SPATIAL INFORMATION MANAGEMENT AND GEOGRAPHIC INFORMATION SYSTEMS IN THE DELIVERY OF S-HELP DECISION SUPPORT TOOLS FOR EMERGENCY SITUATIONS

Dr. William Hynes
william.hynes@futureanalytics.ie

Managing Director,
Future Analytics Consulting (Ireland).
www.futureanalytics.ie

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In the next 10 minutes…

Our Work Within S-HELP On Decision Support Tools

Emergency Management

Spatial Information Management

Geographic Information Systems

Our Work Within S-HELP (Securing – Health.Emergency.Learning.Planning)

S-HELP is developing a decision support system (DSS) that will support decision makers in preparing for, responding to and recovering from major emergency incidents.

On Decision Support For Emergency Situations

- Spatial Data Integration & Mgt. System
- Indicative tool groups per phase of emergency management

Mitigation and Preparedness:

- EM Tutor,
- Collaborative tools
- EM intelligence
- Logistics
- Learning Simulator Management / Skills

Response:

- Tutor as Prompt
- Decision Support Systems (DSS)
- Central Repository
- Logging
- Logistics
- Incident Based Reasoning System

Recovery:

- Reporting: Baseline, Performance, EM Intelligence
- Post Evaluation

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www.fp7-shelp.eu

The Emergency Management Phases

Mitigation/ Planning

- **Activities that eliminate or reduce the probability of a disaster.** Activities that also analyse and document the possibility of an emergency or disaster and the potential consequences or any impacts.

Preparedness

- Activities to develop plans to save lives and minimize disaster damage **that could not have otherwise been eliminated through mitigation**.

The Emergency Management Phases

Response

- **Activities following an emergency or disaster**. These activities are designed to provide emergency assistance for victims and **seek to stabilise the situation**.

Recovery

- **Activities necessary to return an affected area to a state of normality or improvement in a timely manner.**

Effective Emergency Management

Effective emergency management must be[1]:

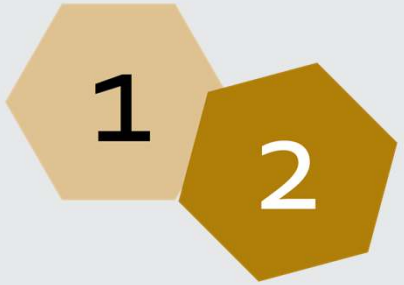
1. Comprehensive
   - Decisions must take into account all hazards, phases, impacts, and relevant stakeholders.

1 *FEMA, 2007, 'Principles of Emergency Management', http://www.fema.gov/media-library-data/20130726-1822-25045-7625/principles_of_emergency_management.pdf*

Effective Emergency Management

Effective emergency management must be[1]:

1. Comprehensive
2. Progressive
   - Anticipating future emergencies and focussing on prevention, mitigation and reducing vulnerabilities.



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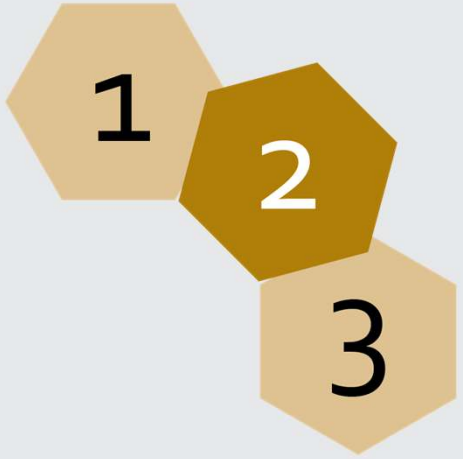
Effective Emergency Management

Effective emergency management must be[1]:

1. Comprehensive
2. Progressive
3. Risk-driven
    - To use sound risk management principles (hazard identification, risk analysis, and impact analysis) in assigning priorities for resource logistics during emergencies.



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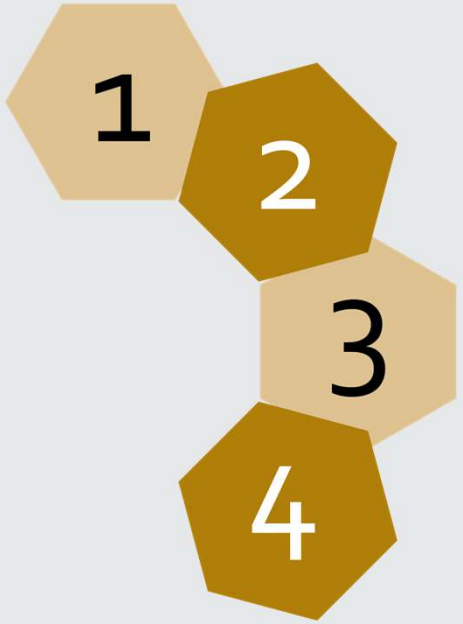
Effective Emergency Management

Effective emergency management must be[1]:

1. Comprehensive
2. Progressive
3. Risk-driven
4. Integrated
   - To ensure unity of effort among all levels of government, primary responders, stakeholders and all elements of the affected community.



