Climate Action Genomics Initiative *Climate-Smart Agriculture and Food Systems*

Interdisciplinary Challenge Teams

FUNDING OPPORTUNITY

1. Overview

Interdisciplinary Challenge Teams (ICTs) represent the largest, key component of the Climate Action Genomics Initiative (CAGI) – Climate-Smart Agriculture and Food Systems ("the Initiative"). ICTs are integrated teams of researchers from different disciplines and users who work together to address specific questions, achieve relevant deliverables and, ultimately, reduce the carbon footprint and greenhouse gas emissions of Canada's agriculture and food systems. As part of the Initiative portfolio, the teams will work toward broader national impacts that manifest value beyond each individual project. The ICTs will provide genomic solutions to help implement agriculture and food production systems that are climate-resilient, socially responsible, economically viable and environmentally sustainable, and that contribute to the mitigation of climate change impacts.

2. Objectives

The ICT funding opportunity aims to support teams that use genomic[1] approaches to achieve the overall objective of the Initiative, which is to develop and apply genomic tools and technologies to reduce greenhouse gas emissions and mitigate the carbon footprint of Canada's food systems to ensure they are resilient, economically viable and environmentally sustainable.

The scope of this funding opportunity will include 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. Furthermore, projects should demonstrate how their outputs could be translated into reduced emissions by taking

[1] The term genomics is defined here as the comprehensive study, using high throughput technologies, of the genetic information of a cell or organism and its functions. The definition also includes related disciplines, such as epigenomics, metabolomics, metagenomics, proteomics, transcriptomics, bioinformatics and synthetic biology, as long as the link to genetic information is clear.

into account the various dimensions of the food system value chain, including production, processing, distribution and consumption.

Applicants must demonstrate how their proposal has significant potential to achieve concrete deliverables by the end of the funding period. Proposals that make a strong case that their deliverables will translate into significant social and/or economic benefits that align with the Initiative's overall intended impact (i.e., the reduction of greenhouse gas emissions to lessen the carbon footprint of Canada's agriculture and food production systems) within the shortest time frame possible after the end of the project are particularly encouraged. Consideration will be given to what is reasonable for different research areas.

To ensure that the objectives of the funding opportunity are met, all applications must address the evaluation criteria established for the competition (see Appendix 1).

3. Available funding and term

- There is approximately $24 million available for the ICTs from Genome Canada.
- Genome Canada's maximum contribution to an approved project will be $3 million.
- There must be a minimum contribution of $1 million from Genome Canada to each approved project.
- A project's eligible costs must be co-funded from eligible sources such that the co-funding is at least equal to the Genome Canada contribution.
- Successful teams will be awarded funding for a term of up to four years.

It is anticipated that eight to 10 ICTs will be funded as part of the Initiative portfolio. The portfolio will also include a Data Coordinating Centre (DCC) as well as a Knowledge Mobilization[2] and Implementation Coordinating Centre (KMICC).

4. Research into the implications of genomics in society

Because genomics and its applications have the potential to make significant social and economic impacts, all ICTs must undertake research into the applications and implications of genomics in society—specifically, genomics and its ethical, environmental, economic, legal and social aspects (GE[3]LS[3]).

The GE[3]LS research supported in this competition should investigate aspects of responsible innovation, such as key factors that may facilitate or hinder the effective translation of research and uptake of genomic-based applications. GE[3]LS research deliverables should

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[2] In the context of this funding opportunity, knowledge mobilization encompasses a wide range of activities relating to the production and use of research results, including knowledge synthesis, dissemination, transfer, exchange and co-creation or co-production by researchers and knowledge users. See **https://www.sshrc-crsh.gc.ca/funding-financement/policies-politiques/knowledge_mobilisation-mobilisation_des_connaissances-eng.aspx#a1.**

[3] **The acronym GE[3]LS stands for genomics and its ethical, environmental, economic, legal and social aspects. However, it should be understood broadly as research into the implications of genomics in society from the perspective of the social sciences and humanities. Therefore, it is not strictly limited to the disciplines that comprise the acronym, but rather encompasses all those that rely on quantitative and qualitative methodologies to investigate the implications of genomics in society and to inform applications, practices and policies.**

inform and help implement changes in practices or policies related to the use of genomics research and innovation; drive the adoption, uptake, scale and spread of the innovation; and/or enhance the understanding of the implications of genomics in society more broadly. The GE³LS research must also address salient factors that will impact the advancement and application of the project's genomics research, and must be aligned with and complementary to the overall project and Initiative goals. The portfolio review will consider GE³LS research across the ICTs to ensure cohesion and avoid duplication. To this end, the GE³LS components within the ICTs must commit to working with other teams within the portfolio as well as with the project funded through the KMICC. Some revisions to the GE³LS research plans may be required to further align with the portfolio of funded projects and KMICC.

