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Canadian–based Projects

TRANSITION TO SCALE GRANTS

Manitoba

*** Loving the loo: New marketing strategy targets sanitation in rural Nepal**
iDE, Winnipeg (Implementation country: Nepal) *(*#0354-05-40)
*Total new **transition-to-scale** investment: $2.2 million*

iDE, a Winnipeg based non-profit organization that supports business opportunities in the developing world, will work with Nepali small business owners and local entrepreneurs to scale up the production, marketing and sale of simple latrines, using a novel approach successfully demonstrated in Cambodia and Nepal: marketing simple, low-cost toilets as a status symbol and sanitation as an affordable source of pride.

"The traditional approach – standard public health messages coupled with giveaway programs that sideline local businesses – is not working", says Stu Taylor, iDE's Director of Performance Measurement. "Our experience shows that when you make sanitation affordable and desirable for users – and profitable for businesses – it just takes off." iDE's marketing approach is complemented by training for small-scale local producers and entrepreneurs to produce and sell simple-design, low-cost latrines, easily installed within a few hours. Profitability will encourage other entrepreneurs to develop new designs to attract even more customers.

"When people see the toilet's attractive design and how easy it is to keep clean, this has become a product that people actually aspire to," says iDE Nepal Country Director Luke Colavito. "We've already seen that, once a few people buy these toilets, their neighbours feel a need to keep up and buy one too, generating more sales."

Thanks to a $1 million Grand Challenges Canada grant, iDE has leveraged an additional $1.2 million through partnerships with UNICEF and other donor investments. Over the next three years, iDE aims to facilitate the production and sale of 100,000 toilets, improving the lives of an estimated 500,000 people in Nepal, while demonstrating a viable model to tackle this urgent public health crisis. Some 2.5 billion people worldwide lack adequate sanitation and hygiene, resulting in extensive health problems. Diarrhea, for example, is the world's second leading cause of death among children under five – 1.5 million each year.

Video**:* N/A. ***Pictures: http://bit.ly/RwBmY0

Ontario

*** A lucky little fish to fight iron deficiency among women in Cambodia**
***Lucky Iron Fish, Guelph* (Implementation country: Cambodia) *(*#0355-05-30)**
*Total new **transition-to-scale** investment: $860,000*

In Cambodia, six in 10 women are anemic due to iron deficiency in their diets, causing premature labour, hemorrhaging during childbirth and the impaired brain development of their babies. Usually obtained through red meat or other iron-rich foods, a small chunk of iron added

to water in the cooking pot can release a life-saving iron supplement. But attempts to persuade mothers to do so were unsuccessful. On a 2008 study mission in Cambodia, University of Guelph researcher Chris Charles thought of creating a piece of iron shaped like a local river fish believed to bring good luck and fortune. His simple idea succeeded beyond all expectations. Women happily placed the Lucky Iron Fish in their cooking pots and, in the months that followed, anemia in the village fell dramatically. A Lucky Iron Fish is small enough to be stirred easily but large enough to provide about 75 per cent of daily iron requirements.

"The results are stunning," says Dr. Alastair Summerlee, President of the University of Guelph and Chair of the Board of Directors of Lucky Iron Fish. "Initial results show a huge decrease in anemia and the village women say they feel good, experience no dizziness and have fewer headaches. The iron fish is incredibly powerful." Small businesses across Cambodia will produce and distribute the fish with quality control measures in place. About 7.5 cm (3 inches) long, and made from recycled material at a cost of about $5 each, the iron fish provides health benefits for roughly three years.

"Our goal is to produce 10,000 Lucky Iron Fish this year and another 50,000 next year," says Gavin Armstrong, President and CEO of Lucky Iron Fish.

"U.S. President Herbert Hoover once famously promised his constituents 'a chicken in every pot.' We have no chicken to offer but hope that one day a Lucky Iron Fish will be in every pot in Cambodian villages, saving and improving lives through the enriched intake of iron in food and drinks." Taking the project to scale offers profound potential health benefits to many women in Cambodia, with potential markets throughout the world. Grand Challenges Canada's $500,000 loan to Lucky Iron Fish is part of a total scale-up financing package of $860,000, and augments earlier commitments of equity investors Innovation Guelph and the University of Guelph.

Video: http://bit.ly/1oJbyTr. ***Pictures***: http://bit.ly/1l98Cyr.

