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United Nations Conference
on Sustainable Development

Monitoring Sustainable Development: Why Location Matters?



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Agenda

- Professor Sir Bob Watson CMG FRS, Chief Scientific Adviser, Department for Food, Environment and Rural Affairs (Defra), UK Government
- Dr Vanessa Lawrence CB, Co-chair of the United Nations Committee of Experts for Global Geospatial Information Management and Director General and CEO, Ordnance Survey, Great Britain
- Mr Greg Scott, Director, Geographic Information, Australian Government
- Dr Luiz Paulo Souto Fortes, Chair of the United Nations Permanent Committee on Geographic Information for the Americas
- Professor Sir John Beddington CMG FRS, Chief Scientific Advisor, United Kingdom Government





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Why accurate location information is vital to monitoring sustainable development

Professor Sir Bob Watson FRS
Chief Scientific Adviser,
Defra, UK Government

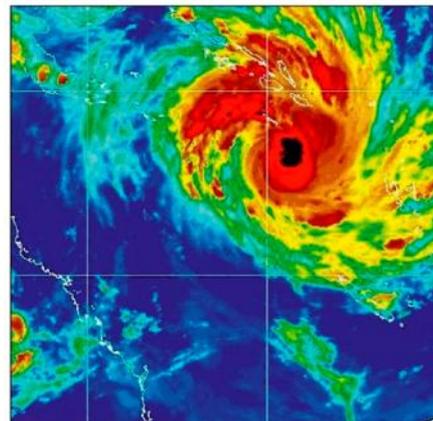


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Sustainable development: location matters



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Where have we come from?



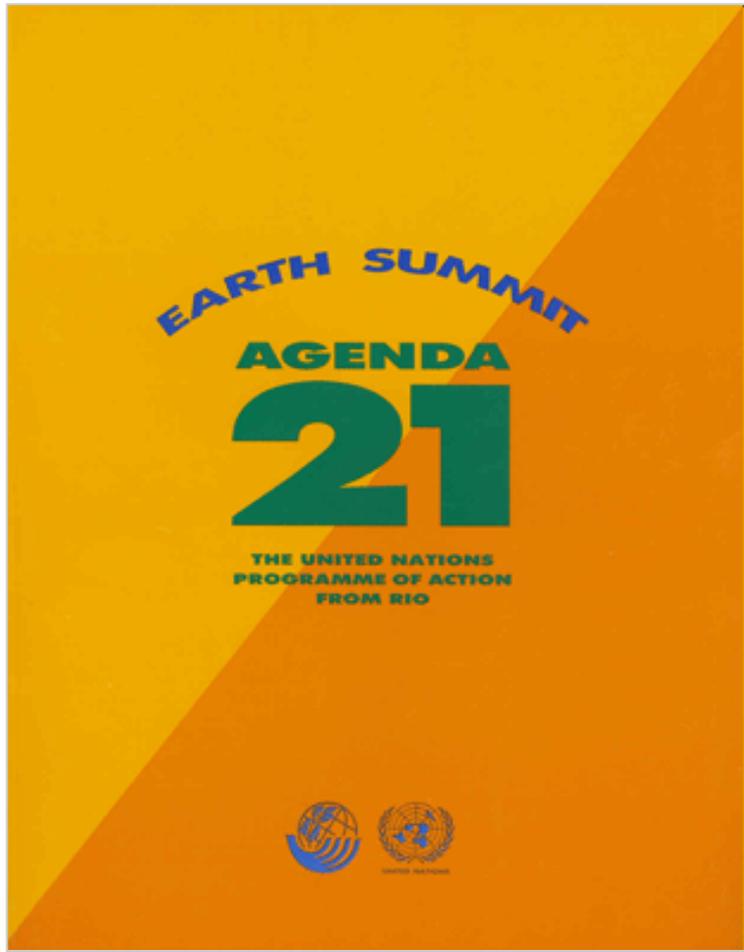
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Plan of Implementation of the World Summit on Sustainable Development

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A solid information base

132. Promote the development and wider use of earth observation technologies, including satellite remote sensing, global mapping and geographic information systems, to collect quality data on environmental impacts, land use and land-use changes, including through urgent actions at all levels to:

(a) Strengthen cooperation and coordination among global observing systems and research programmes for integrated global observations, taking into account the need for building capacity and sharing of data from ground-based observations, satellite remote sensing and other sources among all countries;

(b) Develop information systems that make the sharing of valuable data possible, including the active exchange of Earth observation data;

(c) Encourage initiatives and partnerships for global mapping.

133. Support countries, particularly developing countries, in their national efforts to:

(a) Collect data that are accurate, long-term, consistent and reliable;

(b) Use satellite and remote-sensing technologies for data collection and further improvement of ground-based observations;

(c) Access, explore and use geographic information by utilizing the technologies of satellite remote sensing, satellite global positioning, mapping and geographic information systems.