ICTs should also include knowledge mobilization, translation and implementation activities, and a knowledge mobilization plan, as described in Section 9, Impacts and Benefits for Canada.

5. Data management and data- and resource-sharing

The explosion of genomic data and associated metadata has led a proliferation of custom-built databases for handling complex (and sometimes sensitive) data sets. The patchwork nature of these repositories, given their various rules for access and lack of standard data formatting, presents barriers to uploading and downloading data sets. Good data management practices provide the foundation for effective data-sharing and improve the reproducibility and reliability of research findings. Data-sharing enables researchers to rigorously test the validity of research findings, strengthen analyses through combined data sets, reuse hard-to-generate data, and explore new frontiers of discovery.

ICTs must submit plans that explain how they will manage, preserve and share the scientific data and resources generated by the project. These plans must comply with Genome Canada's **Data Release and Sharing Policies** and commit to working with the DCC. Revisions to teams' data plans may be required to further align with the portfolio of funded projects and the DCC.

Data plans are expected to reflect internationally accepted standards and include a description of elements, such as: the type and quantity of data that are being generated through the project; the metadata and controlled languages that will be used or advanced; the timing of data-generating and -sharing; data governance and stewardship requirements; and barriers or limitations to data-sharing and how they will be addressed. Projects should consider, where relevant, international agreements that may affect their research plans as well as their data- and resource-sharing plans.
Approved ICTs, together with the DCC and the KMICC, will co-develop a joint portfolio data plan. The ICTs will commit to adhering to the data plan, including timely data-sharing and standardized processes as a condition of ongoing funding.

The ICTs are expected to work together to identify barriers and leverage opportunities to create national data assets that are capable of having impacts beyond the sum of individual contributions.

6. Eligibility

Each proposal will be reviewed for eligibility at each stage of the application process. The following criteria will be used:
- Does the proposal respond to the program objectives?
- Does the proposal include genomics approaches as essential components in terms of importance to the overall project outcomes?
- Does the proposal include GE^{3}LS research, whether as the major focus or as an integrated component?
- Does the proposal's scale and scope enable it to address challenges requiring a genomics approach, compete internationally and make a major impact?

ICTs must focus on the use of genomic approaches to deliver genomic tools and technologies that mitigate the impacts of climate change and ensure Canada's food systems are resilient, economically viable and environmentally sustainable.

To be eligible, projects must demonstrate how genomic technologies have the potential to address one or more of the following impact areas:
- Reduced greenhouse gas emissions and carbon footprint from food production and inputs manufacturing.
- Enhanced carbon sequestration to improve performance, mitigate climate impacts and support healthy ecosystems.
- Resilient and sustainable food systems that reduce environmental impacts and greenhouse gas emissions.
- Novel nature-based solutions and processes that can replace traditional consumptive production processes with sustainable and circular solutions for the environment and economy.

While projects can seek to increase the productivity of an agriculture or food production system, this increase must not come at the cost of a net increase in emissions, increased use of inputs, or unintended disturbance of natural landscapes.

This competition provides an opportunity for research teams to propose large-scale projects that would be part of even larger national and international research initiatives, as long as the eligibility criteria are met.

6.1. Eligible research areas

Some examples of eligible research areas include, but are not limited to, using genomics-based approaches to:
- Increase the production efficiencies of existing food systems of value to Canada while reducing their environmental footprints.
- Develop scalable applications using microbial communities to help build carbon-neutral agriculture and aquaculture production systems, such as soil, plant-microbe synergies, rumen or monogastric gut microbiome engineering, fermented foods and sustainable products.

