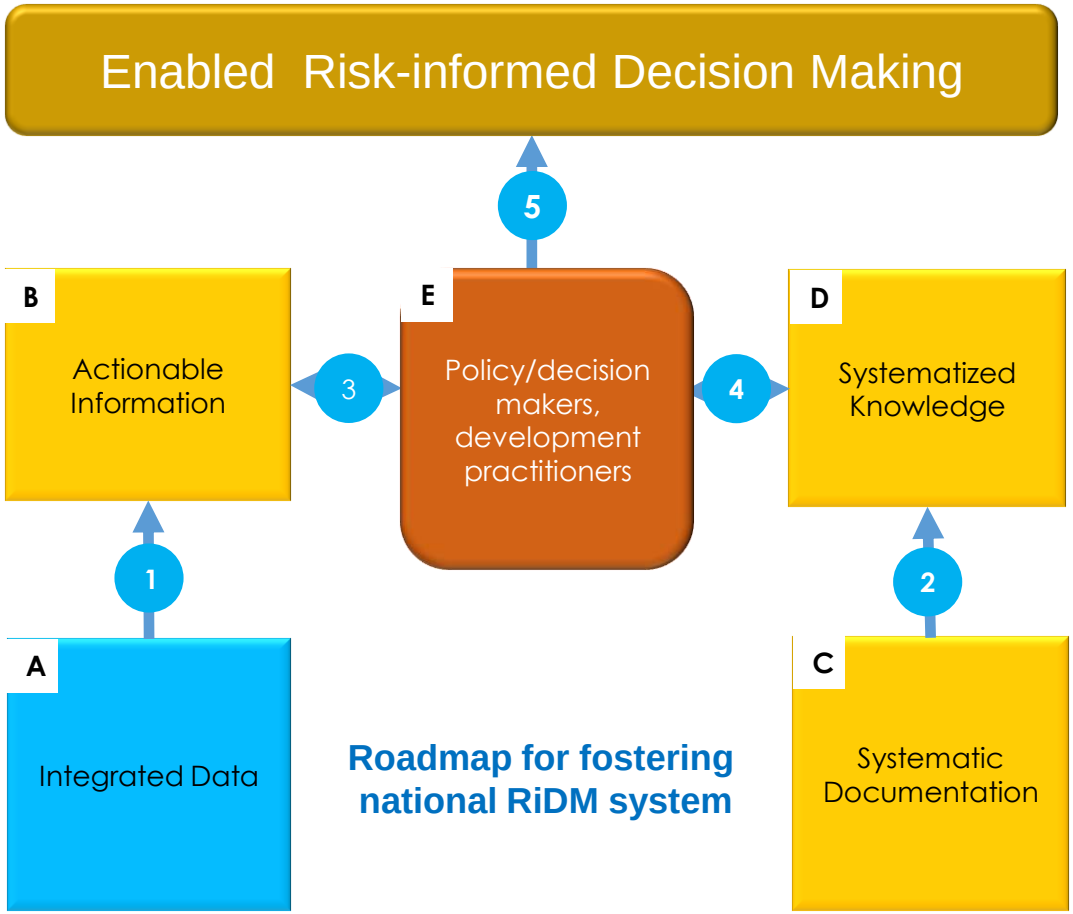
- Little sound decision making under risk (uncertainty)
- Few Decision makers, practitioners, and technical professionals with sufficient knowledge of risk management
- Sparse systematized knowledge (e.g. development risk management & governance)
- Little actionable information (i.e. hazard, risk, disaster, etc.)
- Fragmented / disciplinary knowledge (Research papers, books, reports, thematic portals, etc)
- Scattered data (i.e. historic disasters, hazard, exposure, risk, social vulnerability & capacity)

Products:

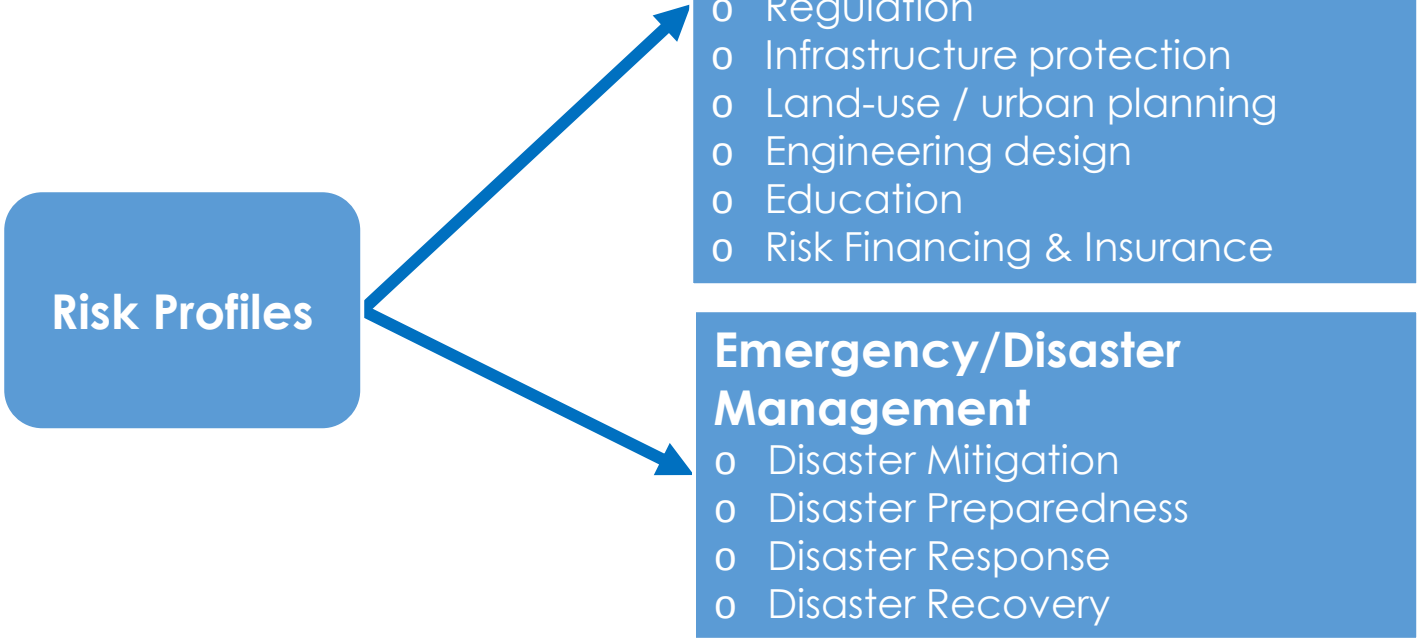
A: National Data Infrastructure **(NDI)** for dynamic risk assessment, including disaster info databases
B: Evidence-based risk profiles and atlas (**IRA**)
C: National **RiskInfo** e-Library
D: Thematic risk management knowledge frameworks
E: Integrated Development Risk Governance (**IDRG**) training pack

Methodologies and Tools:

1) Disaster risk modeling, mapping and profiling; National Disaster Observatory (**NDO™**)
2) Good practice documentation
3) Understand and access to risk information
4) Knowledge transfer and science-policy dialogues
5) Economic analysis of risk management measures



Risk Profiling by Users



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Development Planning

- Sector/Facility Risk Profile
  - Deterministic Risk Profile
  - Probabilistic Risk Profile
- Comprehensive Risk Profiles

Disaster Management

- Disaster Risk Profile
- Comprehensive Risk Profiles

Integrated Country Solution for Disaster Risk Information Management

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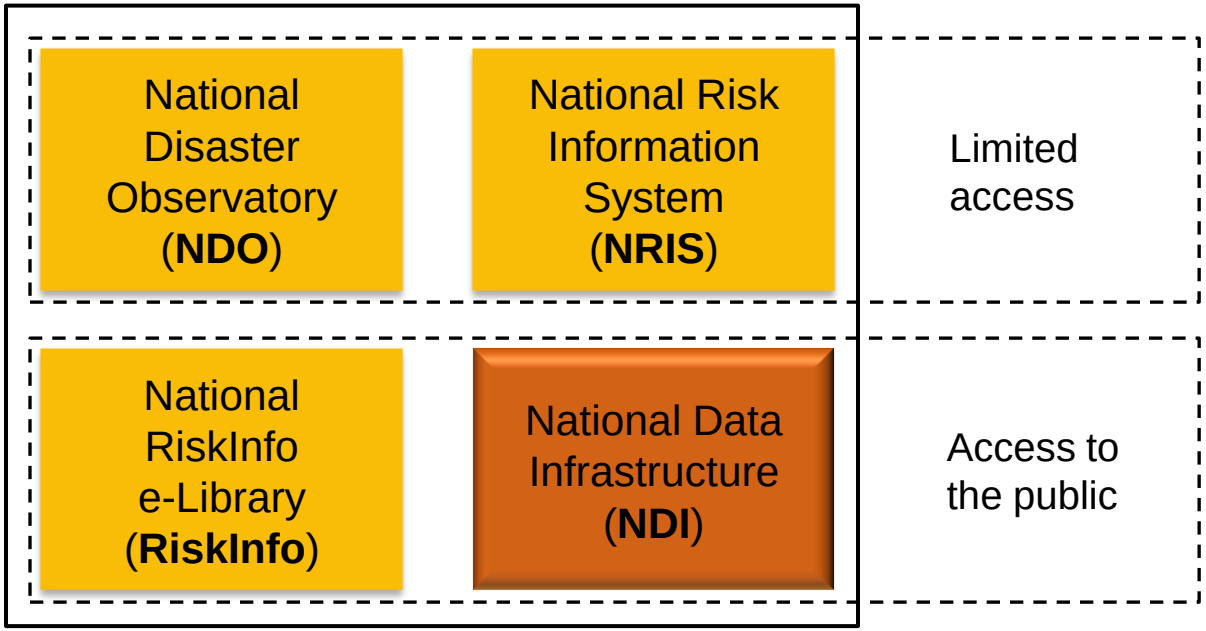