Location Information Framework

Analysis and aggregation across geographies



Aggregated to Local Government area or higher



Aggregated to suburb or postcode



Location information at address level

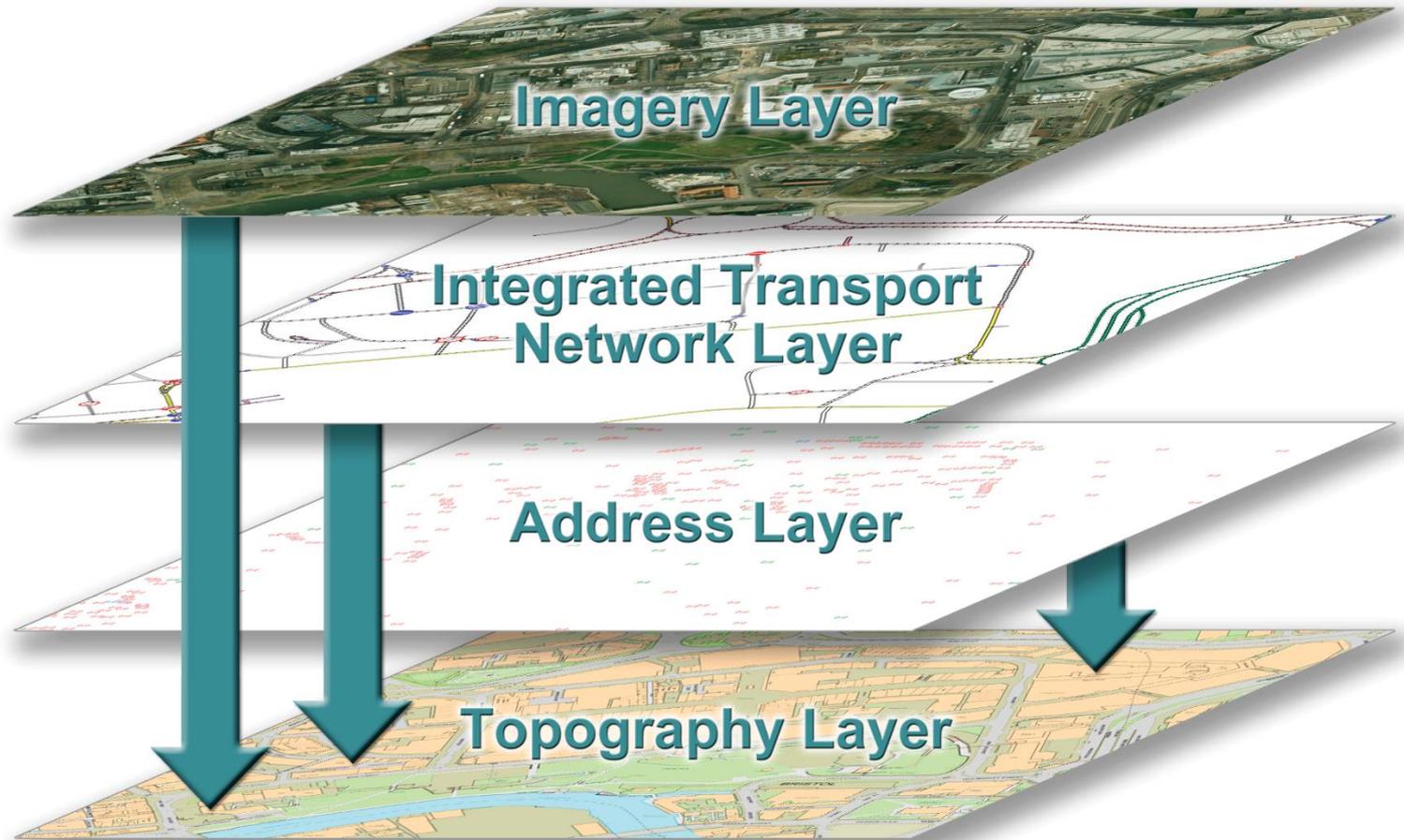


Geocoded unit level data

25 Smith St = x,y: 35.5676, 135.6587



Mapping layers to which all other information can be connected



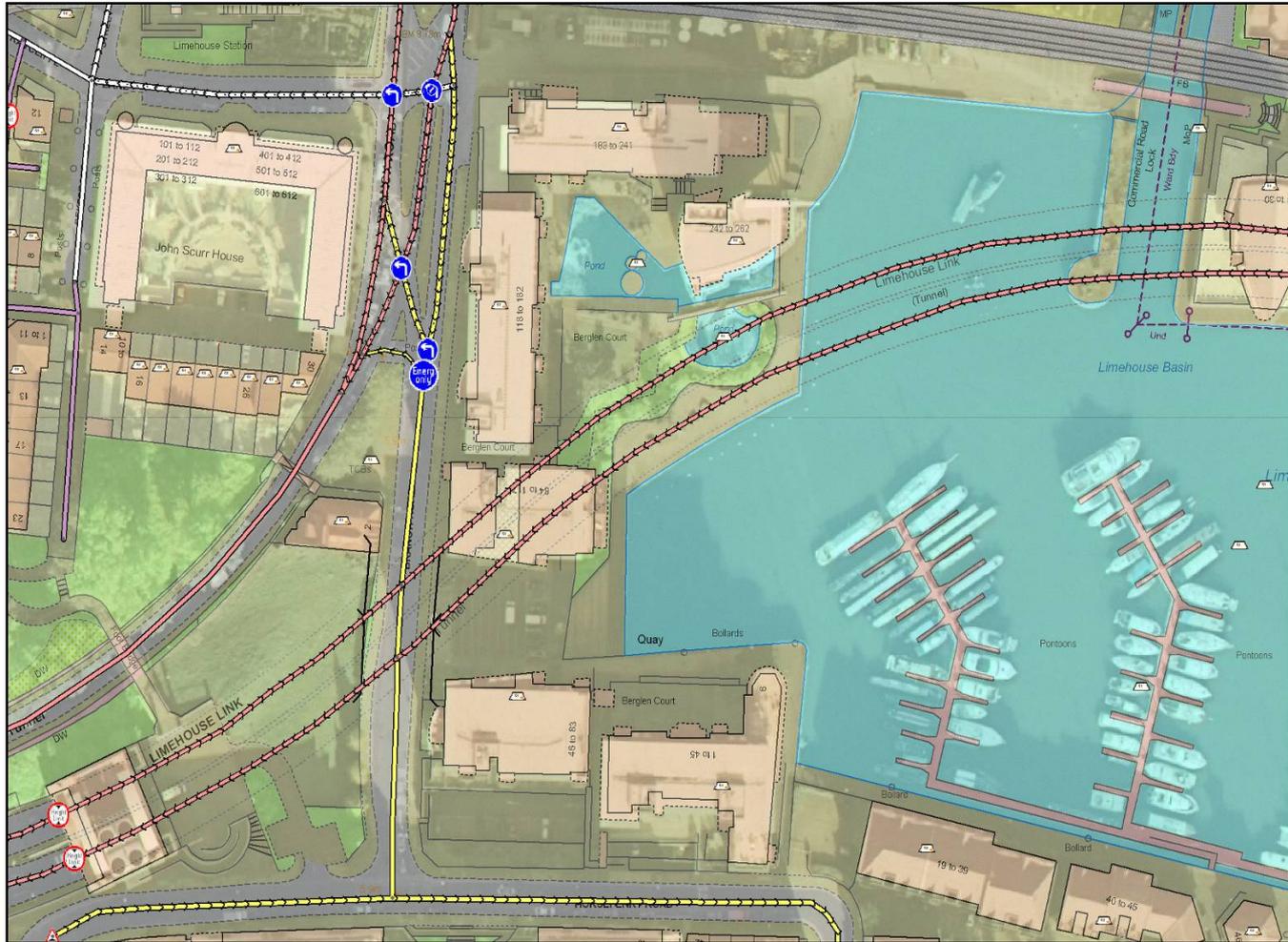
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Location information