- Characterize and develop cultivars and soil microbial communities that improve terrestrial carbon sequestration.
- Reduce the environmental footprints of crop, livestock and aquaculture production systems by decreasing the use of water, fertilizers and pesticides, reducing greenhouse gas emissions, and improving fish feed, resulting in improved sustainability.
- Create food products in new and sustainable ways, such as through the use of cell cultures, tissue engineering or precision fermentation-based techniques.
- Develop commercially viable production systems for emerging climate-smart options like seaweed, controlled-environment agriculture or alternative and plant-based proteins.
- Enhance food production in local communities (such as urban communities or remote or underserved areas) to limit transportation emissions.
- Develop food supply chains that are more efficient and less susceptible to spoilage and waste, for example by breeding for specific traits that improve crops' resistance to damage during harvesting, handling and storage.
- Develop more sustainable production systems for established input types, such as fertilizers or protectants.
- Develop novel production inputs that maintain or improve productivity while providing sustainability benefits, such as biostimulants, protectants (including RNA-based solutions), pre- and pro-biotics, and feed additives.

Some potential integrated GE^{3}LS topics include, but are not limited to:

- Exploring translational pathways, including social, political, regulatory, policy or economic factors that would accelerate the responsible uptake of genomics-based tools and technologies to reduce the carbon footprint of food production and investigating strategies that can foster receptivity.
- Exploring the effects of national policies and/or regulations on sector competitiveness and productivity.
- Investigating the influence of consumers' values and beliefs on the likely success of novel foods developed using nature-based solutions and processes (for example, consumer acceptance of foods developed through cell cultures, tissue engineering or precision fermentation-based techniques).
- Improving the effectiveness of regional, national and/or international sustainable production practices on food safety, security and sustainability.
- Developing models to encourage users (such as farmers) to adopt genomics tools for sequestering carbon in agricultural soils as a climate change mitigation strategy.

6.2. Non-eligible research areas

While projects focused on forest production systems cultivated for non-food products are not eligible, tree horticulture systems used for food production remain eligible.

Projects primarily focussed on the human health benefits of functional foods are not eligible.

7. Portfolio considerations

Funded ICTs will form the key components of an integrated portfolio of projects that will be managed to integrate activities and objectives across the various elements within the portfolio. The portfolio will be selected by an independent selection committee from full applications that have been deemed meritorious of funding after a rigorous peer review process.

Projects will be prioritized for inclusion in a portfolio based on the following considerations.

A. Potential for synergy across diverse topic areas, technologies and teams
- Ideally, the portfolio will include projects from a range of eligible areas to increase the portfolio's ability to generate benefits for a wide range of agriculture and food production systems.
- The portfolio should include teams that provide a diversity of experiences and expertise (technical and otherwise) to increase the potential for cross-ICT activities.
- A diversity of technologies, tools and processes should be included in the portfolio through different projects so that other projects can potentially draw on those resources to increase the impact of the overall portfolio. Project deliverables should present opportunities for the development of novel tools and approaches across the portfolio.

B. Potential for building on regional priorities for national impact
- As a whole portfolio, the ICTs must lead to reductions in the greenhouse gas emissions and carbon footprints of the activities and systems involved. A net emissions reduction should be realized at the portfolio level.
- The teams in the portfolio must have the ability to create value beyond the potential of the individual projects.
- The portfolio should address regional priorities that build national impact, resulting in a pan-Canadian portfolio.
- The portfolio of projects should complement broader national efforts in this area.

C. Potential for effective coordination
- To realize impact, the portfolio should create a path to implementation for the portfolio deliverables. This includes the potential for coordinated knowledge mobilization and implementation, based on the quality of the knowledge mobilization plan included in the individual ICT application but considered in the broader context of an integrated portfolio.
- The portfolio should have the potential for coordinated and meaningful outreach and engagement with the broader ecosystem.
- The portfolio should have the ability and opportunity to create coordinated and cohesive systems for data generation, storage and sharing.

Projects that are selected for inclusion in the portfolio will be convened shortly after funding decisions to further identify opportunities for alignment and synergy between individual projects, as well as coordination of research methodologies, implementation and data-generating and -sharing activities. Mechanisms will be put into place to ensure that teams

involved in funded projects within the portfolio regularly connect, convene and learn from each other in order to support the overall Initiative's research, knowledge mobilization and implementation, outreach and engagement, and data-generating and -sharing activities.

Each project must have human and financial resources allocated to help ensure coordination across the portfolio, to support portfolio cross-cutting activities, and to inform and develop portfolio relevant activities.