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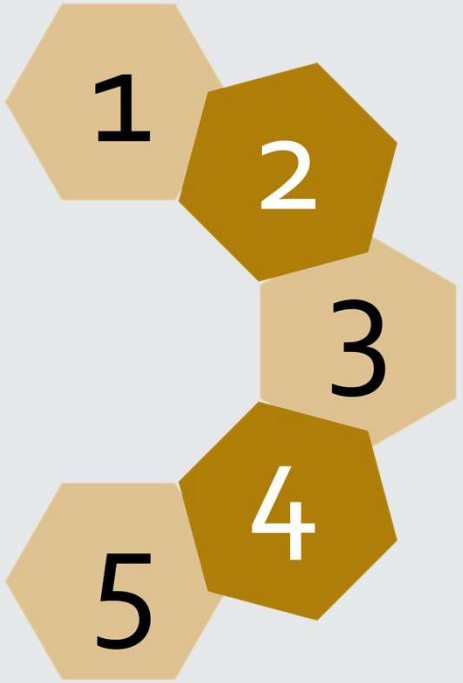
Effective Emergency Management

Effective emergency management must be[1]:

1. Comprehensive
2. Progressive
3. Risk-driven
4. Integrated
5. Collaborative
   - To create, encourage and sustain relationships of trust and communication between individuals and organisations working together.



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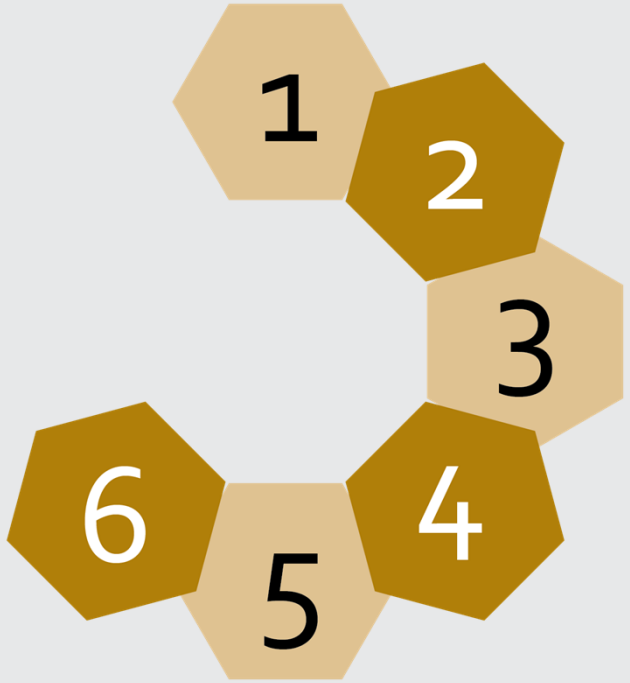
Effective Emergency Management

Effective emergency management must be[1]:

1. Comprehensive
2. Progressive
3. Risk-driven
4. Integrated
5. Collaborative
6. Coordinated
    - To synchronize the activities of all relevant stakeholders to achieve a common purpose.



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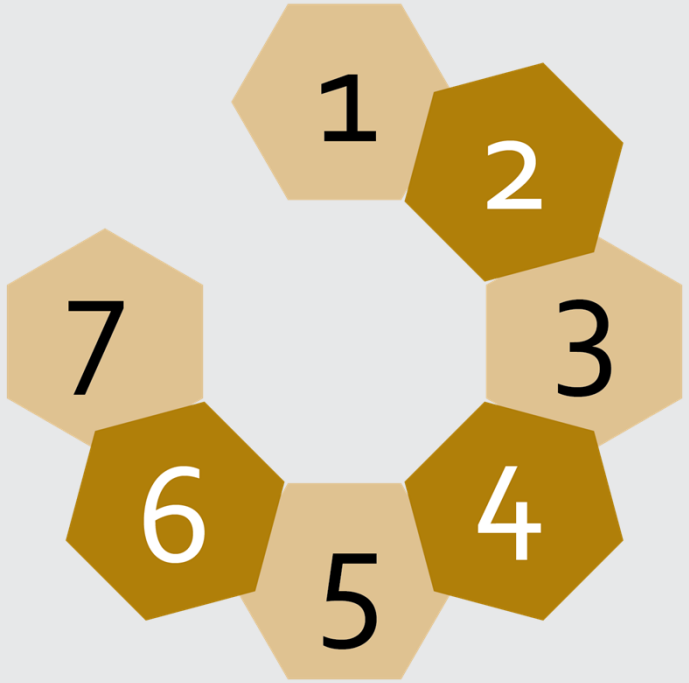
Effective Emergency Management

Effective emergency management must be[1]:

1. Comprehensive
2. Progressive
3. Risk-driven
4. Integrated
5. Collaborative
6. Coordinated
7. Flexible
    - To use creative and innovative approaches in solving disaster challenges. Being adaptable to changing conditions.



