Natural Sciences and Engineering Research Council of Canada

2019–20

Departmental Results Report

The Honorable Navdeep Bains, P.C., M.P.
Minister of Innovation, Science and Industry

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Minister's message

It is our pleasure to present the 2019-20 Departmental Results Report for the Natural Sciences and Engineering Research Council of Canada (NSERC). As the Department continues to mobilize industry and the research community to confront the COVID-19 pandemic, the various organizations in the ISED Portfolio have coordinated their efforts to position Canada as a global innovation leader and shape an inclusive economy for all Canadians.

With the onset of the global COVID-19 pandemic, Canada and nations around the world are facing unprecedented health, economic and social challenges. While the 2019-2020 Departmental Results Report outlines major accomplishments before the outbreak, it underscores the critical importance of sustained support for natural sciences and engineering research in Canada. NSERC, in close collaboration with its funding agency counterparts has made great strides in strengthening Canada's research and innovation ecosystem through investments in discovery research, research talent development and research partnerships based on principles of research excellence, equity, diversity and inclusion and the application of knowledge for the social and economic wellbeing of Canadians. These investments will help provide the necessary knowledge base and expertise in supporting the response to and the recovery from the most significant challenges of our generation.

The Honourable Navdeep Bains
Minister of Innovation, Science and Industry

These are just a few examples of NSERC's work on behalf of Canadians regardless of their background, region or generation. We invite you to read this report to learn more about how we are making a difference for Canadians through ground breaking discovery research, support for innovation and the development of talent in natural sciences and engineering research.

Institutional Head's message

It is my pleasure to present NSERC's 2019-20 Departmental Results Report.

Since 1978, NSERC has played a critically important role in the evolution of natural sciences and engineering research in Canada. Thanks to NSERC's support, scientists and engineers across Canada are engaged in cutting-edge research and innovation that produce important benefits for all Canadians. Likewise, NSERC's programs benefit thousands of students and postdoctoral fellows across the country, and provide the stable long-term support that deep, multi-year research requires to tackle complex problems. NSERC also supported creative public outreach activities, explaining and promoting the value of science and engineering to our citizens, especially to young people.

Dr. Alejandro Adem
President

With the historic investments of over $500 million over five years in support of science and research announced in Budget 2018 and support for new postgraduate research scholarships in Budget 2019, NSERC is well positioned to deliver on the Government of Canada's objectives in advancing knowledge, skills and innovation for the benefit of all Canadians.

NSERC's Departmental Results Report demonstrates delivery on our objectives and intended results for making Canadian natural sciences and engineering research internationally competitive, developing a pool of highly skilled people, and ensuring that the results of the research we fund is used for the benefit of all Canadians.

In 2019-20, NSERC worked in collaboration with our partners, the Social Sciences and Humanities Research Council, the Canadian Institutes of Health Research, the Canada Foundation for Innovation and other agencies to provide equitable and inclusive participation in the research system; to support early career researchers and to strengthen Indigenous research capacity in Canada through our Discovery and Research Partnership Programs and policies.

We are facing unprecedented times as we work to adapt the delivery of our programs through the pandemic. Over the past few months we have learned a lot and adjusted as we navigate on this uncertain journey. NSERC will continue to support the development and application of scientific knowledge which will guide us through these challenging times.

Results at a glance and operating context

In 2019-20, NSERC supported over 12,000 researchers including scientists and engineers and nearly 32,800 trainees at post-secondary institutions across Canada through its funding opportunities under the Discovery Research Program as well as the Research Training and Talent Development Program, the Research Partnerships Program and the College and Community Innovation Program. In 2019-20, NSERC implemented investments and recommendations from Budget 2018 and Budget 2019 as follows:

1. Worked in collaboration with the Social Sciences and Humanities Research Council (SSHRC) and the Canadian Institutes of Health Research (CIHR) to support the Canadian Research Coordinating Committee (CRCC), which aims to improve collaboration, co-ordination and harmonization among the granting agencies and the Canada Foundation for Innovation[i] (CFI) to the benefit of researchers and research trainees across Canada. In 2019-20, NSERC advanced implementation of many key initiatives outlined in the Tri-agency EDI Action Plan on Equity Diversity and Inclusion[ii].

2. Provided additional support to launch early career researchers through the Discovery Launch Supplements[iii] and the execution of the Tri-council Early Career Researcher (ECR) Action Plan. In 2019-20, 543 supplements, valued at $12,500 each, provided timely resources to support ECRs as they establish their research programs and hire students in diverse areas ranging from environmental sciences and agriculture to information and communications technologies.

3. Increased direct support to students by 500 awards for both the Master's and doctoral levels (Canada Graduate Scholarships program). In addition, Paid Parental Leave duration was expanded from six to twelve months.

4. Continued the implementation of a Tri-agency Action Plan on Equity, Diversity and Inclusion (EDI) to achieve greater diversity among research funding recipients, including improved support equity-seeking groups. As of spring 2020, over a hundred postsecondary institutions and other organizations have endorsed the Dimensions Charter[iv], including ten federal government departments and agencies.

5. Held the fifth Discovery Frontiers competition and awarded $1M per year for 4 years for a proposal entitled "Antimicrobial resistance genes in bioaerosols in Canadian arctic, rural, and urban environments: sources, profiles, transport and fate".

6. Supported the development of a Tri-agency research strategy with Indigenous communities, *Setting New Directions to Support Indigenous Research and Research Training in Canada*.

7. Launched [Alliance Grants][v] the new NSERC Research Partnerships, which replaces six prior partnership programs resulting in a single point of entry to encourage and support university researchers to collaborate with a broader range of partner organizations. In 2019-20, NSERC received 234 Alliance program applications and funded 107 awards. One hundred and sixty-five (165) private businesses, 38 public organizations and 32 not-for-profits collaborated on Alliance grants.

8. Increased support for collaborative innovation projects involving businesses, colleges and polytechnics through the [College and Community Innovation][vi] (CCI) Program, a Tri-agency program managed by NSERC. In 2019-20, over $75 million was awarded to fund 988 college collaborations with over 1200 partners.

9. Continued to pursue actions to provide international research and training opportunities to Canada's natural sciences and engineering research community. In the fall of 2019, NSERC participated in the [Resilience in Rapidly Changing Arctic Systems (Arctic II)][vii] Belmont Forum Collaborative Research Action competition in Moscow. NSERC awarded $450,000 over three years to two projects resulting from this competition to complement funding from international collaborators in France, Norway and Sweden.

Operating Context

NSERC's main stakeholders are Canada's postsecondary institutions, their faculty, their students, and Canadian business enterprises that conduct and fund R&D. Canadian universities, colleges and polytechnics are challenged by increasing enrolments, changing student demographics, aging faculty, and a lack of diversity of faculty and students in some science and engineering disciplines. Postsecondary institutions are striving to better equip their graduates with market-ready skills that employers are demanding. Canadian business investment in R&D is relatively low compared to the average of OECD countries. Canada's business expenditures on R&D as a share of the Gross Domestic Product (GDP) have been on the decline since 2001. Canadian expenditures in Higher Education R&D have not kept pace with other OECD countries over the past decade. With new investments announced in Budget 2018 in support of fundamental science and streamlining business facing programs, NSERC continues to implement new program and policy initiatives to embed the principles of equity, diversity and inclusion within Canada's post-secondary research enterprise, provide greater opportunities for early career researchers, and improve the effectiveness and efficiency of the agency's research partnership program delivery.

