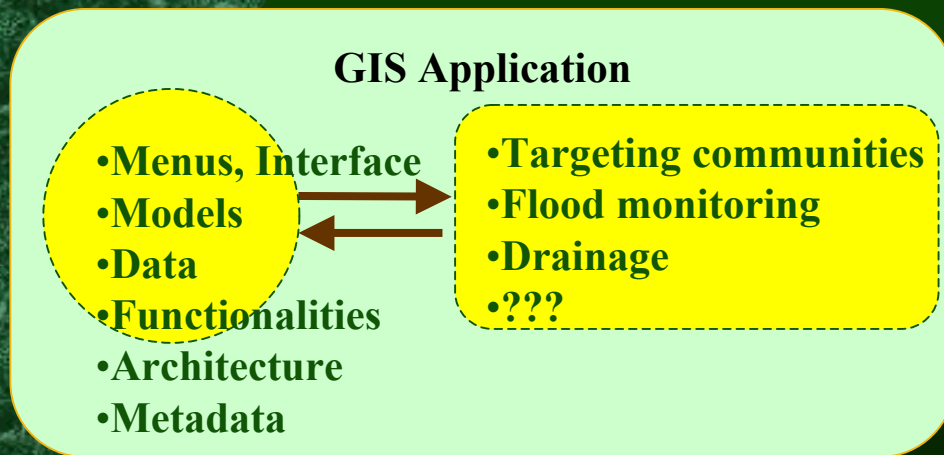# The Adoption of Geo-Information and Geographic Information Systems for Natural Disaster Risk Management by Local Authorities

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Adoption of GIS Applications

GIS Application

- Menus, Interface
- Models
- Data
- Functionalities
- Architecture
- Metadata

- Targeting communities
- Flood monitoring
- Drainage
- ???

Drainage Improvement Routine

GI

- Identify & dismantle illegal construction
- Monitor silt sources
- Identify & fine improper solid waste disposal

Technology is the <u>knowledge</u> of cause-and-effect relationships <u>embedded</u> in <u>machines</u> and <u>methods</u>.

Complex Systems

Geo-information Technology

Local Authority

Natural Disaster Risk Management
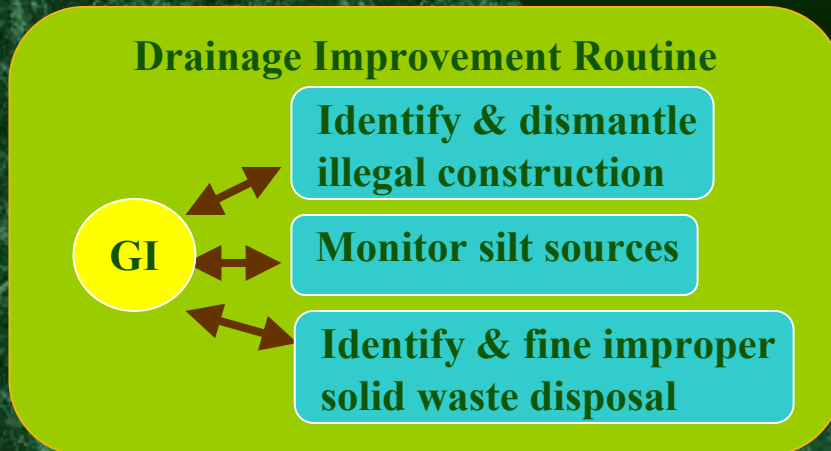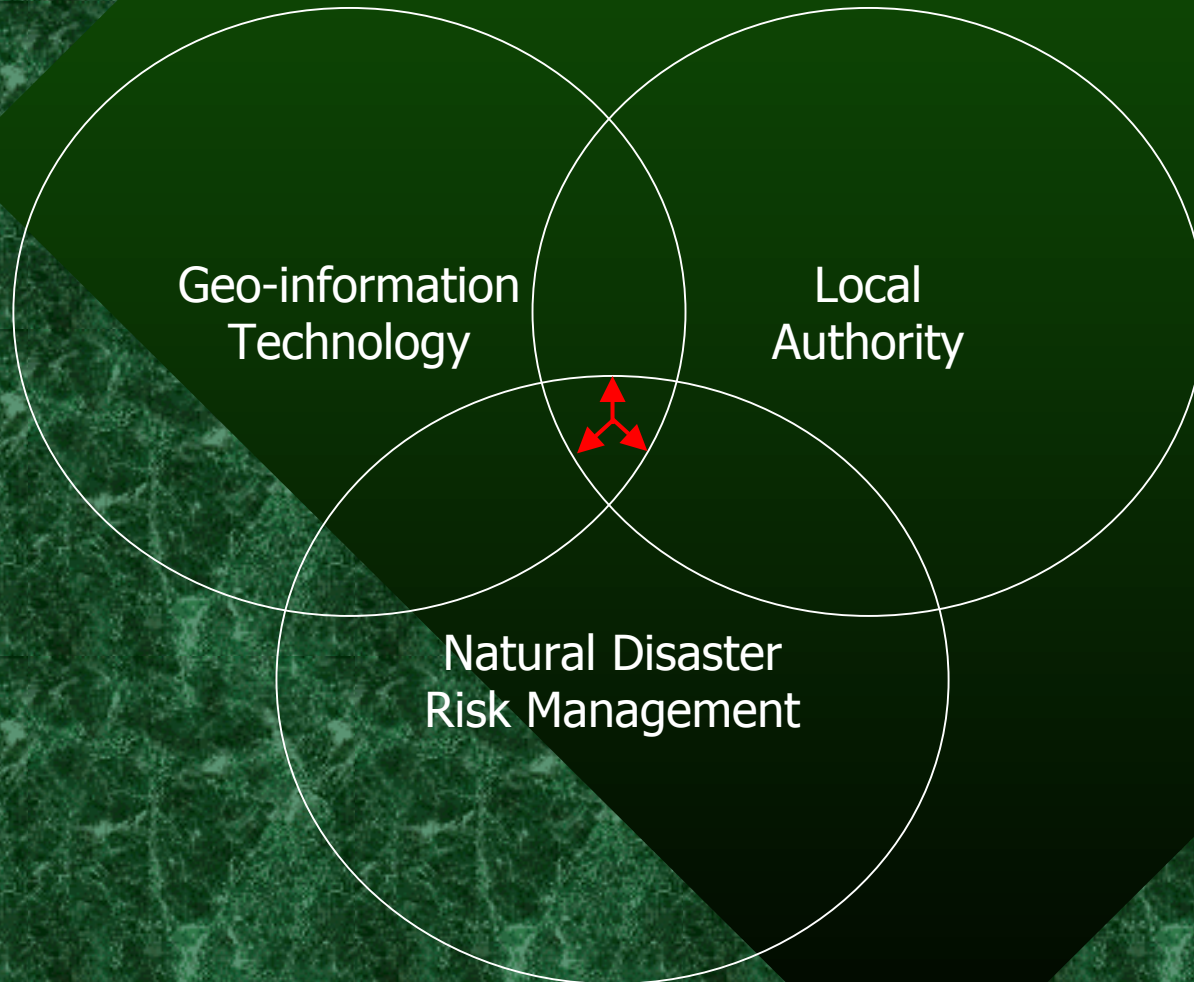
Implementation

