Spotlight

Effective climate action requires relevant and trusted data. Data trusts can help.

Joint Learning Network on Climate Action

digital impact alliance

Climate change is no longer theoretical: people are suffering today, and the global struggle for livable temperatures, breathable air, mobility, and the resilience to cope with extreme weather events is growing. Conversations about accessing and utilizing the data needed to mitigate, anticipate, and respond, therefore, cannot remain theoretical.

This paper, and the Joint Learning Network on Climate Action (Climate Data JLN), are designed to spur action: investment to scale effective data governance models; innovation to improve data governance and turn data into useful information for decision-makers; data owners incentivized to allow the re-use of data held behind paywalls or other barriers; and decision-makers willing and able to leverage data in service of their communities and constituents.

Yet, despite the potential benefits, frontline decision-makers – often sub-national governments in low-resource environments – struggle to access and use data effectively to inform their adaptation and response strategies. Challenges exist across the data lifecycle, including data collection, sharing, and use. Attempts to share data more effectively face a range of obstacles, from disparate policies and regulations to outdated technology to high costs.

To address this challenge, the Digital Impact Alliance rallied a group of partners to launch the Climate Data JLN under the multistakeholder Green Digital Action initiative.

The Climate Data JLN brings together experts in climate action, data exchange, and digital public infrastructure to understand new models for data governance that can overcome some of these challenges, particularly those related to trusted data sharing.

Launched at COP28 in Dubai, the Climate Data JLN will deliver recommendations in time for COP29 in Baku.

The group of JLN partners informed the content of this spotlight and will continue to collaborate on the subsequent spotlights. This multi-disciplinary network identified multiple promising models to explore in the context of unlocking data for climate action. This Spotlight paper examines the first of these models: data trusts. Through examination of data trusts in action, the paper analyzes the key elements of data trusts that render them more or less applicable to specific climate-related data sets. Regardless, data trusts are an under-utilized approach to the data infrastructure needed to accelerate climate action. This data infrastructure must be complemented by intermediaries that make data accessible and useful to frontline decision-makers.

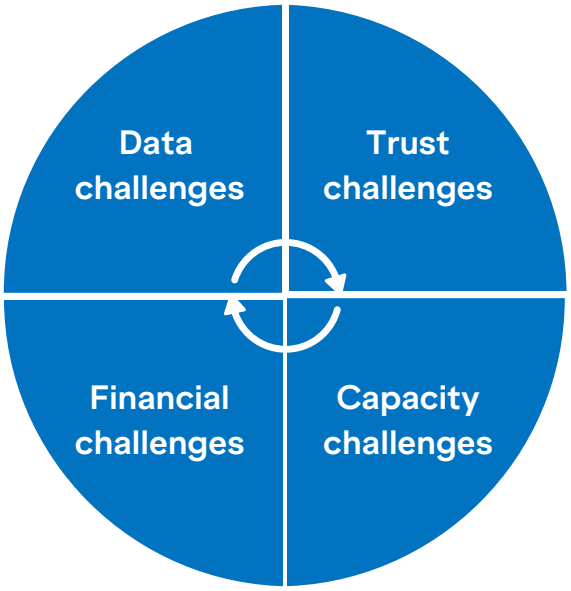
Much of this work was inspired by the multistakeholder Green Digital Action (GDA) initiative, convened by the International Telecommunications Union with participation from 40+ organizations.

Following our engagement on the GDA track at COP28, the Digital Impact Alliance launched the Joint Learning Network on Unlocking Data for Climate Action (Climate Data JLN.)

Green Digital Action aims to enhance collaboration, fast-track industry-wide commitments to addressing climate challenges, and put digital solutions at the forefront of climate action.

Challenges to the use of data for climate action

There is a clear market failure when, despite the urgent needs associated with climate change, climate-relevant datasets are not yet collected, are incomplete, or are not yet being used for climate action. Furthermore, even when this data exists, it is often inaccessible to the frontline governments and communities that need it the most.



This market failure is driven by different factors, which vary depending on the specific dataset. This analysis broadly buckets these challenges into four overlapping categories: data, trust, financial, and capacity-related challenges. These challenges focus on data sharing and use, without listing additional challenges related to data collection, storage, processing, or archival.