In addition to continuing to deliver its programs in the most efficient and effective manner possible, over 2019–20 NSERC managed its priorities in response to external influences, including the implementation of actions from the government's response to Canada's Fundamental Science Review[viii], including the review of Tri-agency scholarship and fellowship programs and the direction provided by the Government of Canada's mandate to support innovation ecosystems across the country. NSERC continued to work closely with its partner agencies to advance new priorities articulated by the Canada Research Coordinating Committee[ix], mandated to achieve greater harmonization, integration and co-ordination of research-related programs and policies.

For more information on NSERC's plans, priorities and results achieved, see the "Results: what we achieved" section of this report.

Results: what we achieved

Core responsibility

Funding Natural Sciences and Engineering Research and Training.

Description: The Natural Sciences and Engineering Research Council of Canada (NSERC), through grants, fellowships and scholarships, promotes and supports research and research training in the natural sciences and engineering to develop talent, generate discoveries, and support innovation in pursuit of economic and social outcomes for Canadians.

Results:

Departmental Result: Canada's natural sciences and engineering research is internationally competitive.

This result is aligned with the Government of Canada's mandate to support innovation ecosystems across the country. NSERC contributed to this mandate by supporting research excellence. The levers to influence this result and its indicators were primarily delivered through NSERC's funding envelopes and mechanisms. NSERC continued to support the Minister of Innovation, Science and Industry in his mandate to address the great challenges of our age, including climate change, clean growth, and a healthy society.

In 2019-20, NSERC supported over 12,000 researchers including scientists and engineers and nearly 32,800 trainees at post-secondary institutions across Canada through its funding opportunities under the Discovery Research, Research Training and Talent Development, and Research Partnerships Programs. 60% of NSERC Discovery Grants and over 50% of NSERC Alliance grants are used for student training. The publication of research results in peer-reviewed journals provides a good measure of discovery and knowledge generated in the natural sciences and engineering (NSE) in Canada, and citations of these publications provide a measure of knowledge flow and the influence of Canadian researchers. The ranking of Canada among OECD nations on the average citation in the NSE illustrates Canada's international competitive strength. Based on the most recent data available (2018), Canada ranked 18th among the 37 OECD countries with an Average Relative Citation (ARC) score[1] of 1.37.

In 2019-20, NSERC continued to work in collaboration with the Social Sciences and Humanities Research Council (SSHRC) and the Canadian Institutes of Health Research (CIHR) to support the Canada Research Coordinating Committee (CRCC), which aims to improve collaboration, co-ordination and harmonization among the granting agencies and the Canada Foundation for Innovation (CFI) to the benefit of researchers and

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[1] (Luxembourg ranked first with an ARC of 1.80). It should be noted that a small change in the ARC value can lead to a large shift in the ranking of a country.

research trainees across Canada. [The Dimensions: equity, diversity and inclusion Canada pilot program](#)[x] was officially launched on May 9, 2019. As of spring 2020, over one hundred postsecondary institutions and other organizations have endorsed the [Dimensions Charter](#)[xi], including 10 federal departments and agencies. Following a competitive process in summer 2019, 17 universities and colleges were selected to form a cohort engaged in the co-development of the program; an additional 23 institutions are involved as affiliates.

The [Equity, Diversity and Inclusion Institutional Capacity-Building Grant](#)[xii] funding opportunity announced in Budget 2018 was launched in January 2019. The fifteen awarded institutions received $2.66 million in 2019-20 and have submitted their mid-year reports in early 2020 and final reports are expected in spring 2021. The second-round of the pilot program will be launched in Fall 2020.

NSERC also continued to support the CRCC's priorities of developing a Tri-Agency research strategy with Indigenous communities, and supporting the development of early career researchers (ECR).

In support of the CRCC's priority to co-develop with Indigenous Peoples an interdisciplinary research and research training model that contributes to reconciliation, in November 2019, the CRCC approved the Strengthening Indigenous Research Capacity (SIRC) Strategic Plan: *[Setting New Directions to Support Indigenous Research and Research Training in Canada, 2019-2022](#)[xiii]*. The Strategic Plan outlines four key strategic directions that reflect new models for Indigenous research and research training that cover and extend beyond the requirements of Call to Action 65:

- Building relationships with First Nations, Inuit and Métis People
- Supporting research priorities of Indigenous Peoples
- Creating greater funding accessibility to granting agency programs
- Championing Indigenous leadership, self-determination and capacity building in research

Preparation of the implementation plan is underway and consultations and stakeholder engagements will continue.

NSERC continued to work alongside its Tri-Agency partners to identify the best methods to deliver training support. This included adopting a common Tri-Agency definition for an early career researcher and supporting the CRCC's ECR plan to help early career researchers succeed in the research enterprise. In 2019-20, NSERC continued providing targeted investments in ECRs through the [Discovery Launch Supplements](#) and the execution of the Tri-agency ECR Action Plan. In 2019-20, 543 supplements valued at $12,500 each, provided timely resources to support ECRs as they establish their research programs and hire students in areas ranging from environmental sciences and agriculture to information and communications technologies. As a result of these initiatives, the Discovery Research Program committed $101 million over six years to ECRs.

To promote and maintain a diversified base of high-quality research across Canada and provide a stimulating environment for research training in small universities across Canada, NSERC continued its Discovery Development Grants[xiv] pilot program. Award levels were increased from $10,000 to $15,000, and 50 recipients received $740,000 in 2019-20.

In 2019-20, NSERC continued to seek opportunities to participate in international funding opportunities and leverage NSERC's investments by providing opportunities for international collaboration. In the fall of 2019, NSERC participated in the *Resilience in Rapidly Changing Arctic Systems (Arctic II)* Belmont Forum Collaborative Research Action competition in Moscow. For this competition, 22 eligible proposals were submitted, including 10 with Canadian participants requesting NSERC funds. Following peer review and funding agency negotiations, 8 grants were awarded in total, including two with Canadian NSERC participants (one Canadian lead). NSERC awarded these projects $450,000 over three years to complement funding from international collaborators in France, Norway and Sweden. As part of its membership in Belmont Forum (an international research funding network dedicated to advancing sustainable development goals), NSERC participated in the annual fall plenary meeting in Taipei as the Canadian representative, contributed staff support to Belmont Forum Secretariat throughout the year and participated as a member of the External Evaluation Task Group.

In April 2020, NSERC awarded the ALPHA-Canada subatomic physics[xv] project funding over three years, enabling Canadian researchers to continue to play a leading role in experiments run by an international collaboration at the Antiproton Decelerator at CERN, the largest particle physics laboratory in the world. ALPHA-Canada represents more than a third of the overall collaboration and continues to advance the field of antihydrogen physics.

International collaboration enables Canadian researchers to keep abreast of the latest research results and to leverage international research capacity. In 2019–20, 47 percent of NSERC-funded research involved international collaboration.

In 2019-20, the Department of National Defence (DND) and NSERC jointly supported university-based research and training by connecting academic researchers with industry and DND researchers. The DND/NSERC Discovery Grant Supplements[xvi] support discovery-based research dedicated to the development of non-weapon specific technologies with dual-use applications in defence and security target areas. In 2019-20, $1.7 million was awarded to 14 recipients over three years.

