

# CASE STUDY: OPTIMISING TOOLS AND PARTNERSHIPS FOR RESILIENCE



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## ABSTRACT

Digital technologies have enormous potential to help governments operate more sustainably, plan for climate emergencies and protect the environment. This case study focuses on how further collaboration and partnerships between the private sector, non-profit organisations and governments can generate and use data to design better environmental policies and help societies build resilience to the effects of climate change.

## Key messages

- Digital tools can help governments improve the design and delivery of public services while advancing progress towards sustainability by using high-quality data to evaluate and adapt policy implementation.
- To reach sustainability targets, all sectors will have to contribute. Governments and civil society should partner with firms, researchers and initiatives that contribute technology capacity and expertise.

Governments around the world are transforming services and regulations to tackle urgent environmental challenges such as climate change and biodiversity loss. Digital technologies and solutions can enhance their ability to collect, store, analyse and visualise data – empowering them to make better and quicker decisions and leading to more effective policy delivery and enforcement.<sup>1</sup> Partnerships between public and private sector actors use the power of digital tools and data to increase Internet connectivity and address environmental and climate change risks.

One example, the Microsoft Planetary Computer and Artificial Intelligence (AI) for Earth programme, provides technical resources including open-source tools, models, infrastructure, data and application programming interfaces to accelerate technology development for environmental sustainability (Microsoft, 2021<sup>[1]</sup>). Used by researchers, non-profits, start-ups and academics, these resources offer solutions that governments can apply as well. Through this programme, governments and private sector partners use technology to:

- improve well-being and protect life and property in the face of climate change
- use data to enable more informed policy development and ensure compliance with standards that drive a sustainable society
- demonstrate leadership by meeting environmental targets and improving sustainability in their respective operations.

The examples outlined here illustrate the range of uses for data and digital tools. They use an Assess-Accelerate-Transform approach to show how digital technology solutions help evaluate current conditions, expedite

solutions, and create better ways of working and outcomes for both citizens and the planet.

### Using digital technologies to address the causes and impacts of climate change

Tools such as cloud-enabled data capabilities and artificial intelligence are being used in developing and developed countries alike to deliver sustainable energy and Internet connectivity, model extreme weather patterns to better build resilience, and inform preparedness efforts. A project evaluation framework focused on data, resilience and capacity angles, as outlined below, help show the value of the collaboration.

#### *Produce data to support sustainable energy use and build disaster resilience*

**Example:** In Africa, as in all parts of the world, Internet connectivity depends on access to affordable electricity. Yet, 600 million people still lack such access (IEA, 2020<sup>[2]</sup>). Through the Airband Initiative, Microsoft partners with Internet providers, telecom equipment makers, non-profit organisations and local entrepreneurs on energy solutions for improving access to affordable Internet, affordable devices and digital skills. For instance, M-KOPA, the largest provider of solar home systems in East Africa, uses cloud-enabled data capabilities to generate predictive insights, including on weather patterns, allowing better service and access to sustainable energy (Microsoft, 2018<sup>[3]</sup>).

**Example:** In the United States, digital technologies help the US Army Engineer Research and Development Center (ERDC) model the risk of coastal extreme weather. A new agreement between the ERDC and

Microsoft will improve climate modelling and natural-disaster resilience using cloud-based, predictive analytics-powered tools and AI. One aim of the agreement is to determine the scalability of the ERDC coastal storm modelling system and allow researchers to replicate the workflow on other affected coastlines (US Army Corps of Engineers, 2021<sup>[4]</sup>).

### ***Building resilience and capacity***

These projects assess current issues and emerging risks by:

- bridging gaps between long-range forecasts, short-range situational awareness and real-time interventions
- defining capacities to support faster and more accurate decision-making capabilities
- sharing and using predictive modelling to understand environmental, infrastructure and human responses to critical events.

This approach helps stakeholders accelerate their response to near-term demands by:

- equipping organisations to share data across governmental and geographic boundaries
- enabling real-time communication and collaboration between teams in crisis environments and/or where resources are scarce
- managing responses based on real-time information.

These pre-emptive actions build resilience and transform public service management by:

- sharing data across government and industry to create a common operating picture
- increasing warning times and specificity to respond more effectively
- utilising past lessons to inform future preparedness.

### **Using data and AI to protect vulnerable marine and forest ecosystems**

Researchers and environmental groups use digital technologies such as AI to pinpoint potential threats to fragile ecosystems. Governments and regulatory agencies use

these data to head off risks and enforce protections.

### ***Artificial intelligence algorithms to identify threats in real time***

**Example:** Illegal and unregulated fishing is one of the greatest threats to marine ecosystems. However, many governments lack the resources and expertise to monitor and control their marine areas against illegal fishing operations. OceanMind, a non-profit organisation, powers enforcement and compliance to protect the world's oceans. Using digital technology, it works with government agencies in Costa Rica and Thailand, among others, to protect fishing stocks by pulling public data on vessel positions into the cloud and tracking each boat in real time. AI algorithms analyse ship movements to identify suspicious behaviour such as staying still for too long or venturing off established routes. Government agencies use the insights to help patrol boats target illegal actions (Microsoft, 2021<sup>[5]</sup>).