Challenges related to data quality:

- Data may be incomplete, inaccurate, or out-of-date.
- Data may take too long to move from collection through processing to use, a critical obstacle for climate data where people's lives are at stake and time is of the essence.
- Current technology stacks are not always interoperable, meaning that data cannot be easily shared between systems on a real-time basis.
- When data is collected at a global, regional, or even national level, the utility of that data at the local level may be limited due the lack of granularity or comparability.

Challenges related to lack of trust:

- Many countries lack applicable or robust legal and regulatory frameworks for issues such as intellectual property rights and data transfer restrictions, and where these frameworks exist, cross-border border disparities can provide additional obstacles.

- Current data owners may be hesitant to share data due to data privacy concerns, their inability to negotiate proper terms and conditions, or the lack of oversight and dispute mechanisms.

Challenges related to financing:

- Data owners often do not want to share data without getting some return on investment, which can result in paywalls that are unaffordable for many frontline responders who operate in low-resourced environments.

- Governments, particularly sub-national governments, often do not have continuous budget streams allocated to the on-going purchase of data.

Challenges related to capacity:

- Frontline, sub-national governments report that they often do not know what data exists.

- If they do know, they often lack access to technology such as high-speed internet to view and use the data, a culture of data-driven decision making, and/or staff trained to analyze data and translate it into relevant information.

Data trusts as entities that can address some of these challenges

Data trusts provide independent, fiduciary stewardship of data.[1]

A data trust is a legal entity designed to responsibly manage and govern data assets. The term "data trust" here is used to refer to an entity that provides a fiduciary arrangement where a trustee holds data assets on behalf of its members (not to be confused with the broader concept of trust in, or belief in the accuracy of, data.) This paper will briefly outline the definitions and key aspects of data trusts, in order to set the stage for the analysis of how this type of entity can be used in the context of climate data.[2]

Data trusts are relatively new, yet they are based on established models for other types of assets, including land trusts. As with land trusts, in a data trust, trustees are legally bound to uphold the pre-defined principles. Participants in the trust, which may be individuals, companies, or public entities, come together to establish the governance structure, the mechanism for data sharing, and accountability measures that help safeguard against misuse.

Key elements of an effective data trust include:

- Governance structure: A data trust should have a clear governance structure defining roles, responsibilities, and decision-making processes. The governance structure should also consider mechanisms for actively engaging with stakeholders to build trust and address concerns.

- Legal framework: A data trust should operate within a robust legal framework that defines the rights, obligations, and liabilities of stakeholders involved in data sharing and management.

- Ethical guidelines: A data trust should adhere to ethical guidelines that prioritize principles such as transparency, accountability, fairness, and respect for individual privacy and rights. There may be additional sector-specific guidelines that are required for trust participants.

1. Definition compiled from multiple sources: ODI Data Trust explainer, GPAI, ODI, and Aapti, 2021. "Enabling data sharing for social benefit through data trusts." The Ostrom Workshop Harvard Business Review (2020). "'Data Trusts' could be the key to better AI."

2. For a more detailed discussion of data trusts, the resources in the previous footnote are a good starting point

- Data management policies: A data trust should have policies and procedures for managing and safeguarding data. These include defining data quality standards, security measures, access controls, and retention policies to ensure data integrity, confidentiality, and availability.

- Technical infrastructure: A data trust should have the technical infrastructure and capabilities to securely manage and share data. This will differ based on the types of data that the trust holds but could include interoperability requirements, encryption technologies, access controls, and data analytics tools to support data-driven decision-making and innovation.

One key feature of data trusts that make them an interesting model for climate action is their ability to unlock data held by private companies, where much of the data relevant to climate currently sits. Many private companies hold a lot of data of commercial value that they are not willing to share because of the lack of a commercial advantage. However, they may be willing to share and contribute de-identified data in return for receiving similar types of data from other trust members, including competitors. In return for access to greater quantities of data, the private sector can pay a larger fee to the trust, unlocking further value for other intermediaries, and creating a more sustainable governance model.

Data trusts in practice

To better understand the key features of data trusts that make them successful at unlocking data otherwise unavailable or unused by decision makers, below are four examples of data trusts in action. As data trusts are a relatively new concept in practice, it is still an ongoing process to determine their level of success across different use cases, particularly related to climate. Therefore, these examples come from a variety of sectors with the objective to elaborate on key elements and considerations for accelerating climate action.

