IC-IMPACTS

Building Healthy Communities in Canada and India





ANNUAL REPORT
2012-2013

NCE RCE

Canada-India Research Centre of Excellence
Established through the Canadian Networks of Centres of Excellence

CANADA NEEDS TO BE CONNECTED TO AN INTERNATIONAL SUPPLY OF IDEAS, RESEARCH, TALENT AND TECHNOLOGIES IN ORDER TO PROSPER IN AN INCREASINGLY COMPETITIVE GLOBAL ENVIRONMENT. THIS NEW CANADA-INDIA RESEARCH CENTRE OF EXCELLENCE WILL BUILD STRONGER BILATERAL RESEARCH TIES AND CREATE VALUABLE LEARNING OPPORTUNITIES WHILE GENERATING POSITIVE ECONOMIC AND SOCIAL BENEFITS FOR BOTH COUNTRIES.

– CANADIAN PRIME MINISTER STEPHEN HARPER, NOVEMBER 6, 2012

INDIA WELCOMES CANADA'S INITIATIVE TO AWARD $ 13.8 MILLION IN GRANTS TO SET UP THE CANADA-INDIA RESEARCH CENTRE OF EXCELLENCE (CIRCE). – INDIAN PRIME MINISTER MANMOHAN SINGH, NOVEMBER 6, 2012

CONTENT

EXECUTIVE STATEMENT

IC-IMPACTS, the India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Community Transformation and Sustainability, brings together a team of expert researchers, industry innovators, community leaders, government agencies, and community organizations, to work hand-in-hand to find solutions to the key challenges that affect the quality of life of millions of people in Indian and Canadian communities.

IC-IMPACTS signature "partner community" strategy will facilitate the effective mobilization of new technologies and will ensure that holistic solutions are designed to improve water quality, increase the safety and sustainability of critical civil infrastructure and improve health across both nations. The "partner communities" will be highly varied and represent the myriad of challenges and contexts that define Canada and India. These diverse community contexts will enable IC- IMPACTS researchers to evaluate the scalability and transferability of their technology solutions.

By producing and implementing new technologies and treatments across the water-health-infrastructure nexus, IC-IMPACTS will help to improve public health, spark economic prosperity, and create positive social change. The legacy of IC-IMPACTS will be to share knowledge and training between Canada and India, and to produce healthy and sustainable communities in both countries, well into the future.

Excellence of the Research Program: Founded upon a well-established history of partnership and innovation between academic institutions and industrial partners in Canada and in India, IC-IMPACTS will focus its work in three strategic areas:

1. Integrated Water Management
2. Sustainable and Safe Infrastructure
3. Public Health: Disease Prevention and Treatment

In addition to addressing water-related challenges which cross-cut all three research themes of IC- IMPACTS, the unique multidisciplinary expertise brought together through IC-IMPACTS also creates opportunities to address other interconnected, critically important health and safety challenges within partner communities. These projects strategically reinforce the impacts of water-related research and innovation activities. As a consequence, IC-IMPACTS research program not only produces novel solutions for water-related challenges in Canada and India, it also works synergistically to create unparalleled multiplier impacts within IC-IMPACTS partner communities.

Knowledge Mobilization and Exchange: The ability to deploy new technologies directly into partner communities in Canada and India is a cornerstone of the IC-IMPACTS strategy to create healthy communities with social and economic benefits. Based on extensive consultations with community leaders and local governments, IC-IMPACTS will offer tailored solutions to problems faced in its partner communities. Once IC-IMPACTS technologies and treatments are proven in its partner communities, they will be deployed in communities in both nations and eventually, to communities in other countries. The result will be positive social change for millions of people in India and Canada and beyond.

Networking and Partnership: IC-IMPACTS is a partnership among three of Canada's leading research universities (The University of British Columbia, University of Alberta, and University of Toronto), and internationally reputed academic institutions in India (Indian Institutes of Technology in Bombay, Roorkee and Delhi; Birla Institute of Technology and Science in Pilani, V.P. Chest Institute; and the International Centre for Genetic Engineering and Biotechnology). Collectively, these institutions form the hub of a strategic network of academic institutions, non-governmental organizations, industrial leaders, community partners, and governments across Canada and India.

An overarching goal of IC-IMPACTS is to increase the economic productivity and prosperity of Canada and India. Its constantly evolving strategic partnership network will be foundational to future research and commercialization initiatives between both countries. Fueled by the excellence of its research partners and the active participation of industrial communities in Canada and India, IC-IMPACTS will generate new discoveries and innovations, identify new partners, and create inroads to new markets to develop and deploy new products and services in both countries.

Development of HQP: The range of capacity-building and advanced training programs offered by IC- IMPACTS and its partners will benefit the Canadian and Indian knowledge economies by producing highly trained, highly qualified personnel with expertise in building capacity and community in an international context. In the first five years of operations, IC-IMPACTS is working to identify funding to provide advanced training to more than 700 students, researchers, and professional practitioners. This will create a potent cohort of entrepreneurial experts who have direct experience translating research into commercial applications and deploying them in community contexts. These "innovation leaders" will form the backbone of Canada and India's economic growth strategies in key areas including: clean drinking water, low-carbon and safe infrastructure, and public health and infectious disease prevention and treatment.

