

Policy Brief

National Agricultural Data Infrastructure: Caribbean

Summary

While agriculture and fisheries are crucial sectors for food security, employment and exports (including through the tourism market) in the Caribbean, their direct contribution to gross domestic product (GDP) varies greatly. Belize, Guyana and Haiti see a larger contribution of agriculture and fisheries to GDP, whereas many of the other states have a lower contribution, with other sectors often dominating, particularly in the services-driven and industrialised (oil and gas) economies. This leads to a mean contribution of 3–5 per cent across Caribbean Community (CARICOM) countries. Meanwhile, the labour force involved in agriculture varies between 10 and 25 per cent, which illustrates the structural dualism whereby agriculture remains vital for employment and livelihoods but contributes less to overall economic output compared with other sectors.

The two sectors are also subjected to challenges that include weather variability, such as extreme weather events like hurricanes and drought, which have direct impacts on agricultural productivity; the ongoing transition of agriculture and food systems from traditional cash crops like sugar and bananas to more diverse crops and livestock and a focus on agribusiness and agro-processing; and maintaining the sustainability of the fisheries sector while facing the risks of overfishing. One of the options in endeavouring to transition successfully to the sustainable development of

agriculture and fisheries is to leverage cutting-edge technologies and data to address the challenges.

Data could be the conduit for boosting trade and investment, as enshrined in the Declaration on the Commonwealth Connectivity Agenda for Trade and Investment.¹ According to the Open Data Institute, the sharing of data can create social and economic value for people, organisations and the wider economy.² In ensuring data sovereignty, including by maintaining a secure, trusted data environment, governments have an important role to play in laying the foundations for a flourishing data-driven economy. This will involve pursuing policies that improve the flow of data and ensuring that companies that want to innovate have appropriate access to high-quality and well-maintained data.³

In June 2024, the Commonwealth Secretariat, with the Government of Barbados, in close collaboration with the Inter-American Institute for Cooperation on Agriculture (IICA) and CARICOM and other partners, convened a regional multi-stakeholder dialogue in Barbados that made recommendations on how to put in place an enabling environment for collaborative interventions among institutions engaged in agricultural data management so they can design, establish and start the implementation of a National Agricultural Data Infrastructure (NAGDI) in countries in the Caribbean region.

The Commonwealth advocacy on NAgDI: Countries with robust public infrastructure are better equipped to meet the needs of their people and accelerate action towards the United Nations Sustainable Development Goals. From the Commonwealth's perspective, NAgDI across the countries creates a broad interoperable data system that can act as a backbone to inform advisory decisions, policy decisions, and trade and investment decisions between countries.

What is the issue?

Governments of the member states of CARICOM are taking steps to lay the foundations for digital public infrastructure (DPI), each in their own way and within the means allocated to the development of the agriculture and fisheries sectors, as described above, all with the goal of improving service delivery and increasing citizen agency in the governance process. At the same time, private sector operators and service providers in the field of agriculture have been developing their services across the region. However, rather than working in isolation at the individual country level, the process could be streamlined by bringing in the best of practices from across the region and collaborating to develop a harmonised approach to serve the entire regional community.

The experience of participating in a regional dialogue gave each country a higher chance of success in designing and establishing a NAgDI, which is a model of DPI for agricultural data management at country level. The region is endowed with a set of well-established institutions with good capacity to handle data management processes in their respective areas. Other fundamental building blocks on which the countries can rely on to establish robust NAgDI are existing models in the region of farmer registration, farm registries, mapped farmlands, digital platforms serving the farming community, insurance platforms and platforms serving the governmental planning sector. In addition, the presence of region-based organisations, which can support a regional approach involving CARICOM countries interface with both regional service providers and extra-regional collaborators, is a tangible asset that the region can build on.



However, there was general agreement among stakeholder institutions that duplication of efforts exist, and that a regulatory framework for agricultural data management in each country is needed. This may also require an entity that can gather stakeholders to discuss the issue and find solutions collaboratively both at national and at regional levels. This was one of the conclusions of the multi-stakeholder dialogue, convened by the Commonwealth Secretariat and hosted by the Government of Barbados, in collaboration with IICA and CARICOM and with financial support from the Open Society Foundations, held on 12–14 June 2024. Nevertheless, the dialogue on the establishment of a NAgDI also uncovered strong potential in the region to embark on such an initiative. The consultations identified several stakeholder groups within the regional and national agricultural ecosystem that are already actively involved in the management of agricultural data (data generation, aggregation, processing, analysis, sharing and use).

Why is this important?

In general, lack of reliable and trusted data to inform investments in agriculture and

agribusinesses renders a country risky for investors. This lack of trusted data, often resulting from duplications of data systems, with different entities reporting multiple figures on a single data point, can hinder private sector investment in the sector, which will deprive the economy of opportunities for steady economic growth, resulting in increased food insecurity, poverty and hunger.