PLACE

URL:	https://thisisplace.org/
Type of data:	High-resolution aerial & street imagery, geospatial
Climate use cases:	Urban planning, disaster risk, transportation, ecological
Geographies served:	Africa, small island nations in Caribbean and Pacific
Legal Model:	501(c)3, based in US and not for profit company with a data trust (PLACE Trust) in UK
Financial model:	Member contributions and data license fees, grants

Description

PLACE addresses mapping inefficiencies by establishing a trusted intermediary for delivering hyperlocal, accurate earth surface imagery. Both from above (aerial) and at street level. The initiative started with a need for more detailed data about cities, communities, and neighborhoods in urban centers in much of the world.

To meet the need for data collection, PLACE has been structured as an international group of non-profit organizations, with each organization serving a separate, but symbiotic purpose and working for the shared objective of making geospatial data available for the public good. At the center of its governance structure is the PLACE Trust, which is a permanent legal entity in the UK, and serves as an independent, fiduciary data steward. PLACE utilizes the data trust model to safeguard and manage the use of the data and minimize potential harm, while the other PLACE legal entities support the trust through the collection and licensing of data that enables critical mapping products to be created to help with land planning, climate adaptation, coastal management, energy infrastructure and many other uses.

Through a licensing agreement, PLACE ensures that the data is sovereignly owned by the government and a copy is made accessible to serve the public's interest. While there is no cost to the government, the government is asked to provide the necessary licenses and permits to collect the data, the right to steward the data in the Trust, and the right to license the data for use by members. In return for use, members of PLACE pay a membership contribution and a further license fee if the intended use would result in a commercial derived work or value added product. Non-commercial map products are required to be made available publicly by the member.

CAD Trust

URL: https://climateactiondata.org/
Type of data: Open data on carbon markets
Climate use cases: Transparency on climate credits
Geographies served: Global
Legal Model: Independent legal entity in Singapore
Financial model: Grant funded

Description

The Climate Action Data Trust was created to connect carbon market registries to maximize transparency of climate credits, minimize the risk of double counting, enable operationalization of Article 6 of the Paris Agreement,[3] and enhance the overall integrity of the markets. The challenges in the current carbon markets stem from a prevalence of independent private registries and national-level carbon markets, with a lack of centralized registries between voluntary and compliance markets.

The CAD Trust works to improve trust in the carbon markets economy by offering a decentralized, blockchain-powered public digital infrastructure that connects disparate registries and eliminates the need for manual effort in reconciling them. Public and private sector entities can use the CAD Trust for easier compliance reporting, transacting, and analyzing, rating, and benchmarking.

The CAD Trust does not hold any data but creates transparency and accountability for publicly available carbon credits data. It is an independent entity established by the Government of Singapore, World Bank, and IETA, and is domiciled in Singapore. CAD Trust's and with a governance structure that is managed by the CAD Trust Council and Board, and supported by its Technical Committee, User Forum, and Secretariat.

3. Article 6 of the Paris Agreement - Cooperative Implementation

LifeCycle - Digital Jersey

URL: https://www.lifecycle.je/data-trust
Type of data: Cycling data
Climate use cases: Transport, Urban Planning
Geographies served: Jersey, UK
Legal Model: Independent legal entity in UK
Financial model: Public funding (for 1 year pilot)

Description

LifeCycle is a data trust project launched by Digital Jersey being piloted in Jersey, UK. It collects and manages data generated by local cyclists and is administered by professional trustees. The objective is to enable the trustees to have a database about local cyclists, community cycling, and cycling conditions in Jersey, with the broader aim to promote green transport in the city. In its inaugural year, the project has tracked savings of 12.879 kg of carbon by recruiting cyclists to enroll in the program.[4] In return, the city of Jersey receives data generated by the cyclists that use the city's bike-share program.

Once enough data and analysis are generated, Digital Jersey aims to invite organizations to submit requests to access the insights. A group of trustees are responsible for vetting and reviewing the requests on data use based on previously agreed upon principles.

The primary users of the trust are the infrastructure and environment departments of the local government that collect cycling patterns to inform city planning. While the primary objective is to make the city more bikeable, the data collected and maintained by the trust also informs other traffic measures,such as pedestrian or school traffic planning.

In contrast to other fitness apps, cyclists can share their journey data with the specific aim of improving cycling conditions without risking their personal data for commercial benefits. The Trust is legally obliged to follow stipulated terms, protecting the privacy of the end user.

Digital Jersey is using LifeCycle as its pilot project but will continue to explore the potential Digital Jersey's Data Stewardship Services program for other uses.

