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Maximising the value of location information

Value Chain and Cost-benefit Analysis: applied to 3D Geo-information

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Introduction

- Quantification of socio-economic benefits is increasingly critical in making the business case for Geo projects
- Value chain analysis and cost-benefit analysis are well developed and understood general methodologies
  - They can be applied where geo-information is the primary deliverable
- They work best when applied to well-defined use cases
- Good sources of primary evidence are essential
  - Too many current studies use “circular reasoning" Social network data has huge potential

Valuing Information

- We should not confuse the *value of information* with the *value of benefits from policies and/or systems that use it in decision making* (the apportionment problem)

- There is almost always alternative evidence to support decisions (economists call this the "counterfactual"):
  - other data sources (increasing in a world of data abundance)
  - different evidence bases (often from social science)

- It follows that an information source is only worth the "delta" in value between it and the next best alternative

[Adapted from Mollie Macauley]

Research Inventories: EVRI

Environmental Value Research Inventory

- Inventory contains over 2000 studies
- Mostly Contingent Valuation (using Willingness to Pay)
- Summarises:
  - topic subject
  - method of measurement
  - results
  - Reference to further information
- Several countries are sustaining members, so access is free to citizens

3D Geo-information Case Study

- Undertaken for EuroSDR – research body funded by National Mapping and Cadastral Agencies

- Methodology
  - Identify potential use cases
  - 6 selected for value chain analysis
  - 2 selected for cost-benefit analysis
  - Workshop to share results
  - Methodology training

Use Cases Selected

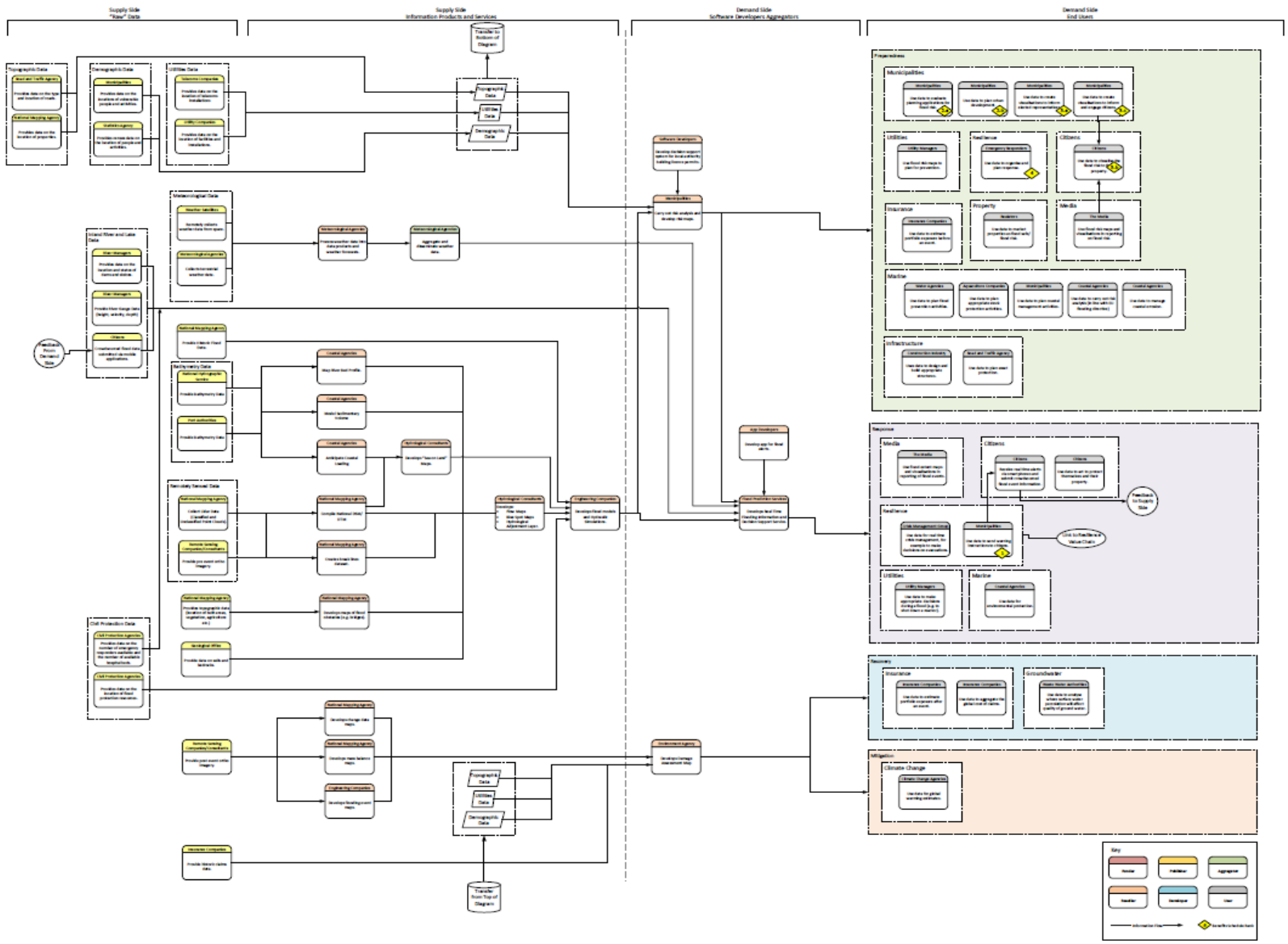
- **Asset Management** – scoped down to the value of an improved interface between underground and building infrastructure
- **Cadastre and Valuation** – the benefits of adding the 3rd Dimension to existing registers
- **Flood management** – high resolution DEMs for improved risk reduction and response
- **Forestry management** – value of DEM and DSM in improving productivity
- **Resilience** – City models for crisis management
- **Urban Planning** – streamlined zoning using 3D city models