National Disaster Observatory (NDO)

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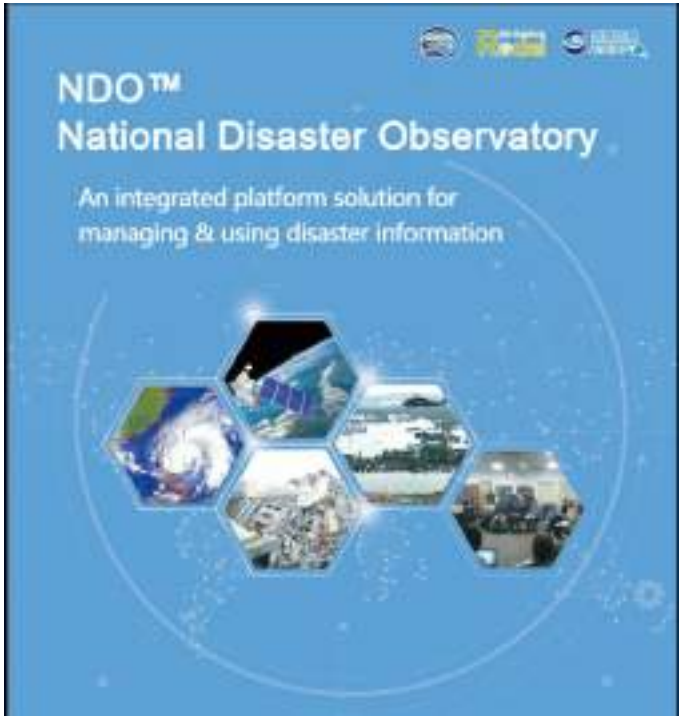
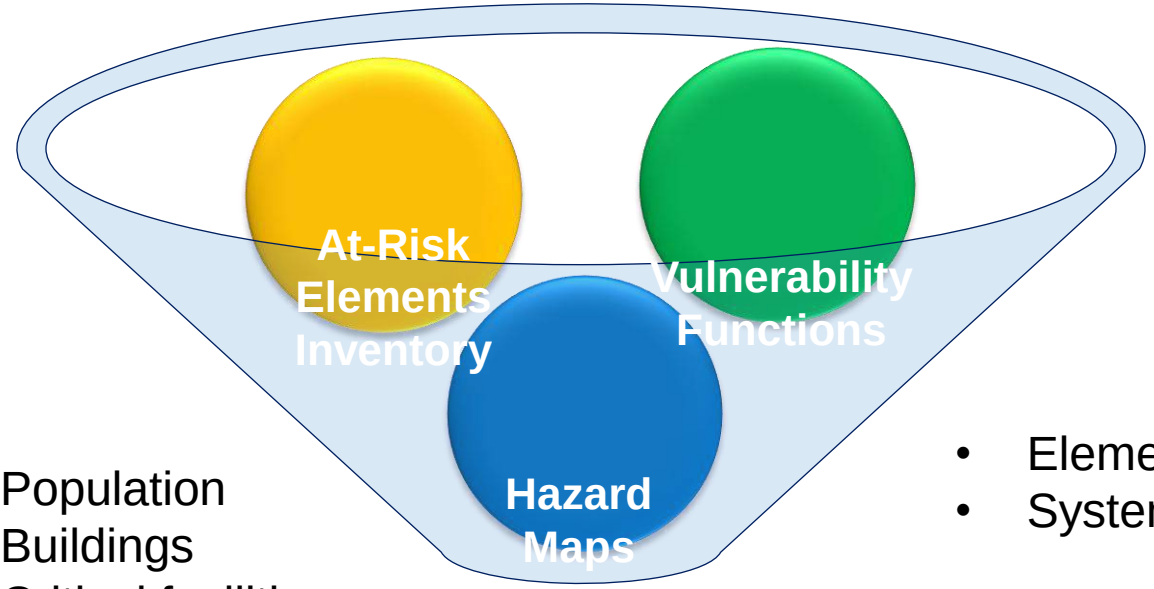
NDO, featured with key functionalities, i.e. disaster registration, disaster monitoring and analysis, damage and loss accounting, and disaster situation visualization and rapid reporting, is an integrated disaster risk management platform solution that has been developed to:

