Spatial Visualize Information System for Effective Disaster Management in Sri Lanka

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generous support of:
Sri Lanka at Glance....

Location: South Asia
Size: 65,610 Km2
Population: 20 Million
Meteorology: Two Monsoon seasons
30 Year Civil war ended up in May 2009

Major Hazards in Sri Lanka
• Flood
• Drought
• Landslides
• Tsunami
• Civil Conflict
Major Disasters occurred in Sri Lanka

Flood
Jaffna Dec 2008

Tsunami
East Dec 2004

Civil Conflict
Vavuniya May 2009
Right **Information** at a Right **time** in a Right **way**

Qualitative and Quantitative Info.

Decision Making for Effective Disaster Risk Management

**Challenge:**

Information Management & Visualization on time

Spatially Referenced **DYNAMIC** Information System

Google Earth Platform
Methods

Feasibility test of 3 types hazards for 3 Key areas of Disaster Management Cycle in Google-Earth Platform

Emergency Response for Flood
Focused on Jaffna Flood in December 2008

Preparedness for Tsunami
Focused on Eastern- present situation

Recovery from Civil Conflict
Focused on Vavuniya IDP* Camps- present situation

* IDP: internally displaced person
Information transfer - based on hazard type

- Adding a new features
  - Point, Line, Polygons
- Image overlays - Ground & Screen
- Styles
- Import GPS data
- Multimedia
- Statistics, Graphs, Tables
- Geometry
- Folders
- Network Links
- Browser Integration
- Interactive editing of KML content

Visualize Information In Google-Earth Platform
Emergency Response for FLOODS

Case 1: Focused on Jaffna Flood in December 2008

- Road Network
- Population Statistics
- Administrative Boundaries
- Main towns
- Imp. buildings
  Eg. Hospitals, Police etc
- IDP Camps
- Link databases -3W
- DMC and Gov Officers
- Statistical Info-GA
- Flood Levels
- SBI- RADA images
Potentials for timely response

- Rescue Operations
- Logistic Support – distance, easiest path -GPS navigation
- Quantified information on area calculations
- Prioritization of resources
- Visual interpretation with GE ground images
- Identify the vulnerabilities
- Lost estimates

Dynamic environment
Preparedness for **TSUNAMI**

Case 2: Focused on Eastern Sri Lanka, 2004 Tsunami

- General information
  - Inundated areas & wave strengths
  - Measurements on resistance
  - Population dynamics
  - Evacuation roads & elevation
  - Access for health centers
  - Early warning Dissemination
  - Tsunami warning tower network, coverage
Potential for Preparedness

- Vulnerabilities – Population, Physical and Socio-economic
- Level of Tsunami Risk
- What are the physical structures need to be strengthened e.g. schools, hospitals, public buildings etc.
- Monitoring the progress of DM Awareness
  First-AID
  Mock drills
  DM committee’s formed
- DRR into Development planning

Risk = Hazard x Vulnerability

Coping Capacity

\[
\text{Risk} \propto \frac{1}{\text{Coping capacity}}
\]
Recovery after Human Conflict

Case 3: Focused on Camp Management

- General information layers
- IDP Camps
- Different Zones, Resource Allocations, Accessibility
- Relocation process
- De-mining
- Agencies present
- Automatic real-time content updates
Automatic real-time content updates

Field users
Vavuniya District Summary

Vavuniya IDP Trend Chart
IDP population: 100,967
Updated on 15th Feb 2010

Type of Shelters:

Directions: To here - From here
Menik Farm Zone 4
Vavuniya District

No of IDPs: 12,841

<table>
<thead>
<tr>
<th>Area</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres</td>
<td>People</td>
</tr>
<tr>
<td>480</td>
<td>22,076</td>
</tr>
</tbody>
</table>

Updated on: 12/02/2010
Menik Farm Zone 1 - Ananthakumarasuwamy Relief Village
Yavuniya District

No of IDPs: 23,978

<table>
<thead>
<tr>
<th>Area</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>220</td>
<td>31,400</td>
</tr>
</tbody>
</table>

Updated on: 12/02/2010
Cluster Updates

Shelter/NFRI/ Camp Management

<table>
<thead>
<tr>
<th>Needs</th>
<th>Achievements</th>
<th>Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency shelter decommissioning, repairs and replacement related needs IDPs in Vavuniya, Mannar, Jaffna and Trincomalee</td>
<td>Approx 48,734 emergency shelters erected</td>
<td>Assessments on the type and number of shelter needs in the return areas</td>
</tr>
<tr>
<td></td>
<td>Approx 37,111 tents erected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some 4,230 emergency tents and 4,319 emergency shelters are remaining in stock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some 91,739 displaced families have received approximately 105,078 non-food-item packages.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The core kit includes bed sheets, jerry can, bucket, floor mats, mosquito nets, plastic basin, towels, rope and kitchen set. In addition, hygiene packs are also distributed as well as additional items on a need basis, such as clothes, slippers and other small items.</td>
<td>Assess needs for transitional and return kits for resettlement of IDPs</td>
</tr>
<tr>
<td></td>
<td>Fencing around drainage ponds have been erected for child safety.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The storm water drainage system in the Menic farm IDP site has been improved.</td>
<td></td>
</tr>
</tbody>
</table>

![Graph](image.png)

Directions: To here - From here
### Stakeholder Perception to increase the Effectiveness of the system

<table>
<thead>
<tr>
<th>Priority</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case 1</strong></td>
<td>Emergency Response for Floods</td>
<td>Preparedness for Tsunami</td>
<td>Recovery from Human Conflict</td>
</tr>
<tr>
<td><strong>Case 2</strong></td>
<td>Feature accuracy</td>
<td>Technology (Databases etc)</td>
<td>User accessibility (#)</td>
</tr>
<tr>
<td><strong>Case 3</strong></td>
<td>Sat Images</td>
<td>Feature Layer &amp; Stat.</td>
<td>Multimedia</td>
</tr>
</tbody>
</table>

**Stakeholders:**
Government (Admin & Technical), International Community, CBO, Individual users
**Advantages**

- Multi-user dynamic accessibility
- Powerful data visualizing techniques
- Holistic approach for common platform
- Comparable on various feature interconnections
- Quick results
- Share files via Emails and Web
- Data compatibility with other technologies.

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**Limitations**

- Lack of Image coverage In certain areas
- Low internet connectivity speed
- Different level of knowledge in GE user
- Less accuracy in DEM
- Projection differences with local data sets.
- Published info rights, goes to the GE company
- Limitations in different versions. (GE Pro, GE)
• This method could be used with preloaded information to produce accurate results on time

• This system could be used to identify the actual needs during disasters for the decision-makers to compare with the various types of dynamic information

• Provide a platform to justify the decisions been taken

• This system need to be further improved with all the dimensions of Disaster Management, which would assist stakeholders to have a common system and equal level of information

Conclusion
How you gather, manage and **use** information will determine whether you win or lose

----- Bill Gates, 1993

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**http://www.hpsl.lk**

Thank you😊