Strengthening Canada-India Collaborations: The vision of IC-IMPACTS is to become a new model for international collaboration that ensures on-the-ground change in local communities. This vision is driven by a commitment to research excellence and partnership between academic institutions in India and Canada in areas of critical importance to both countries. Together, the world-leading research institutions and their partners will enhance Canada's profile as a global leader in international development and research innovation, and India's well deserved reputation for research excellence and global talent development. As IC-IMPACTS generates research innovations, new industrial ventures will emerge around them that will significantly strengthen industrial sectors in both nations. Ultimately, IC-IMPACTS will deliver tangible results to support Canada and India's joint commitment to healthy communities, by bringing positive social change, health and longevity, and economic prosperity to millions of people in both nations.

MESSAGE FROM THE CHAIRMAN OF THE BOARD OF DIRECTORS

It is my great pleasure to serve as the inaugural Chairman of the Board of Directors of the India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Community Transformation and Sustainability (IC-IMPACTS). Announced by Canadian Prime Minister Stephen Harper in November 2012, IC-IMPACTS is the first international Networks of Centres of Excellence (NCE).

IC-IMPACTS promises to become a new model for international research and training partnerships between Canada and India. It also has the potential to forge new pathways for commercialization partnerships and to extend significantly the international reputation of Canada and India as innovation leaders.

However, potential is only achieved through hard work, determination and effective leadership.

The first few months of IC-IMPACTS operations in the 2012-2013 fiscal year (formally incorporated under the Not-for-Profit Act on January 18, 2013) were dominated by the development of legislative agreements, procedural frameworks, governance structures, and Centre infrastructure. They will enable IC-IMPACTS to pursue effectively its ambitious research, training and partnership agenda. As part of these activities, IC-IMPACTS has attracted an outstanding Board of Directors who bring a range of experience from Canada and India and who show energy, commitment and dedication to making IC-IMPACTS a success. I am pleased to Chair a Board of such strength and diversity.

Despite the requirement for an administrative focus in fiscal year 2012-2013, IC-IMPACTS wasted no time in forging new partnerships and in tackling the most urgent challenges of communities in India. Through a workshop in IC-IMPACTS partner community of Nagpur, Maharashtra, in February 2013, the ground has been set for collaborative research projects in water monitoring, water treatment and sustainable infrastructure. New technologies and research advances should be in evidence by as early as fall of 2014!

The first year of operations were not without challenges. IC-IMPACTS continues its work to identify funding strategies to enable Indian researchers to collaborate in research and to allow for the engagement of themselves, their students and their research laboratories. IC-IMPACTS will ensure that its mandate to benefit equally Canadian communities is not outshone by activities in India. As a consequence, partner community development within Canada will be a priority for 2013-2014.

What has impressed me during this initial year of IC-IMPACTS is the interest of industrial partners, government leaders, and researchers in IC-IMPACTS. At every venue where the topic of IC-IMPACTS arises, a spark is ignited and interest in collaboration is not only expressed, but actively pursued. Such support and interest is creating a rich network of industry, government and researchers that will have significant long-term results for innovation and knowledge-sharing between Canada and India.

Having now worked with the scientific and management team of IC-IMPACTS, led by Dr. Nemkumar (Nemy) Banthia at the University of British Columbia, for nearly a year, I am confident that the potential to which all who hear about IC-IMPACTS see, will be realized.