TCBs

27.9m

Shelter

Ward BkV
CR

Cycle Hire
Station

27.7m

PARK LANE

DUNRAVEN STREET

North Row Buildings

Subway

EMBASSY OF BRAZIL

Apartheid House

TCP

WOOD'S MEWS

68

28 to 45

115

110

1 to 48

12

19

105

25

138

20

12

132

22

131

27

130

129

32

32

48

103a

101

44

38

36

6

5

23

1a

9

3

1

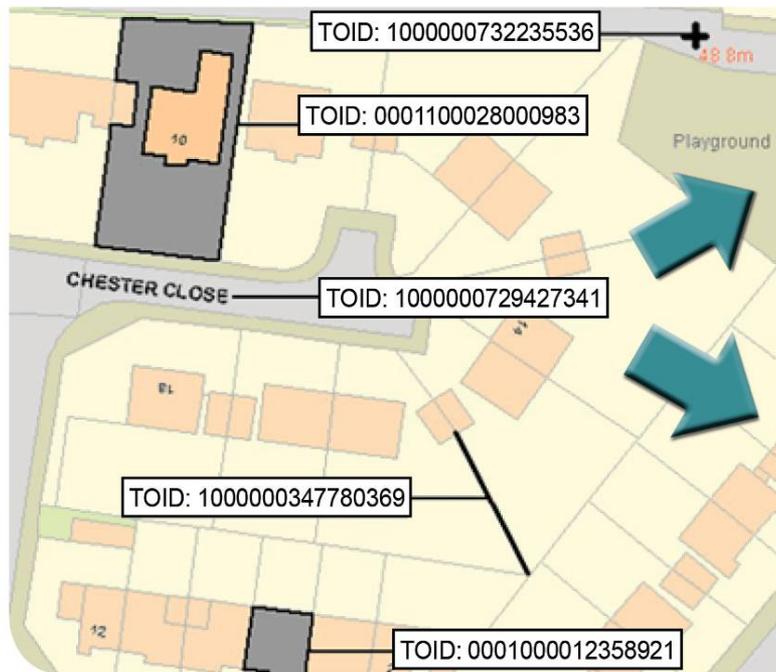
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22

61

A geographic database to connect information

Many databases have a unique identifier; in this case a unique non-geographic 16-digit code. These unique identifiers can be used to connect other information.



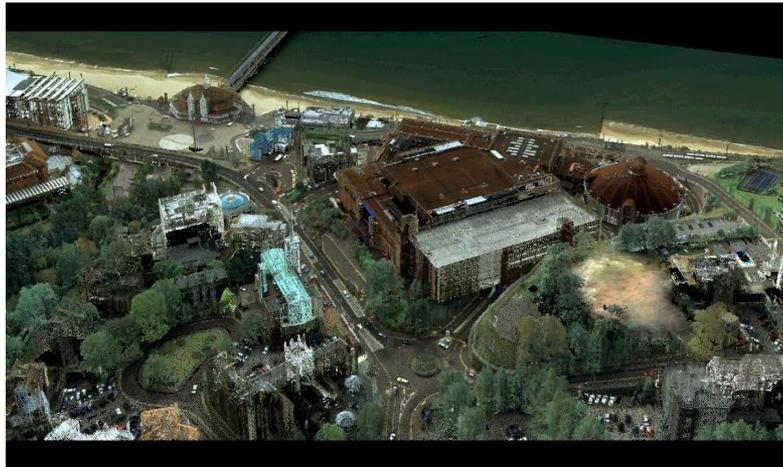
Highways database
road_name: **Chester Close**
road_type: **cul-de-sac**
lighting: **none**
TOID:
osgb1000000729427341

Crime report database
crime_type: **vehicle break-in**
date: **09/05/2003**
TOID:
osgb1000000729427341

Highways and Police can share information



Technological developments



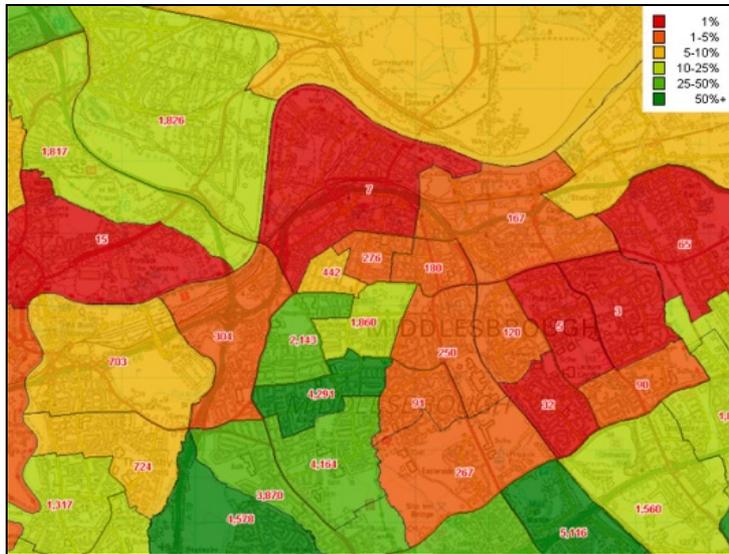
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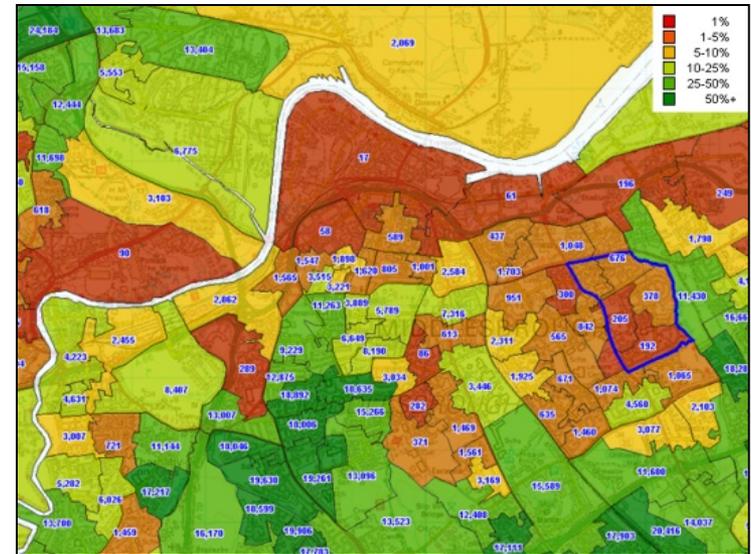
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Geography connects information: in this case social deprivation indices in a four-year period