8. User engagement

All projects must clearly demonstrate engagement with users (as well as with stakeholders and rights holders) in the development and execution of the research plan to help ensure the uptake and practical applicability of the research. This engagement should inform the genomics research, the GE^{3}LS research and, to the extent possible, the integration of the GE^{3}LS research into the overall project.

"Users" are defined as those who are able to use the information generated by research to make informed decisions on relevant issues, policies, programs and product development. Examples of user organizations include industry and industry associations, government departments and regulatory agencies.

Users must be clearly integrated into the project team in the form of a project team member, collaborator and/or member of the management team. Users are encouraged to collaborate actively in the priority-setting and conduct of the research as well as in summarizing, distributing, sharing and applying its resulting knowledge. Co-funding would clearly demonstrate user interest in the project's potential deliverables, although user organizations are not required to contribute to co-funding.

9. Impact and benefits for Canada

All applications must describe, with supporting evidence, the deliverable(s) that will be realized **by the end of the project** that have the potential to be translated into significant impact and benefits for Canada.

Each team must include a knowledge mobilization plan for its research that showcases how its work can help drive to a common impact across the Initiative portfolio. This plan should describe the appropriate target audiences and users who will be essential for the work to achieve broad impact, and how the team plans to increase the adoption, uptake, scale and spread of the outputs from the research and innovation funded.

ICTs should also include knowledge mobilization, translation and implementation activities to increase the impact of the research, facilitate connections, support collaborations, raise awareness of the new research and innovation, change systems and behaviours, increase engagement, break down barriers (such as in policy, public perception or data-sharing), and facilitate commercialization and creation of intellectual property (IP). In this context, knowledge mobilization can include activities such as knowledge translation, synthesis,

dissemination, stakeholder relations, user engagement, policy forums and outreach materials.

The knowledge mobilization plan must explain the next steps of how the deliverables from the research will be transferred, disseminated, used and/or applied to realize the benefits. The plan should outline the potential value proposition for the deliverables as they are implemented or commercialized, consideration factors such as market potential, alternatives, competitors and IP barriers. Furthermore, the plan should include a risk assessment that accounts for likely hurdles to adoption (such as legal, regulatory, social, economic, logistical hurdles).

Once funded, the project teams will be required to elaborate on this plan during the project's term to provide a more substantive business case describing the path forward. This requirement aims to ensure that the proposed deliverables feed into the Initiative's broader impacts.

10. Inclusion, diversity, equity and accessibility

A diverse and inclusive research community strengthens research deliverables, innovation and creativity. As such, Genome Canada has committed to making inclusion, diversity, equity and accessibility (IDEA) a priority by integrating IDEA principles into all funding opportunities. Therefore, project teams are expected to include plans to integrate IDEA-related considerations into their research design and practice, including but not limited to the participation of equity-deserving groups on research teams and/or as research users. Equity-deserving groups include, but are not limited to, women, Indigenous peoples, members of visible minorities, and persons with disabilities.

It is also expected that new researchers will be incorporated into the project team. New researchers are defined as early-stage investigators (i.e., within five years of their first appointment allowing them eligibility as per Genome Canada Guidelines). The five-year window should take into account instances where a researcher has had an acceptable delay in research or a period of inactivity, such as due to illness, parental leave, etc.

11. Indigenous engagement

Research done with Indigenous communities, on Indigenous lands and/or incorporating Indigenous knowledge has been under-recognized, under-valued, under-funded and often conducted in a culturally insensitive manner. Genome Canada recognizes that Indigenous communities have unique approaches to research in the areas of climate change that are rooted in their unique experiences and relationships with the natural world.

Research projects that address issues of relevance to Indigenous peoples are expected to include a plan to engage Indigenous peoples, including First Nations, Métis and Inuit peoples, in research design and practice. The plan should specify how Indigenous groups will participate on the research team and/or as users of the research, as well as how

Indigenous knowledge systems (including ontologies, epistemologies and methodologies) will co-exist with and complement the project's other activities. Projects involving Indigenous research should be conducted with sensitivity, and only after carefully considering who will conduct the research and why and how it will be conducted. The research should be conducted in line with **the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans Chapter 9: Research Involving the First Nations, Inuit and Métis Peoples of Canada,** and **the First Nations principles of ownership, control, access and possession (OCAP®).**

12. Timeline

Project support requests must be submitted to Genome Canada through a regional Genome Centre. Please contact your Genome Centre for further information about its process and internal deadline dates.

