

EVALUATION OF THE NRC'S AQUATIC AND CROP RESOURCE DEVELOPMENT RESEARCH CENTRE

NRC-EVALUATION



Budget (2015-16 to 2020-21)

Total Revenues: \$30.2M

Total Expenses: \$207.3M



Resources (as of January, 2022)

Staff (including students): 205

Equity, Diversity and Inclusion (EDI): Better representation of women and visible minorities than overall workforce availability. The representation of women is also not concentrated around any particular employment subgroup or location.

About the research centre

The Aquatic and Crop Resource Development (ACRD) Research Centre was established in April 2012 through the consolidation of previous institutes at the NRC with different expertise, to build critical mass in biobased resource development. The research centre aims to make Canada a world leader in the sustainable transformation of biobased resources into economic value. The ACRD Research Centre provides scientific advice, and technical and strategic services to support the agrifood, marine biotechnology, sectors supported by an industrial biotechnology platform and currently has expertise in seven disciplines of importance to these sectors: Genomics and Plant Biotechnology, Marine Biotechnology, Natural Product Chemistry, Bioprocessing, Analytical Technologies, Algal Technologies and Zebrafish Technologies.

About the evaluation

The evaluation of ACRD covered the period of 2015-16 to 2020-21. It used a mixed method approach, incorporating a bibliometric analysis, document review, data review, external and internal interviews, client survey and an expert peer-review. The peer-review focused on the research centre's marine biotechnology activities and related areas of R&D. A gender-based and diversity lens was applied throughout the evaluation.

Key findings

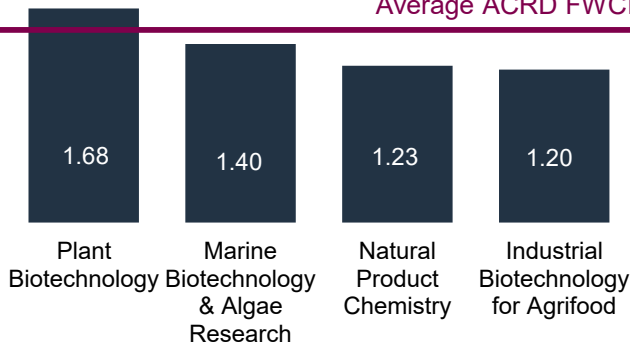
Scientific excellence

The ACRD Research centre mostly published in highly cited peer-reviewed journals (91% of the total publications) and had higher average field-weighted citation impact (FWCI) (1.51), compared to NRC (1.43) and Canadian (1.47) averages. ACRD publications are also aligned with the six key strategic sectors of Canadian economy, namely, health/bio-sciences, food, advanced manufacturing, clean technologies, resources for the future and digital industries.

Given the existing budget and the status of the NRC as a Research and Technology Organization (RTO), the marine biotechnology peer-review committee was highly impressed with the volume and the quality of marine biotechnology and algae publications. The committee, however, noted some room for improvement and suggested the research centre publish perspective and/or trend papers in high impact journals.

ACRD research areas varied in citation impact

Average ACRD FWCI, 1.51



Economic, Social and Environmental Impact

The ACRD Research Centre contributed to a number of technology advancements and created new knowledge for its clients. As a result, clients were able to: increase their revenues (a combined actual and projected amount of \$33.3M over the next 5 years) and create new jobs, minimize start-up and operating costs, and enter into disruptive technology research.

Surveyed clients reported increased economic activities due to their work with the ACRD Research Centre...

- 9% reported creation of new/spin-off businesses
- 22% reported increased production
- 22% reported commercialization
- 21% reported increased sales and exports

The ACRD Research Centre has contributed to food security by developing different crop varieties and platforms, and is currently working on a project aimed at meeting the dietary needs of environmentally-challenged and remote populations. Although not a main focus of the research centre, ACRD has had an impact on health technology research, such as through a project supporting a hemp technology platform impacting the economies of rural and small towns.