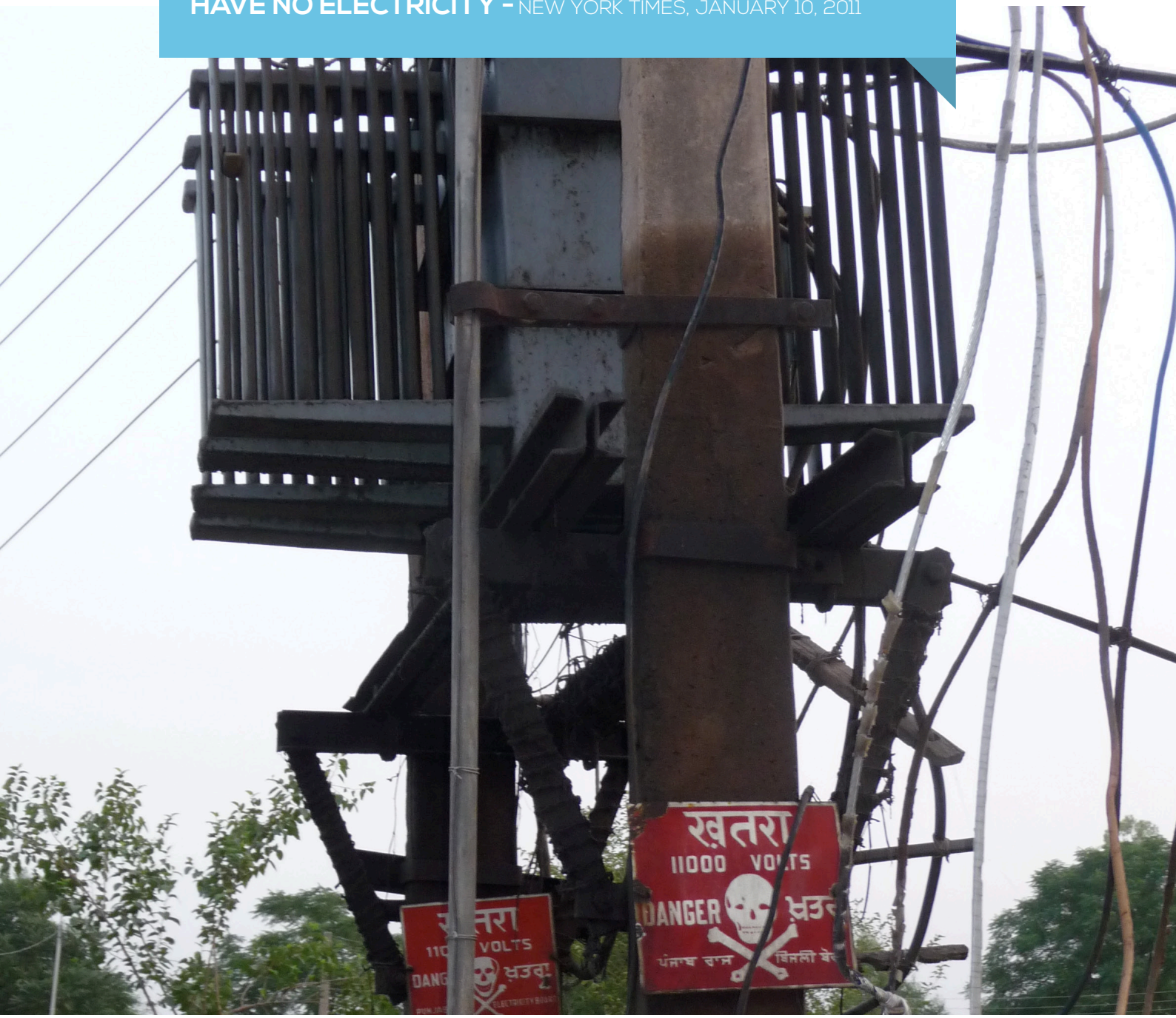
I would like to take this opportunity to thank our Canadian founding partners - The University of British Columbia, University of Alberta and University of Toronto, for their commitment to the development of IC-IMPACTS.

To our readers, we thank you for your interest and invite you to become part of the IC-IMPACTS Centres for Excellence. We hope you will join us as we create healthy communities in Canada and India.

Sincerely,

The Honorable Roy MacLaren, PC
Chairman of the Board of Directors
IC-IMPACTS Centres of Excellence

NO COUNTRY HAS MORE CITIZENS LIVING WITHOUT POWER THAN INDIA WHERE MORE THAN 400 MILLION PEOPLE, THE VAST MAJORITY OF THEM VILLAGERS, HAVE NO ELECTRICITY – NEW YORK TIMES, JANUARY 10, 2011



MESSAGE FROM THE CEO & SCIENTIFIC DIRECTOR

This first annual report for IC-IMPACTS covers only the three month period between incorporation as a Not-for-Profit Organization in January 18, 2013 and March 31, 2013. Notwithstanding this short period of time, IC-IMPACTS has already managed to make great strides towards positioning itself as a new "go-to" Centre for collaboration between interested research, government and industrial partners in Canada and India. The interest, enthusiasm, and breadth of opportunity by founding and prospective partners is truly both staggering and humbling. I have every confidence that IC-IMPACTS, with such a strong community backing, will achieve our vision to make important social change in the communities with whom we partner.

As the highlights in this annual report demonstrate, IC-IMPACTS partners are paving the way of IC-IMPACTS long-term success. Through our host institution, The University of British Columbia, IC-IMPACTS has a well-supported administrative home in the beautiful C.K. Choi building in Vancouver, BC and a regional site office in Delhi. The Butibori Manufacturer's Association, Asia's largest industrial hub, has provided purpose-built facilities in our partner community of the City of Nagpur, Maharashtra, India and has proven a proactive contributing partner for knowledge exchange and collaboration mobilization. Further, our research community has embraced the opportunity for collaboration and has worked with great effect to define innovative new research programs that will directly tackle urgent challenges found within our partner communities. The catalytic foresight of the Canadian government to create a new Canada-India Research Centre of Excellence through the seed funding of $13.8 million has already been more than doubled in cash and in-kind commitments from IC-IMPACTS partners.

In fiscal year 2012-2013, IC-IMPACTS established a Research Management Committee (RMC). This committee focused on establishing the processes and procedures that would ensure IC-IMPACTS research program was administered and evaluated through a framework defined by equity, transparency, and accountability. Truthfully, there were some missteps as we raced to simultaneously launch an ambitious research program, create the basic infrastructure of the first Canada-India Research Centre of Excellence, and develop a rich and meaningful international network of collaborating partners. However, through the guidance of an expert and wise Research Management Committee and two exceptional Associate Scientific Directors, IC-IMAPCTS has now established a coherent and effective framework for adjudicating research.