- **promote cross-sectoral sharing and coordinated management of disaster information to strengthen synergy among different authorities and agencies during an emergency/disaster;**
- **provide timely, all-dimensional information services for real-time disaster monitoring and decision making in disaster response;**
- **provide integrated risk assessment and governance with solid data and knowledge by in-depth forensic analysis of historic disasters.**





- Population
- Buildings
- Critical facilities
- Infrastructures
- Economic activities
- Natural resources
- etc.

- Element vuln.
- System vuln.

NRIS

- Hazard Extent
- Hazard Intensity
- Hazard Zonation

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NDO

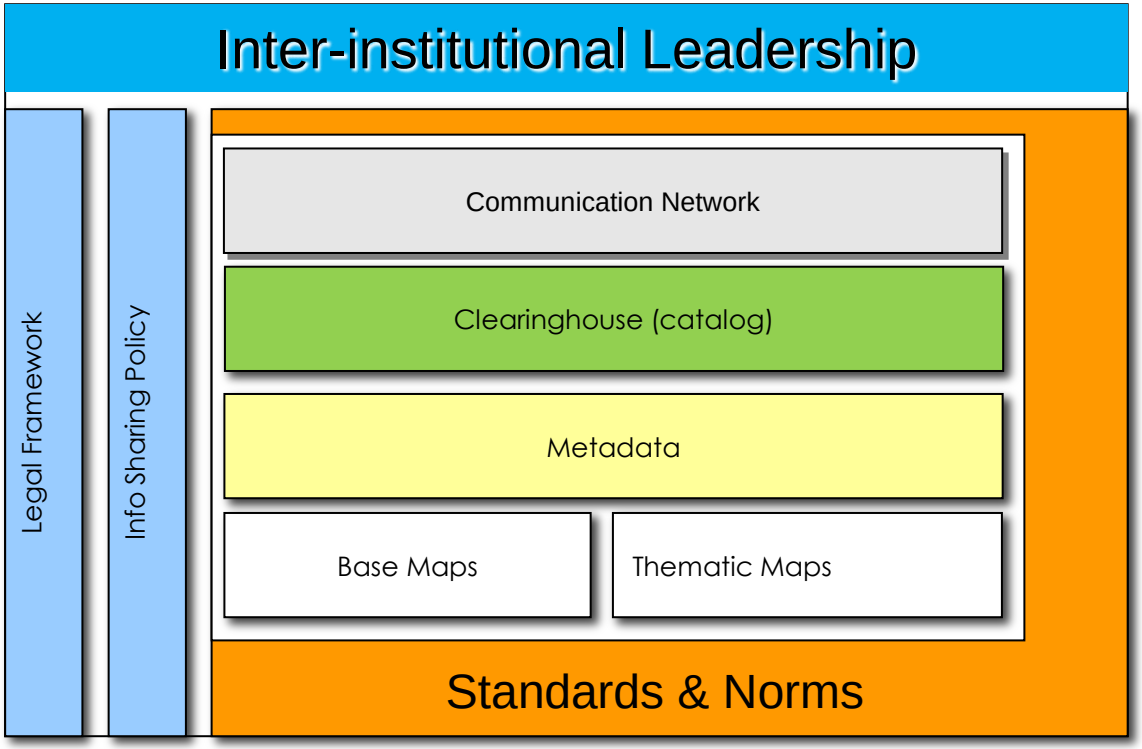
- Disaster Preparedness, Response and Recovery
- Disaster information
- Data collection through a network of observers
- Dynamic disaster analysis and mapping during an emergency / disaster

NRIS

- Risk management and development planning (Disaster Prevention)
- Hazard risk information
- Data production through simulation and calculation
- Dynamic risk analysis and mapping by hazard, sector, jurisdiction, etc.

National Spatial Data Infrastructure (NSDI):

A contextual framework for acquiring, processing, storing, distributing, and improving the utilization of geospatial data from many different sources and for wide group of potential users.



