



Funding Opportunities for Indo-Canadian Research On Wealth from Waste

BACKGROUND

According to the World Health Organization (WHO), the global pressures of population growth, urbanization, water shortages, and climate change impacts are increasing the agricultural demands for treated waste as a steady source of water and nutrients.¹ In addition, freshwater, nutrients, energy, and chemical compounds recovered from treated waste have found application in areas such as irrigation, horticulture, forestry, and industrial water supply. Further research is underway to explore mining waste for other valuable components that could be reused and recovered in other industries.

Collaborations between academia, government, and industry to recover water, nutrients, energy, and valuable chemicals from waste have the potential to yield commercial successes and be scaled up to global markets.

PROPOSALS:

IC-IMPACTS and the Department of Biotechnology (DBT) invite researchers to submit proposals for projects that can be completed in two years (or less) and that focus on extracting Wealth from Waste.

Your proposal should offer biotechnology driven research-based solutions, reflect cost and space efficiencies required for deployment in cities such as Delhi, Kanpur, Varanasi, etc. or in locations with similar geographies.

Central to the successful proposal will be demonstrating a scalable technology that can be developed as a commercially viable option to extract wealth from wastewater and be applicable to rejuvenating a polluted water bodies such as the River Ganga in India.

This call for proposals has two parts: a research component and a demonstration component.

Funds requested for Part 1 (research) of this proposal must be no more than about 40% of the overall budget requested, with the remaining 60% allocated to Part 2 (demonstration).

Part 1: Research: The research component should enable the extraction of reusable water, nutrients, energy, and valuable chemicals from waste.

¹ World Health Organization, Wastewater (https://www.who.int/water_sanitation_health/sanitation-waste/wastewater/en/)



Wastewater is being increasingly recognized as a source for reusable water, nutrients, energy, and valuable chemicals. Reuse of treated wastewater has been adopted for irrigation, industrial water supply, recreation, landscape enhancement, as well as indirect potable use. Being essential nutrients for agriculture, horticulture, and forestry, recovered phosphorus and nitrogen compounds for fertilizer production have been extensively investigated via struvite precipitation, biological capture, and membrane separation processes.

The carbon matter in wastewater has also been recovered as a bioenergy source. For instance, harvesting of biogas as a byproduct of anaerobic wastewater treatment has been practiced for decades. Biochar and bio-oil conversion from wastewater sludge through hydrothermal liquefaction or pyrolysis is an active area of research. Moreover, mining of wastewater microbiomes enables the production of bioproducts of industrial, high therapeutic, and environmental values (e.g., alcohols, fatty-acids, or polyesters, which can be used as a feedstock of high-value chemicals or biofuels, antibiotics, and biopesticides). In addition, the temperature difference between the wastewater and the environment renders wastewater a promising source of thermal energy. Use of wastewater as a heat source or sink to supplement the energy expenditure for heating or cooling in residential areas has been demonstrated.

Similarly solid municipal waste is also being gradually accepted as a source of biofuels (such as liquid, gaseous and solid fuels); bulk and platform chemicals such as fats and oils, volatile fatty acids and glycerol; high-value products such as fibre products, organic acids, metals, plastics, chitin/chitosan and bio-fertilizer and other materials such as animal fodder, novel microbes, compost/fertilizer and construction materials made from recycled glass and cement

Part 2: Demonstration: The demonstration component may be funded as a follow-up to a project in Part 1 or concurrently with Part 1.

Biotechnology driven technology demonstrations should rank high on the Technology Readiness Level² Scale and enable the extraction of treated water, nutrients, energy, and valuable chemicals from waste. Central to the successful execution of the proposed project will be demonstrating a scalable technology that can be developed as a commercially viable option to extract wealth from waste and be applicable to rejuvenating polluted, sites and/or water bodies.