2007



2011



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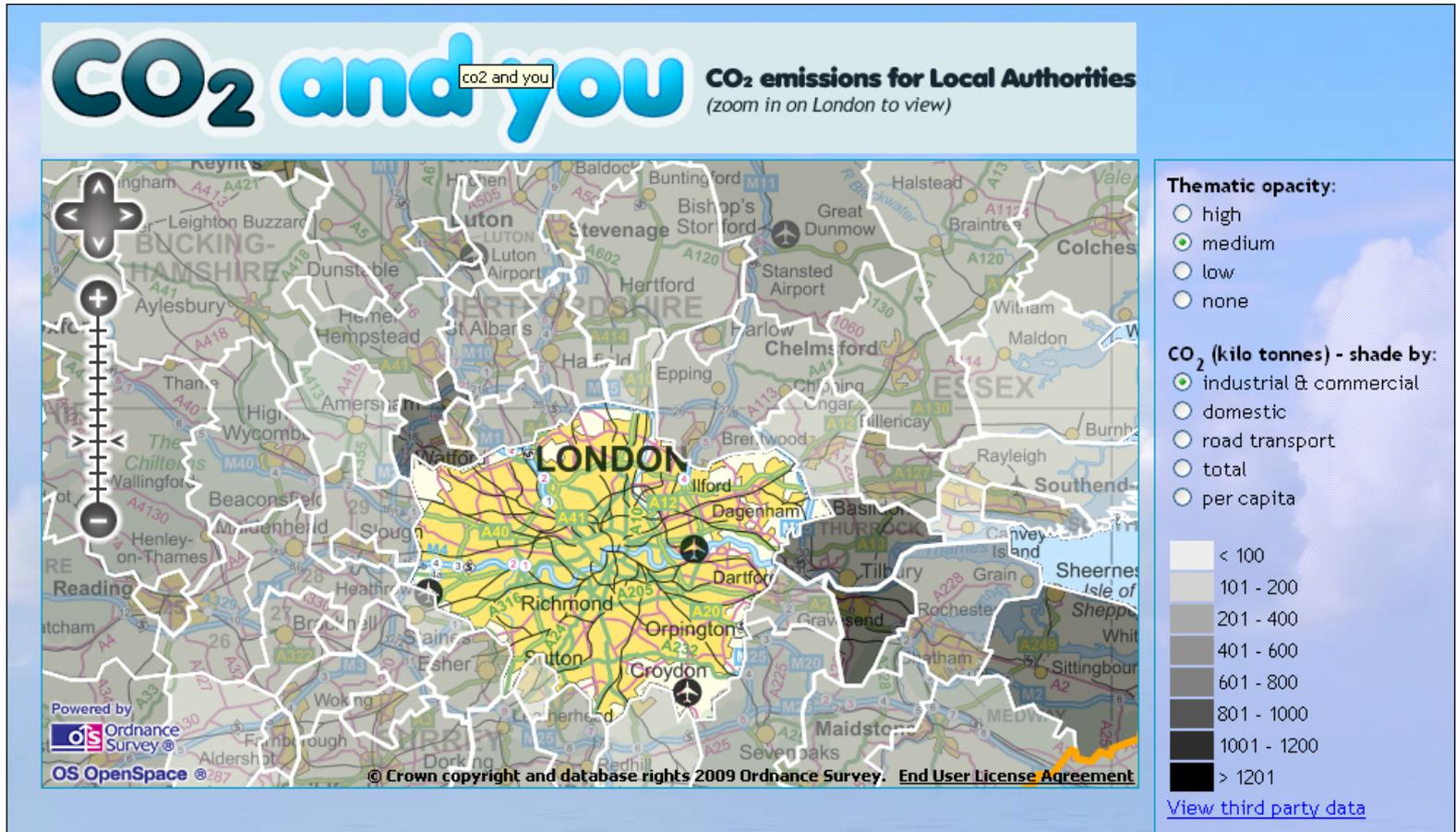
Geography connects information: census data of Thorntree ward overlaid on OS MasterMap data of Great Britain



Thorntree in UK has a population of 5 000 and was identified as the third most deprived (out of 8 414) housing ward in England in 2000. The Index of Multiple Deprivation has begun to measure smaller output areas; as a result the three areas of Thorntree now rank 192nd, 205th and 378th most deprived (out of 34 412) in England respectively.



Contextualising other information



Location information and Rio+20



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Water management

To be able to manage water supply, we must be informed of its infrastructure, location and monitor its availability



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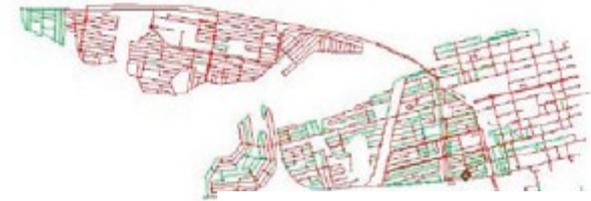
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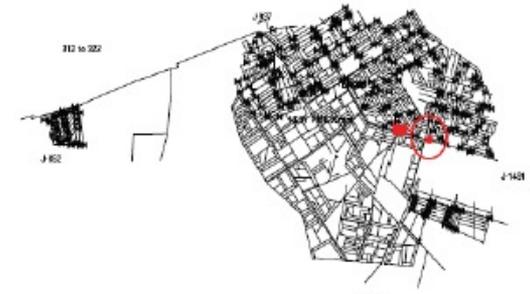
Monitoring local water use: assessing and improving water management

- The Water Plant in Ouagadougou, Burkina Faso uses a GIS-supported monitoring system to manage efficient water use through pressure control, automated valves and leak detection systems.
- By monitoring water flow and use, resources can be managed more effectively to identify areas and times of high use and potentially detect systemic problems such as leaks or illegal water tapping.
- The more consistent water supply has reduced water theft, raised local awareness of water management and freed up money to be spent on water quality and sanitation.



Area of distribution (top)

Identification of a leak point (bottom)

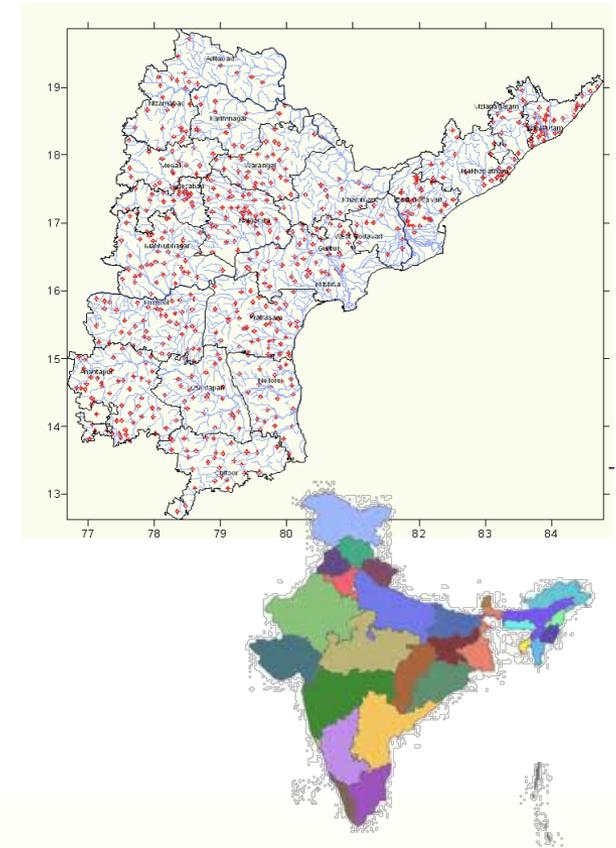


Source: The UN



Monitoring water issues: national and regional management

- The Hydrology Project in India is creating a hydrologic database and Hydrological Information System (HIS) to detail both natural and man-made water infrastructure.
- By monitoring infrastructure, more effective water resource planning and management can take place, improving the productivity and cost-effectiveness of water related investments, whilst aiding the future planning of infrastructure to meet increasing population needs.