Source: Lance and Pedreros (2001)

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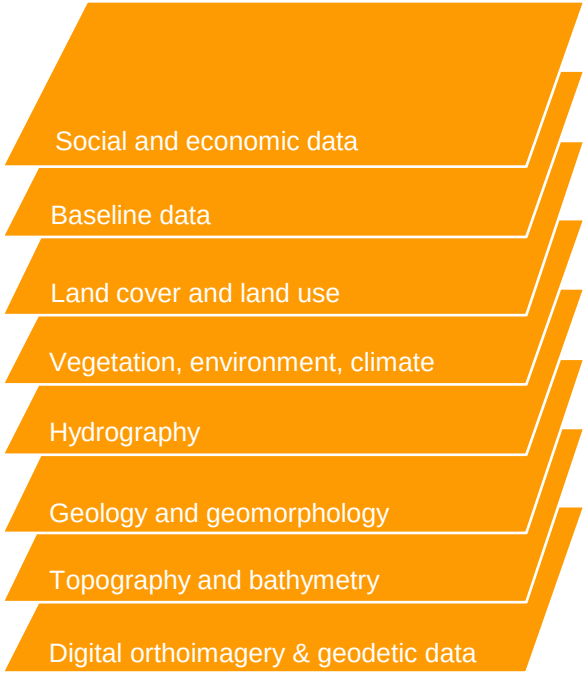
Framewowork Data:

A set of base data and maps (or fundamental data, core data, reference data)



National Data Infrastructure Framework for Risk Assessment

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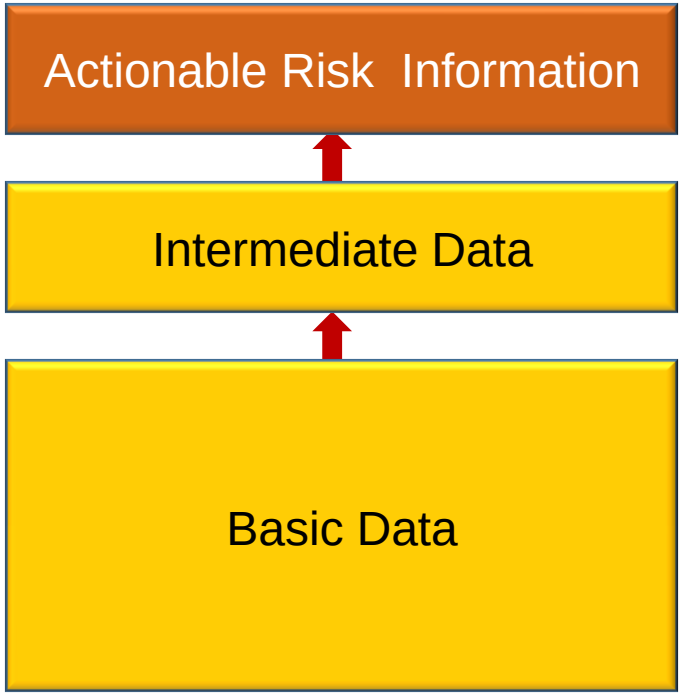

Hazard zonation maps, risk maps, disaster scenarios, risk profiles and portfolios, etc.

Hazard-prone area, hazard intensity, geo-referenced inventory datasets, vulnerability , etc.

Base Data: Historic event catalogues, disaster damage & loss databases, various inventory datasets, socio-economic data, disaster relief data, etc.

Base Maps: DEMs, satellite imagery, zonation and boundaries, various geo-, hydro-, meteo-, and climato- data, etc.

Methodology Tools for Systematic Inventory and Evaluation (SIERA)

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Worksheet 01 Users' needs and requirements for hazard and risk information