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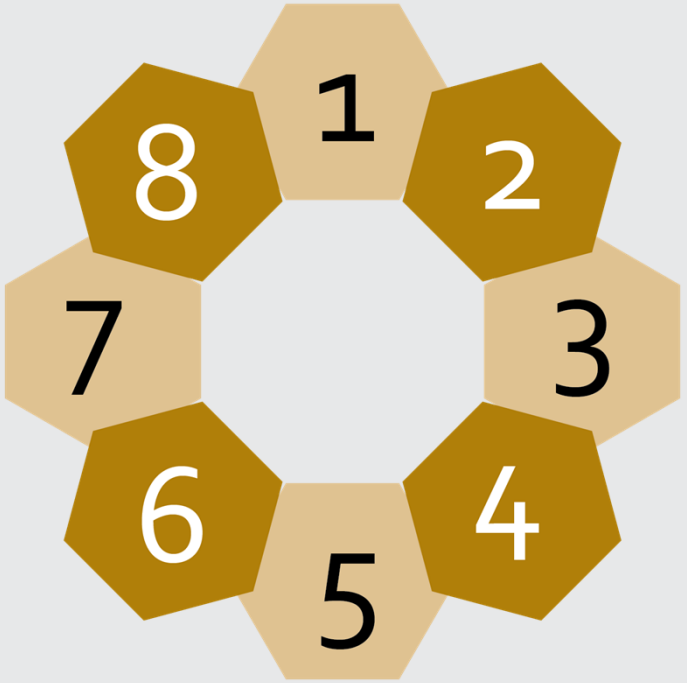
Effective Emergency Management

Effective emergency management must be[1]:

1. Comprehensive
2. Progressive
3. Risk-driven
4. Integrated
5. Collaborative
6. Coordinated
7. Flexible
8. Professional
    - To value knowledge-based approaches arising from qualified analysis of the available factors.



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Effective Emergency Management

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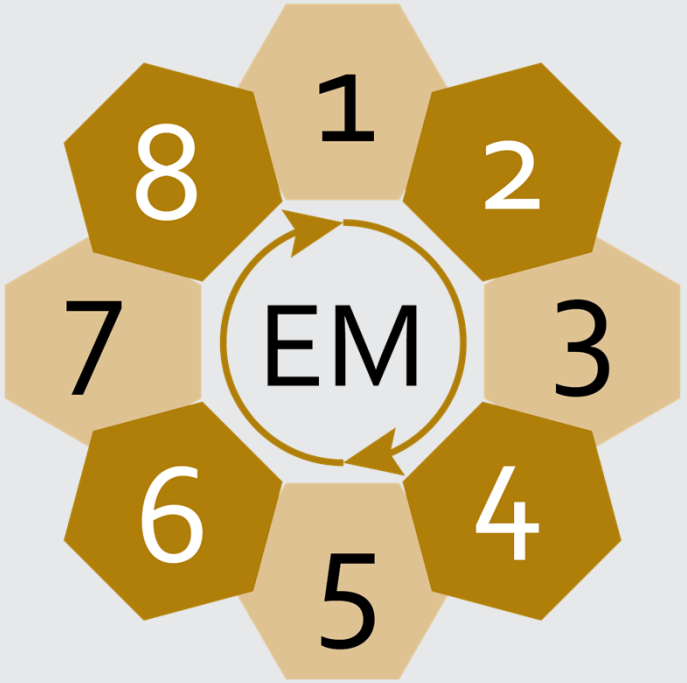
Are part of what the **DSS** and **Spatial Information Management System** will consider



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Spatial Information Management For Emergency Situations

What is spatial information management?

Access to reliable and up-to-date information is fundamental to effective emergency management. **The aim of spatial information systems is to assist in the conversion of data into information, and ultimately, knowledge; yielding an understanding of events.**

Spatial information systems represent a unique way to integrate spatial and non-spatial data, to interface with many sources of data, and to manage, query, analyse and present information in actionable form.