**Example:** In Brazil, Imazon, a research institution to promote conservation and sustainable development in the Amazon, uses AI algorithms to deliver data and insights for policy and decision makers to protect biodiversity and safeguard the rainforest. Through its partnership with Microsoft and Fundo Vale, a social and environmental investment and development fund, Imazon stores satellite images of Brazil's Amazon rainforest in the cloud, where AI algorithms detect unofficial roads and other risk factors for deforestation. The resulting output is visualised in an interactive map that highlights areas where action is needed to reduce risks, such as forest fires, before they occur (Microsoft, 2021<sup>[6]</sup>).

### ***Sharing data and enhancing data standards***

These projects use measurement to assess current conditions by:

- sourcing data and assuring their quality
- applying standardised approaches to data curation

- publishing data in standard formats and maintaining their accuracy.

The approach develops and enforces evidence-based policies to accelerate change by:

- communicating and sharing data across organisational and geographic boundaries
- modelling impacts of policy options and actions
- automating data collection, facilitating compliance monitoring and enforcing adherence.

These improvements transform policy making and enforcement of regulation by:

- collecting, monitoring and publishing data on outcomes
- comparing investments to impacts
- using real-time intelligence to respond to non-compliance
- adapting policies and guidance where targeted outcomes are not achieved.

### Applying digital technologies to improve the environmental sustainability of government services

Public sector organisations must overcome siloed structures, databases and communications to visualise information effectively and act on the insights. Automation and standardisation of data flows provide real-time data and insights that can help companies and governments record and report on their environmental impacts at scale. New tools can support organisations in using data flows to reduce carbon emissions.<sup>2</sup> Digital tools can lower costs and increase the efficiency of public services, building expertise in the government workforce and helping governments enact leadership in environmental protection and sustainability, and reach their net zero commitments.

#### *Data flows to improve environmental performance*

**Example:** In Norway, C4IR Ocean, an independent non-profit, developed the Ocean Data Platform (ODP),<sup>3</sup> an open and

The city was able to reduce the annual energy consumption of its light posts by 66%, resulting in a net reduction of 20% on its electricity bill or an annual savings of EUR 400 000.

collaborative data platform that helps governments, regulators and maritime transport companies track data from shipping vessels. This is combined in the cloud with data generated by an open Automated Identification System (AIS) used to monitor vessel traffic and positioning. Advanced analytics and machine learning models are applied to this combined data to help forecast greenhouse-gas emissions and other environmental costs of transportation activities.

**Example:** The city of Gandía, Spain, uses connected streetlights to report energy consumption and operational status. The resulting system allows for improved control, lower energy costs, better citywide lighting and a 2 723-tonne reduction in annual carbon emissions. The city was able to reduce the annual energy consumption of its light posts by 66%, resulting in a net reduction of 20% on its electricity bill or an annual savings of EUR 400 000 (Microsoft, 2019<sup>[17]</sup>).

#### *Reducing the carbon footprint of the public sector*

These projects assess public sector operations and identify areas for action by:

- recording the environmental impact of the entire operational and value chain
- sourcing reliable data from telemetry, sensors, and internal and external sources
- analysing, visualising and reporting resource use, environmental impacts and progress towards sustainability.

These projects accelerate solutions and actions to meet sustainability targets by:

- using data intelligence, feedback loops and automation to reduce resource consumption and emissions footprints
- identifying opportunities to achieve climate goals within the government and among service providers
- developing employee skills to adopt new technologies
- communicating and sharing data across different agencies and geographies.

These projects improve public services and transform their contribution to sustainability by:

- monitoring real-time data on progress, reviewing impacts, and adapting actions and approaches
- to replace high-carbon footprint actions with low-carbon footprint alternatives.

### **Governments must urgently apply digital technologies in a holistic way**

Governments must move aggressively to meet environmental targets by making more

effective use of data and clean technologies to make their operations greener and to better enforce environmental protections.

These technologies can support responses to the climate and other crises by predicting and helping better prepare for severe weather events, and by reducing environmental risks. With advanced modelling, governments can take a proactive stance to adapt and build resilience.

Governments should encourage partnerships across sectors to take advantage of digital approaches that can better assess current conditions and accelerate their response. These include collaboration between governments, financing organisations, non-profit organisations, established technology providers, start-ups, and researchers and academics. All organisations can use technology in their activities as suppliers, investors, employers, policy advocates and partners to move from making pledges towards making progress on solving climate challenges.

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## NOTES

1. For more information on how digital approaches can support governments in addressing sustainability challenges, see: <https://wwps.microsoft.com/whitepaper/sustainability/>.
2. For more information on the Microsoft Cloud for Sustainability, see: <https://blogs.microsoft.com/blog/2021/10/27/advancing-a-net-zero-future-ahead-of-cop26-new-carbon-accounting-tools-available-with-the-microsoft-cloud-for-sustainability-now-in-public-preview/>.
3. For more information on the Ocean Data Platform, see: <https://www.oceandata.earth/>.



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