KEY CRITERIA FOR A SUCCESSFUL APPLICATION:

Successful applications will be relevant to Indian and Canadian ecosystems and conducive to commercialization, particularly in remote and low-resource settings in

² Government of Canada, Annex 2—Technology Readiness Level (TRL) Scale (<https://ito.ic.gc.ca/eic/site/ito-oti.nsf/eng/00849.html>)



India and Canada. Successful applications will also include:

- Funds requested for the research portion of a proposal must be no more than about 40% of the overall budget requested, with the remaining 60% allocated to the demonstration portion.
- We are keen to see biotechnology solutions that develop and operate pilots or prototypes to demonstrate the developed technology.
- Strong potential to scale up research and build rapid demonstration capabilities that can be applied to polluted, sites and/or water bodies.
- Demonstration projects with TRL 6 or above, thereby reflecting significant potential for successful commercialization of research and demonstration outcomes.
- Availability of strong industry partnership and/ or Indian urban or other local government body to assist with commercialization of the project. Please submit a letter of support from the industry/ local body partner with details of their potential cash-funding commitment.
- Achievable research-based deployment at a suitable location in India, within the two years of the project life cycle, concurrent with Part 1 (research) or as a follow up to Part 1 (research).
- Provide training opportunities for Highly Qualified Professionals (HQP), particularly master's and doctoral students as well as postdoctoral fellows.

IMPLEMENTING AGENCIES:

The Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India, is entrusted upon promotion of research, development and innovation in the field of biotechnology. DBT funds and supports all Indian universities, research organizations, non-governmental organizations and industry working in the area of biotechnology. The DBT has promoted and reinforced the development of innovations in biotechnology, and lifesciences with far-reaching impacts in fields that range from health, agriculture, environment to animal sciences and industry.

IC-IMPACTS Centres of Excellence is a not-for-profit organization, established by the Federal Government of Canada through the Centres of Excellence Program to serve as a pan-Canadian agency responsible for the delivery of research programs in the areas sustainable infrastructure, integrated water management, and public health, disease prevention, and treatment between Canada and India. It is the only Networks of Centres of Excellence (NCE) with a mandate focused on research collaborations between Canada and India.

TIMELINE:

- Launch of call on IC-IMPACTS and DBT websites: **27 February, 2019**
- Project Submission Ends: **13 May, 2019**
- Announcement of Successful Projects: **June, 2019**
- Project(s) are expected to start in **August-September 2019** and should complete latest by the end of **July-August 2021**.

ELIGIBILITY:

- All Canadian researchers eligible to receive funding from IC-IMPACTS and tri-council agencies in Canada are eligible to apply as Principal Investigators from Canada along with an eligible Indian Principal Investigator.
- All Indian researchers generally eligible to apply for DBT funding opportunities are eligible to apply as Principal Investigators from India

INTELLECTUAL PROPERTY:

DBT and IC-IMPACTS funded participants in the projects shall agree upon the ownership, access rights, and exploitation of the intellectual property generated during the cooperation. The collaboration agreement(s) shall be made in writing. The guidelines of the funding organizations should be followed when making the agreements.

At a minimum, a letter of intent between the collaborators should be included in the application stating the desire for cooperation and acknowledging that each participant has understood the general terms and conditions of the other project parties.

APPLICATION INSTRUCTIONS:

- Proposals must be written in the English language and clearly marked as DBT: IC-IMPACTS proposals and have to be submitted to both IC-IMPACTS and to DBT in parallel in accordance with the proposal preparation requirements of each side, respectively.
- While conforming to the different respective regulations, forms and submission procedures of the two agencies, the project descriptions must be identical in their substance. As the projects must be fully integrated Indo-Canadian research projects, it is expected that the proposals must contain detailed information about the mode and essentiality of collaboration between the Indian and the Canadian side.
- Canadian researchers have to submit the proposals electronically via [online IC-IMPACTS' application portal](#).
- Indian researchers have to submit the proposals as a single consolidated PDF file by e-mail to icone@dbt.nic.in in stipulated *proforma* (see links given



below).

REVIEW PROCESS FOR THE EVALUATION OF APPLICATIONS:

- Joint projects will be evaluated separately by DBT and IC-IMPACTS within the respective national competitions on the basis of the projects' scientific merit/quality, the justification for scientific-collaboration and the qualifications as well as the compatibility of the participating team members.
- The results of the review process will be shared between the agencies. Funding will be granted for only those proposals where both DBT and IC-IMPACTS recommend funding. Unilateral funding of only one part of a joint initiative will not be possible.

FURTHER INFORMATION:

- **To submit a proposal to IC-IMPACTS:**
All documents and forms required for a project application are accessible at www.ic-impacts.com
- **To submit a proposal to DBT:**
Please follow the
 - [*a. Modalities of Participation and Funding for Indian Investigator\(s\)*](#)
 - [*b. DBT's Proposal submission proforma*](#)

CONTACTS:

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