Discovery Frontiers[xvii] grants address national research priorities and global challenges, and are led by world-class Canadian researchers with international collaborations. In 2019, NSERC held the fifth Discovery Frontiers competition, Antimicrobial Resistance in the Environment. An international review committee met virtually in April 2019 to review 22 letters of intent and selected 5 groups to submit a full application. An international selection committee met in October 2019 and recommended $1M per year for 4 years funding for "Antimicrobial resistance genes in bioaerosols in Canadian arctic, rural, and

urban environments: sources, profiles, transport and fate". The project involves international collaborators from China, France and the United States.

Three competitions were launched under the [New Frontiers in Research Fund](#)[xviii] (NFRF), a tri-agency program administered by the Social Science and Humanities Research Council (SSHRC) on behalf of the all three federal granting agencies that focuses on research that is international, interdisciplinary, high risk, and fast-breaking.

- In 2019-20, the Exploration stream, which focuses on high risk, high reward and interdisciplinary research, awarded 186 grants with a total value of $46 million over two years. Thirty eight per cent of the awarded proposals were led by Early Career Researchers (ECR).
- The inaugural Transformation stream was launched in December 2019. Transformation stream awards support large-scale, world-leading, Canadian-led interdisciplinary research projects that address a major challenge with the potential to realize real and lasting change. The first awards will be granted in September 2021.
- The inaugural International stream was launched in January 2020 to support Canadian researchers partnering on large international projects supported through Horizon 2020.

In addition to the three funding opportunities, NFRF also supported fast-breaking, rapid-response research related to COVID-19. Fifteen projects, identified through the CIHR-led Government of Canada rapid research response, in partnership with several organizations, were awarded $7 million in funding from NFRF. NSERC participated actively in the rapid response call with CIHR and fully funded one project.

Departmental Result: Canada has a pool of highly skilled people in the natural sciences and engineering.

This result is aligned with the Government of Canada's Innovation and Skills Plan, as NSERC seeks to foster an entrepreneurial and highly skilled workforce. The People and Skills pillar of Canada's Innovation and Skills Plan supports Canadians throughout their lifetimes, ensuring firms have the talent they need to grow. From inspiring youth to pursue careers in coding to lifelong skills development, its interconnected suite of programs use partnerships to build a resilient and skilled workforce for the future. The Innovation and Skills Plan was introduced as a vehicle to foster new partnerships to leverage Canada's innovation strengths to bridge the gaps from science, to commercialization, to investment and scale up.

Through its funding opportunities, NSERC supports the attraction, retention and development of highly qualified and skilled people in the NSE in Canada. These activities are essential to building the human capital required to enable a strong, globally competitive research and innovation system in Canada. Researchers, students and young people benefit from the grant, scholarship and award funding, which supports postsecondary university research as well as outreach activities at universities, museums, science centres, and community-based organizations. NSERC currently

supports 32,800 post-secondary students and postdoctoral fellows, slightly lower than the target of 33,000, due to the Experience Awards being sunset.

In 2019-20, NSERC continued its national leadership of science and engineering promotion in Canada. Promoting an understanding of science, technology, engineering and mathematics (STEM) to young Canadians may encourage them to study the NSE at the postsecondary level. In 2019-20, NSERC continued its partnerships with likeminded organizations to support Science Odyssey[xix] and Science Literacy Week[xx]. In 2019 Science Odyssey celebrated its fourth edition from May 4 to 19. Given the increasing success of this national campaign, led and coordinated by NSERC, a growing number of participant organizations have adopted Science Odyssey as a staple in their yearly programming. In 2019, for the first time, Science Odyssey was a 16-day celebration, offering three-weekends of science in Canada! In 2019, 508 partners hosted 1051 events in 281 cities and communities across Canada. Almost 500,000 people across Canada participated in events over the 16 days of celebrations. To help facilitate participation in the events, additional grants of up to $5,000 were awarded to PromoScience grantees: 82 grants for Science Odyssey and 56 grants for Science Literacy Week.

In direct support to the next generation of scientists and engineers, NSERC and Ingenium have renewed their commitment to collaborate for the next three years. In Spring 2019, the Ingenium-NSERC STEAM Horizon Awards[xxi] were presented to five young people, including two candidates from Indigenous communities.

The 2019 (September 16 to 22) Science Literacy Week celebrated oceans as the theme in recognition of the UN decade of Oceans Research. It included over 650 events put on by more than 300 partners in 250 cities across Canada. While events took place throughout the entire week, Science Literacy Week reached a peak on Wednesday, September 18, 2019, with the celebration of National Science Reading Day! To prepare for this day, NSERC worked in partnership with Les explorateurs, Les débrouillards, Curium (French only) and Owl Kids magazines to organize two contests. The contests were designed to encourage children and adults across the country to devote some of their time to reading about science. Over 48,000 children and adults, including students from 1,630 different classrooms, took part in the contest and spent part of their day reading a book, a magazine, a comic or any other form of science writing that piqued their interest.

In May 2019, the Little Inventors: Inventions for Space Challenge[xxii] hosted an extraordinary closing event in Fredericton, NB, with Canadian astronaut David Saint-Jacques presenting the two challenge winners during a special live downlink from the International Space Station. More than 600 students were in attendance in the University of New Brunswick auditorium and many hundreds more followed through a Facebook live event.

In total, the Space Challenge reached over 83,000 children from all provinces and territories across Canada. Close to 3,000 invention ideas were submitted from over 150 participating schools. A total of 30 objects were prototyped out from the invention ideas

submitted. These objects were exhibited in Fredericton to more than 10,000 students participating in the Canada-Wide Science Fair STEM Expo. Some objects have been exhibited since then at the Montreal Science Centre, a few others were presented during Science Literacy Week in September at the Canada Aviation and Space Museum. A prototype is also shown at the Little Canada Museum in Toronto, and two students presented their inventions to Prime Minister Justin Trudeau during the Prime Minister's Science Fair[xxiii].

In 2019-20, NSERC continued to deliver its PromoScience grants[xxiv] with a sustained focus on science teachers and on underrepresented groups such as girls and Indigenous youth. In 2019, over $10 million in funding was awarded to 86 grantees over a three-year period. Of these 86 grants, 33 included teacher resources/training while 33 focused on girls and 58 focused on Indigenous youth. Funding of more than $187,000 was awarded through the PromoScience Supplements for collaboration to support 13 different partnerships within the science promotion community that will contribute to STEM learning opportunities for youth.

To strengthen the promotion of STEM fields to Canadian youth, NSERC has been running a five-year pilot of the micro-funding instrument promoted by Treasury Board to experiment with an innovative approach to distribute grants (low-value payments of up to $1,000) to individuals and not-for-profit organizations. In 2019–20, 49 recipients in eight different provinces received grants through the NSERC Student Ambassadors grants and through the NSERC Young Innovators[xxv] grants, 63 organizations in 12 provinces/territories were provided with grants of $1,000.

Through its scholarship, fellowship and grant funding opportunities, NSERC continued support the development of highly qualified "marketplace-ready" people in the NSE. In 2019-20, 30% of NSERC supported research trainees gained industrial experience. NSERC continued to deliver the Collaborative Research and Training Experience[xxvi] (CREATE), which provided enhanced opportunities for research trainees to develop technical and professional skills, and to gain experience in enriched and varied research environments. In 2019–20, 93 awardees received $25 million dollars, and over 75% of the reported CREATE internships offered trainees experience in an industrial setting to over 700 students. These actions align with the government priority of helping employers create more co-op placements for students in STEM fields.