Source: The Hydrology Project, India



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Food management: food supply and sustainable development

To be able to manage food supply, we must monitor current availability and access to food resources



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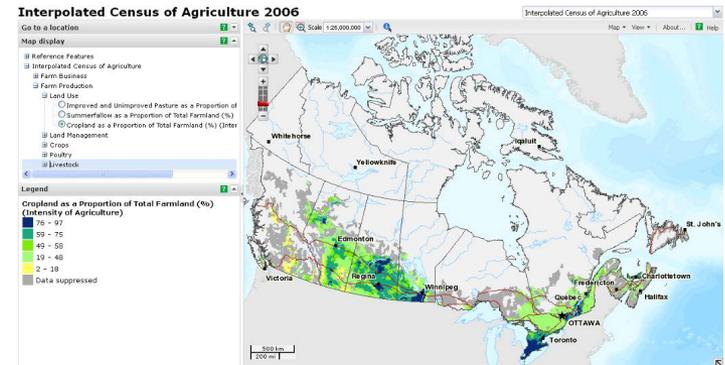
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Monitoring national food resources: managing food availability

- The Census of Agriculture in Canada provides a comprehensive picture of agricultural activity in Canada, supporting the development of agri-environmental indicators, policy analysis, land-use decision making and other analysis or applications and created ‘Agri Map’.
- By monitoring land use, future food security can be planned for by identifying areas of high production yields and the future potential of the crops in harvest.

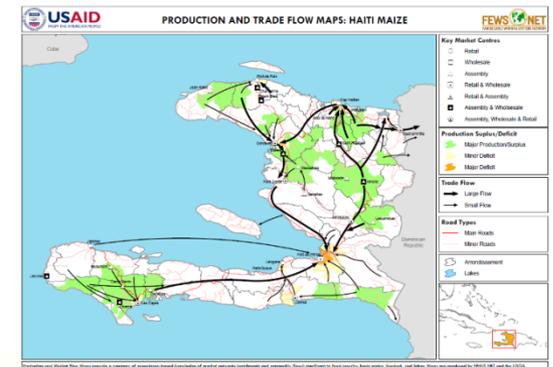
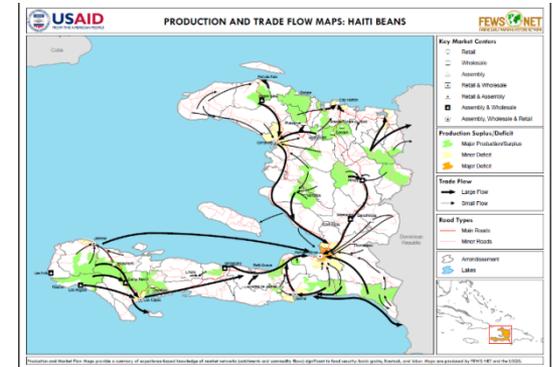


Source: Government of Canada (2012)



Monitoring national food resources: managing food access

- The Famine Early Warning System network monitors the flow and access to food within known national commodity trading.
- Monitoring food flows and understanding where food is and where food will flow to on local, national, regional and global scales is important to ensure every community has access to food helps planning for emergency food aid in the case of famine or disaster.



Source: USAID/FEWS/USGS



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Food management and sustainable agriculture

To manage sustainable food production, we must monitor farming activities and plan for daily and seasonal changes



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Monitoring sustainable agriculture: planning regional farming activities

- Conservation International's Centre for Applied Biodiversity Science is researching into which crops will be the most productive and where within the Andes regions.
- Monitoring current crop productivity – and the environmental conditions in which they grow – is providing data to help decide future growing patterns and practices, particularly in response to the change climate.
- By integrating several separate pieces of information about changing environmental conditions against a land use map, future planning decisions are made simpler and more accurate.

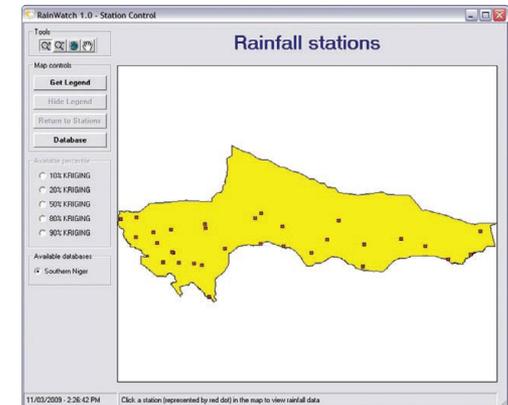


Source: Conservation International



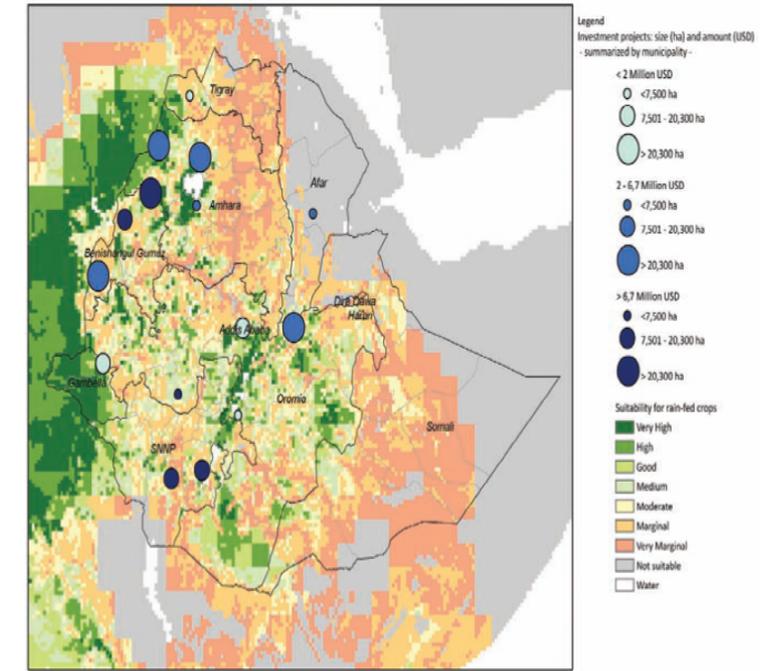
Monitoring sustainable agriculture: planning local farming activities

- Rainwatch, developed by NOAA, is a prototype geographic information system that monitors monsoon rainfall and tracks season rainfall attributes and delivers the information directly to farmers in East Africa to monitor precipitation and assess the impact on their crops.
- By monitoring and delivering information about key environmental conditions that are location specific, farmers can pre-empt the impact on crops and therefore implement contingency measures, such as increased irrigation, earlier on.



Monitoring sustainable agriculture: planning national land use

- As demand for food increases, the demand for usable agricultural land will increase and land ownership rights will become more important.
- Location information has provides a governance tool to prevent land grabbing and unsustainable agricultural development.