Very often, there is poor co-ordination in the management of agricultural data, such as unique identifiers of farmers, traders, agribusinesses and other entities within the ecosystem (*user data*), and data on the substance for the entities, such as production data, agronomic data, weather data, financial data, soil data and transactional data (*content data*). This lack of co-ordination has led to fragmented databases, unwillingness of data-holders to share data, further duplication of data systems, operational inefficiencies, data collection fatigue on data subjects, failure to scale innovations based on data, unsuited policies being made based on these fragmented data points and a data power imbalance between the data-owners and data-holders.



The dialogue was structured based on the Digital Agriculture Framework⁴ and Digital Fisheries Framework⁵ produced by the Commonwealth Secretariat. Pillar 2 of these frameworks deal with Data Infrastructure. In general, infrastructure powers societies, provides fundamental services and systems that enable economies to function, allows for communication, facilitates the creation and growth of other systems and supports daily activities: shared public infrastructure such as roads, railways, telecommunication networks or power lines serve as the fundamental building blocks that allow other innovations to thrive. Similarly, agricultural data management at a country level needs a model of DPI to power

new innovations within the sector. This is what forms the foundation for the concept of the NAgDI as a model of DPI for agricultural data implementation in Commonwealth countries.

Barbados was the fourth country to host such a two-and-a-half-day multi-stakeholder dialogue, in the presence of representatives from other countries in the Caribbean region, as the first step towards achieving the goal of the initiative in the region. The countries with representation at the dialogue were Antigua and Barbuda, Barbados, The Bahamas, Belize, Dominica, Guyana, Jamaica, St Kitts and Nevis, Saint Lucia, St Vincent and the Grenadines, and Trinidad and Tobago.



The dialogue took place after three months of online bilateral engagements with regional and national stakeholders on the subject. It was attended by over 70 private and public sector organisations and departments represented by between 50 and 55 participants daily. The dialogue featured presentations from experts on agricultural data management, digital technologies and policy development, many of them from local institutions already implementing agricultural management

initiatives in the public or private sectors. Participants also engaged in breakout sessions to discuss specific issues such as data privacy, data-sharing and the role of the private sector in agricultural data infrastructure development.

Participants agreed that duplications of data existed in countries and the region; that there was a need for regulatory frameworks to manage agricultural, fisheries and climate data in countries; that co-ordinating bodies, entities, mechanisms and platforms were required to bring

stakeholders together to collaborate; and that data management issues were prevalent, related to trust, accuracy, quality, integrity, confidentiality, validation, standards, security and ethics, among others.

A general observation from the dialogue was that the Caribbean region is well positioned in this field, with good policy frameworks; with existing infrastructure and data management systems; and with institutions actively involved in agricultural data management in both the private and the public sectors that are interested to engage in the establishment of a NAgDI. These data management assets include DigiFish and the Fisheries Information System in Barbados; farmer registries in Belize under the Belize Agriculture Information Management System (BAIMS); the Agricultural Information System in Guyana; Farm Credibly in Jamaica; D' Market Movers, the

National Agricultural Market Information System and Tech4Agri 360 in Trinidad and Tobago; and Cloud Carib across the region, among others.

What should policy-makers do?

The NAgDI is likened to any national public infrastructure, such as rail or roads. A well-operating national road infrastructure has policies guiding its use; backbone technologies supporting multiple users; a business model to ensure maintenance and sustainability of the infrastructure; and a governance model that ensures the use of the policies, the technologies and the business model. As a result, the design and implementation of the Commonwealth NAgDI has been conceptualised to cover four components: (i) data principles and policies; (ii) data systems and technologies; (iii) a marketing and business plan; and (iv) governance and administration.



Given the already existing systems and platforms that could be integrated into a NAgDI, and tapping into the ongoing work of organisations in the region, recommendations for the implementation and management of the NAgDI in the region and in Barbados in particular are summarised as follows.

Data Policies and Principles to guide the infrastructure: The region's independently

strong institutions still require an oversight mechanism for the reform of regulations at national level, in support of the NAgDI. This may require a joint assessment of the need for and facilitation of convergence of the ongoing data management initiatives in the countries. This will not only involve public institutions but also entail dialogues among public and private sector

stakeholder institutions. The outcome of this oversight regulatory mechanism will be coherent and inclusive implementation, monitoring and evaluation of the NAgDI. Such an oversight mechanism is best led or driven by governments at ministerial or inter-ministerial level. It may also impose penalties for non-compliance and also facilitate mechanisms for those seeking redress in case of non-compliance.

Data Technologies and Systems in support of the infrastructure: Participants recommended that a massive awareness campaign on digitisation and support for its implementation in agricultural data take place across the countries in the region. Countries need to identify technologies that bridge existing data systems in-country while aiming to put in place interoperable systems for the seamless integration of data from various sources. With the presence of regionally based service providers such as Cloud Carib, there is an option to consider a regional approach to providing the backbone for data management. Each country will need to rationalise its investments in information and communication technology (ICT) or alternatively use a service provider for equipment and cybersecurity, with service agreements. Such a component could be managed under the leadership of the private or non-governmental sector.