May 12, 2022	Launch of funding opportunity
Please check with your Genome Centre	Deadline for submitting registration to a Genome Centre
Mid-July 2022	Virtual information session(s) with members of registered ICTs
Please check with your Genome Centre	Deadline for submitting Letter of Intent (LOI) to a Genome Centre
Early November 2022	Applicants notified of results of LOI after peer review organized by Genome Canada
Please check with your Genome Centre	Deadline for submitting full application to a Genome Centre
Mid-February 2023	Genome Canada's review committee meets
End of February 2023	Portfolio selection committee meets
End of March 2023	Notification of decision
May 2023	Teams convened

13. Application process

Applicants are required to apply for funding through their regional Genome Centre. The application process comprises three steps: registration, LOI and full application. Both the LOI and full application steps will include an element of portfolio review.

13.1. Registration

A brief registration form will be used to indicate each applicant's interest in applying to the competition. The registration will include applicant information, a brief description of the project—including integrated GE^{3}LS, research methodologies and technologies—expected deliverables, approximate budget and suggested reviewers. Registration enables an eligibility check and facilitates the early selection of reviewers for the peer review process. Information from eligible registrations—that is, the name(s) of project leader(s), lead institution, title of project and a brief project description—will be posted on the Genome Canada website so researchers can identify areas of potential synergy between proposals across the country and consider engaging with others on common projects.

Virtual information sessions with members of the eligible registered ICTs will be organized and delivered in conjunction with the Genome Centres. These sessions will focus on the objectives of the Initiative and ICT program as well as the project and portfolio review processes and review criteria, and will provide a further opportunity for teams to come together.

13.2. Letter of Intent

For the LOI, applicants will be asked to submit a short description of:
- The proposed research plan, including integrated GE^{3}LS research.
- How the team will engage users in the project.
- The expected deliverables of the research.
- The potential impact and benefits for Canada.

LOIs will be reviewed in two stages. The first stage will involve an initial review that will be done by a college of reviewers (all subject matter experts). These reviewers will focus on the quality of the research plan and the potential benefits for Canada. Reviews will rate the quality of the research proposal and potential for benefits. A ranking of the LOIs will be prepared. The LOIs with the lowest scores will not be considered further.

The second stage will involve review by a committee with broad expertise in research, portfolio design and management, mission-oriented innovation policy, and climate change policies. This second stage will consider the reviews from the first stage and finalize the assessment of the LOIs based on the quality of the research plans and their potential benefits. This committee will also carry out an initial review based on the portfolio selection criteria: the potential for synergy across a diversity of topic areas, technologies and teams; the potential for building on regional priorities for national impact; and the potential for effective coordination. Only those LOIs that have demonstrated the best combination of quality of research, potential for impact and benefits for Canada, and potential for being part of a portfolio (see Section 7, Portfolio considerations) will be invited to submit a full application.

Information from approved LOIs will be posted on the Genome Canada website, including the names of project leaders and lead institutions, project titles and abstracts.

13.3. Full application

Applicants who succeed at the LOI stage will be asked to submit a full application. Full applications must address the evaluation criteria for individual projects established for the competition—that is, quality of the research proposal, impact and benefits for Canada, and management and financial competency. The projects considered the most meritorious will be considered for inclusion in the portfolio.

13.3.1. Review as individual projects

A multidisciplinary committee of experts with expertise in assessing all of the review criteria will review applications. It is expected that the review committee will meet with and interview representatives from each project through virtual or in-person meetings. Projects that best meet the competition's criteria will advance to the portfolio selection stage.

13.3.2. Portfolio review

The portfolio selection committee—with broad expertise in research, portfolio design and management, mission-oriented innovation policy, and climate change policies—will select the final portfolio of ICT projects. The committee will base its selection on the potential for synergy across a diversity of topic areas, technologies and teams; the potential for building on regional priorities for national impact; and the potential for effective coordination (see Section 7, Portfolio considerations). The committee is accountable for recommending the component ICTs at the core of the portfolio to Genome Canada's Board of Directors for decision.

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.