Worksheet 02 Descriptive summary of hazard and risk information products

Worksheet 03 Basic data and base maps

Worksheet 04 Hazard-related datasets and maps

Worksheet 05 Geo-referenced inventory datasets

Worksheet 06 Vulnerability functions and studies of key elements at risk

Worksheet 07 Standards, guidelines, methodologies, and tools

Worksheet 08 E-Library, databases, information systems, and knowledge portals

Worksheet 09 Thematic Country situation

Worksheet 10 Overall country situation

The SIERA Process

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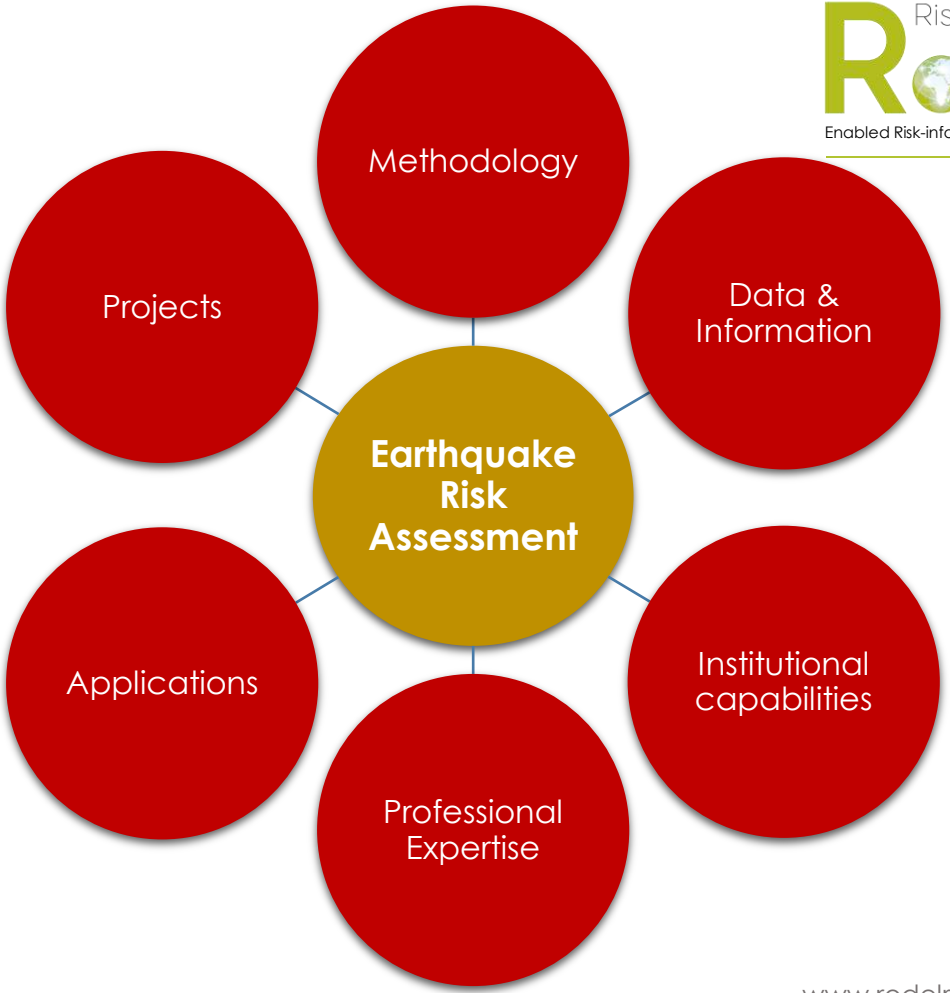
Step 1
- **Identification**
  - Stakeholders, data & information sources

