APPLYING GEOSPATIAL INFORMATION TO CLIMATE CHALLENGES

The 'How' Guide

The urgency of our **'Why'** is well known. We must act as part of a global system to mitigate and adapt to our changing climate. At the same time, we are often very focused on **'What'** we do as national mapping and geospatial agencies to deliver our public tasks.

As national agencies, supporting our governments, we need to act.

Cambridge Conference 2022 has looked at **'How'** we make changes in our own institutions to implement the two recommendations from the Cambridge Conference Statement Paper on Climate Change. Those recommendations were for us to:

1. Take an active leadership role as advocates for location data in our countries, understanding its value in supporting government priorities, and showcasing the real benefits it can bring to national adaptation and mitigation policies. We should act as drivers of change, empowering organisations and individuals to use location data in new ways and to actively respond to the current and future needs of citizens.

2. Recognise that a changing climate is a global issue that affects all nations differently. Adaptation and mitigation strategies need to be based on best-available national data and considered in a global context. In recognition of this we should work with others, not alone, creating new networks, and move to using internationally-agreed standards to enable the use of trusted data for adaptation and mitigation solutions.

In order to tackle the climate challenges facing our countries, we need to better equip our people, improve our data and technology, and strengthen our governance. That's why we've used the UN's Integrated Geospatial Information Framework (IGIF) as a lens for considering our practical advice.

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Taking Action for our People

We must take ownership of the problem and provide active leadership – both for our organisations and for our governments.

We should focus on education and capacity building in our users to help them ask the right questions, while at the same time working to equip our staff to help answer those questions.

We must connect more effectively with other data professionals, making geospatial information part of the tool-kit of data scientists and analysts in other sectors.

We must understand the impact that we are having and be able to tell the story. In order to communicate the value of better use of geospatial data, a common framework for economic benefit analysis will be critically important, as will a wider understanding of the impact that geospatial information has across sectors.

The value must also be communicated clearly, simply, and with a connection to our customers' needs. We can't just talk to our geospatial sector and achieve the outcomes that we need – our expertise must be applied directly to our customers' challenges.

1. How do we help our governments better understand the impact of climate change on our societies?

Be a Leader: Climate change must be put at the core of our public tasks, and we must accept the leadership of that response. Our data is often already supporting the response to climate events, disasters and new infrastructure investment, but if we do not acknowledge the climate drivers of that work then our data, and the perspective that it brings, can be taken for granted. We cannot only bring problems to the table; we should also propose solutions.

Build coalitions for common purpose: Cross-agency and cross-policy collaboration will help us understand the wider impacts of climate change. We should collaborate with other public bodies to bring end-user stories to the forefront, as they have unique perspectives which can help to enable our governments to view climate related challenges through a geographic lens.

2. How do we need to equip our people with training and skills?

Focus on the younger generations: Get geospatial on to the school curriculum early on and teach the teachers to use and play with geospatial data showing them how to use it in different ways. At the same time, we can use others – gamification, social media influencers – to build a level of geospatial awareness. This helps attract passionate people that want to make a difference and encourages diversity of thought in our organisations.

Move up the value chain: In a new data-driven environment, we cannot just focus on data capture and delivery. We must pivot to a richer, analysis-ready data focus. As we move up the value chain, enabling better decisions and richer data science, we demonstrate our credibility and our capability to change the world.

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3. How do we tell the story of the impact that we're making?

Don't just tell the start of the story: We have to get to the end – and what it means for the listener. Processes and technical data capture isn't the finish – our stories must end up with the value to real people. We must ensure the data and analysis we provide is calculated in economic, social and environmental value to government and to the citizen. Without that credibility and focus on real outcomes, governments and funders are unlikely to sign up and support.

Create advocates: Working in collaboration with other businesses, public sector partners and global organisations will create a network of supportive voices who recognise our value (as long as we tell our story effectively.) We must also recognise that the general public are some of our greatest champions - helping individuals and communities change their behaviour is an important way of demonstrating the power of geospatial data and combating climate change.

Taking Action on our Data & Technology
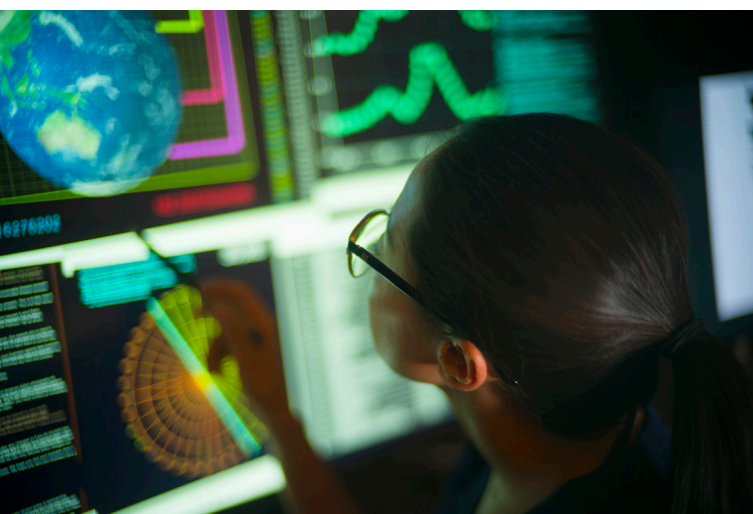
We must move past a focus on the **'What'** of data.

