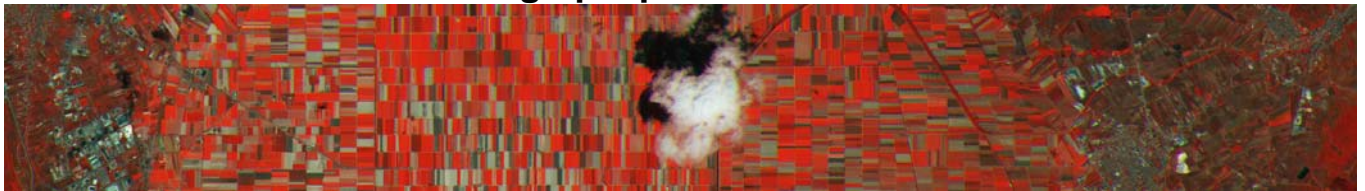


19th November 2015: Building up a picture



Aims

This was the second in a series of three meetings, and the aim of it was to use examples provided by the witnesses to explore ways in which overlaying big data sets and remote sensing can assess and communicate risk and resilience in food supplies and changes in biodiversity.

Witnesses

Dr Francois Kayitakire, a senior scientist at the Joint Research Center (JRC) in the Institute of Environment and Sustainability (IES) from Ispra, Italy flew over to join **Dr Matthew Smith**, an ecologist working in the Computational Science Lab at Microsoft Research and **Craig Mills**, the CEO of Vizzuality.

Research gaps

Francois outlined the food security programme at JRC and argued that resilience thinking calls for multi-disciplinary approach, not only in the qualitative analyses, but also in quantitative models. Food security is an area that needs absolutely such an approach. An emerging focus of development for both them and the EC is to **think about food security in terms of resilience by building safety nets, putting in place response mechanisms and managing risk**. He argued that putting food security in a broader context of the conflicts surrounding resources and the vulnerability of resources is essential for policy and decision makers.

Matthew's group in Microsoft Research was originally founded to apply their expertise in predictive modelling to real world problems such as water security and food security and climate change. He is now concentrating on agriculture and 'agricultural intelligence' where he is working with companies to create geotemporal models that are being used to predict food supplies, represent demand and match the two together to minimise waste in supply chains. He argued that **some of the data challenges we face are fairly basic, simple and mundane** rather than being highly intellectual. Finding ways to better train the next generation to be able to bridge disciplines will be essential. Are there opportunities for better engagement between, for example, biologists and mathematicians, if the goal was problem based rather than discipline based?

Craig introduced Vizzuality and their aim of visualising complex datasets in a way that people can understand and interact with. Recently, they have been working with the World Resources Institute (WRI) to create [Global Forest Watch](#), based on Matt Hansen's Global Forest Change datasets. Typically, **their challenge is to take data out and to strip the information back in order to be able to communicate clear messages**. For example, the aim of a [new project with the Zietz Foundation](#) is to take live data feeds from satellites and send information to poor farmers in Kenya via their mobile phones to help them to improve their crop productivity. Most of them text only, so key questions centre on ways to present big data on a small screen: How does satellite data relate to what is happening on the ground? How can that information be communicated in a way that helps people to make practical decisions?

Wicked problems and questions generated by the discussion included:

- **How do we build resilient food systems in both developing and developed countries?**
- **The politics of data are very complex and can be politically changed and politically sensitive** which will influence both how the data are collected and how it is used.
- **Bringing remote sensing data down to a human scale:** There is a disconnect between environmental information and people's understanding and use of that information. There are many new opportunities for open data and services, such as Copernicus, but as yet, there has been relatively little investment in how to communicate the information in a way that people can use to make decisions in the real world.
- **Remotely sensed data does not replace the need for on the ground sensors and information**, but instead compliments it. Finding ways to be able to support long term, ground and air based datasets will be an essential part of answering the questions we need to ask about food security in the future.
- Decisions are taken at multiple scales from local to international. **What place does satellite data have in decision-making at all of these scales** and is it feasible to use it to make local scale decisions?
- **Is there scope for a growing role for citizen science in this 'new world' of open, big data?**
- Although boring, **data collection and storage standards are going to become increasingly important** if we are going to be able to be able to cross-analyse and layer different datasets. Could lessons to be learnt from the experience of genetic open data be applied to environmental datasets?



Witnesses

Dr Francois Kayitakire	Food Security Assessment Team in the Monitoring Agricultural Resources Unit (MARS), Institute for the Environment and Sustainability (IES), Joint Research Centre (JRC) of the European Commission (based in Ispra, Italy)
Dr Matthew Smith	Scientist in the Computational Science Lab at Microsoft Research
Craig Mills	CEO of Vizzuality

Biographies

Dr Francois Kayitakire

Francois leads a team working on resilience and on food and nutrition security assessment within the Food Security (FOODSEC) Group. His current activities focus on resilience for food and nutrition security, in particular the resilience measurement issues, food security assessment and classification methods and on agricultural risk management in developing countries. His team provides early warning on food security crisis using various data types and in particular satellite imagery and meteorological data, and they conduct research on modeling food security indicators. His area of interest is mainly Africa but also other developing countries.



Francois' first assignment at the European Commission was within the Unit for Global Security and Crisis Management at the JRC. His work focused on building pieces of an armed conflict early-warning system and understanding their root causes. He worked also on monitoring natural resources that are susceptible to fuel armed conflicts, and on the use of satellite imagery to support post-disaster needs assessments.

Francois holds a Ph.D. degree in Agricultural Sciences received in 2006 from the Université catholique de Louvain (UCL), Belgium. While working as researcher at the UCL, from 1998 to 2004, he focused on forest mapping and urban green area management using satellite imagery.

Dr Matthew Smith

Matthew works in the Computational Science Lab at Microsoft Research, and is committed to improving societies (people, businesses, governments) abilities to predict geotemporal phenomena (properties and processes that can be associated with geographical space and time). He has worked in both theoretical and applied ecological science since he left high-school and has come to realise the enormous untapped value in predictive models of ecological and environmental systems and aims to unleash that potential on the world. In recent years he has also discovered so many other geotemporal phenomena that we can predict, anticipate and make decisions about much better than we have done to date, especially in the domains of agriculture, utilities and energy, to name some major business sectors.



He is currently working on some research projects with UK companies to investigate the value of predictive models of geotemporal phenomena to their businesses. While doing that, he maintains research interests in predicting crop dynamics, carbon and vegetation, human responses to climate change, and ecosystem structure and function.

Craig Mills

Vizzuality is a science and technology company focused on data visualization, web-GIS and tool development and committed to working on projects related to conservation, the environment and sustainable development. As CEO, Craig is responsible for figuring out what problems they should be trying to solve, guiding the company towards important world improving projects and working with NGOs to help them tell their stories.



Before joining Vizzuality, he spent 7 years working with the UNEP World Conservation Monitoring Centre. As Head of Infomatics, he led a team of software engineers, geospatial developers, designers and product managers to help scientists and government/non-government organisations share their knowledge and data on the web and reduce the time it takes to get from raw environmental data to useful knowledge for policy decisions. These projects ranged from applications mapping every national park on the planet, ipad apps for scientists to monitor mangrove forests and tools for governments to monitor the trade of endangered species. Previously, he spent 7 years with the UK government at the Centre for Environment, Fisheries and Aquaculture Science (Cefas) undertaking marine geospatial research.