Step 2
- **Systematic Inventory**
  - Comprehensive catalogues

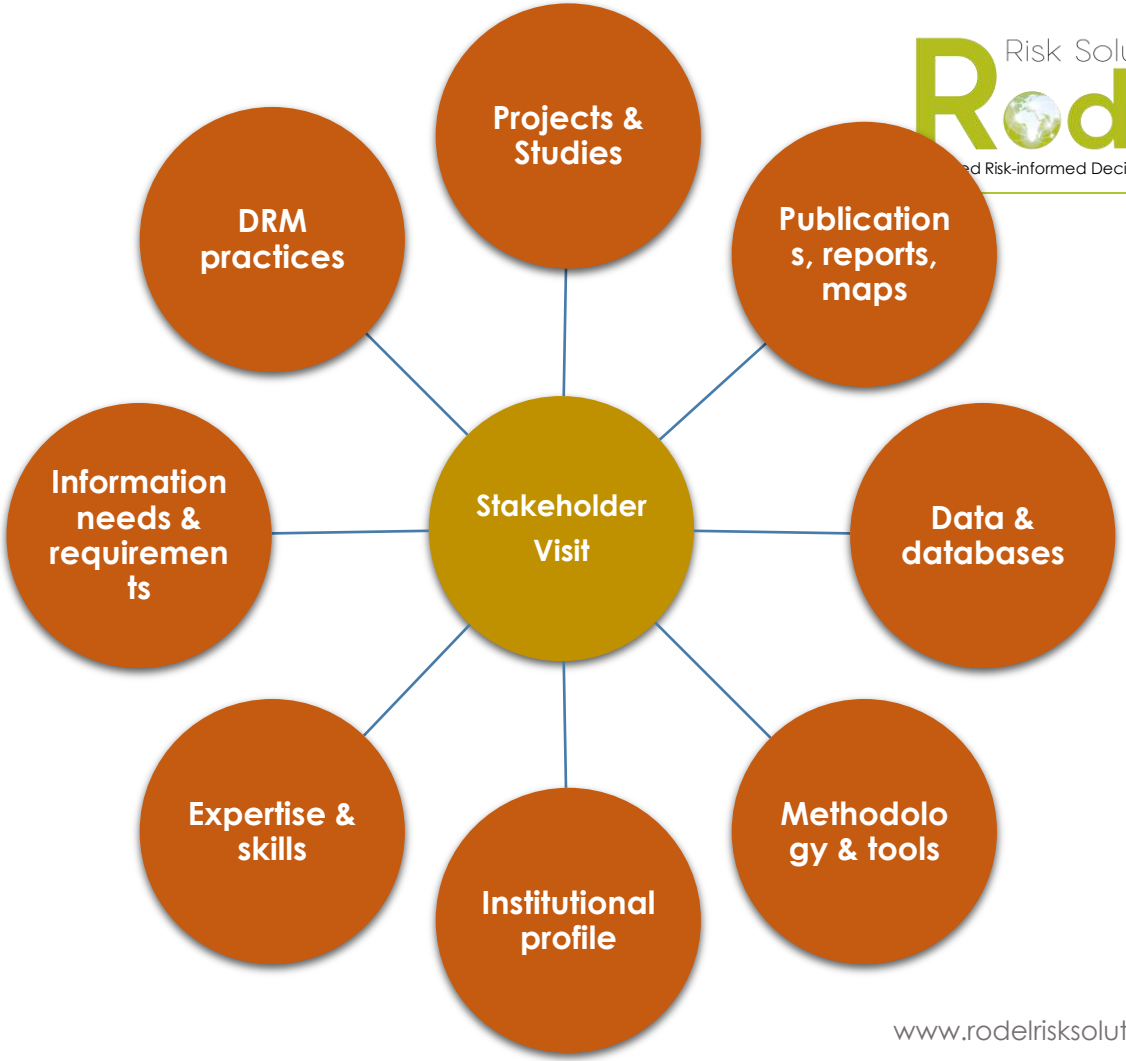
Step 3
- **Analysis & Evaluation**
  - Current status, quality, issues, gaps, external support

Step 4
- **Situation Reporting**
  - Country profile, progress report

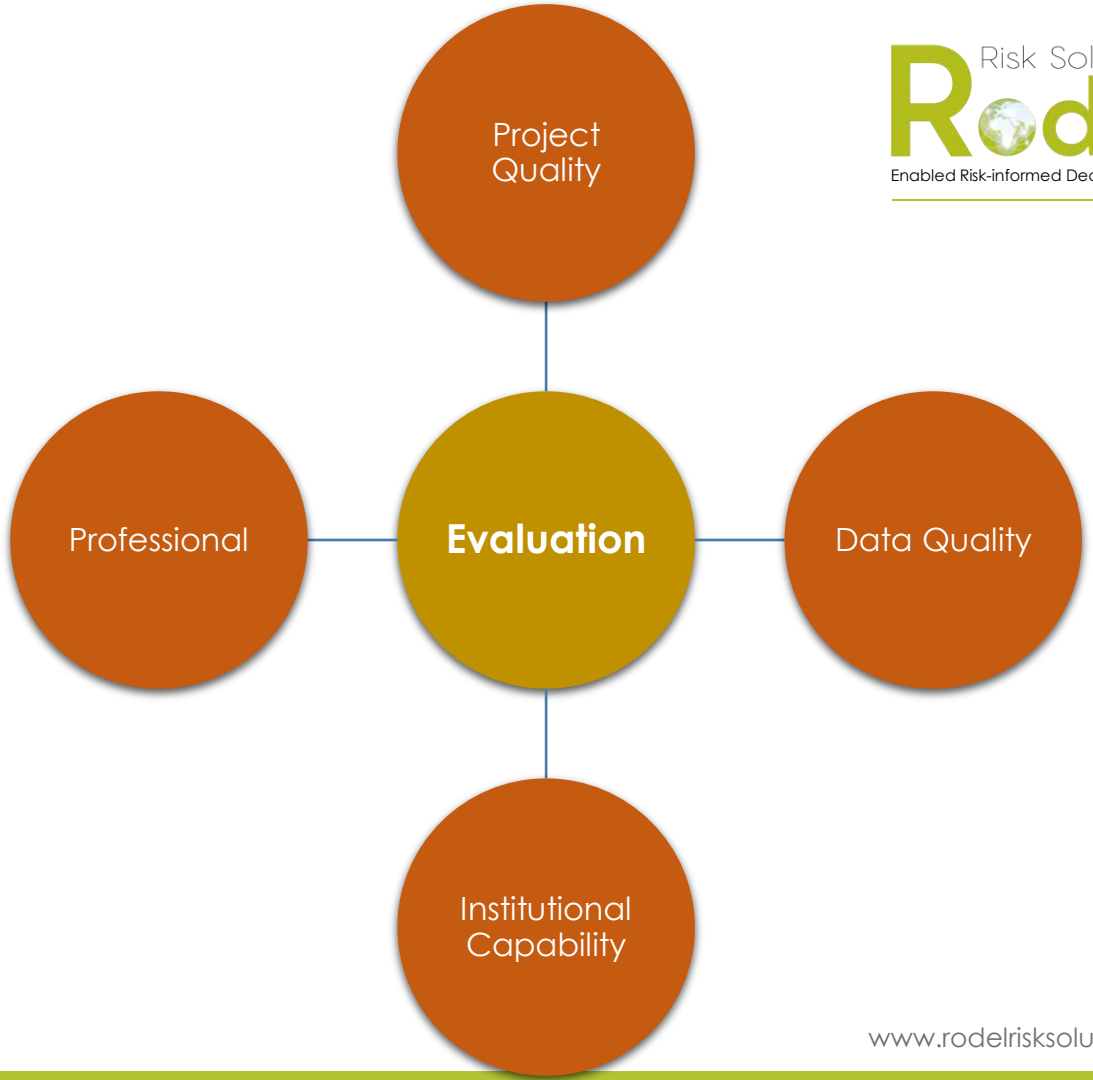
- Desktop review
- Informant Interview
- Group discussion
- Stakeholder Visit