14. Project management and oversight

All funded projects must adhere to Genome Canada's **[Guidelines for Funding](#).**

14.1. Project managers

Each approved project must have a dedicated project manager. The project manager will coordinate the project's administrative and reporting requirements and support its research enterprise and engagement with the rest of the Initiative portfolio.

14.2 Project oversight

Each ICT will have a Research Oversight Committee (ROC) constituted by and reporting to the Genome Centre and Genome Canada. The ROC will review and report on the progress being made by the project and make recommendations to the funders regarding continued funding. It will also provide advice and guidance to the research team to help ensure that

the project achieves its stated objectives and milestones and works toward coordinated portfolio impacts.

The membership of the ROC must be completely independent from the project, with no real or perceived conflicts of interest, and should be composed of experts who will work with the Genome Centre, Genome Canada and other funders to maximize the successful outcomes of the project. A portion of the funds awarded to each project will be designated to cover costs associated with the project's ROC. Contact your regional Genome Centre for additional information.

Portfolio governance structures will be created to ensure cohesive and coordinated oversight of the projects within the portfolio.

Mechanisms will also be put into place to ensure that teams working on funded projects in the portfolio have the opportunity to regularly connect, convene and learn from each other and that the group is enabled to collectively support the Initiative's research, knowledge mobilization and implementation, and data-generating and -sharing activities.

15. Co-funding

A project's eligible costs must be co-funded from eligible sources such that the co-funding is at least equal to the Genome Canada contribution. To be considered as an eligible funding source, co-funding for this competition must be for research activities that are an integral part of the Genome Canada–approved project and must be for eligible costs specifically requested in the Genome Canada budget. See the Genome Canada **Guidelines for Funding** for more details.

16. Contacts

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Appendix 1. Evaluation criteria

Proposals submitted to Genome Canada are evaluated through a rigorous, independent peer review process to assess their research merit and potential for impacts and benefits for Canada and to ensure that sound management and financial practices are implemented.

Eligibility criteria

Each proposal will be reviewed for eligibility at each stage of the application process. The criteria listed in Section 6 of the funding opportunity will be used.

Review criteria
If considered eligible, the proposal will be reviewed using criteria from the following three categories:

1. Research proposal
2. Impact and benefits for Canada
3. Management and finance

Note that the descriptive phrases that follow the criteria below are not all-inclusive.

1. Research proposal

Including research into the implications of genomics and its ethical, environmental, economic, legal and social aspects (GE^{3}LS)

- Research context and originality
    - To what extent does the proposed research lead, extend and/or complement national and international work in the area?
    - To what extent does the proposed research reflect creative and original thinking?
    - To what extent is the research relevant to the users identified?

- Research plans
    - How appropriate are the methods and approaches in terms of the research objectives?
    - How feasible is the research, given the projected resources and timelines?

- Inclusion, diversity, equity and accessibility
    - How appropriate is the plan to integrate considerations related to inclusion, diversity, equity and accessibility (IDEA) into the project's research design and practice, including the participation of equity-deserving groups on the research team and/or as users of the research?

- Indigenous engagement and knowledge systems
    - If the project addresses issues of relevance to Indigenous peoples:

- To what extent has the team engaged with and included Indigenous Peoples and voices in their research plan?
- How well has the team included Indigenous knowledge systems (including ontologies, epistemologies and methodologies)?
- To what extent is the proposal in line with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, **Chapter 9: Research Involving the First Nations, Inuit and Métis Peoples of Canada**, and the **First Nations principles of ownership, control, access and possession (OCAP®)**?

- Data and resource management and sharing plans
  - To what extent are the plans for generating, managing and analyzing data appropriate and achievable within the scope of the project?
  - To what extent are the plans for sharing data and resources timely and robust across the project (e.g., interoperable application programming interfaces (APIs) and standards), portfolio (i.e., data flow or linkages to the Data Coordination Centre), and wider community (e.g., international database submission)?
  - To what extent are the data governance and data stewardship plans appropriate within the context of the project (e.g., how well do they address privacy, security and the FAIR principles [findability, accessibility, interoperability and reusability])?
  - Note that:
    - The plans must comply with **Genome Canada's Data Release and Sharing Policies.**
    - The team must commit to adhere to data governance, data standards, analysis methodologies and data flow as eventually determined by the portfolio.
    - The team must share and preserve data and accompanying metadata using existing repositories rather than keeping them only with the researcher or institution, and must provide these upon request.