Budget 2019 included a number of measures linked to the 2018 Scholarships and Fellowships Study and Horizontal Review of Skills Programming. In particular, direct support to students was increased by 500 awards for both the Master's and doctoral levels (Canada Graduate Scholarships program). In addition, Paid Parental Leave duration was expanded from six to twelve months. Implementation of these measures was completed in 2019-20.

CIHR led the evaluation of the Vanier Canada Graduate Scholarship[xxvii] (Vanier CGS) program, in collaboration with NSERC and SSHRC. The evaluation assesses the needs addressed by the program, the effectiveness of program design in supporting outcomes, and the achievement of expected results during the period from 2013-14 to 2017-18.

Moreover, NSERC also supported additional Canada Graduate Scholarships through investments from Budget 2019.

Departmental Result: Canada's natural sciences and engineering research knowledge is used.

This result is meaningful to Canadians as it demonstrates the transfer of knowledge and skills to the user sector leading to the commercialization of Canada's NSE research through new products, services, and processes for the benefit of all Canadians.

In 2019-20 NSERC supported the Minister of Innovation, Science and Industry's mandate to help Canadian businesses innovate and grow so that they can create good quality jobs and wealth for Canadians. Through its research partnerships funding opportunities, NSERC supported innovation ecosystems across the country, particularly those based on partnerships between businesses and postsecondary institutions, to support job creation, technology adoption, investment and scale-up. In 2019-20, over 2,100 NSERC-funded researchers worked with 3,245 non-academic partner organizations, including companies, societies and associations. These collaborations build on strong discovery research to mobilize knowledge that allows Canada to address complex challenges, generate economic benefits and support evidence-based decision making and leveraged over $281 million of cash and in-kind contributions from private sector research partners to enable researchers to advance scientific knowledge, address real world challenges, and connect people and skills.

NSERC continued to capture information from partners on outcomes at the end of the partnered grants. At the end of fiscal year 2019-20, over 12,000 reports have been received since 2016 that cover the major funding opportunities within the Research Partnerships program. To date, partners have reported the following:

- 97% would recommend academic collaborations to others

- 76% said the project enhanced the knowledge and skills of personnel

- 52% developed or improved a product, process or service

- 93% said the project achieved its objectives

- 83% reported a public good impact as a result of the partnership (social, environmental or policy)

- one in three said the research results helped to reduce environmental impact

The research partnerships also provided a rich learning environment that offered student trainees the opportunity to add to their experience by working with users of knowledge on real world challenges. In 2019-20, 30% of students supported through NSERC grants gained industrial experience. Students and trainees who perform research as part of their studies are provided with leading-edge learning as well as employment opportunities. Over 33% of the partners reported hiring a student from the

research project. By mobilizing knowledge, these trainees reciprocally provide leading-edge science and technology expertise to innovative companies and organizations across Canada. With the NSERC partnership grants, approximately 50% of researchers' grant funding is used to pay for student stipends who build important competencies while working as part of academic-industry collaborations.

In compliance with the 2018 Federal Budget directive to simplify modernize and improve funding opportunities that are available to support research partnerships, Alliance Grants were created and implemented in 2019-20. Alliance replaces six prior partnership programs resulting in a single point of entry to encourage and support university researchers to collaborate with a broader range of partner organizations. These grants support research projects led by strong, complementary, collaborative teams that will generate new knowledge and accelerate the application of research results to create benefits for Canada. In 2019-20, NSERC received 234 Alliance grant applications and funded 107 awards involving collaborations with 165 private businesses, 38 public and 32 not-for-profit organizations.

Applicants to the Alliance program were also asked to consider sex, gender and diversity in the project's research design as well as among the group of co-applicants, collaborators and trainees. Project plans will be encouraged to promote and support a variety of forms of mentoring to ensure trainees' equitable participation and growth. In 2019-20, 73% of the teams that applied and 72% of awarded teams demonstrated diversity in at least one of the four categories (women, Indigenous peoples, persons with disabilities and visible minorities).

In 2019-20, NSERC invested new funds allocated in Budget 2018 ($140 million over five years) to increase support for collaborative innovation projects involving businesses, colleges and polytechnics through the College and Community Innovation (CCI) Program, a Tri-agency program managed by NSERC. The CCI program continues to increase awareness about the capacity of postsecondary institutions to assist local businesses with applied research projects. In 2019-20, over $75 million was awarded to fund 988 college collaborations with over 1200 partners. Forty-seven percent of the collaborations included new partners (public, private and not-for-profit organizations) that had not previously collaborated with a college. College students acquired applied research knowledge and experience and exposure to business work environments through the program, with 10% of partners indicating that they hired a college student after the grant.

In 2019-20, the Centres of Excellence for Commercialization and Research (CECR)[xxviii] and the Business-led Networks of Centres of Excellence (BL-NCE)[xxix] programs continued to help connect businesses to Canada's world-class research enterprise. The responsibility for NCE-funded programs will be gradually transferred to ISED's Strategic Innovation Fund, ensuring that the programs continue to support BL-networks and centres, until the end of their funding agreements.

The Networks of Centres of Excellence (NCE)[xxx] program continued to mobilize multi-disciplinary research teams from across the country to help find solutions to major

social, economic or health issues for Canada and train the next generation of highly qualified personnel. The gradual transition of NCE funding to the New Frontiers in Research Fund [xxxi] will continue over the next few years with a complete wind-down of the NCE suite of programs by 2023-24. During the transition period, networks will continue to be fully supported until the end of their funding agreement.

In 2019-20 in addition to collaborative research initiatives in emerging and priority areas of importance to Canada such as Arctic, antimicrobial resistance and quantum computing, NSERC also collaborated with other government departments including the Department of Fisheries and Oceans with three awards of $50,000 for Whales Science for Tomorrow initiative[xxxii] and Environment and Climate Change Canada with $1.7 million to fund nine awards to the Advancing Climate Change Science in Canada initiative[xxxiii].

Gender-based analysis plus

Through the coordinated work of the three agencies (NSERC, SSHRC and CIHR), key initiatives outlined in the Tri-agency Equity Diversity and Inclusion Action Plan[xxxiv] will continue to be implemented, including the mandatory GBA+ training for program and policy staff, with 81% of the targeted workforce having completed the training as of March 2020. In September 2019, the Tri-Agency Statement on Equity, Diversity and Inclusion[xxxv] was published. In particular, specific training commitments aimed at agency staff, peer reviewers and selection committee members, and governance/advisory board members to support their EDI competencies were developed as part of the Federal Funding Agency Equity, Diversity and Inclusion Training Plan, presented to the CRCC in January 2020.

Highlight box: Key program and policy developments include:

- Conducted GBA+ analysis on eight existing or new funding opportunities;
- Started collecting self-identification from review committee members, in addition to the collection from applicants that was initiated in 2018-19. In 2019-20, 38% of NSERC review committee members were women;
- Introduced mandatory training on unconscious bias for grants and scholarships review committee members and recommended for external peer reviewers;
- Strengthened the consideration of equity, diversity, and inclusion considerations in research design and training of Highly Qualified Personnel in NSERC funding opportunities;
- Implemented program literature updates to increase recognition of outreach and mentoring in two funding opportunities;
- Introduced questions in the Discovery grant post-competition survey for evaluation group members to gather feedback from the community on research excellence; and
- Signed the San Francisco Declaration on Research Assessment (DORA)[xxxvi], recognizing the need to improve the ways in which the outputs of scholarly research are evaluated, beyond the widely used journal impact factor.