As the 2013-2014 fiscal year unfolds, IC-IMPACTS is well on its way to rolling out its ambitious research agenda that is characterized by: applied projects that attempt to solve urgent challenges faced by partner communities; meaningful partnership between Canadian and Indian research, industrial and government communities; and a synergy of cross-thematic research projects that together will create multiplier impacts on the health of communities.

It is a very exciting year ahead for IC-IMPACTS. A year where the vision which now exists still largely on paper will come to life in the hands of our expert researchers, innovative partners, and progressive governments. I am honoured to have the opportunity to serve as IC-IMPACTS Chief Executive Officer and Scientific Director. It gives me both pride and humility to have this rare opportunity to serve the two countries I most dearly cherish: the country from which I was born and raised (India) and that which has furnished my professional career (Canada).

Sincerely,

Dr. Nemkumar (Nemy) Banthia
Chief Executive Officer &
Scientific Director

IC-IMPACTS **VISION**

Working hand-in-hand with communities in Canada and India, IC-IMPACTS and its partners will develop and implement community-based solutions to the most urgent needs of each nation: poor water quality, unsafe and unsustainable infrastructure, and poor health from water-borne and infectious diseases. By helping communities overcome these urgent problems, IC-IMPACTS will create *Healthy Communities* in both nations through improved health and longevity, increased economic prosperity, and positive social change.

MISSION STATEMENT

Driven by a commitment to research excellence and partnership, IC-IMPACTS will deliver a new model for international collaboration that ensures on-the-ground change in local communities.

IC-IMPACTS will be a portal for multisector engagement between Canada and India, providing new pathways for leadership in commercialization and innovation, and enhancing the competitiveness and prosperity of their industrial sectors.

By providing real-world experiences in implementing solutions in community contexts, IC-IMPACTS will train and equip a generation of entrepreneurial researchers and innovators with essential skills in research, innovation, commercialization, and leadership. These "innovation leaders" will continue the work of IC-IMPACTS around the world, driving knowledge economies and enabling enduring social change.

IC-IMPACTS will reaffirm Canada and India's international reputations for leadership in research and innovation through an impact-focused research program that demonstrates clear benefits to partner communities, industrial sectors, and capacity-building initiatives. This will provide a firm and collaborative foundation for partnership between the two countries enabling them to look to each other to advance their innovation and economies in the future.

RESEARCH THEMES

WATER

Finding new water quality solutions in both Canadian and Indian communities is an urgent priority. Despite being one of the world's most water-rich nations, Canada issued more than 1,800 boil-water advisories in 2010 alone. The IC-IMPACTS partner communities in India equally share these challenges and are in urgent need of new technologies to monitor, treat, and prevent water contamination. IC-IMPACTS Integrated Water Management theme will focus on the development of novel water quality sensors, water treatment solutions and water infrastructure systems.

The Centre will develop, test and implement new sensor technologies for treating both portable and wastewater and also assess the integrity of distribution systems. The Centre will also focus upon novel approaches to providing consistent, stable, and affordable power to ensure the effective operation of water sensing and treatment solutions. Additionally, IC-IMPACTS will work closely with local and community water operators to ensure they are fully trained to maintain the proposed solutions.

ACCESS TO SAFE DRINKING WATER IS FUNDAMENTAL TO HUMAN SURVIVAL AND YET IT IS ONE OF THE WORLD'S GREATEST CHALLENGES. THE UNITED NATIONS REPORTS THAT MORE THAN ONE IN SIX PEOPLE WORLDWIDE – 894 MILLION PEOPLE – DO NOT HAVE ACCESS TO IMPROVED WATER SOURCES THAT ARE IMPERATIVE TO MEET BASIC NEEDS SUCH AS DRINKING, COOKING, AND CLEANING.

INFRASTRUCTURE

The IC-IMPACTS research theme in Safe and Sustainable Infrastructure is primarily driven by the needs of partner communities in India and Canada which have been carefully selected to represent the needs of the larger nation.

To tackle infrastructure challenges in its partner communities, IC-IMPACTS has developed a holistic research program that cuts across each challenge and interconnects with the overall water and health themes of the Centre. New technologies selected for development will improve the quality of drinking water, prevent intermixing of drinking and waste water systems, and strengthen water infrastructure against damage from seismic activity and corrosion due to more frequent climate change-induced severe weather events. Projects under this theme will also substantially improve the health of populations by reducing air pollution from cement manufacturing and addressing water contamination. The cross-cutting research foci of the Safe and Sustainable Infrastructure theme are (i) condition assessment sensing and structural health monitoring, (ii) service life extension of structures and strengthening for earthquakes, (iii) new sustainable materials development, and, (iv) conservation of heritage water infrastructure.

HEALTH

Building on existing partnerships in the area of infectious diseases and community outreach, IC-IMPACTS' health program is focused upon developing community-oriented public health strategies to prevent infections and improve primary health care, develop improved diseases surveillance and monitoring with the development of rapid, point of care/use detection technologies and diagnostics, and develop new treatments to control the spread of, and resistance to, infectious diseases.