4. LifeCycle Data Trust | An Update from 2024's Annual Review

UK Biobank

URL:	https://www.ukbiobank.ac.uk/
Type of data:	Healthcare research
Climate use cases:	No direct climate use cases
Geographies served:	UK
Legal Model:	Independent legal entity in UK
Financial model:	Grant funded

Description

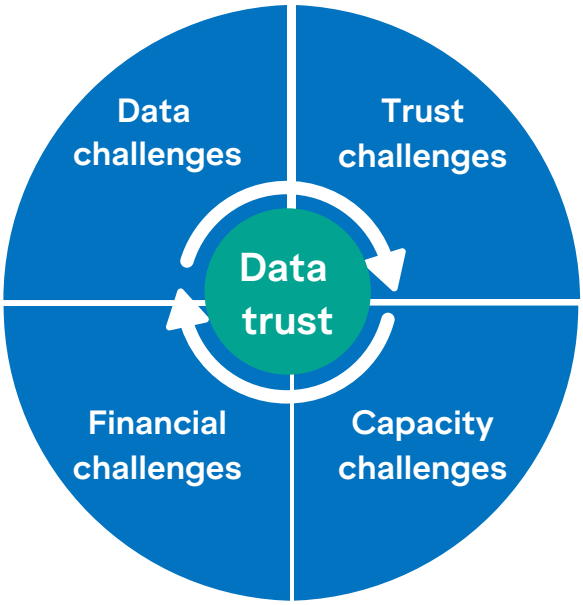
The UK Biobank is a large-scale biomedical database and research initiative established to improve the prevention, diagnosis, and treatment of a wide range of diseases. It collects and stores health and genetic data from half a million participants in the UK, including detailed health records, genetic information, and lifestyle data, to facilitate scientific research on the causes and prevention of various health conditions.

The data trust model employed by the UK Biobank ensures that participants' data is managed responsibly, ethically, and transparently. Participants provide informed consent for their data to be used for research purposes, and the data is de-identified to protect privacy.

A data access committee oversees requests for access to the data, ensuring that research projects align with the Biobank's ethical guidelines and objectives. Researchers granted access to the data must adhere to strict terms and conditions regarding data usage and confidentiality. This model fosters trust among participants, researchers, and the public, while also maximizing the scientific value of the data for advancing medical research and improving healthcare outcomes.

Making data trusts work for climate action

We can look to these examples to start to understand where data trusts might be most effective in increasing accessibility and use of data for climate action.



First, we can see from the four examples that data trusts are particularly applicable to climate datasets that are not accessible and/used due to challenges related to lack of trust, such as:

- Geolocation and transportation patterns (movement of individuals), as with LifeCyle.

- Climate risk data which involves modeling behavior and other sensitive information such as we see with UK Biobank. Other examples include data collected from personal devices, electric vehicles, smart energy meters, IoT sensors, etc.

- Data that individuals, companies or governments are hesitant to share widely such as the hyperlocal mapping data collected by PLACE or the double counting in carbon markets collected by CAD Trust. Other examples include building efficiency or urban air quality performance.

Second, we can see from the four examples that each has added additional design features to overcome not only challenges related to trust, but also to the other challenges mentioned above. In doing so, these insights become relevant to a broader range of data sets relevant to climate action. For instance:

- To overcome challenges related to financing, data trusts can unlock privately held data through tiered pricing models based on resources and need, as we see with PLACE. Other ways to provide sustained access to data includes membership dues, licensing fees, public/private partnership structures, and/or donor funding. In interviews, we heard that while the four examples above are mostly grant-funded, there is recognition that these other financing models are also needed in order to sustain operations over the medium to long-term.

- To overcome data-related challenges, these entities can require minimum quality standards including maintenance, metadata, and metrics, in turn reducing the risk of errors or inaccuracies in research findings and policy recommendations. They can also speed up the time it takes to process and share relevant data by aggregating and preprocessing data, and establishing standard data-sharing protocols that can be used during unforeseen climate events. For example, CAD Trust reconciles publicly available carbon market data, enabling organizations to check it for double counting risk, benchmarking,and compliance reporting. PLACE Trust, on the other hand, conducts a minimum level of processing to ensure that data is anonymized and meets the data principles that its members have agreed to.

