Climate-Smart Agriculture and Food System Initiative
Data Coordination and Collaboration Hub: Funding Opportunity

1. Overview

Genome Canada launched its new challenge-driven **Climate Action Genomics Initiative funding** opportunity on **May 12, 2022**.

The new opportunity, called the Climate-Smart Agriculture and Food Systems Initiative (hereafter "the Initiative"), is investing $30 million from Genome Canada in cutting-edge genomic research and innovation to reduce greenhouse gas emissions and the carbon footprint of Canada's food production systems to build their resiliency, environmental sustainability and economic viability.

The scope of this funding opportunity includes areas where genomic technologies are used to help achieve net-zero emissions by 2050 and reduce the carbon footprint of Canada's agriculture and food production system. Projects should seek solutions that will increase the value created by production systems without increasing greenhouse gas emissions or amplifying negative impacts on the natural environment.

The Initiative will fund a portfolio of Interdisciplinary Challenge Team (ICT) projects that will be supported, coordinated and connected through cross-cutting programs in knowledge mobilization, data coordination and implementation. This portfolio approach allows the benefits from one solution to be applied to other food production systems or supply chains such that the impacts can cascade throughout the broader food system.

Data are a central component of the Initiative. Data will act as a bridge or connector between projects and as an output supporting the ability to achieve and measure impact across a diverse portfolio of projects.

To that end, this Initiative will fund two cross-cutting coordination Hubs: the Data Coordination and Collaboration Hub (hereafter "the Data Hub"), which will focus on data, and the Knowledge Mobilization and Implementation Coordination Hub (hereafter "the KMIC Hub"), which will focus on knowledge mobilization and implementation. These Hubs will provide administrative, technical and coordination leadership to the project portfolio with a focus on:

- Intentionally connecting projects across the ICT portfolio.
- Supporting the coordination and alignment of portfolio activities across projects.
- Engaging stakeholders and end users at the portfolio level.
- Adding value to project outputs.
- Addressing gaps to create portfolio coherence in achieving impacts.

A single pan-Canadian team will be selected to provide data coordination and technical expertise for the portfolio of projects. This team will work with the ICTs and other partners to develop and implement a portfolio data plan.

The Data Hub will be responsible for coordinating the scientific data within the portfolio that are required to validate and replicate research findings, regardless of whether the data are used to support scholarly publications. Beyond genomic datasets, relevant scientific findings will include information about how the data were generated (e.g., software, workflows and protocols) and the context in which the data should be interpreted (e.g., metadata, policy, socio-economic measures, etc.). Collectively, scientific data outputs from the Initiative will be referred to as "data assets."

The Data Hub intends to leverage existing digital research infrastructure or software platforms and focus on adding value to these, as opposed to engineering new software. Moreover, the intent is to support the success of individual projects by providing data resources and broader connections to stakeholders. To facilitate climate impact, the Data Hub will help provide a common framework for portfolio outputs. It will not link disparate projects under one overarching research question.

The Data Hub will be responsible for data governance, research data management, and data analytics:

- Data governance will ensure that the appropriate data stewardship and data-sharing policies are implemented for access, security and privacy.
- Research data management will focus on the infrastructure for data storage, processing and data-sharing. This will include advancing data interoperability standards to optimize data flow and linkages.
- Data analytics will provide value to the portfolio through expertise in statistics, machine learning and artificial intelligence (AI). Analytics would include developing tools and workflows that support ICTs and/or that make the data more useful to external partners.

It will be critically important for the Data Hub and KMIC Hub to work together to coordinate their activities across the portfolio, informing each other's data and knowledge mobilization portfolio-level strategies. Both Hubs will require formal mechanisms and structures to ensure coordination and co-creation of work across the portfolio and with each other. Governance structures will support this. Genome Canada and the relevant Genome Centres will have ongoing, direct relationships with the Hubs to drive strategic objectives in knowledge mobilization and data coordination.

2. Objectives

This funding opportunity aims to support a single pan-Canadian team that will develop and implement a data plan for Genome Canada's Climate-Smart Agriculture and Food Systems Initiative. First, the team will internally coordinate data-related activities across the interdisciplinary research teams to add value and consistency to the genomic data assets that are being generated. Second, the team will help the projects leverage these data assets to externally advance genomic technologies and policies that have the potential to measurably mitigate climate change, such as by reducing greenhouse gas emissions and/or increasing carbon sequestration.

The broader vision is to co-develop the foundation of a collaborative Canadian climate genomic data hub.

3. Funding available and term

- Only one pan-Canadian team will be funded.
- Up to $4 million of Genome Canada funding will be available for the Data Hub project. This includes up to $1.5 million for the first phase and up to $2.5 million for the second and third phases.
- A detailed budget is required for the first phase. A high-level budget is required for the second and third phases.
- Co-funding that is at least equal to the Genome Canada contribution is required.
- There is a 100 per cent co-funding commitment required for the first phase at the time of the release of funds.
- The term is five years.