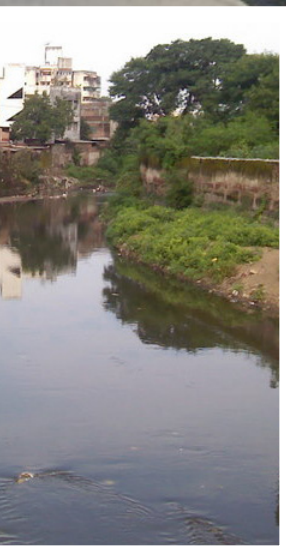
One particular area of focus within IC-IMPACTS Public Health theme will be the intersection between water and health. Waterborne and water-associated (i.e., carried by vectors associated with water) infectious diseases are a major cause or morbidity and mortality, especially in remote and rural areas, and with high incidence of impact on children and women. The health research theme will adopt two approaches to developing community-oriented solutions to water borne and water-associated infectious disease: (i) the application of public health strategies to prevent infections and improve primary healthcare, and (ii) the application of efficient strategies for treating water-borne and water-associated infectious diseases. Effective disease surveillance is a critical component of successful health solutions and bridges IC-IMPACTS health and water themes. As a consequence, IC-IMPACTS public health theme will strive to make improvements in five areas: (i) rapid, point of care/use detection, (ii) tools and protocols shared by partners, (iii) disease and exposure monitoring and target interventions, (iv) diagnostics and clinical decision making, and (v) application of advanced biology and genomics.

PARTNER COMMUNITY SHOWCASE

IC-IMPACTS has the strong support and partnership of the District Commissioner and a consortium of local industries to establish Nagpur, Maharashtra as one of the first IC- IMPACTS partner communities. Nagpur is the ninth-largest urban conglomeration in India and is situated in a mildly seismic region. With 4.5 million people, the challenges here are complex and multifaceted. Deteriorating civil infrastructure, poor water quality and dated sewage treatment methodologies are just a few of the areas in which IC-IMPACTS is working to find solutions.

Nagpur's thermal power plants produce large amounts of fly-ash. The Koradi Thermal Power Plant generates nearly 1.7 million tons of fly-ash annually with over 90% of the ash going to waste. With extensive civil infrastructure in poor condition, IC-IMPACTS researchers will investigate the feasibility of using fly-ash as a cement replacement for new constructions in Nagpur. High cotton production and agricultural waste in the area allow researchers to explore reinforced building materials using natural fibers. IC-IMPACTS researchers will assess, monitor and devise a strategy for strengthening buildings, bridges, dams and power plants.

The concentration of organic matter and pathogens in Nagpur's water sources vary significantly with nearby land-uses and overall climate. Understanding the quality of source water and its seasonal variability is crucial for the selection of technology and for optimal treatment and disinfection. IC-IMPACTS researchers plan to establish a long term sampling campaign to collect monthly samples of varying water sources and water wells. This sampling campaign would allow researchers to accurately establish linkages between specific activities and its water quality impact. Researchers will also be able to select appropriate technologies that would address specific water quality challenges with their relative sources. This, in turn, will equip the community with the necessary information to take corrective actions towards improving the quality of the source water.



IC-IMPACTS hosted a workshop in February 2013 within its partner community of Nagpur. During this workshop (attended by individuals representing all IC-IMPACTS partner groups), 50 scientists from 18 academic institutions in Canada and India worked with community leaders, government officials and industry partners to set a research agenda that would target the specific challenges of the Nagpur region.

By the conclusion of the workshop, a core set or projects were identified for collaboration in the Integrated Water Management and Safe and Sustainable Infrastructure themes. These projects all have both a discovery component and application-based research foci.

In the Integrated Water Management theme, priority project areas with the potential for field deployment within two years were identified to include: paper-based, cantilever based, and optics-based water monitoring systems; low-cost filter bed water treatments systems; and low-cost solar PV and hybrid power systems to support water treatment and water monitoring technologies.

For the Safe and Sustainable Infrastructure theme, the following project priorities were identified: focus on corrosion detection in bridge decks using several Non-destructive testing methods as well as the development of smart monitoring technologies using fiber optic sensing (FOS) and piezo-resistive cement-based carbon nanotube (CNT) sensors; characterization and use of industrial waste with a focus on fly-ash demonstration projects in new application contexts; characterization and use of ago waste with a focus on bagasse ash again with demonstration projects in new application contexts; seismic strengthening of schools using sprayable eco-friendly cementitious composites (which also has important application BC, Canada) and strengthening of deteriorated columns using fiber reinforced polymers (FRPs).

Finally, the research community from Canada and India in the area of IC-IMPACTS third theme – public health – became aware of the greater opportunities for intersection and inter-linkage with the water and infrastructure themes and the public health challenges within the partner community context. As a result of this critically important community insight, focus for Nagpur will shift to short-term objectives including rapid, point of care/use detection; tools and protocols shared by health partners; disease and exposure monitoring, and target interventions; diagnostics and clinical decision making; and finally, application of advanced biology and genomics.

KEY NETWORKING EVENTS

IC-IMPACTS was promoted at the Canada-India Business Council Second Annual Business Forum held in New Delhi in November 2012.