Results achieved

Departmental results	Performance indicators	Target	Date to achieve target	2017–18 Actual results	2018–19 Actual results	2019–20 Actual results
Canada's natural sciences and engineering research is internationally competitive	Canada's rank among OECD nations on the citation score of natural sciences and engineering research publications	22	March 31, 2020	15	18	N/A*
	Percentage of funded research involving international collaboration	57	March 31, 2020	47**	47**	N/A*
Canada has a pool of highly skilled people in the natural sciences and engineering	Proportion of award holders who are underrepresented individuals	29	March 31, 2020	28.5***	33***	32***
	Number of research trainees supported	33,000	March 31, 2020	34,400	37,700	32,800****
	Percentage of research trainees supported gaining industrial experience	30	March 31, 2020	28.5	36.3	30
	Percentage of previously funded research trainees that go on to work in a research position	67	March 31, 2020	N/A	80	N/A*****
Canada's natural sciences and engineering research knowledge is used	Partner funding for research projects	$225M	March 31, 2020	$248M	$269M	$281M
	Number of partners on research projects	3,700	March 31, 2020	3,710	3,760	3,245
	Percentage of funded projects reporting socioeconomic outcomes for Canadians	55	March 31, 2020	51	52	52

* Results are delayed one year, due to availability of data.
** Methodology to calculate the result updated to include NSERC-acknowledged papers only.

*** Percentage of funded researchers and research trainees who self-identify as a woman.

**** Result lower than target, due to Experience Awards being sunset.

*****Result available every two years.

Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)	2019–20 Difference (Actual spending minus Planned spending)
1,362,995,409	1,362,995,409	1,364,492,647	1,359,365,352	-3,630,057

Human resources (full-time equivalents)

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
456	471	15

* The variance in FTEs is due to the implementation of Budget 2018 measures (fundamental research, College and Community Innovation Program and Increasing Diversity in Science).

Financial, human resources and performance information for NSERC's Program Inventory is available in GC InfoBase[xxxvii].

Internal Services

Description

Internal Services are those groups of related activities and resources that the federal government considers to be services in support of programs and/or required to meet corporate obligations of an organization. Internal Services refers to the activities and resources of the 10 distinct service categories that support Program delivery in the organization, regardless of the Internal Services delivery model in a department. The 10 service categories are:

- ‣ Acquisition Management Services
- ‣ Communication Services
- ‣ Financial Management Services
- ‣ Human Resources Management Services
- ‣ Information Management Services
- ‣ Information Technology Services
- ‣ Legal Services
- ‣ Material Management Services
- ‣ Management and Oversight Services
- ‣ Real Property Management Services

Results

In 2019-20, NSERC made substantial progress in its workplace renewal project, preparing and equipping employees for the organization's transition to GC Workplace at our new office location (anticipated for 2021). Specifically, NSERC rolled out mobile work tools (e.g., tablets, iPhones, remote access keys) and processes (e.g., Digital Authorization Directive) throughout the year. As a result, when COVID-19 required all employees to work remotely at the end of 2019-20, many employees were already equipped and the organization was well positioned to speed up the process and provide tools and training to the remaining employees. NSERC also engaged with PSPC on an ongoing basis to plan our future physical space, feeding the process with information gathered through employee consultation.

NSERC has extended its People Strategy Action Plans, including the Employment Equity, Official Languages, and Mental Health and Wellbeing plans. This allowed the organization to continue ongoing activities while gathering information and setting the foundation for an updated HR strategy.

Results of the 2019 Public Service Employee Survey show NSERC's continued strengths in employee engagement, quality supervision, respectful workplace, bilingualism, and support for work-life balance. While results related to harassment are generally positive, NSERC pushes for constant improvement. This year, training on civility and respect became mandatory for all employees, NSERC launched an Action

Plan to Prevent Harassment and Violence, and targeted measures were put in place for any units of concern.

NSERC continues to plan for several key compliance activities, waiting on direction from core agencies. Migration to the TBS required Financial Management System has been postponed to 2022-23, updates to the Policy on Transfer Payments were postponed to 2020-21, and revised TBS policies and directives for HR were only released in Q4 of 2019-20.

NSERC continued to work with CIHR and SSHRC on the Tri-Agency Grants Management Solution[xxxviii] (TGMS) initiative to harmonize and modernize grants management to better support applicants, administrators and reviewers across the entire grants management lifecycle. To help identify areas for improvement TGMS delivered journey-mapping workshops to a targeted group of internal and external users who shared and documented their experiences with current systems.

Budgetary financial resources (dollars)

2019–20 Main Estimates	2019–20 Planned spending	2019–20 Total authorities available for use	2019–20 Actual spending (authorities used)	2019–20 Difference (Actual spending minus Planned spending)
23,998,403	23,998,403	21,415,086	26,605,581	2,607,178

* The variance is due to the investment in technology to support Council-wide teleworking due to the COVID-19 pandemic.

Human resources (full-time equivalents)

2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2019–20 Difference (Actual full-time equivalents minus Planned full-time equivalents)
156	168	12

* The variance in FTEs is due to the implementation of Budget 2018 measures (fundamental research, College and Community Innovation Program and Increasing Diversity in Science).

Analysis of trends in spending and human resources

Actual expenditures

Departmental spending trend graph

The following graph presents planned (voted and statutory spending) over time.

	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23
☐ Statutory	6	6	6	6	6	6
■ Voted	1,213	1,324	1,359	1,359	1,373	1,317
Total	1,219	1,330	1,365	1,365	1,379	1,323

The y-axis is labeled [Financial unit of measure] and ranges from 1,100 to 1,400.
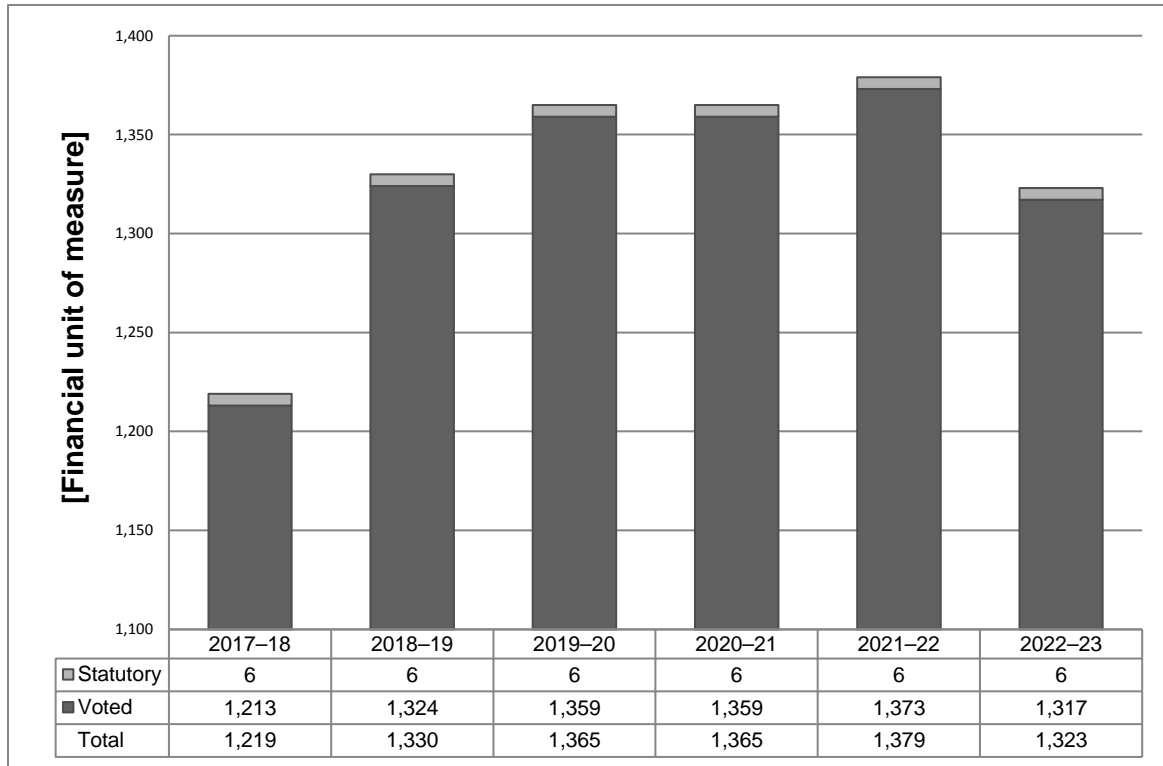
Budgetary performance summary for Core Responsibilities and Internal Services (dollars)