4. Phased approach

It is essential to have a robust data voice at the portfolio level during the planning stages of the Initiative. It is also necessary to recognize that there will be uncertainty in the role of data across diverse projects during the initial stages of the Initiative, and to make accommodations accordingly. In recognition of these factors, a phased approach to activities and funding is being undertaken.

Phase 1. Engagement and development of the portfolio data plan. During years one and two, the Data Hub will:

- Establish **mechanisms and structures** (e.g., regular meetings, working groups, training, education, etc.) across the portfolio to:
    - understand the needs of both the projects and the portfolio
    - build awareness, knowledge and expertise across the portfolio
    - coordinate and co-create work across the portfolio.
- Identify **gaps and opportunities** at the portfolio level and corresponding **use cases** that the Data Hub will address.
- Undertake **prototype and/or test activities** that will inform and lay the groundwork for the implementation phase.
- Identify and engage key **external stakeholders**—including end users, policy- and decision-makers, under-represented groups and industry—to inform the work and drive uptake and implementation of data components.
- Advance the **harmonization** of project-specific data plans into a portfolio data plan.

During this phase, it will be important for **the Data Hub and the KMIC Hub to establish mechanisms and structures to work together**, coordinate efforts and co-create portfolio-level plans and activities.

Expected outputs at this stage include:

- Evidence of structures in place to coordinate and co-create the data processes and assets across the portfolio and with the KMIC Hub.
- An evaluation of the prototype and/or test activities, including an assessment of how they will inform the portfolio data plan for the implementation phase.

- A comprehensive portfolio data plan for the implementation phase (e.g., data governance, management and analysis activities). The plan should include activities that address gaps and opportunities within the portfolio (e.g., new research methods, data generation to build a gold standard dataset, accreditation of a new industry data standard, or the development of a bioinformatics tool that informs policy).

The Portfolio Oversight Committee will review these outputs and recommend what is required to move to the next phase.

Phase 2. Implementation of the portfolio data plan. To initiate this phase, the Data Hub and the KMIC Hub will have their portfolio plans approved at the end of phase 1. The Data Hub will work on completing the portfolio data plan within years three and four. That plan will include the data governance, data management, and analysis elements described previously. The transition from the development phase to implementation will provide an opportunity to update the project budget and bring new skills and partners aboard to align with the activities in the consensus portfolio data plan.

During the implementation phase, the Data Hub will work closely with the KMIC Hub to help ensure that the data and other outputs collectively translate into climate change impact.

Expected outputs at this stage include:
- Evidence that milestones and deliverables are on track from the portfolio data plan.
- A plan to ensure transition and sustainability beyond the project, including any revisions to activities and/or budget within year five to address the plan.

The Portfolio Oversight Committee will review these outputs and recommend what is required to move to the next phase.

Phase 3. Sustainability and transition planning. During year five, the emphasis will be on developing a sustainability plan to ensure that the outputs of the Initiative continue to have the desired impact. This work could include cooperating with Genome Canada and other stakeholders to transition the leadership of this work, transfer research and innovation to others, and help identify new objectives and funding.

5. Required elements

Applicant teams will describe a proposed portfolio data plan that is ambitious and achievable. The activities should focus on the development phase. There will be three main sections in the application form:

- Vision for the Data Hub (i.e., data governance, data management, data analysis).
- A development phase plan (i.e., mechanisms and structures needed to coordinate across the portfolio, understand the gaps and use cases, and develop portfolio data plan).
- Management and finance (i.e., team, decision-making processes, and resourcing to achieve the project objectives).

Hubs must have a dedicated project manager with sufficient administrative support to coordinate Hub-specific activities. In addition, each Hub will contribute

the budgetary equivalent of 0.5 of a full-time employee to pay for a portfolio-level project manager responsible for coordinating shared activities.

6. Application process

Only one team will be funded. Applicants are required to apply for funding through a regional Genome Centre.

Registration

Applicants will use a brief registration form to indicate their interest in applying to the competition. The form will include the applicant's information, details about the composition of the provisional team, and a list of partners. Information from eligible registrations—that is, the name(s) of the Project Leader(s) and lead institutions—will be posted on the Genome Canada website. Applicants who are deemed eligible will be invited to submit a full proposal.

Full proposal stage

Full proposals must address the required elements for the competition—that is, a vision for the Data Hub, the development phase plan, and management and finance details.

A committee with expertise in assessing all of the review criteria of the competition will review the full proposal. The project that best meets the competition's criteria will be considered for a portfolio review. This review will take into account synergies with ICT and KMIC Hub projects.