The Mitacs Roundtable for Canada-India Educational Enrichment Programs was held in Delhi in November 2012 and showcased IC-IMPACTS. The roundtable involved 40 senior industrial sector executives and academic leaders involved in research and educational programming in India. This group also involved a number of potential new participants in the IC-IMPACTS Centre including several of India's very highly reputed National Institutes of Technology (NITK Surathkal, NIT Trichy, NIT Warangal), two new IITs not yet involved in IC-IMPACTS (IIT Madras and IIT Rajasthan), and the recently created Indian Institute of Science Education and Research – IISER Pune.

IC-IMPACTS held a formal launch of the organization in Vancouver, attended by more than 70 individuals representing local government, Consul General of India, High Commission of India, Department of Foreign Affairs and International Trade, University Presidents, industry leaders and researchers. The event was recorded by OMNI television, covered by the Asian Journal, and attended by The Sunday Guardian.

WORKSHOPS & NETWORKING

KEY OUTCOMES

IC-IMPACTS signed a Memorandum of Understanding (MOU) with the Butibori Manufacturers' Association (BMA) in the partner community of Nagpur. The BMA is Asia's largest industrial area, home to 423 industrial enterprises which together have a combined turnover of nearly $3 billion. This MOU has already yielded impressive results with an industrial firm of Sanghvi Industries approaching IC-IMPACTS for help in using flyash and improving the performance of its building blocks. IC-IMPACTS has provided technical consulting by Canadian researchers to Sanghvi Industries enabling it to make their processes more sustainable, reduce the carbon footprint of their product and improve the overall quality of the products which in turn makes the products much more attractive to the Indian marketplace.

IC-IMPACTS industrial partner – Starmass Environmental Technologies, India, has joined together with a research team at the University of British Columbia. In a collaborative initiative they are developing a Structural Health Monitoring program for a ship loading facility in Canada's north. IC-IMPACTS has served as the conduit to bring together the pre-existing products and expertise of Starmass together with the Canadian research community to develop tailored solutions to the ship loading facility's unique context and conditions.

IC-IMPACTS has also forged a new three-way collaboration between IC-IMPACTS, the Building Fire Research Center of the National Institute of Engineering, and Reliance Industries India. Reliance and IC-IMPACTS have being partnering in the area of its integrated water management theme, and this new partnership represents not only the cross-thematic transference of an industrial partnership but also brings a new industrial partner to the Building Fire Research Centre. Together, Reliance Industries, IC-IMPACTS, and the Building Fire Research Centre will collaborate to develop new fire resistant materials for restoration of heritage structures.

POOR WATER QUALITY CONTINUES TO POSE A MAJOR THREAT TO HUMAN HEALTH. DIARRHOEAL DISEASE ALONE AMOUNTS TO AN ESTIMATED 4.1 % OF THE TOTAL DISABILITY ADJUSTED LIFE YEAR (DALY) GLOBAL BURDEN OF DISEASE AND IS RESPONSIBLE FOR THE DEATHS OF 1.8 MILLION PEOPLE EVERY YEAR (W.H.O., 2004). IT IS ESTIMATED THAT 88% OF THAT BURDEN IS ATTRIBUTABLE TO UN-SAFE WATER SUPPLY, SANITATION AND HYGIENE AND IS MOSTLY CONCENTRATED ON CHILDREN IN DEVELOPING COUNTRIES. – WORLD HEALTH ORGANIZATION, 2004

THE YEAR **AHEAD**

In the upcoming year, IC-IMPACTS will launch its research program through the development of community-identified research projects and multi-partner workshops. The initial projects involves conservation of heritage structures, modelling and assessment of deficient structures, reinforcement of existing structures, development of drinking water treatment systems, development of technologies for detection of bacteria and contaminants in water supplies, and renewable energy sources to power water treatment technologies. Other projects will be identified as IC-IMPACTS further engages its partner communities and its research network.

IC-IMPACTS will be working hard in 2013-2014 to formalize its Canadian partner community strategy. As part of this strategy IC-IMPACTS has targeted initial communities in Canada's far north, Alberta and a First Nation's community in British Columbia. This cross-section of communities provides IC-IMPACTS with an ability to undertake very different research challenges. From cold climate impacts on wastewater treatment and infrastructure durability, to water quality issues arising from naturally occuring elements such as arsenic and up-stream contaminations, to deteriorating infrastructures that are calling into question year-round water quality. Moreover, working within very different cultural contexts, IC-IMPACTS will develop valuable lessons and understanding of the approaches and requirements that will lead to successful technology uptake within Canada's diverse community settings. As part of our priority focus on Canadian communities, 2013-2014 will include the launching of a new mobility program into Canada's far north, a workshop with community, research, and industry partners in Alberta, and the extension of a single research project located in a BC First Nations community into a more robust and multidimensional partner community strategy.

November 2013 will feature a "Water for Health" workshop in Faridkot, Punjab and in Delhi. These workshops will link the three pillars of the IC-IMPACTS network - water, infrastructure and public health. Water has a profound impact on health. Enhancing access to safe water can decrease the incidence of water borne and water related diseases and improve health, particularly for women and children. Improved access to clean water will lead to significant gains in health, child development, reductions in morbidity and mortality rates, and reduced health care costs. Furthermore a sustainable and secure physical infrastructure is essential for the storage, transportation and delivery of drinking water and the treatment and removal of wastewater. Contamination through breaches, leaks, aging or non-existing infrastructure has negative consequences on public health and can undermine water purification technologies if the purified water re-enters deteriorated infrastructure on route to households. A holistic examination of water and its impacts on health will thus lead to a series of interrelated projects that have the potential to greatly improve overall community health.