Implementation is the part of the technology adoption process for transforming the unproven potential of an information system into a taken-for-granted component of the daily activities of the organization.

Two key questions:
- How will geo-information contribute to disaster risk management processes?
- How can an organization integrate a new working practice into existing traditions and norms?

Case Studies

- Lalitpur SMC, Nepal
- Naga City, the Philippines
- Organizational factors that currently impede the adoption of geo-information and GIS applications for natural disaster risk management
- Key concept – organizational routine

Lalitpur SMC, Nepal

- Hazard – strong earthquake every few years
- LA Characteristics – monarchy, centralized; National Building Code, but no building safety inspection procedure, has building permit procedure; has Earthquake Safety Section to analyze building plans with one engineer, 1 diploma engineer, 1 admin; no GIT in use yet
- GI Application – GIS to support planning, city administration, and disaster management

Naga City, Philippines

- Hazard – recurrent flooding from Bicol river; flash floods from Naga river; duration up to half a day; high tide backs water into city from bay
- LA – republic, decentralized; has flooding mitigation plan; has flooding mitigation GIS as project of the Mayor+Engineering+EDP rather than in City Planning & Development; GIS application present since 1994
- GI Application – Engineering: drainage system; CPD: ?; EDP: none; Mayor: support for political lobbying

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"Matching"

GIS Applications
- Vulnerability assessment
- Hazard assessment
- Impact assessment
- Emergency response

Routines
- Safety regulations enforcement
- Awareness raising
- Drainage maintenance
- Garbage collection
- Political lobbying
- ???

Routine

- Structures, rules, procedures, strategies and technologies that an organization operates to perform certain functions.
- Geo-information is a possible resource.
- A routine is a set of <u>coordinated</u> responses to a trigger.
- Decomposable into tasks and resources, forming a pattern that can be modified.

Routine (continued)

● Task   ■ Information   ◆ Geo-information
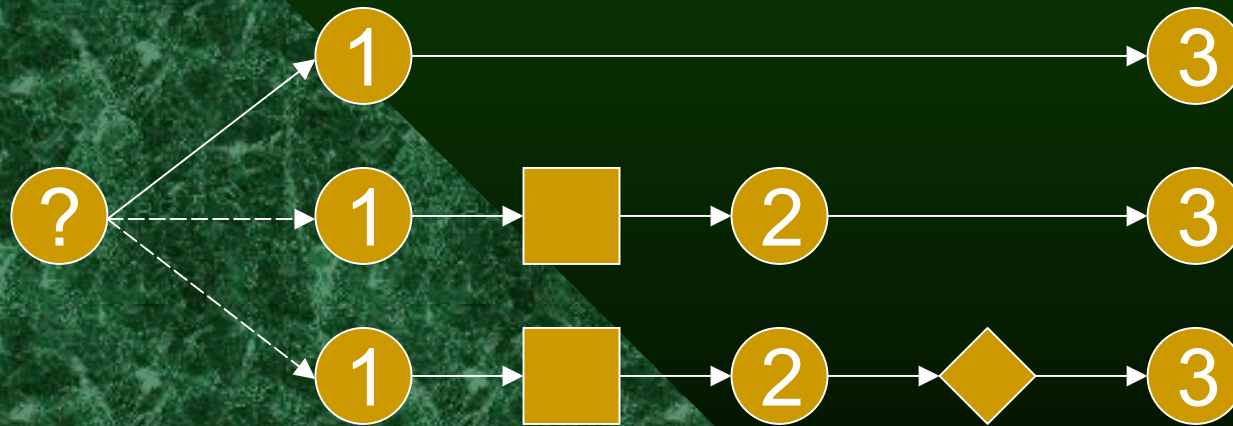
Conclusions

- Geo-information use can be articulated within corresponding organizational routines when designing an application.
  - Indicates higher potential of use of geo-information.
  - Provides measure of usefulness of GIS.
  - Provides measure of impact on natural disaster risk management.

Conclusions

- Organizational routines can be modeled as sequences of tasks and resources.
  - Provides an articulation of responses that may or may not involve the use of geo-information.
  - Provides a basis for adding or modifying existing activities to accommodate geo-information.