DOCUMENTED LAND ACQUISITIONS IN ETHIOPIA, 2004-2009

Source: International Fund for Agricultural Development (IFAD)



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Sustainable energy

To manage energy and to provide sustainable energy we must understand where energy is needed and how it can best be provided



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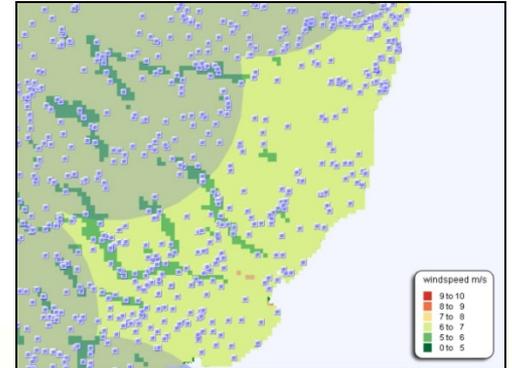
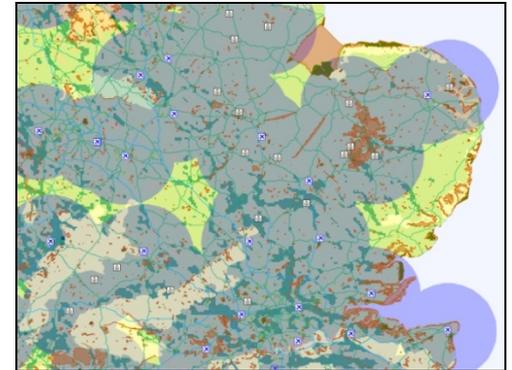
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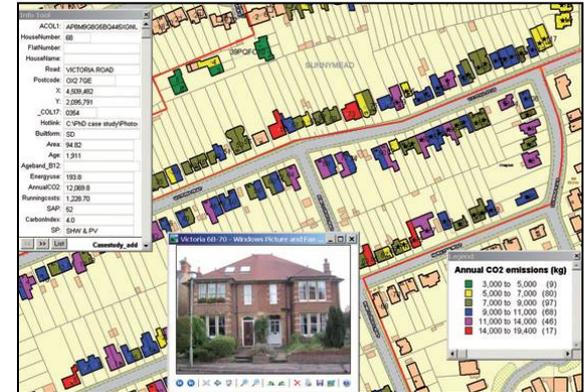
Monitoring energy: developing green energy

- Location information provides decision makers with crucial information required when identifying optimal sites for green energy generation.
- Site selection for a wind farm requires the analysis of different datasets at the regional, district and local levels.
- To avoid areas of natural beauty, airports and prioritise areas that have winds speeds 45 m above ground level, location information is essential.



Monitoring energy: monitoring and managing energy use

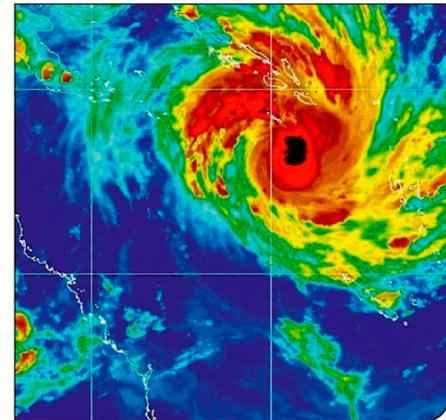
- Initiative in West Oxford for community monitoring of household energy use and carbon footprint.
- Monitoring energy allows energy providers to plan to meet demand, reduce energy insecurity during and in areas of high use and plan for future infrastructure investment; this all depends on knowing where energy is being used.
- Monitoring energy also allows for authorities to target energy reduction campaigns; high energy use or patterns of peak use can be identified and more sustainable energy use can be explained to energy users.



Source: Oxford Brookes University



Sustainable development: location matters



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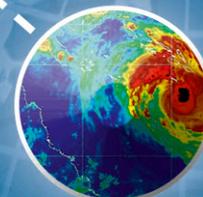
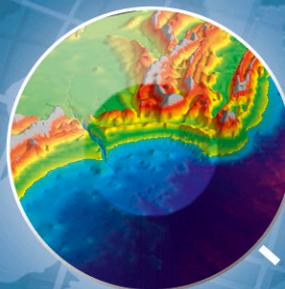
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Monitoring sustainable development: Why location matters

Dr Vanessa Lawrence CB

Co-Chair, United Nations Committee of Experts on
Global Geospatial Information and Management

Director General and Chief Executive,
Ordnance Survey of Great Britain,
United Kingdom Government



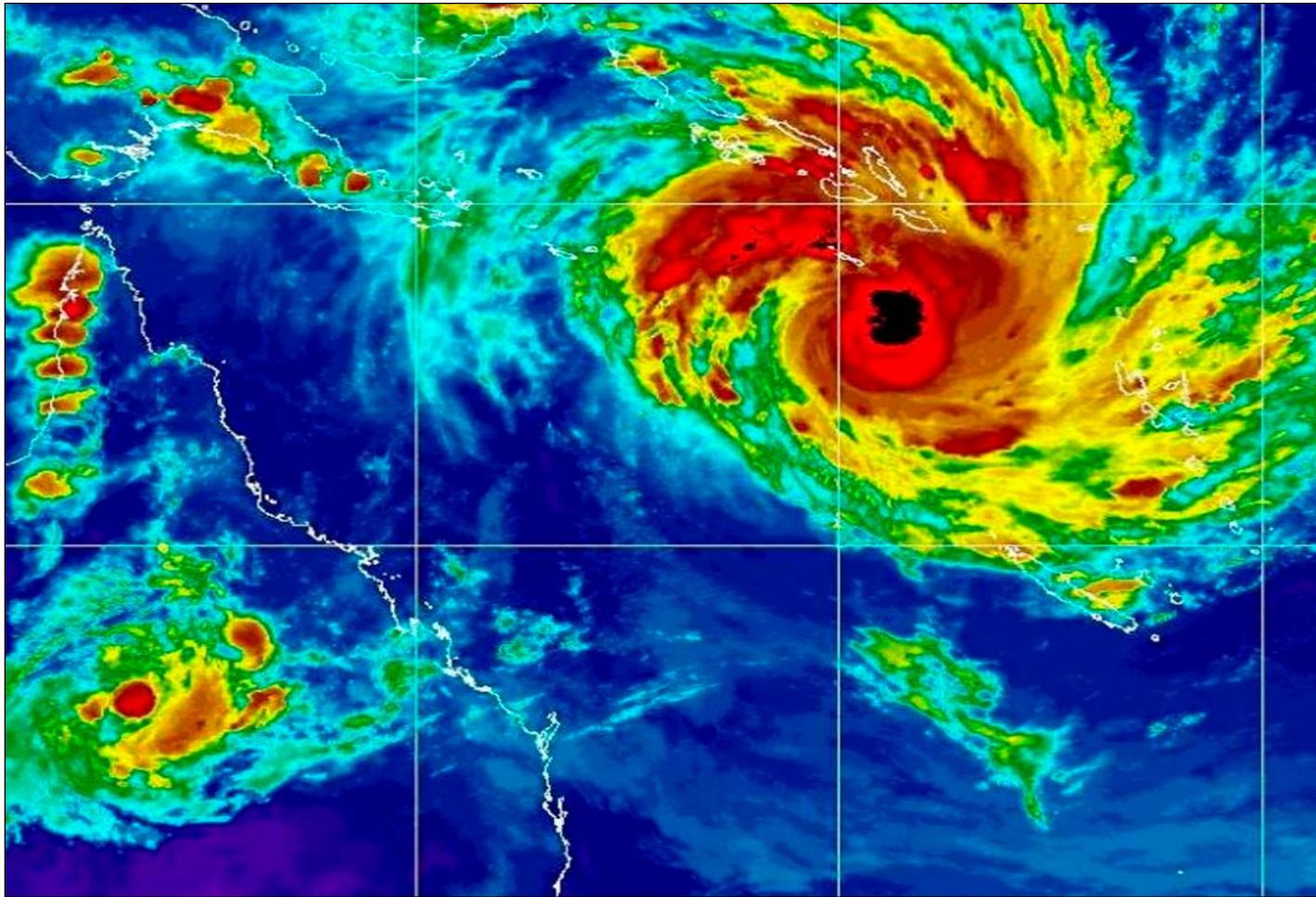
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Accurate location information assisting
better decision-making:

- Water management
- Food management; food supply and sustainable agriculture
- Sustainable energy



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The Future We Want: 19 June 2012

187. We recognize the importance of early warning systems as part of effective disaster risk reduction at all levels in order to reduce economic and social damages including the loss of human life, and in this regard encourage States to integrate such systems into their national disaster risk reduction strategies and plans. We encourage donors and the international community to enhance international cooperation in support of disaster risk reduction in developing countries as appropriate through technical assistance, technology transfer as mutually agreed, capacity building and training programmes. We further recognize the importance of comprehensive hazard and risk assessments, and knowledge and information sharing, including reliable geospatial information. We commit to undertake and strengthen in a timely manner risk assessment and disaster risk reduction instruments.

274. We recognize the importance of space-technology-based data, in situ monitoring, and reliable geospatial information for sustainable development policy-making, programming and project operations. In this context, we note the relevance of global mapping and recognize the efforts in developing global environmental observing systems, including by the Eye on Earth network and through the Global Earth Observation System of Systems. We recognize the need to support developing countries in their efforts to collect environmental data.



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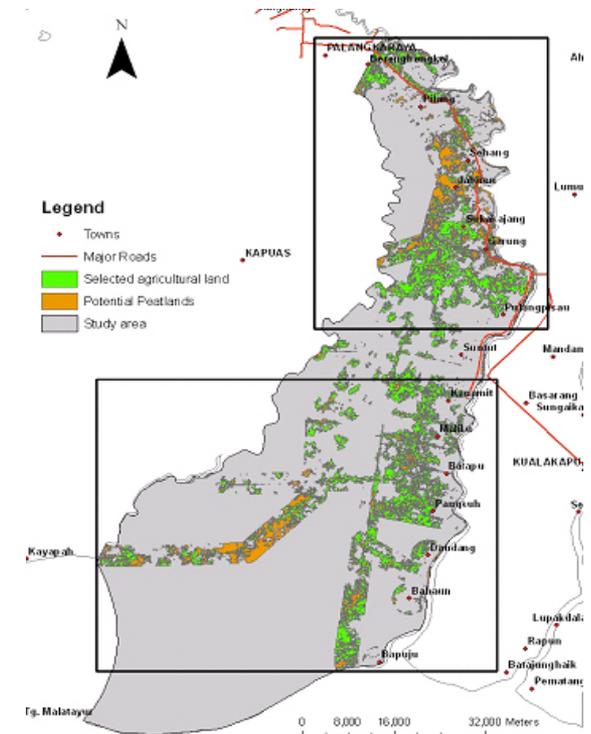
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Resource management: Indonesia

- Major problem of how to balance conflicting ideals of economic growth and maintaining environmental quality and viability.
Using location information:
 - provided a framework for the optimal use and cost benefit of drained peatlands in Indonesia in relation to generated revenue. By evaluating the results
 - helped to identify different crops that can be grown viably on the drained peatlands of Indonesia, for example, Sago palm, Melaleuca and Gharu wood
 - helped to identify suitable locations for the processing of the cash crops and likely local markets; such as Berengbengkel, Pilang, Senhang, Jabiren, Garung and the capital, Palangkaraya.



What can be achieved if we really underpin decisions with accurate, authoritative, maintained location information



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Monitoring the city: creating a sustainable city

- Masdar City, Abu Dhabi: ‘The First Carbon Neutral City’ integrates the use of GIS in every aspect to plan the city: from ensuring the construction process is efficient and produces zero waste to planning the transport and energy network, to meet potential demand, and building in monitoring systems into the city infrastructure.
- Location is essential to help with urban planning on any scale: from creating a new city to expanding current infrastructure, location is needed to ensure infrastructure is optimal in terms of energy reduction, environmental conservation and social development.



Monitoring the city: managing daily life

- The Rio Operations Centre helps the City Authority watch and manage daily life.
- The Centre integrates information on weather forecasts, water information, traffic flows and any other anomalies in daily life of the city to predict and manage potential situations such as flooding or traffic accidents.
- By monitoring the city and communicating information to local services, including traffic officers, fire services, and flood protection officers, contingency plans can be put in place and the public put on alert to minimise impacts of potential situations.



Monitoring transport use: planning for electric cars

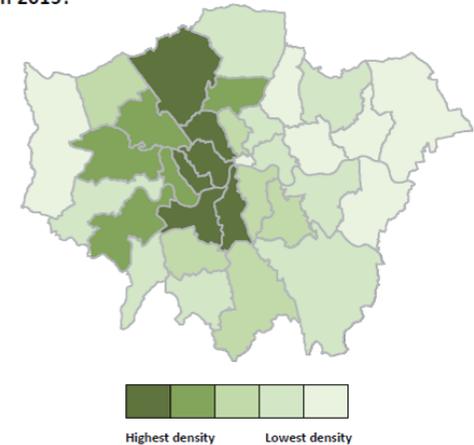
London's Smart City: part of the Plugged In Places Initiative.

Mapping car use to plan electrical charge points for most effective and sustainable use.

Key consumer segments...



Where are plug-in vehicle owners likely to live in 2015?



Source: DfT/TfL



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Geography as a mechanism for sustainable development

How can Britain feed itself?



Enter the GeoVation challenge



Social enterprise facilitating new and existing growing schemes and local government engagement with local food.

Discover great food, at your fingertips

foodnation
www.food-nation.co.uk



A location-based web and mobile application that promotes locally-sourced food and farms.