In February 2014 IC-IMPACTS is collaborating with government and industry partners to develop a collaborative research program tackling infrastructure and transportation challenges.

The development of novel training programs will also be a key focus for 2013-2014. A new program to take students into remote community contexts is under development and graduate research fellowships will commence as research projects begin.

Finally, IC-IMPACTS will be unveiling a new "Meeting Place" virtual portal that will help accelerate connections between industry organizations, researchers, and communities.

IC-IMPACTS **PARTNERSHIPS**

INDIAN PARTNERS

Indian Institute of Technology Bombay	Ranbaxy Laboratories Limited
Indian Institute of Technology Roorkee	Reliance Industries Ltd.
Indian Institute of Technology Delhi	Robonik India Pvt. Ltd.
Birla Institute of Technology & Science Pilani	Starmass Environment Technologies Pvt. Ltd.
Apollo Hospitals	Stewols India Pvt. Ltd.
Baba Farid University of Health Sciences	Tandon Consultancy Services
Building Fire Research Centre, National Institute of Engineering	Tata Consultancy Services
Guru Nanak Mission Medical & Educational Trust	Regional Medical Research Centre for Tribals (India Council of Medical Research, Ministry of Health, Government of India)
Indian Institute of Science Bangalore	Energy and Petrochemical Department, Government of Gujarat
Indian Institute of Technology Kharagpur	Nagpur Municipal Corporation
Institute of Chemical Technology	Bureau of Indian Standards
International Centre for Genetic Engineering and Biotechnology	Butibori Manufacturers' Association
Pandit Deendayal Petroleum University	Indian Association of Structural Engineers
Vallabhbhai Patel Chest Institute, University of Delhi	Indian Concrete Institute
Golder Associates Consulting (India) Pvt. Ltd.	Public Health Foundation of India
Lars Enviro Pvt. Ltd.	Viadarbha Industries Association
Lifecare Innovations Pvt. Ltd.	

CANADIAN PARTNERS

The University of British Columbia	RES'EAU WaterNET
University of Alberta	United Nations University - Institute for Water, Environment and Health
University of Toronto	Mitacs
Delcan	Canada India Business Council
Pultrall Inc.	Canada India Education Society
Sensor Technology Ltd.	Canada India Foundation
Stream Technologies Inc.	Alberta Urban Municipalities Association
Vector Corrosion Mitigation Services	Canadian Construction Association
Public Health Ontario	MaRS Innovation
Ontario Ministry of Environment	University Health Network

GLOBAL PARTNERS

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Mr. Hari Varshney	President	Varshney Capital Corp.
Dr. Nemkumar Banthia	Professor / Canada Research Chair (Infrastructure Rehabilitation and Sustainability)	The University of British Columbia / IC-IMPACTS Centres of Excellence

RESEARCH MANAGEMENT COMMITTEE

NAME	TITLE	ORGANIZATION
Dr. Nemkumar Banthia	Professor / Canada Research Chair (Infrastructure Rehabilitation and Sustainability)	The University of British Columbia / IC-IMPACTS Centres of Excellence
Dr. Sushanta Mitra	Professor & Asst. VP Research	University of Alberta
Dr. Stewart Aitchison	Professor	University of Toronto
Dr. Daman Panesar	Assistant Professor	University of Toronto
Dr. Kevin Kane	Professor	University of Alberta
Dr. Madjid Mohseni	Professor, Associate Head-Graduate, Scientific Director RES'EAU WaterNet	The University of British Columbia
Dr. Pradipta Banerji	Director	Indian Institute of Technology Roorkee
Dr. Reed Ellis	Vice President, Practice Lead - Bridges	Stantec Consulting Ltd.

SCIENTIFIC LEADERSHIP

Dr. Nemkumar Banthia is a Professor of Civil Engineering, Distinguished University Scholar and a Tier I Canada Research Chair at the University of British Columbia. Dr. Banthia has been conducting research in 'sustainable and safe infrastructure' for over 25 years. He has edited/co-edited eighteen volumes, published over 300 technical papers, and holds three international patents. A professional engineer in the province of BC, Dr. Banthia has chaired numerous technical committees of the American Concrete Institute (ACI), RILEM, Canadian Standards Association, American Society for Testing and Materials and Indian Concrete Institute. He serves on the Editorial Boards of eight international journals and is Editor-in Chief of the Journal of Cement and Concrete Composite. Dr. Banthia was awarded the WG Hislop Award of the ACI-BC Chapter, Wason Medal from the American Concrete Institute, solutions Through Research Award of the British Columbia Innovation Council, Wolfson Merit Award of the Royal Society of the United Kingdom, Killam Research Prize from the Killam Foundation and the Horst Leipholz Medal of the Canadian Society of Civil Engineering. He is a fellow of the American Concrete Institute, Canadian Society for Civil Engineering, Indian Concrete Institute, Canadian Academy of Engineering and the Royal Society of Canada.

