

Information Management in the Environmental Management domain

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Current position

Environmental Management in the UK is an increasingly mature activity, with a strong legislative base and generally positive pressures being exerted on (and increasingly by) business and government. The costs of the information base used to deliver environmental management is decreasing with consequently increasing focus and emphasis on adding value to the information, particularly through exploring the linkages between different datasets and adopting more holistic frameworks. Information sets are also increasingly coming out from their technical domain, and being made available through mass-market technologies. In parallel, there is also increasing interest in data collected by the mass-market, and approaches are emerging as to how to take advantage of that information, including understanding and dealing with the quality issues that arise.

Anticipated Changes

- The continuation of the trend toward a more holistic view of the environment – for example an Ecosystem Services approach – in terms of the information collected and models constructed;
- More immediate and direct “foot printing” of the consequences of everyday decisions – if not direct carbon taxes at least the ability to price and understand the consequences of different courses of action. A typical example would be increasing granularity in the insurance market as better tools and datasets become available to determine environmental risks.;
- More sophisticated approaches to decision-making made in everyday life – e.g. smart grid and smart metering for energy consumption, road usage pricing, certification, incentivisation etc. Environmental considerations therefore become implicit within everyday life, even for those not engaged in the process;
- Increasing sophistication in the analysis, presentation and understanding of uncertainty issues, for example how to communicate probabilistic-based information sets. This issue is particularly relevant for scenario forecasting such as climate change or flood risk analysis, where there is increasingly sophisticated datasets availability;
- Potentially, the GMES programme with its significant budgets and intention to, in effect, find the problem to which environmental remote sensing is the solution, may have an impact. This will further drive down the costs of primary data collection, and create more opportunities for linking data, added-value analysis. A “cloud” of data will be created, ripe for the mining and harvesting by all stakeholders;

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- Democratisation of data and information: information will increasingly be collected by the public and stakeholder organisations, or if not collected by them, there will be a sense of ownership and entitlement. This trend is entangled with the mass-market impact of tools like Google Earth, with its climate change data overlays;
- Move to a framework based on restitution of damage caused, rather than purely a punitive system, which builds on both the previous points i.e. an appreciation of the underlying natural services and the costs and consequences of actions taken to damage them.

Impact of Changes upon the geospatial industry and upon customers

- An increasingly sophisticated understanding and analysis of environmental processes, coupled with a rise in the availability and accessibility of data of all types, will create opportunities for tools and systems that can put the two aspects together in a way that provides useful business value.

EXAMPLE: the UKCIP2009 scenarios are available for direct usage within GIS software, rather than remaining in the meteorological modelling domain. There are specific opportunities for the application of GIS expertise in the handling and working with this information.

- To achieve the potential of the holistic frameworks, bridges will need to be built to the wider business information domain.

EXAMPLE: smart grids and meters can manage power demand to take into account environmental factors – this requires building a bridge between the (geospatial) information regarding environmental conditions and the business domains managing energy supply.

- There is a potential paradox at the heart of the information management within this domain that creates an opportunity in the GIS arena: as the cost base associated with data collection is driven down and the volume of data available goes up, the public becomes at best confused and at worst sceptical. In many cases, more information equals greater confusion – another dataset will be around the corner to refute any position. This means that rather than being able to let “the figures talk for themselves” it becomes increasingly important how the information is presented and telling the story associated with the information in a compelling way. This does not mean however to filter the information, to protect it, or to otherwise impede its release – that would be counter-productive. Rather the increasing availability of GIS tools and “geoweb” enthusiasts mean that there is a wider pool of people who can be partners in understanding and communicating the issues.

EXAMPLE: the decision-making around the disposal of refuse combines both an intensive predictive modelling exercise, underpinned by a baseline monitoring campaign, with an engagement with local politicians and pressures groups to explore the wider issues of waste disposal options, including

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transport to distant land-fill sites. Effective information management coupled with clear and transparent communications.

Scenarios

Environmental data cloud: government-sponsored data warehouse facility (cloud-based) where structured and linked environmental information is deposited under open and accessible licence conditions. This supports a diverse range of added-value products and services created by the GIS and geoweb industry:

- MasterMap Environment Layer: large scale environmental map of Great Britain with a consistent representation of a variety of environmental themes. Optional extra: change (only) updates – real time variations of environmental conditions in the layers of the map;
- StateofTheEnvironmentToday: benchmarking and analysis of environment available instantly, instead of a 9-month to 1-year lag as currently;
- Green Energy Account: a remote-controlled home heating system that draws down real-time and forecast information from the cloud, combines this with real-time production and transmission information to remotely activate and control the home heating system;
- Alarms triggered by the remote sensing, crown-sourced, sensor-web enabled monitoring data in the cloud showing rapid rise in cyanide and ammonia in the Trent in the West Midlands. Immediate dispatch of officers to deal with incident and prevent widespread fish-poisoning;
- fixmytown.org.uk / fixmycountry.org.uk – stakeholder-generated resources that provide a framework for crowd-source monitoring data to deliver intelligence on environmental management issues – feedback loop directly into the cloud;
- whatshouldido.org.uk / environmental.org.uk – public-facing toolset that provides simple representation of the consequences of different life choices – e.g. where to live, what transport choices to make.

Summary of key points

- More data and information, in more formats.
- Greater integration of environment into business domains.
- Opportunities for chained and linked geographical services to deliver added value to information.
- Innovation in presentation and engagement.

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