In today's data-driven world, standardisation and interoperability have become indispensable elements of effective DPI. By establishing common formats, structures and definitions for data, countries can unleash the power of data to enhance service delivery, promote transparency and drive innovation. Hence the need for a structured approach to data management that ensures consistency, compatibility and interoperability. Such an approach will facilitate seamless data exchange and utilisation across diverse government agencies and systems.

Marketing and Business Planning for the infrastructure: Marketing the NAgDI to attract initial financing, as well as developing its business plan, requires a strong approach to future investment options to ensure the sustainability of the infrastructure. While the NAgDI should have an open and free data component, there will also be a need to monetise parts of components. Partnership opportunities should be sought in support of the initial financing of the infrastructure, through seed funds, grants and loans, from development agencies, international financial

institutions, etc. Such efforts could be launched in collaboration with the regional organisations already active in the region. The aggregation of data from across countries and the processing of data within the NAgDI, and the appeal of the processed data, information or knowledge to the user/farmer/donor, are useful tools for marketing; it is also smart to ensure that the data contributor gets access to the value-added processed data to maintain motivation to contribute more data. Thus, a set of marketing insights can be shared across the region. Meanwhile, revenue models to support the infrastructure should be explored, such as subscription fees, transaction fees, premium features, freemium, data licensing and sales, etc. This can best be achieved through the identification of customer segments such as financial institutions, development agencies and investors as well as high-level macro products to be built by the infrastructure. This component could be led by the private sector with the support of the regional organisations.

Governance and Administration of the infrastructure: The need to instil trust in the NAgDI system means that the public sector or the government will need to drive the process of ensuring the governance and administration of the infrastructure. Currently, the precise institutions needed to play this role are not in place in the country; however, capacity can be built by expanding the mandates of existing agencies and institutions to carry out the role in a transparent manner. The case for governments to lead the infrastructure, initially as a public good, is strongly supported, with the option that the private sector can take over the governance in the context of high-value chains. For this component, transparency in implementation is crucial, to strengthen the other components of the NAgDI. Any organisation that leads such an initiative would have to play the role of independent custodian representing all stakeholders but with a mandate from the national government. Examples of such organisations exist in the Caribbean, such as the credit scoring facility CariCRIS (Caribbean Information and Credit Rating Services), while regional co-ordination mechanisms such as the Caribbean Regional Fisheries Mechanism (CRFM) in the fisheries sector could serve as a model. Nevertheless, for an initiative to be taken up at a regional level, there is a need to identify a champion institution in a country, and a champion country to trigger the regional uptake.

The four components of the infrastructure function while content data and user data, acting as the 'resource', are pulled, harmonised, integrated, improved and pushed for macro-level decision-making.

Content data: Climate-resilient agricultural data is fundamental in addressing the current and future agricultural challenges posed by climate change, such as drought, floods and extreme weather events. It supports the development of early warning systems, climate-smart agriculture practices, financial services, inclusion, trade and informed policy-making. A co-ordinated approach to climate-resilient agricultural data through the NAgDI will align with global efforts to strengthen food security, adapt to climate change and achieve the Sustainable Development Goals. Ultimately, content data, including on soil, agronomy, markets, finance, weather, pests and diseases, is a vital resource in ensuring the resilience and productivity of the agriculture sector.

User data: When content data is linked with user data, a stronger business case can be made for the private sector investment options. The existence of an effective and operational national ID system has been shown to be a useful asset in the establishment of the NAgDI. The agricultural data infrastructure also requires that other stakeholders in the sector be identifiable through

unique digital IDs (e.g. agribusinesses, institutions, networks, etc.). Another foundational layer of data relates to harmonising the mapping of polygons of farmers' fields, which can then be associated with a farm ID. Thus, a unique functional ID system for all farmers can take root from the national ID system if it exists, but the example of BAIMS in Belize is a powerful testimony to the possibility of working with a farmer and farm ID system in the absence of a national ID system.

Endnotes

- 1 The Commonwealth (2018) 'Declaration on the Commonwealth Connectivity Agenda for Trade and Investment'. <https://thecommonwealth.org/connectivity-agenda>
- 2 Open Data Institute (2023) 'Understanding the Social and Economic Value of Sharing Data'. <https://theodi.org/insights/reports/understanding-the-social-and-economic-value-of-sharing-data-report/>
- 3 HM Treasury (2018) 'The Economic Value of Data'. Discussion Paper.
- 4 <https://state-digitalagriculture.thecommonwealth.org/digital-agriculture/introduction>
- 5 <https://state-digitalfisheries.thecommonwealth.org/digital-fisheries/introduction>

About the series: These Policy Briefs are the results of multi-stakeholder dialogues hosted by governments in selected countries in the Commonwealth and jointly organised by the Commonwealth Secretariat, acting as an honest broker, to bring actors together to design and develop a National Agricultural Data Infrastructure (NAgDI) for climate-related issues. These dialogues, involving relevant national stakeholders, are possible through financial support from the Open Society Foundations and in collaboration with IICA, CARICOM and the Government of Barbados in this case.

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