Dr. Sushanta Mitra received his PhD in Mechanical Engineering from the University of Waterloo, Canada. He is currently a Professor in Mechanical Engineering and Assistant Vice-President (Research) at the University of Alberta. He is the Director of Micro and Nano-scale Transport Lab and the Team Leader for Nano-Bio-Energy Network. He serves as a Guest Editor for four international journals and also the co-Editor of Microfluidics and Nanofluidics Handbook. He is actively involved in a number of professional organizations, including serving as the Vice-Chair for Micro & Nano Fluid Dynamics Technical Committee of ASME, Board Member for CSME and Engage North, and recently elected as a Member of the Committee on International Scientific Affairs, American Physical Society (APS). For his contribution in the field of mechanical engineering, he has been elected the fellow of the American Society of Mechanical Engineers (ASME) and the Canadian Society of Mechanical Engineers (CSME). He is a registered professional engineer in the provinces of Alberta and Ontario.

Professor J. Stewart Aitchison received his Ph.D from the Department of Physics, Heriot-Watt University, Edinburgh, U.K., in 1987. He joined the Department of Electronics and Electrical Engineering, University of Glasgow in 1990 and was promoted to a personal chair as Professor of Photonics in 1999. Since 2001 Professor Aitchison has held the Nortel chair in Emerging Technology, in the Department of Electrical and Computer Engineering at the University of Toronto. His research focuses on the development of micro and nano-scale devices for optical signal processing and sensing applications. From 2004 – 2007 he was the Director (and from 2010 – 2011 the interim director) of the Emerging Communications Technology Institute at the University of Toronto, where he established an open access micro and nano-fabrication facility. In 2009 he co-founded ChipCare Corporation with James Dou and Rakesh Nayyar. Chipcare is currently developing a portable HIV monitoring system, which will enhance healthcare delivery in remote communities. This project won the University of Toronto inventor of the year award in 2012 and the Canada business magazine Innovation Award in 2010. Professor Aitchison is a Fellow of the Royal Society of Canada and a Fellow of the American Association for the Advancement of Science.

FINANCIAL STATEMENT

STATEMENT OF OPERATIONS
Period from incorporation on January 18, 2013 to March 31, 2013

RECEIPTS	
Contributions from Networks of Centres of Excellence	$108,998
Contributions from University of British Columbia	$5,450
	$114,448
DISBURSEMENTS	
Communication and Promotion	$8,165
Research Networking	$64,439
Operating Costs	$11,894
Professional and Consulting Fees	$20,260
Technology Transfer	$9,690
	$114,448
NET ASSETS, beginning and end of period	**$0**

STATEMENT OF CASH FLOWS
Period from incorporation on January 18, 2013 to March 31, 2013

CASH	
Provided by (used in) Operating Activities	
Cash recieved from Networks of Centres of Excellence	$2,476,150
Increase in Cash	**$2,476,150**
Cash - Beginning of Period	$0
Cash - End of Period	**$2,476,150**

HAY & WATSON | Chartered Accountants
900-1450 Creekside Drive, Vancouver BC V6J 5B3
P 604 734 1690 F 604 336 8959 E creekinfo@hay-watson.bc.ca

INDEPENDENT AUDITOR'S REPORT
To the Directors of IC-IMPACTS Centres of Excellence

We have audited the financial statements of IC-IMPACTS Centres of Excellence (the "Network"), which comprise the statement of financial position as at March 31, 2013 and the statements of operations and cash flows for the period from incorporation on January 18, 2013 to March 31, 2013, and a summary of significant accounting policies and other explanatory information

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility
Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.
An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing and opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.
We believe the audit evidence we have obtained is sufficient and appropriate to provide a basis for our qualified audit opinion.

Basis for Qualified Opinion
The Network has Partners in India who make in-kind contributions to certain events the Network undertakes in India. As IC-IMPACTS management has not received any information on these in-kind contributions made in India for the period from incorporation on January 31, 2013 to March 31, 2013, they have no been included in these financial statements. We were unable to obtain sufficient appropriate audit evidence from the Indian Partners of IC-IMPACTS for these amounts and, consequently, were unable to determine whether any adjustments were required to record these amounts in these financial statements.

Qualified Opinion
In our opinion, except for the possible effects of the matter described in the Basis for Qualified Opinion paragraph, the financial statements present fairly, in all material respects, the financial position of the Network as at March 31, 2013, and the results of its operation and its cash flows from the period from incorporation on January 18, 2013 to March 31, 2013, in accordance with Canadian accounting Standards for not-for-profit-organizations.

Hay + Watson

Chartered Accountants
Vancouver, British Columbia
July 30, 2013

CONTACT US

Room 179, C.K. Choi Building
1855 West Mall
University of British Columbia
Vancouver, Canada V6T 1Z2

Tel: +1 604 822 1303
Fax: +1 604 822 0212
Web: www.ic-impacts.com
email: info@ic-impacts.com

IC-IMPACTS
Building Healthy Communities in Canada and India