Third, we see that data trusts struggle to overcome capacity-related challenges, limiting their ability to reach sub-national governments and other local actors at the frontlines of climate response. Data trusts can be considered a form of digital public infrastructure (DPI). As infrastructure, data trusts can provide interoperability and API interfaces, encryption technologies, access controls, and data analytics tools to make data more accessible to non-technical users. However, even with these technical features in place, data trusts require intermediaries who are able to collaborate directly with frontline decision-makers in order to turn data into useful and timely information, pre-packaged based on the unique demands of city governments and others who deal directly with affected communities.

"Local communities are on the frontlines of climate change impacts, yet rarely do they and other local actors have a voice in the decisions that most affect them. We need to shift the status quo from current top-down approaches to a new model where local actors have greater power and resources to build resilience to climate change."

WRI Principles for Locally Led Adaptation

From our examples dealing directly with climate data - PLACE and CAD Trust - we see that their efforts are currently focused on making data more accessible to national governments. These governments have a clear demand for data as they need to report against targets set for their Nationally Determined Contributions (NDCs) under the Paris Agreement. Yet, it is cities and other sub-national entities that are closest to the individuals and communities who are suffering the negative impacts of climate change.

These cities have, writ large, lower technical capacity and different decision making needs than national governments. And while city governments have not set their own NDCs, they increasingly have approved climate adaptation, resilience, and/or response plans.

Intermediaries can bridge this gap and help make the information generated by data trusts relevant to sub-national entities.

Intermediaries can take various forms including non-profit organizations, academic and/or research institutions, private companies, technologists, or even national government agencies.

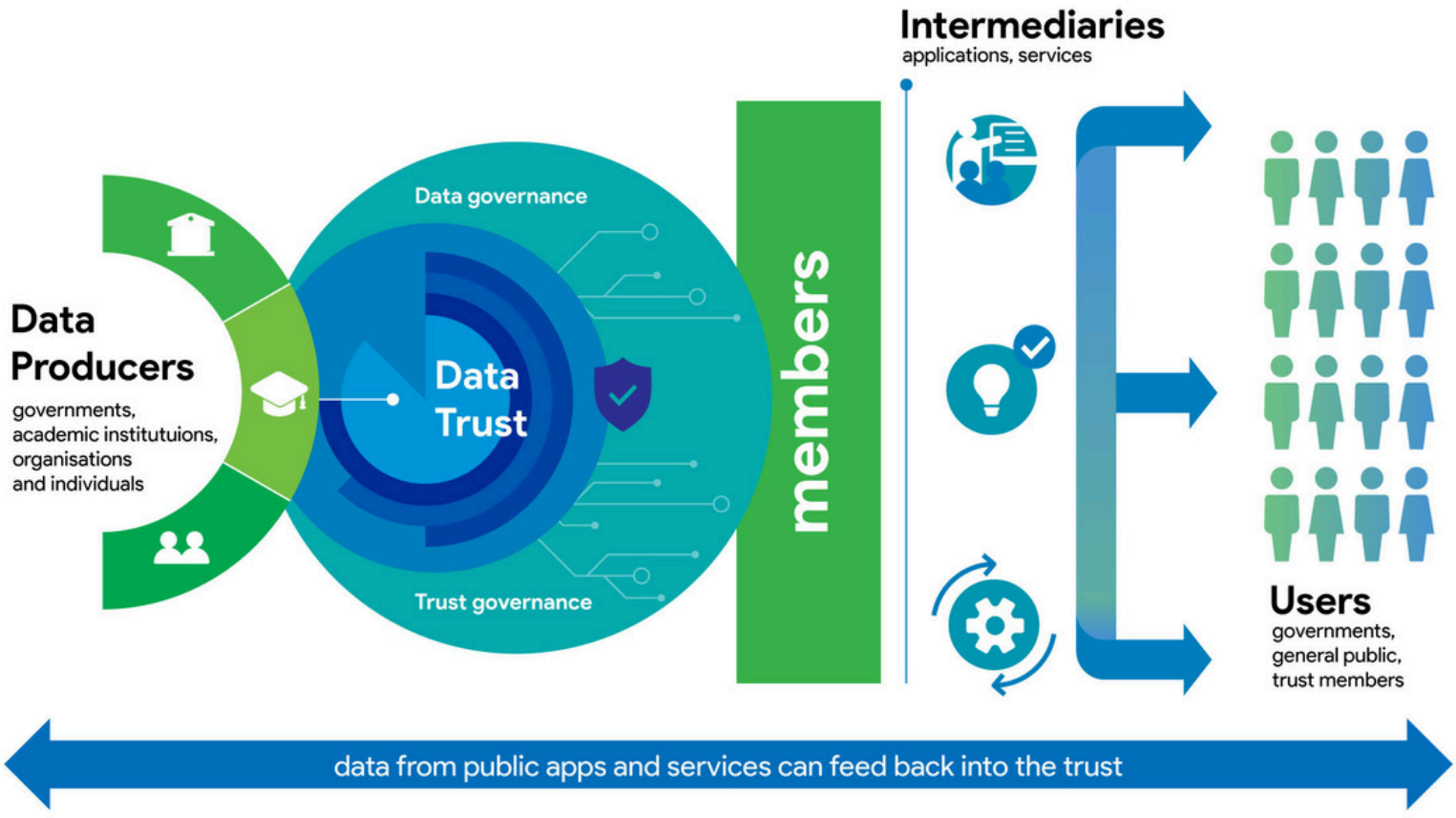
In this role, intermediaries can facilitate several functions:

- Aggregation and analysis: Intermediaries can collect data from the data trust infrastructure and other sources, aggregate and analyze it to derive insights relevant for specific climate action use cases.

- Customized tools/services: Intermediaries can provide tailored and innovative data services and products to meet the unique needs of city governments and other end-users. Some examples include decision-support tools, impact assessments, or capacity-building programs.

- Policy advocacy: Intermediaries can advocate for policies and regulation by translating raw information into actionable insights. Some intermediaries may serve to provide decision support and policy recommendations to city governments to make informed decisions.

- Community engagement: Intermediaries can act as a liaison with the trust and local communities to ensure data-driven solutions are inclusive and equitable.



Limits to the data trust model in climate action

Data trusts are a promising model for accelerating data sharing, but they will not be applicable for all data sets. To start with, these models require mature legal structures that enable data stewardship which are not present in all countries. All four examples analyzed are operating in countries where there are existing trust laws that provide the necessary legal and regulatory basis for these types of entities to operate effectively. Even with this legal and regulatory basis in place, it can be time-consuming and resource-intensive to navigate complex legal landscapes and ensure compliance with evolving regulations.

This contributes to the overhead costs that lead to the financing challenges previously discussed. While all of the data trusts analyzed recognize that they need to shift away from pure grant funding, it has proven difficult to operationalize other types of revenue streams.

Furthermore, data trusts require demand for data and clearly bound use cases (if data is available elsewhere, a data trust may not be relevant). As such, they are not applicable to data that should be widely available as a public good. In the context of climate, they are therefore less relevant to datasets such as historical climate data essential for predictive modeling and data measuring performance against global metrics, i.e. Paris Agreement commitments. Historical climate data, for example, is critical for understanding long-term trends and making accurate climate predictions, and thus should be openly accessible to researchers, policymakers, and the public. Similarly, data used to measure and report progress on global climate goals, such as carbon market activity, needs to be transparent and universally available.

Looking forward

The urgency of climate action demands innovative solutions to overcome obstacles that hinder the effective use of climate-related data. Data trusts can speed up data sharing by overcoming trust challenges and challenges related to data quality. Through a combination of features, they build trust, improve access, and overcome traditional delays related to bureaucracy and uncertainty. By shortening the distance between data sharing and innovation/use, they can play a critical role in addressing urgent climate-related needs, such as managing extreme heat or mitigating the impact of floods.

Moreover, with the growing importance of artificial intelligence (AI) for tackling climate use cases, data trusts offer a unique opportunity. Unlike text-based language models, climate-focused AI models often rely on diverse, high-quality data types from a variety of sources. These include satellite imagery, aerial photos, street views, and sensor data. The effectiveness of these AI models hinges on the availability and quality of extensive datasets, which data trusts can help facilitate. By enabling a community of users to identify data gaps and collectively address acquisition issues, data trusts can ensure that AI models have the comprehensive data they need to provide the required analysis.

However, while data trusts hold great potential, they are not a one-size-fits-all solution. Their success hinges on factors such as demand for data, well-defined use cases, and mature legal frameworks, which may vary across contexts and geographies. Moreover, data trusts require upfront investment in terms of time, resources, and expertise to establish and maintain which may challenge widespread adoption.

Moving forward, stakeholders invested in climate and data innovation need to work on building an ecosystem that supports implementation of data trusts. This includes fostering collaboration between intermediary organizations and decision-makers, addressing legal and regulatory barriers, and promoting capacity-building initiatives to empower frontline stakeholders such as city governments.