The evaluation processes may be adjusted where warranted by the complexity or number of applications received or by other relevant factors. Any changes will be communicated through Genome Canada's website and the Genome Centres.

7. Timeline

Activity	**Date**
Launch of funding opportunity	August 23, 2022
Registrations due at a Genome Centre	December 2022*
Full application due at a Genome Centre	May 2023*
Application review	May 2023
Notification of decision to teams	Early July 2023
ICT and Hub teams convened	May-late July 2023

**Please check date with your regional Genome Centre.*

8. Contacts

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Appendix 1. Data Hub evaluation criteria

Eligibility criteria

1. The team must be pan-Canadian with representation from *at least* three provinces.

2. The team must include relevant expertise in:
   - Data governance (i.e., data-sharing, access, security and privacy policy).
   - Data management (i.e., standards, metadata, data portals and cloud computing).
   - Data analytics (i.e., bioinformatics, statistics, and AI).
   - Agriculture science (e.g., crops and livestock).
   - Climate science (e.g., carbon accounting, climate modelling, geographic information systems).

3. The project must include public or private sector partner(s) to:
   - Support computational infrastructure and longer-term sustainability.
   - Facilitate the downstream use and/or impact of the data resources.

4. Project leaders from the ICT teams cannot be Project Leaders of the Hubs. However, members of the ICT teams can be involved in the Hub team as co-applicants.

Phase 1 review criteria

For each of required element, it is important for the application to provide examples of how various team members have a proven track record in leading and delivering the following pieces. In reviewing plans, evaluators will assess:

1. Vision for the Data Hub

1.1 Data governance

- **Governance.** The degree to which the data governance and data stewardship vision is appropriate within the context of the Initiative.

1.2 Data management

- **Merit.** The degree to which the proposed data infrastructure is technically well described, achievable and appropriate to ensure the Initiative will deliver the desired impact.
- **Sustainable.** The degree to which the proposed vision leverages existing technology platforms and digital partners (private and public).
- **Interoperable.** The degree to which the proposed data infrastructure is standards-based, includes relevant metadata, and is consistent with FAIR principles (i.e., findability, accessibility, interoperability, and reusability).
- **Extensible.** The degree to which the proposed vision will be extensible, modular or reusable in climate genomics beyond agricultural food systems (e.g., in biodiversity, the circular bioeconomy or forestry).
- **Scalable.** The degree to which the proposed vision is production-ready and scalable.

1.3 Data analysis

- **Analysis.** The degree to which the vision for analyses and tool development will advance the Initiative objective and facilitate climate impact.

- **AI.** The degree to which the vision meaningfully incorporates AI (e.g., AI training data and resources, AI-generated synthetic data or digital twins, or AI approaches to specific climate problems).

2. Development phase plan

- **Coordination**. The degree to which the proposed structures and mechanisms will facilitate synergies, knowledge exchange and co-creation across the portfolio.
- **Use cases**. The degree to which the proposed activities to identify gaps, opportunities and use cases will inform the portfolio data plan and overall success of the Initiative.
- **Prototyping and/or testing.** The degree to which the proposed activities to prototype and/or test functionality will inform the portfolio data plan and overall success of the Initiative.
- **Harmonization.** The degree to which the planned activities will help harmonize project data plans into a portfolio data plan.

3. Management and finance

- **Team.** The degree to which the team has the right expertise to develop and implement the different elements of the portfolio data plan.
- **Management.** The degree to which the management and decision-making plan is appropriate.
- **Budget.** The degree to which the budget is appropriate and justified for the proposed activities.
- **Equity, diversity and inclusion (EDI).** The degree to which EDI principles are incorporated into the proposed plan, including team membership, partnerships and benefit-sharing.

Appendix 2. Data-sharing policy

Genome Canada will strictly adhere to and reinforce its **data release and sharing policy** for projects within the Initiative. The intent is that any activities associated with federal research funds will require data management and sharing plans that make data broadly available, including with and through the Data Hub. Any exceptions will need to be well justified. Compliance will be a condition of continued funding.

Genome Canada recognizes that different disciplines and research communities participating in the Initiative may have constraints related to data-sharing. These may include data privacy for competitive reasons (such as intellectual property or regulatory or jurisdictional requirements) as well as appropriate stewardship of Indigenous or environmentally sensitive data. It is also recognized that different disciplines and research communities participating in the Initiative will have existing internal data infrastructures and use established external international databases.

Therefore, the ICT and the Data Hub will work together to develop a portfolio data plan that not only aligns with any constraints, but supports and provides additional value to maximize benefits to Canada. Specifically, the plan will include a single point of entry to scientific resources and data assets that can be used beyond the Initiative to realize climate impact through appropriate data governance.