Core responsibilities and Internal Services	2019–20 Main Estimates	2019–20 Planned spending	2020–21 Planned spending	2021–22 Planned spending	2019–20 Total authorities available for use	2017–18 Actual spending (authorities used)	2018–19 Actual spending (authorities used)	2019–20 Actual spending (authorities used)
Funding Natural Sciences and Engineering Research and Training	1,332,842,006	1,332,842,006	1,341,810,544	1,355,799,029	1,343,077,561	1,198,380,206	1,306,959,366	1,332,759,771
Budget Implementation vote – unallocated authorities	6,155,000	6,155,000	0	0	0	0	0	0
Subtotal	1,338,997,006	1,338,997,006	1,341,810,544	1,355,799,029	1,343,077,561	1,198,380,206	1,306,959,366	1,332,759,771
Internal Services	23,998,403	23,998,403	23,505,390	23,163,807	21,415,086	20,761,682	23,015,594	26,605,581
Total	1,362,995,409	1,356,840,409	1,365,315,934	1,378,962,836	1,364,492,647	1,219,141,888	1,329,974,960	1,359,365,352

* The variance of actuals is due to the increase of programs, communication and support services in delivering of funds for the implementation of Budget 2017 (PromoScience), Budget 2018 (fundamental research funding; College and Community Innovation Program; Canada Research Chairs program) and Budget 2019 (Canada Gaduate Scholarships; Paid Parental Leave).

Actual human resources

Human resources summary for core responsibilities and Internal Services

Core responsibilities and Internal Services	2017–18 Actual full-time equivalents	2018–19 Actual full-time equivalents	2019–20 Planned full-time equivalents	2019–20 Actual full-time equivalents	2020–21 Planned full-time equivalents	2021–22 Planned full-time equivalents
Funding Natural Sciences and Engineering Research and Training	284	284	300	303	299	297
Subtotal	284	284	300	303	299	297
Internal Services	138	147	156	168	156	156
Total	422	431	456	471	455	453

* The variance in actual FTE is due to the increase of programs, communication and support services in delivering of funds for the implementation of Budget 2017 (PromoScience) and Budget 2018 (fundamental research funding; College and Community Innovation Program; Canada Research Chairs program).

Expenditures by vote

For information on NSERC's organizational voted and statutory expenditures, consult the Public Accounts of Canada 2019–2020.[xxxix]

Government of Canada spending and activities

Information on the alignment of NSERC's spending with the Government of Canada's spending and activities is available in GC InfoBase.[xl]

Financial statements and financial statements highlights

Financial statements

NSERC's financial statements (unaudited) for the year ended March 31, 2020, are available on the departmental website.

Financial statement highlights

Condensed Statement of Operations (unaudited) for the year ended March 31, 2020 (dollars)

Financial information	2019–20 Planned results	2019–20 Actual results	2018–19 Actual results	Difference (2019–20 Actual results minus 2019–20 Planned results)	Difference (2019–20 Actual results minus 2018–19 Actual results)
Total expenses	1,363,475,933	1,364,777,116	1,335,062,820	1,301,183	29,714,296
Total revenues	178,779	152,681	178,224	(26,098)	(25,543)
Net cost of operations before government funding and transfers	1,363,297,154	1,364,624,435	1,334,884,596	1,327,281	29,739,839

*As per 2019-20 Future-Oriented Statement of Operations[xli].

The increase in total expenses over previous year is mainly due to variances in transfer payments in the following initiatives:

- an increase of $30.9 million from Budget 2018 for Fundamental Research;
- an increase of $7.8 million in Centres of Excellence for Commercialization and Research;
- an increase of $4.6 million for Canada Excellence Research Chairs;
- an increase of $4.3 million for Canada Graduate Scholarships;
- an increase of $3.6 million for College and Community Innovation program; and
- a net decrease of $23.4 million in Partnership programs (+4.4M in Alliance, -22.8M in strategic programs and -5.0M in University-Industry Collaborations).

Condensed Statement of Financial Position (unaudited) as of March 31, 2020 (dollars)

Financial information	2019–20	2018–19	Difference (2019–20 minus 2018–19)
Total net liabilities	45,898,127	10,808,068	35,090,059
Total net financial assets	43,870,662	8,441,417	35,429,245
Departmental net debt	2,027,465	2,366,651	(339,186)
Total non-financial assets	1,219,889	2,550,749	(1,330,860)
Departmental net financial position	(807,576)	184,098	(991,674)

The increase in net liabilities and net financial assets is mainly due to grants and scholarships recorded at the end of fiscal year 2019–20 but paid in 2020-21.

The decrease in non-financial assets is mainly due to the decrease in net NSERC's tangible capital assets, where depreciation exceeded investment during 2019-20.

Additional information

Organizational profile

Appropriate minister: Minister of Innovation, Science and Industry

The Honorable Navdeep Bains, P.C., M.P.

Institutional head: Dr. Alejandro Adem (President)

