

Mapping the Nation:

Towards a National Land-Use Map for Scotland

Project Summary:

Climate change; urban sprawl; habitat destruction. Our world is changing – and we need to start watching. Scottish organisations are trying to monitor and manage our rapidly changing world. Scotland is also at the centre of Europe's "New Space" revolution, with more satellites built in Glasgow than anywhere else in Europe. This project aims to create a roadmap to harness this abundant space data for a Scottish National Land-Use Map, to better monitor, manage, and protect our rapidly changing world.

Summary of Scoping Survey and Workshop

Survey & Workshop Aims

- Gather requirements to inform the development of a Land-Use Map for Scotland.
- Identify issues/needs that are common across a range of organisations.
- Establish interest across organisations to provide credibility and support for future development.

The "Ideal" Solution:

- A central data portal
- Online cloud processing
- Integrated datasets
- Seasonal updates

"It doesn't have to be the perfect solution straightaway. Slow iterations of better resolution or better time resolution would be welcome."

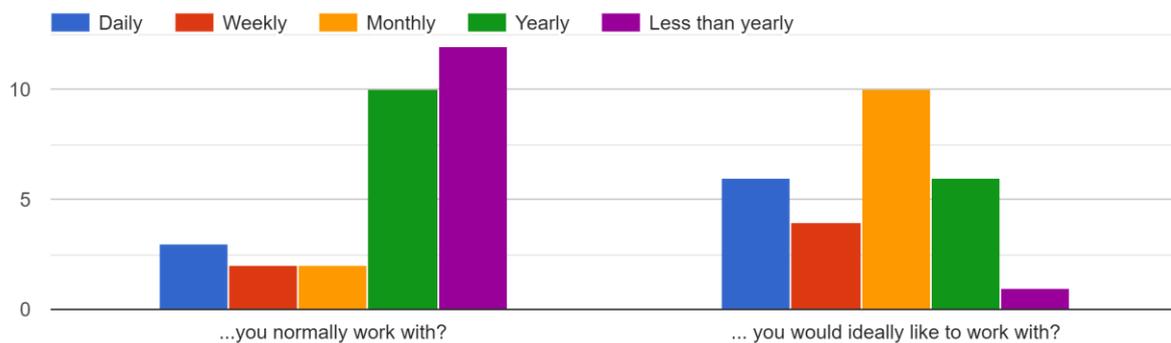
Recommendations:

- Any solution could be developed and rolled out gradually, with incremental improvements.
- Continual curation, maintenance, development, and hence investment, is vital.
- Data must be trustworthy, up-to-date, and accessible.
- Users should be actively engaged in the development of the solution.

Survey: Key Findings

- 39 respondents
- 75% those surveyed used mapping/geospatial data tools at least weekly
- 56% are working with data that is updated yearly, or less frequently
- 44% of people felt that the data they used:
 - Is of insufficient spatial resolution
 - Is updated too infrequently
 - Requires a lot of processing

How frequently updated is the data...



Current Challenges:

1. Lack of resources (data, time, skilled staff etc.).
2. Making data usable and accessible (incl. by non-experts).
3. Lack of ground-truthing/validation.
4. Inconsistency between datasets.
5. Size of data sets.

Future Challenges:

1. Too much data to search through.
 2. Data collected for specific projects cannot be easily fused.
 3. Increased speed of land-use change.
 4. Lack of skills and training.
 5. Climate change/ Brexit: it is challenging to plan for the unknown.
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Workshop: Key Findings

Data Collection Requirements:

“The challenge is going to be to identify what is a spatial and temporal resolution that meets the needs of multiple people.”

Seasonal updates would be of significant value.

Many organisations are currently working with snapshots – being able to monitor change over time would be very valuable as it would enable aspects such as harvest, rates of crop growth, urban development etc. to be captured. However, it is necessary to balance the competing factors: more frequent data updates require more processing, and hence more time and money. Having a central, verified baseline master map against which areas of change could be registered could provide a useful compromise.

10m spatial resolution is good enough for many purposes.

While smaller resolution is vital for certain purposes, it may not be needed nationally, and in fact the increased computational burden may be prohibitive for some. Additionally, the value of high spatial resolution data may be linked to its temporal update frequency (e.g. if data available at 30cm resolution but only updated annually, how valuable is that accuracy?). Supplementation with UAV, high resolution satellite data, or aerial imagery at the locations and times it is needed could address some of these challenges.

For many organisations, land-use is crucial to measure (not just land-cover).

While *land-cover* mapping can tell us what physically exists in a location (e.g. grass) *land-use* tells much more (e.g. pasture vs. public park). This is harder to accurately categorise but has significant value in land management, climate assessment, forecasting etc. The value of any land use mapping system will, for many users, depend on the integration of different data types (such as geospatial with land-ownership, weather, crop type etc.), but there are challenges in data sharing, data fusion, and data protection. This is a challenging problem to address for individual organisations, and is somewhere that a centralised, managed portal could add value.

27 Participants:

- Forestry
- Agriculture
- Climate
- Mapping
- Hydrology
- Geology
- Wildlife
- Cultural heritage
- Land management

“Land management is what we are poorest at measuring – anything that increases that measure is good”.

Data Usage Requirements:

“We’re not looking for a map, but layers of data which could be used to create a map”

Data compatibility is vital.

Integration of a variety of data sets would vastly enhance the capabilities of organisations, but this requires data sets to be standardised to ensure compatibility. Having various data layers with varying levels of detail would allow users to select and use those that are best suited to their needs. A government push would be essential to define and ensure these standards are met and maintained.

Cloud hosting and analysis capabilities would future proof such a system.

A cloud solution would allow data analysis to be performed online, avoiding restrictions on individual organisations' hardware capabilities. This will become even more important in the future as data becomes more numerous and more detailed. Having a central system for processing would also improve transparency, by allowing version control and processes to be stored, replicated and understood.

"A cloud solution isn't desirable. It is essential".

Practical Usage Considerations:

"If we are guiding policy that affects people's lives, we need to ensure we get it right"

Data must be trustworthy and reliable.

There will always be errors and assumptions in data processing - this must be transparent and communicated clearly to all users. Organisations will only use a central system if they are sure they can trust it, and they can understand the processes that have occurred. There is an opportunity here for government to set a high standard for a central process, which others can then follow as data sharing becomes facilitated.

Any system must be maintained.

Establishing a repository or portal is not sufficient: the portal and data must be maintained and updated, and questions from users with regards to the data will need to be responded to. In addition, staff that can curate the data and address user requests could add significant value.

"We need a dynamic system, not a static one"

The system must be publicised and promoted to ensure user uptake.

Although there would be a long-term cost for such a system, there is significant potential for cost savings and enhanced value through use, but this will require promotion of the service as well as user engagement in the design.

For further information, or for questions or comments, please contact:

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