

# BIG DATA AND DATA SCIENCE FOR LAND USE MANAGEMENT

**Deep understanding of socio-environmental systems and their response to future land management needs multi-disciplinary data science approaches**

## Why we need to act?

Big data refers to datasets whose size or type is beyond the ability of traditional data capture, management and processing tools. Big datasets are very large, are created rapidly and/ or are highly variable. Big data comes from sensors, video/audio capture, log files, transactional applications and social media - much of it generated in real time and in a very large scale. Improving preparedness for and responses to changing climate conditions and related hazards should include spatial planning as an instrument for coping with effects of a warming Earth. This needs a better understanding of climate change mitigation, adaptation and counteracting negative climate phenomena. New technologies are generating big datasets. Citizen science increasingly allows publics, e.g. with their smartphones, to contribute to rich datasets. Extracting knowledge and insight from such datasets requires interdisciplinary approaches spanning data science, natural science and social science.

## What we will gain?

Integrated strategies on soil protection and land management should help reduce direct and indirect impacts of climate change. New technical and operational solutions can be developed using low cost and increasingly widely available data gathering technologies. Improved characterisation of the inter relationships between the soil-sediment-water nexus, including energy, and bio economic production is achievable with current big data and machine learning approaches coupled with improved monitoring and modelling techniques.

For circular land management, creative design, construction, decommissioning, rerolling and replacement of urban infrastructure to avoid the need for sprawl and increase the viability of public and shared services involves multi-disciplinarity and exploitation of big data to constrain activities.

## Key research areas

INSPIRATION's bottom up approach revealed pressing research and innovation needs for exploiting big data and data science for land use management in the following areas:

- Development of low cost environmental monitoring and surveillance technology
- Deployment of big data analytics to understand socio-environmental system behaviour
- Development of simulation tools to predict socio-environmental system response to land use management

## How to become active?

Contact your INSPIRATION national contact at [www.inspiration-agenda.eu](http://www.inspiration-agenda.eu) to identify joint funding options for this topic. For further information on this topic please contact Paul Nathanail ([paul.nathanail@nottginham.ac.uk](mailto:paul.nathanail@nottginham.ac.uk) & @cpnathanail).