Ministerial portfolio: Innovation, Science and Economic Development

Enabling instrument: **Natural Sciences and Engineering Research Council Act**[xlii]
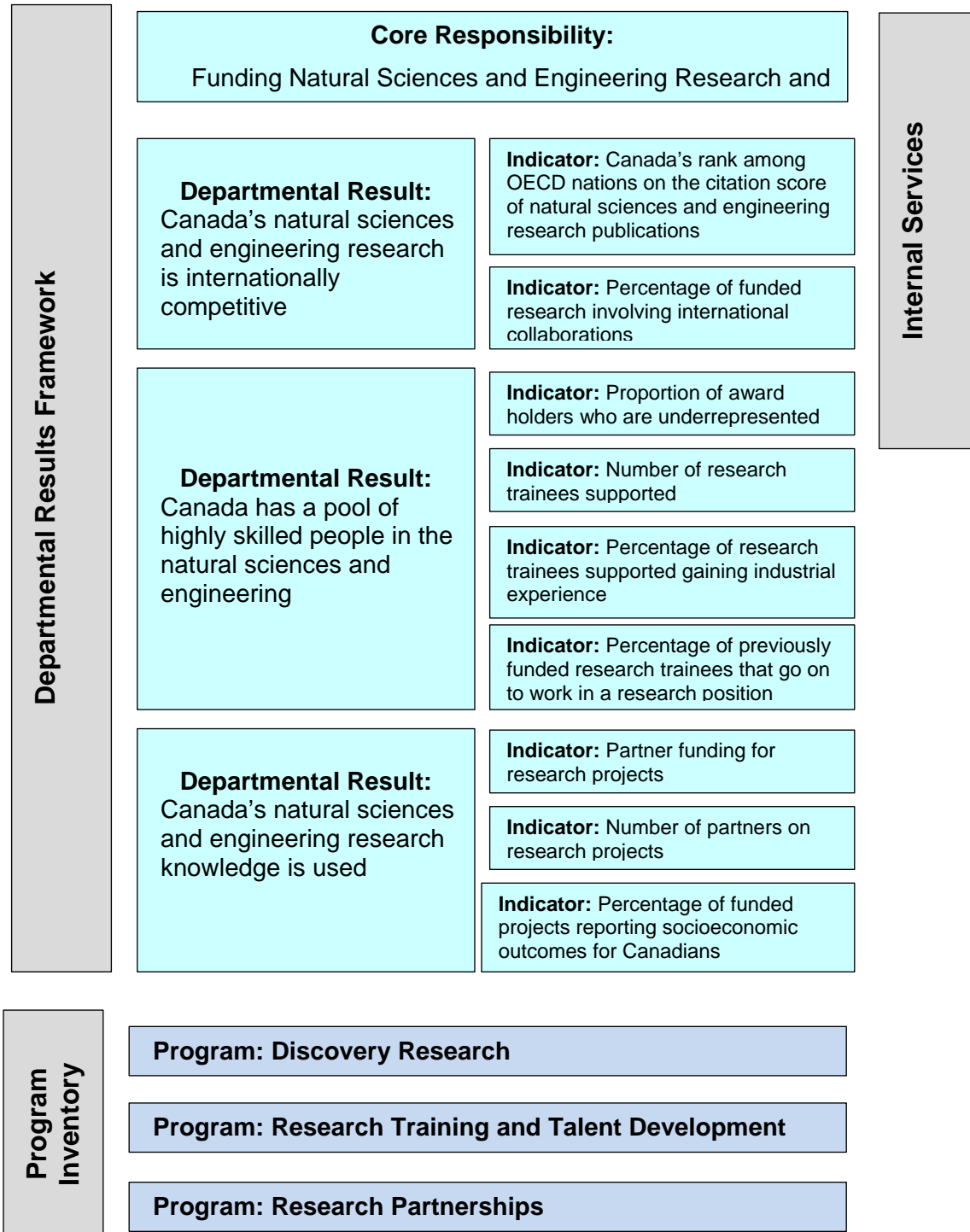
Year of incorporation / commencement: May 1, 1978

Raison d'être, mandate and role: who we are and what we do

"Raison d'être, mandate and role: who we are and what we do" is available on NSERC's website.

Reporting framework

NSERC's Departmental Results Framework and Program Inventory of record for 2019–20 are shown below.

Departmental Results Framework

Core Responsibility:
Funding Natural Sciences and Engineering Research and

Internal Services

Departmental Result: Canada's natural sciences and engineering research is internationally competitive

Indicator: Canada's rank among OECD nations on the citation score of natural sciences and engineering research publications

Indicator: Percentage of funded research involving international collaborations

Departmental Result: Canada has a pool of highly skilled people in the natural sciences and engineering

Indicator: Proportion of award holders who are underrepresented

Indicator: Number of research trainees supported

Indicator: Percentage of research trainees supported gaining industrial experience

Indicator: Percentage of previously funded research trainees that go on to work in a research position

Departmental Result: Canada's natural sciences and engineering research knowledge is used

Indicator: Partner funding for research projects

Indicator: Number of partners on research projects

Indicator: Percentage of funded projects reporting socioeconomic outcomes for Canadians

Program Inventory

Program: Discovery Research

Program: Research Training and Talent Development

Program: Research Partnerships

Supporting information on the program inventory

Financial, human resources and performance information for NSERC's Program Inventory is available in GC InfoBase. xliii

Supplementary information tables

The following supplementary information tables are available on NSERC's website:

▸ Departmental Sustainable Development Strategy
▸ Details on transfer payment programs of $5 million or more
▸ Gender-based analysis plus

Federal tax expenditures

The tax system can be used to achieve public policy objectives through the application of special measures such as low tax rates, exemptions, deductions, deferrals and credits. The Department of Finance Canada publishes cost estimates and projections for these measures each year in the Report on Federal Tax Expenditures. xliv This report also provides detailed background information on tax expenditures, including descriptions, objectives, historical information and references to related federal spending programs. The tax measures presented in this report are the responsibility of the Minister of Finance.

Organizational contact information

Mailing address

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Website: https://www.nserc-crsng.gc.ca/index_eng.asp

Appendix: definitions

appropriation (crédit)

Any authority of Parliament to pay money out of the Consolidated Revenue Fund.

budgetary expenditures (dépenses budgétaires)

Operating and capital expenditures; transfer payments to other levels of government, organizations or individuals; and payments to Crown corporations.

core responsibility (responsabilité essentielle)

An enduring function or role performed by a department. The intentions of the department with respect to a core responsibility are reflected in one or more related departmental results that the department seeks to contribute to or influence.

Departmental Plan (plan ministériel)

A report on the plans and expected performance of an appropriated department over a 3-year period. Departmental Plans are usually tabled in Parliament each spring.

departmental priority (priorité)

A plan or project that a department has chosen to focus and report on during the planning period. Priorities represent the things that are most important or what must be done first to support the achievement of the desired departmental results.

departmental result (résultat ministériel)

A consequence or outcome that a department seeks to achieve. A departmental result is often outside departments' immediate control, but it should be influenced by program-level outcomes.

departmental result indicator (indicateur de résultat ministériel)

A quantitative measure of progress on a departmental result.

departmental results framework (cadre ministériel des résultats)

A framework that connects the department's core responsibilities to its departmental results and departmental result indicators.

Departmental Results Report (rapport sur les résultats ministériels)

A report on a department's actual accomplishments against the plans, priorities and expected results set out in the corresponding Departmental Plan.

experimentation (expérimentation)

The conducting of activities that seek to first explore, then test and compare the effects and impacts of policies and interventions in order to inform evidence-based decision-making, and improve outcomes for Canadians, by learning what works, for whom and in what circumstances. Experimentation is related to, but distinct from innovation (the trying of new things), because it involves a rigorous comparison of results. For example, using a new website to communicate with Canadians can be an innovation; systematically testing the new website against existing outreach tools or an old website to see which one leads to more engagement, is experimentation.

full-time equivalent (équivalent temps plein)

A measure of the extent to which an employee represents a full person-year charge against a departmental budget. For a particular position, the full-time equivalent figure is the ratio of number of hours the person actually works divided by the standard number of hours set out in the person's collective agreement.

gender-based analysis plus (GBA+) (analyse comparative entre les sexes plus [ACS+])

An analytical process used to assess how diverse groups of women, men and gender-diverse people experience policies, programs and services based on multiple factors including race ethnicity, religion, age, and mental or physical disability.

government-wide priorities (priorités pangouvernementales)

For the purpose of the 2019–20 Departmental Results Report, those high-level themes outlining the government's agenda in the 2019 Speech from the Throne, namely: Fighting climate change; Strengthening the Middle Class; Walking the road of reconciliation; Keeping Canadians safe and healthy; and Positioning Canada for success in an uncertain world.

horizontal initiative (initiative horizontale)

An initiative where two or more federal organizations are given funding to pursue a shared outcome, often linked to a government priority.

non-budgetary expenditures (dépenses non budgétaires)

Net outlays and receipts related to loans, investments and advances, which change the composition of the financial assets of the Government of Canada.

performance (rendement)

What an organization did with its resources to achieve its results, how well those results compare to what the organization intended to achieve, and how well lessons learned have been identified.

performance indicator (indicateur de rendement)

A qualitative or quantitative means of measuring an output or outcome, with the intention of gauging the performance of an organization, program, policy or initiative respecting expected results.

performance reporting (production de rapports sur le rendement)

The process of communicating evidence-based performance information. Performance reporting supports decision making, accountability and transparency.

plan (plan)

The articulation of strategic choices, which provides information on how an organization intends to achieve its priorities and associated results. Generally, a plan will explain the logic behind the strategies chosen and tend to focus on actions that lead to the expected result.

planned spending (dépenses prévues)

For Departmental Plans and Departmental Results Reports, planned spending refers to those amounts presented in Main Estimates.