- Complete the **Inventory Forms**
- Create a **comprehensive catalogue**



- Statistic Analysis
- Thematic Analysis



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Systematic Inventory and Evaluation for Risk Assessments in Nepal (SIERA Nepal)

- For designing new national risk assessment in Nepal;
- Funded by DFID, implemented by NRRC, in 01-06/2015;
- Undertaken by a team of 7 professionals.


Hazard and Risk Assessments in Nepal:
Systematic Stocktaking and Country Situation Analysis

Inventory Analysis

Key SIERA/CSA Findings

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- Different understanding of the key concepts and different Risk methodologies are used.
- Risk assessments are implemented by international consultants and organizations.
- **Most data, basic and immediate, required for evidence-based risk assessment are not available.**
- Little useful hazard and risk information available for actual decision making.
- National technical capability is limited to hazard assessment, but relatively weak in vulnerability assessment and risk profiling.
- Lack of strong and effective national governance and coordination for risk assessment.

Key Decision Making Areas in Nepal that needs hazard risk information:

- National and watershed development planning
- Urban planning and building code enhancement
- National land-use planning
- Critical facility safety programme (school and hospital)
- Food security and agricultural development
- Disaster preparedness and emergency operation

Recommendations for Building NRA/M in Nepal

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- **Focus Areas**
  - National Risk Assessment Framework, technical specification on hazard and risk atlas, data and sharing policy, etc.
- **Priorities for Action**
  - NDI, e.g. DEMs, inventory data, met-data, disaster information system, etc.
  - Multi-hazard zonation mapping
  - National guidelines for hazard risk assessment
- **Key Entry Points**
  - Existing programmes and projects

SUMMARY

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- **National Data Infrastructure (NDI)** is a cornerstone for fostering national Risk-informed Decision Making (RiDM) mechanism.
- Building **NDI** for dynamic risk assessment is an engineering programme that should be designed and implemented within a well-established **National Risk Assessment Framework (NRAF)** and **National Spatial Data Infrastructure (NSDI),** if existing.
- **SIERA/CSA** is the first step towards building NRAF and NDI.
- NDI components should be integrated into various risk assessment projects and programmes.
- A national coordination mechanism is critical to the success of NDI programme,

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Many Thanks for Your Attention!

Professionalism | Cooperation | Innovation

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What We Do:

- Country Situation Analysis (CSA)
- Integrated Risk Assessment & Profiling (IRAP)
- Integrated Development Risk Management (IDRM)
- Integrated Disaster Information Management (NDO™)

Our Services:

- Programme Design & Evaluation
- Risk Information
- Training & Coaching
- Research & System Development