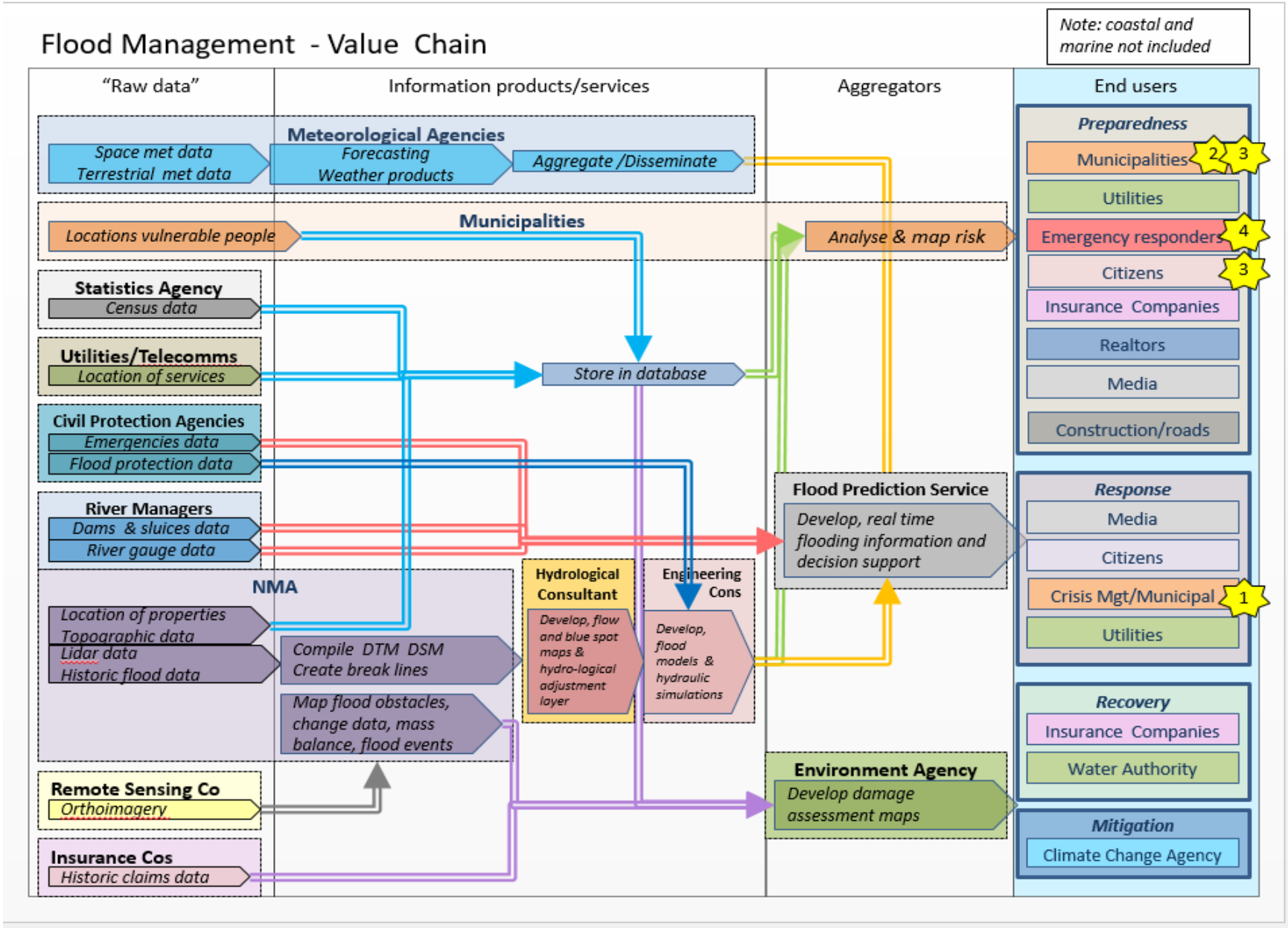
Value Chain Analysis

For each use case a workshop approach was used to understand the **information value chain**

- the “actors”
- the data they produce
- the processes where value is added

2. Value Chain Diagram




Flood Management - Value Chain
Note: coastal and marine not included
"Raw data"
Information products/services
Aggregators
End users
Meteorological Agencies
Space met data
Terrestrial met data
Forecasting
Weather products
Aggregate /Disseminate
Municipalities
Locations vulnerable people
Analyse & map risk
Statistics Agency
Census data
Utilities/Telecomms
Location of services
Store in database
Civil Protection Agencies
Emergencies data
Flood protection data
River Managers
Dams & sluices data
River gauge data
NMA
Location of properties
Topographic data
Lidar data
Historic flood data
Compile DTM DSM
Create break lines
Map flood obstacles, change data, mass balance, flood events
Hydrological Consultant
Develop, flow and blue spot maps & hydro-logical adjustment layer
Engineering Cons
Develop, flood models & hydraulic simulations
Flood Prediction Service
Develop, real time flooding information and decision support
Environment Agency
Develop damage assessment maps
Remote Sensing Co
Orthoimagery
Insurance Cos
Historic claims data
Preparedness
Municipalities
2
3
Utilities
Emergency responders
4
Citizens
3
Insurance Companies
Realtors
Media
Construction/roads
Response
Media
Citizens
Crisis Mgt/Municipal
1
Utilities
Recovery
Insurance Companies
Water Authority
Mitigation
Climate Change Agency

Cost-Benefit Analysis (CBA)

- A formal discipline used to help assess the business case for investment in a project or proposal
- Means of objective comparison between projects with different costs, benefits and duration

Assessing Costs

- Important to include all elements, some often forgotten costs are:
  - Preparing the business case
  - Procurement
  - Project management
  - Business process re-engineering
  - Transition process
  - Data integration
  - Training and re-skilling
  - Marketing

Benefits Assessment: Flood Management

Three approaches used to “triangular” the cost-benefit:

1. Cost Avoidance
   - Based on the approach advocated by the United Nations study on **The Value of Geo-information for Disaster and Risk Management (VALID)**
2. Case study evidence
   - Dutch association of water engineers
3. Benefits transfer
   - Based on area scaling from **National Enhanced Elevation Assessment (NEEA)** - a large comprehensive study from the United States - to infer benefits to European countries.

Mean Return on Investment 3:1 over 10 year period at 4% discount rate

Key Messages

- Value chain analysis and CBA are applicable to geo-information quantification
- They work best when applied to well-defined use cases
- Good sources of primary evidence are essential
    - Too many current studies use “circular reasoning"
    - Social network data has huge potential
- We are not alone in seeking solutions to information quantification
    - We must learn from environmental economists and transport engineers
- Call to Action: We need an EVRI for Geo-information

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Thank you for Listening

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