A department is expected to be aware of the authorities that it has sought and received. The determination of planned spending is a departmental responsibility, and departments must be able to defend the expenditure and accrual numbers presented in their Departmental Plans and Departmental Results Reports.

program (programme)

Individual or groups of services, activities or combinations thereof that are managed together within the department and focus on a specific set of outputs, outcomes or service levels.

program inventory (répertoire des programmes)

Identifies all the department's programs and describes how resources are organized to contribute to the department's core responsibilities and results.

result (résultat)

A consequence attributed, in part, to an organization, policy, program or initiative. Results are not within the control of a single organization, policy, program or initiative; instead they are within the area of the organization's influence.

statutory expenditures (dépenses législatives)

Expenditures that Parliament has approved through legislation other than appropriation acts. The legislation sets out the purpose of the expenditures and the terms and conditions under which they may be made.

target (cible)

A measurable performance or success level that an organization, program or initiative plans to achieve within a specified time period. Targets can be either quantitative or qualitative.

voted expenditures (dépenses votées)

Expenditures that Parliament approves annually through an appropriation act. The vote wording becomes the governing conditions under which these expenditures may be made.

Endnotes

i. Canada Foundation for Innovation, https://www.innovation.ca/
ii. Equity Diversity and Inclusion, http://www.nserc-crsng.gc.ca/NSERC-CRSNG/EDI-EDI/index_eng.asp
iii. Discovery Launch Supplements, https://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/Dis-Sup_eng.asp
iv. Dimensions Charter, https://www.nserc-crsng.gc.ca/NSERC-CRSNG/EDI-EDI/Dimensions-Charter_Dimensions-Charte_eng.asp
v. Alliance Grants, https://www.nserc-crsng.gc.ca/Innovate-Innover/alliance-alliance/index_eng.asp
vi. College and Community Innovation, http://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/Info-Info_eng.asp
vii. Resilience in Rapidly Changing Arctic Systems (Arctic II), https://www.belmontforum.org/cras/#arctic2019
viii. Canada's Fundamental Science Review, http://www.sciencereview.ca/eic/site/059.nsf/eng/home
ix. Canada Research Coordinating Committee, https://www.canada.ca/en/research-coordinating-committee.html
x. The Dimensions: equity, diversity and inclusion Canada pilot program, https://www.nserc-crsng.gc.ca/NSERC-CRSNG/EDI-EDI/Dimensions_Dimensions_eng.asp
xi. Dimensions Charter, https://www.nserc-crsng.gc.ca/NSERC-CRSNG/EDI-EDI/Dimensions-Charter_Dimensions-Charte_eng.asp
xii. Equity, Diversity and Inclusion Institutional Capacity-Building Grant, https://www.nserc-crsng.gc.ca/OnlineServices-ServicesEnLigne/EDI-Capacity_eng.asp
xiii. *Setting New Directions to Support Indigenous Research and Research Training in Canada, 2019-2022, https://www.canada.ca/en/research-coordinating-committee/priorities/indigenous-research/strategic-plan-2019-2022.html#1*
xiv. Discovery Development Grants, https://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/DiscoveryPilot-DecouvertePilote_eng.asp
xv. ALPHA-Canada subatomic physics, https://cognit.ca/en/project/76283
xvi. DND/NSERC Discovery Grant Supplements, https://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/DND-NSERC_eng.asp
xvii. Discovery Frontiers, https://www.nserc-crsng.gc.ca/professors-professeurs/grants-subs/df-fd_eng.asp
xviii. New Frontiers in Research Fund, https://www.sshrc-crsh.gc.ca/funding-financement/nfrf-fnfr/index-eng.aspx
xix. Science Odyssey, http://www.sciod.ca/
xx. Science Literacy Week, http://www.scienceliteracy.ca/
xxi. Ingenium-NSERC STEAM Horizon Awards, https://www.nserc-crsng.gc.ca/Students-Etudiants/UG-PC/STEAM-STIAM_eng.asp
xxii. Little Inventors: Inventions for Space Challenge, https://www.littleinventors.org/events/inventions-for-space-at-the-canada-wide-science-fair/info
xxiii. Prime Minister's Science Fair, https://www.littleinventors.org/press/prime-minister-science-fair-2018
xxiv. PromoScience grants, http://www.nserc-crsng.gc.ca/Promoter-Promotion/PromoScience-PromoScience/About-Apropos_eng.asp
xxv. NSERC Young Innovators, https://www.nserc-crsng.gc.ca/Promoter-Promotion/YI-JI_eng.asp

xxvi. Collaborative Research and Training Experience, http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/CREATE-FONCER_eng.asp

xxvii. Vanier Canada Graduate Scholarship, https://www.nserc-crsng.gc.ca/Students-Etudiants/PG-CS/VanierCGS-VanierBESC_eng.asp

xxviii. Centres of Excellence for Commercialization and Research (CECR), https://www.nce-rce.gc.ca/Programs-Programmes/CECR-CECR/Index_eng.asp

xxix. Business-led Networks of Centres of Excellence (BL-NCE), http://www.nce-rce.gc.ca/Programs-Programmes/BLNCE-RCEE/Index_eng.asp

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xxxii. Whales Science for Tomorrow initiative, https://www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/Whale-Baleines_eng.asp

xxxiii. Advancing Climate Change Science in Canada initiative, www.nserc-crsng.gc.ca/Professors-Professeurs/RPP-PP/ACCSC-SARCCC_eng.asp

xxxiv. Tri-agency Equity Diversity and Inclusion Action Plan, https://www.nserc-crsng.gc.ca/NSERC-CRSNG/EDI-EDI/Action-Plan_Plan-dAction_eng.asp

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xxxvi. San Francisco Declaration on Research Assessment (DORA), https://sfdora.org/

xxxvii. GC InfoBase, https://www.tbs-sct.gc.ca/ems-sgd/edb-bdd/index-eng.html#start

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xl. GC InfoBase, https://www.tbs-sct.gc.ca/ems-sgd/edb-bdd/index-eng.html#start

xli. Future-Oriented Statement of Operations, https://www.nserc-crsng.gc.ca/NSERC-CRSNG/Reports-Rapports/2019-20FOSO_e.pdf

xlii. Natural Sciences and Engineering Research Council Act, http://laws.justice.gc.ca/eng/acts/N-21/

xliii. GC InfoBase, https://www.tbs-sct.gc.ca/ems-sgd/edb-bdd/index-eng.html#start

xliv. Report on Federal Tax Expenditures, http://www.fin.gc.ca/purl/taxexp-eng.asp