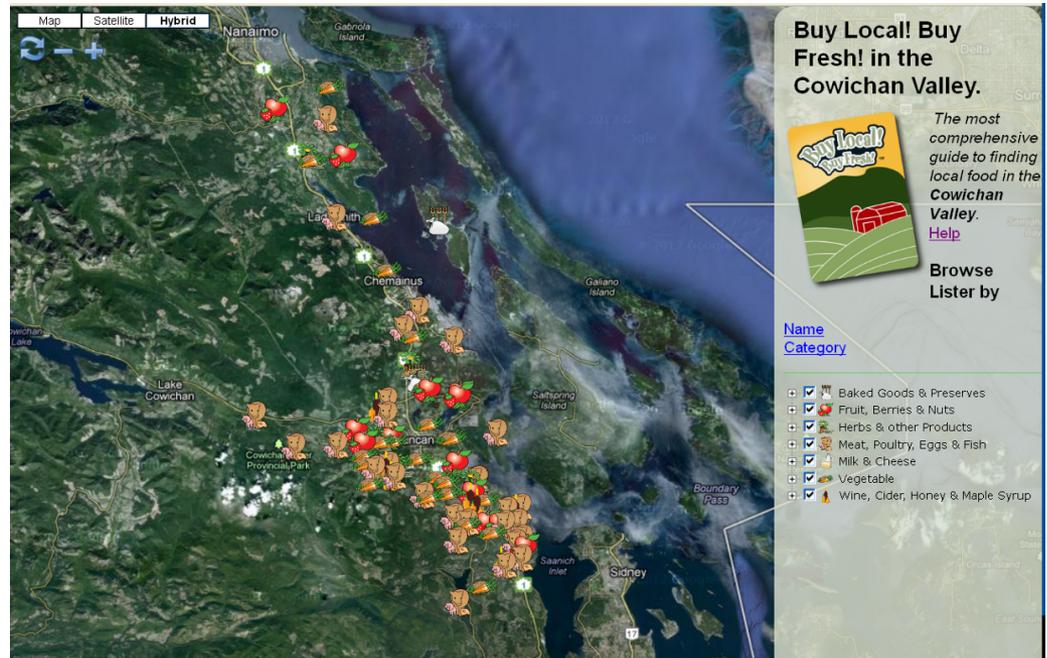
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Monitoring daily life: community food security management

- Community in Canada map their own food resources and access to food.
- Encourages residents to buy all produce locally.



Source: RamanaTandale



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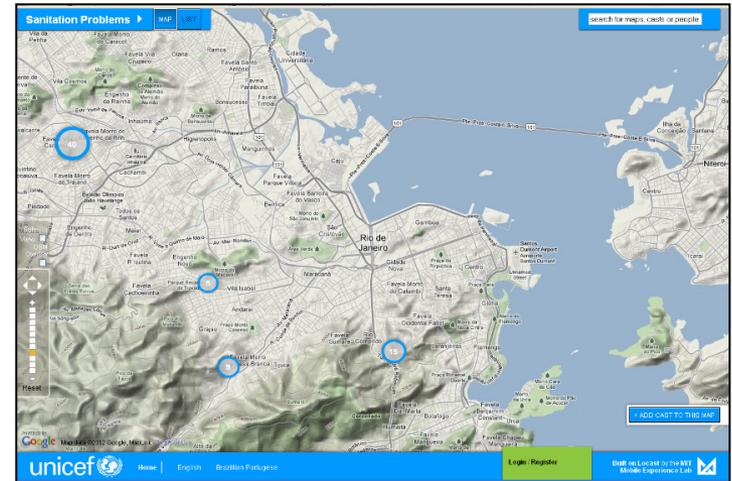
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Monitoring daily life: engaging young people in Rio de Janeiro – UNICEF-GIS

- Engaging young people to care about their community and environment.
- Teaching methods to map with mobiles and report problems in the neighbourhood, from inadequate sanitation facilities, bad waste management to poor access points.



Source: RamanaTandale





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UN-GGIM – what is it?

- The United Nations Initiative on Global Geospatial Information Management, an initiative to enhance and coordinate global geospatial information management.
- Provides a formal mechanism under the UN to discuss and coordinate GGIM activities by involving Member States at the highest government level as the key participants.



The UN steps forward: Global Geospatial Information Management

‘There is a significant gap in the management of geospatial information globally.’

*Paul Cheung, Director,
United Nations Statistics Division,
Cambridge Conference June 2011*



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UN-GGIM: how and why it was formed

- The Economic and Social Council of the United Nations (ECOSOC) recognised the importance of geospatial information in national and global development.
- As a result and following extensive consultation with Member States, the ECOSOC meeting held in July 2011 established the UN Committee of Experts on Global Geospatial Information Management (UN-GGIM).
- ECOSOC encouraged ‘Member States to hold regular high-level, multi-stakeholder discussions on global geospatial information, including through the convening of global forums, with a view to promoting a comprehensive dialogue with all relevant actors and bodies’.



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The UN discusses Global Geospatial Information Management

‘Just like statistics, every country must have authoritative, trusted, maintained, definitive mapping data.’

Professor Paul Cheung, Director, United Nations Statistics Division, Geospatial World Forum, Amsterdam, May 2012



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UN-GGIM: its role

- To play the leading role in setting the agenda with Member State governments for the development of geospatial information within each Member State and to promote its use to address key global, regional, national and local challenges.
- To provide a forum:
 - to liaise, enable discussion and coordinate amongst Member states; and
 - liaise, enable discussion and coordinate between Member States and international organizations.
- To ensure the provision of authoritative, trusted, maintained, definitive mapping data for each country.
- To ensure within the provision of authoritative, trusted, maintained, definitive mapping data that each country adheres to an ethical code set by the Member States.

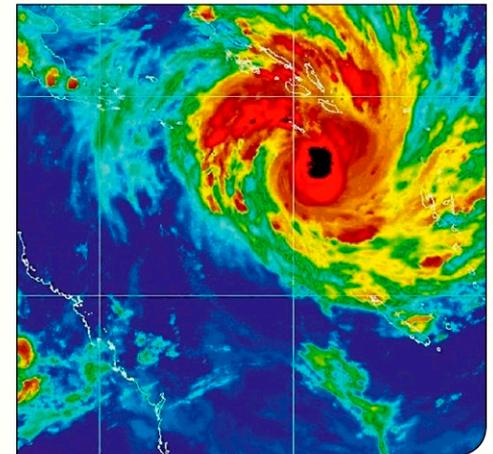


The importance of location

- Bill Clinton (1994): ‘Geographic information is critical to promote economic development, improve the stewardship of natural resources and protect the environment.’
- Al Gore, January 2008: ‘The hard part of taking advantage of this flood of geospatial information will be making sense of it – turning raw data into understandable information.’
- White House memo, August 2009: ‘Various federal programs can function more effectively if they include well-focused, place-based strategies.’



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