In assessing risks, planning for hazards, reducing vulnerabilities, deploying resources and assisting communities recover in emergencies – **spatial information systems are applicable across each of the emergency management phases**, and align with the defined principles in emergency management.

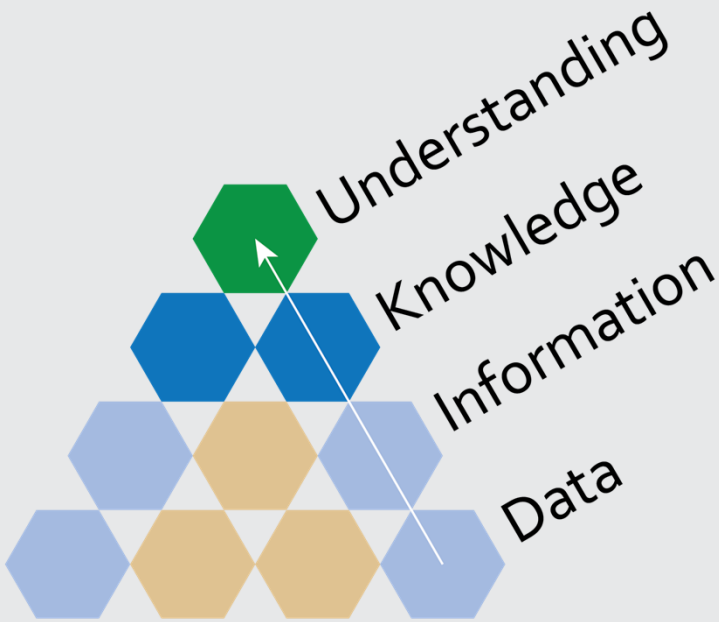
Progression of data into knowledge

Data are facts. Information is value-added data that has been processed and interpreted to extract meaning.

For instance, using GIS analytics information is extracted from data when:

- analysing risk;
- gauging vulnerability;
- identifying mitigation priorities;
- developing cohesive response plans; and
- testing by variable event scenarios.

This knowledge then **enhances decision support capacity** within the DSS, **leveraging the maximum value from the data and information**. Understanding leads to prediction.



Key components of good data management

- **Implementing a data policy:** a set of principles framing the following
- **Data ownership and accountability:** safeguarding IP rights and supply chain traceability
- **Data documentation and metadata compilations:** sufficient record of changes in the dataset as well as its effective use/constraints. A data catalogue to provide an accurate list of dataset metadata; including content, geographic extent, accessibility of the data and to help minimise the risk of loss of data.
- **Data quality, standardisation, harmonisation validation and audit controls:** define quality standards and formats, ensure data is quality assured before use and for data to be suitable for integration and transformation with other databases.
- **Data lifecycle control:** managed from acquisition/creation to disposal
- **Access and dissemination:** access rights clearly outlined for different groups

Benefits of good data management

Data is an important component at the root of each decision. **Knowledge is generated from information that has been extracted from data,** and so the decision-making processes that will drive the S-HELP DSS tools, will be intrinsically linked to **the quality and completeness** of the source data **and the manner in which it is handled and made available for analysis**.

Tangible benefits include:

- **Timely access to information**
- **Maximising use**
- **Avoiding duplication**
- **Maximising integration and interoperability**
- **Improving equity of access**
- **Improving communications**
- **Avoiding loss of data**

Geographic Information Systems (GIS) For Emergency Situations

GIS can assist across the emergency management phases, for example:

Mitigation/ Planning

- **Pinpointing hazards** and **evaluating consequences**
- **Identify and map by critical value** (infrastructure, population density, hazard)
- **Historic Incident Analysis**
- **Research & Development**

Preparedness

- **Site selection and mapping of key related variables** (socio-economic, environmental factors, topography)
- **Selecting and modelling for evacuation routes**, considerations for road capacity, time of day…
- **What-if analysis**

Geographic Information Systems (GIS) For Emergency Situations

GIS can assist across the emergency management phases, for example:

Response

- **Computer-aided dispatch systems**
- **Mobilisation of resources**
- **Support incident management operations**
- **Environmental modelling:** toxic plume cloud, catchment areas
- **Generate intuitive maps quickly**

Recovery

- **Resource management**
- **Damage assessments**
- **Alternate route and shelter assessments**
- **Monitoring progress of reconstruction**
- **Post incident investigation**

Thank you.

FutureAnalytics
Planning + Research + Economics
www.futureanalytics.ie | info@futureanalytics.ie

Dr. William Hynes
william.hynes@futureanalytics.ie

Future Analytics Consulting
23 Fitzwilliam Square (South),
Dublin 2, Ireland.

t: 00353 (0) 1 639 4836
e: info@futureanalytics.ie
w: www.futureanalytics.ie