Clients reported a number of environmental impact that resulted from their work with ACRD, including, crop loss reduction and development of new sustainable food sources.



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Research Focus

The ACRD Research Centre's focus in agrifood and marine biotechnology is unique in Canada and is aligned with the needs and priorities of Canadian small- and medium-sized enterprises (SMEs), academia and the federal government. Most external key informants view the research centre as occupying the "middle space" of the innovation spectrum.

The marine biotechnology peer-review committee found ACRD's focus on marine biotechnology too diverse and suggested the research centre focus on areas with maximum impact potentials such as aquaculture and sustainable feed development, and research relevant to the effects of land-based, agriculture and sea cage aquaculture. In respect to ACRD's overall forward-looking strategic plan, the committee suggested concentration on the 'sustainability' aspect of the research.

Stakeholder Engagement

The ACRD Research Centre currently engages key industry and R&D players active in Canada in its focused research areas, including two superclusters: the Protein Industries Canada (PIC) supercluster and the Ocean supercluster. The research centre was proactive in supporting PIC projects through its Sustainable Protein Production Program while the involvement with Ocean supercluster has been limited thus far due to the early phase of that supercluster. The majority of the ACRD activity, however, has been focused on supporting Canadian SMEs.



Other Government
Departments
28% of total revenue



Canadian Industry
40% of total revenue



Foreign Industry
17% of total revenue

While the marine biotechnology peer review committee appreciated ACRD's role in early-stage risk sharing and innovation acceleration for SMEs, it recommended to engage more large companies given these companies' significant stake in Canadian marine biomass and food areas. The committee also recommended better engagement with maritime networks and international collaborators for marine biotechnology research.

ACRD outreach activities were substantially impacted by COVID-19 and outreach approaches may need to be revisited moving forward. Further collaboration with IRAP could also be beneficial to increase engagement.

Capacities, Competencies and Facilities

The ACRD Research Centre is well-recognized for its scientific and technical expertise. However, there are challenges to maintain the reputation such as aging workforce and challenges in hiring permanent staff with the right expertise due to limited supply of, and high demand for, this expertise in Canada and a lengthy hiring process (a NRC wide phenomenon). In response, the research centre has prioritized implementation of strategic hiring and resource development strategies to attract critical expertise and build new capabilities. The outcome of these strategies will largely depend on the ACRD Research Centre's ability to deal with some NRC wide administrative challenges. The majority of the research centre facilities are in need of upgrades and/or expansions. To fill the gaps, in addition to NRC investment, marine biotechnology peer-review committee identified a number of national and international collaboration opportunities. Any consideration of re-capitalizing facilities should also consider the goal of reducing geographic dispersion in order to have critical mass and facilities in fewer location.

Recommendations

1. The ACRD Research Centre should expand its forward-looking strategic plan to focus on 'sustainability' in agrifood and marine biotechnology research areas where the research centre can have maximum impact. The plan should also better integrate the needs and priorities of remote, northern and indigenous communities.
2. The ACRD Research Centre should increase the visibility of its marine and industrial biotechnology scientific work by publishing perspective (vision) and/or trend papers in high-impact journals.
3. The ACRD Research Centre should include large marine biotechnology companies in its client engagement strategy and increase collaboration with national and international research networks and institutes. Additionally, outreach approaches may need to be revisited to assess their effectiveness in a post-COVID 'new normal' situation.
4. The research centre should increase coordination with IRAP in order to maximize benefits from IRAP's intelligence of Canadian agrifood and marine biotechnology sectors.
5. In order to fill existing or anticipated gaps in competencies and facilities, the ACRD Research Centre should explore ways to expand existing ACRD capacities and capabilities through collaboration with national and international organizations, academic institutions, and other NRC research centres.

The full evaluation report, including the management response and action plan, is available on the NRC's website:
<https://nrc.canada.ca/en/corporate/planning-reporting/evaluation>



National Research
Council Canada

Conseil national de
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NR16-395/2-2022E-PDF
978-0-660-43571-8

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