Data and technology are tools to help describe our world as it is today, advise us how to respond to current challenges, and guide our adaptation and mitigation actions.

However, we must accept that producing data is not enough. We should also understand how to layer data to create information, put information in context in order to share knowledge, and use our knowledge to help our customers make wiser decisions.

We should recognise the value of 'Earth observations' – not just from satellite systems, but from the variety of different sensors that will be needed to solve complex climate challenges with often unforeseen repercussions.

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1. How does our data need to change to meet climate challenges?

Change your practices, not just your data: Improvement in data is as much about changing the practices that surround our data as improving the accuracy and the fitness of the data itself. Working towards greater data harmonisation, data interoperability across multiple domains, while also improving the usability and accessibility of our data, including across NMGAs globally, will better meet customer or user need. Data must come with as much metadata as possible, particularly cross-dataset identifiers for more explicit connections beyond just layering. Data must be validated to be reliable and trustworthy.

Put data in (a global) context: Consider whether geospatial data is enough to detect change and plan climate actions. What data will we regret not recording in 100 years? We will need to reflect the real world to present the data we have which will bring value to these challenges. This should help our data be more usable and discoverable outside the geospatial industry, and bring together data from different data providers to answer climate challenges.

2. How does our response to climate challenges benefit from innovation?

Iterate faster: Our capabilities need to change and adapt to serve climate change use cases, as well as finding ways to make our services more efficient and timely. Innovation is iterative and evolves and we need to allow it to do so to keep up with the pace of change, improved through user engagement

Invest in capabilities, not projects: Use innovation to work out how we provide our data at speed, accurately and seamlessly. Innovation allows for benchmarks and time-series analysis – including in real-time. Often, we work on project funding (which ends), but real change will only come through longer-term sustainable programme funding.

3. How can our data be more trusted and authoritative?

Know where the gaps are (and fill them if you can): Understanding what NMGA data is available to mitigate and adapt to climate change, as well as where the gaps are is critical. We also need to understand what is considered 'authoritative' for different user groups, so that we can be clear about where our data is enough, and what might require a multi-agency or partnerships to meet user needs. If our data is not used, it is not authoritative.

Transparency is important for trust: Honesty builds trust. Increase visibility on algorithms, provenance, data management principles and systems thinking. That means transparency on outcomes, where our data needs to improve, but also being clear on what 'good' looks like across multiple climate change use cases. This should feed a cycle of continual improvement.

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Taking Action to Strengthen our Governance

We must make the case for geospatial information to act as a fundamental data set which other industries, partners, and public sector users can rely on to provide global consistency in our climate response.

We should ensure that our organisations are held up as institutions, built into the fabric of our countries' climate response, so we can continue to provide the trusted, authoritative view of the way our world is changing.

We must each find our most effective, collaborative model for working with industry partners, establishing mutually-beneficial relationships with the growing data ecosystem in order to focus both public and private investment on climate challenges.

1. How can we ensure that geospatial is seen as fundamental data, supporting our governments?

Build capability from the inside: As well as data and services, we also need to give our government users the ability to use them. Embedding a member of staff from the start of a programme can help government users make the most of our data and understand how it can support their objectives.

Connect climate data back to the real world: Our role as NMGAs is to reflect the changes and by implication the impacts of climate change in the real world. We must take that role seriously, and ensure that the data ecosystem around net zero, mitigation, and adaptation accurately reflects what we know is changing in our world every day.

2. How do we work most effectively with industry partners?

Nurture your partnerships: Improving communication with partners will ensure we get the most out of them. Different companies have different characteristics and require different engagement strategies. Communicate with partners regularly and often. Longevity of partnerships is important – not having to build new partnerships for each new programme improves trust and saves time.

Enable others: Create a spatial data framework within which the private sector can grow. Commercial delivery partners require us to be the trusted custodians of their data, enabling greater value than can be enabled only by the market. If we are an active part of the ecosystem, producing fundamental data and providing leadership on purpose, then public-private partnerships can work. The commissioning side does need to tread lightly, however, as many government organisations must still use an official tender process.

3. How can we make the case for sustainable investment?

Focus on the outcomes: Understanding what your senior government officials are trying to achieve in the climate response and tell the story of how your data makes that possible. This must show that there is a return on investment, and how it supports wider evidence-based policy.

Recognise the complexity of the problem: A shared vision and common messages are critical for telling the story of the value of our data, but in order to make a difference on climate change, we must understand the ways in which different aspects of the climate response are interconnected in the real world. Geospatial data is uniquely placed to do that, and must use all of our expertise to provide practical solutions to those difficult problems.

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