- Research expertise
  - How appropriate is the expertise and track record of the research team in terms of realizing the research goals?
  - To what extent does the proposal contain plans to include new researchers, including those who are new to genomics and are early-stage investigators (defined as being within five years of their first appointment allowing them to be an eligible individual as per **Genome Canada's Guidelines for Funding**)?
  - How well will different types of expertise be integrated?

- Research environment
  - How suitable are the available facilities, equipment and services?

- Specific criteria for the **integration** of GE^{3}LS research into the overall proposal

- To what extent does the GE^{3}LS investigation address salient factors that will impact the advancement and application of the genomics research in the Initiative, and to what extent do the GE^{3}LS research questions support the objectives and expected outcomes?
- To what extent is the GE^{3}LS research plan integrated—in other words, is it aligned with, and complementary to, the overall project goals? If the GE^{3}LS research were to be taken out of the project, would the project's viability be affected?

2. Impact and benefits for Canada

- Deliverables
  - To what extent have the applicants identified appropriate deliverables in terms of their potential to have impact and social or economic benefits for Canada?
  - What is the likelihood that the deliverables will be achieved by the end of the funding period?

- Expected benefits
  - How significant are the anticipated benefits described in the proposal in terms of their potential to contribute to the Initiative's objectives?
  - If a project is addressing a regional priority, to what extent does it also have the potential to offer national benefits?
  - How convincing is the assessment of the value of the benefits (including economic aspects, where applicable)?
  - Are the benefits realistic and achievable within the proposed time frame?

- Plan for realizing benefits
  - How strong is the plan for knowledge mobilization and development of benefits? In other words, how well does the plan explain the potential value proposition for the deliverables and the next steps for transferring the deliverables from the research, including the plans for uptake by users?
  - How well does the risk assessment account for likely hurdles to adoption, such as intellectual property barriers?
  - How closely aligned is the plan for knowledge mobilization with the GE^{3}LS research and the overall deliverables and outcomes of the project?

- Expertise for realizing benefits
  - How appropriate are the expertise and track record of the team that will further develop and implement the plan for realizing benefits?
  - To what extent are likely users involved in the project and the plan to realize benefits?
  - If the plan includes commercialization, to what extent has appropriate technology transfer expertise been included?

3. Management and finance

- Management plans and expertise
  - How well does the management plan cover project governance, personnel accountabilities, and processes for decision-making on the research direction and strategy for realizing benefits?
  - How realistic is the project schedule, given the likely need to accelerate activities at the front end?
  - How credible is the management plan in terms of the project's coordination of current and future partnerships, including coordination with other projects in the portfolio?
  - Are the proposed arrangements with technology service providers sufficiently articulated to ensure the provider can complete the requested service(s) in the time frame required by the applicant?
  - To what extent do the project leaders have a management structure in place that will allow them to effectively manage large-scale projects involving research and the application of results?
  - How appropriate are the plans to ensure that an adequate number of highly qualified personnel—meaning both support personnel (such as technicians) and trainees (such as post-doctoral fellows)—are available to meet the needs of the proposed research through recruitment and/or training? How well do the plans integrate IDEA-related considerations?

- Portfolio and cross-cutting support
  - To what extent do the proposed plan and budget (including the human resources allocated) support the realistic involvement and meaningful contribution to portfolio-level activities, coordination and support?

- Communication and outreach
  - What is the likely effectiveness of the proposed plans for communicating within the project, with the Genome Centre, with collaborators and partners, and with the scientific community?
  - To what extent will the team involve research users in their communication and outreach plans?
  - How well do the communication and outreach plans mobilize knowledge to build public awareness of, and literacy in, genomics and help drive the adoption of genomics solutions with the potential to contribute to the impact of this Initiative?

- Budget and expenditure controls
  - How reasonable is the proposed budget in terms of the anticipated level of effort and deliverables?
  - To what extent are the budget and proposed expenditures well documented and eligible per the guidelines?
  - To what extent does the proposal provide assurance that expenditures from a funded project would be closely and critically monitored?

- Financing from co-funders

- To what extent is the proposed co-funding plan well documented, eligible and feasible?
- Does the proposed co-funding directly support the project's objectives?
- How likely is it that the project will be able to secure at least 75 per cent of the co-funding for eligible costs before the deadline for the release of funds?