*** Using mobile phones to fight malaria in Tanzania**
Mennonite Economic Development Associates (MEDA), Waterloo, and Queen's University, Kingston, Canada **(Implementation country: Tanzania) (#321-05-43)**
Total new ***transition-to-scale*** *investment, all sources: $1.5 million*

In 2012, there were an estimated 207 million cases of malaria worldwide. In Tanzania, the disease causes roughly 100,000 deaths each year, an overwhelming majority of them children under five. Pregnant women and young children are at highest risk by far. Since 2011, the Tanzania National Voucher Scheme (TNVS) has used mobile phone text messaging to provide pregnant women with an electronic voucher redeemable at participating retailers for long-lasting insecticidal bed nets, for a nominal fee (33 cents). The scheme has made a significant impact on malaria control in Tanzania but gaps remain – about 40% of women do not redeem the e-voucher, puzzling researchers: do they have enough nets in the home? Did they misplace their e-voucher? Could they not even afford the modest price? Do they understand the protection a net offers? Waterloo, Ontario-based Mennonite Economic Development Associates (MEDA), an international economic development organization that creates business solutions to poverty, is an implementing partner of the TNVS. With the help of a global health researcher at Queen's University, the organization wants to increase the efficiency of the distribution system, focus it more intensively in areas of high malarial risk and examine how the remarkable text-based

delivery system could be applied to additional health threats of growing importance, such as hypertension. MEDA and Dr. Karen Yeates of Queens University have designed a cluster randomized trial that will test the effectiveness of a text message (SMS) dialogue with the women who are issued an e-voucher, sending them reminders to redeem them for nets. The team will also collect data about usage and barriers, and investigate potential solutions. This will not only indicate if SMS is an effective method to ensure redemption but will also investigate why some women do not redeem their net voucher. Involving the end user will ultimately lead to better management and improve the electronic delivery method, reducing the burden of malaria for women and children.

“Africa’s health challenges, like malaria and hypertension, are challenges too big for a government or the private sector to solve alone,” notes Thom Dixon, Director Business of Health at MEDA. “With Grand Challenges Canada’s funding, the team can apply action-oriented market research skills that lead to more effective commercial bed-net delivery and promotion, so more households – particularly those with pregnant women and children – sleep safely under bed nets. Moreover, the funds will enable piloting of e-vouchers to fight hypertension, a growing threat in Africa.”

“The innovation lies in the fact that we are putting the people most at risk – pregnant women – in the driver’s seat, enabling them to help us create a better system, and to improve not only their lives but the lives of other people,” says Dr. Yeates. Grand Challenges Canada is awarding a $792,000 grant, supplementing funds secured by MEDA, generating a total investment of $1.5 million.

***Video**:* http://bit.ly/1jTy7En*, **Pictures**:* http://bit.ly/1nx18q7*.*

*** Implementing neonatal intensive care methods in Guyana to save lives of neonates with respiratory distress, *Guyana Help the Kids (GHTK), Toronto* (Implementation country: Guyana) (#0320-05-10)**
*Total new **transition-to-scale** investment: $600,000*

One third of child deaths in Guyana result from respiratory distress or bacterial infection in the first few weeks of life. Although infant mortality rates have improved in Guyana, the numbers today correspond with those in the U.S. and Canada in the early 1970s, before the extensive availability of neonatal intensive care units. Slightly under half of all babies in Guyana are born in the nation’s largest city and capital, at Georgetown Public Hospital Corporation (GPHC). GPHC has a neonatal intensive care unit (NICU) but mortality remains high, due to problems of insufficient education, limited experience and minimal equipment. With the Ministry of Health of Guyana as a partner, Guyana Help the Kids (GHTK) is receiving a $350,000 Grand Challenges Canada grant to augment $250,000 from its own resources for equipment, education, and support to physicians and staff, to improve the survival rate of high-risk neonates in Guyana. The project will lift and sustain the level of neonatal intensive care at GPHC, and will develop a national neonatal network and transportation system. Neonatal-related infrastructure will expand, and education provided to physicians and nurses throughout Guyana – in particular those at the five network hospitals, which account for more than 80 per cent of all deliveries in the nation.

"We intend to significantly decrease neonatal mortality by empowering Guyanese healthcare providers through education and technology, which will ensure sustainability," says Dr. Narendra Singh, founder of Guyana Help the Kids.

Video: N/A, ***Pictures***: http://bit.ly/1hCUHwH.

SEED GRANTS ($112,000 EACH)

Nova Scotia

*** Cape Breton University (Implementation country: South Sudan) (#0472):** *Micro-franchised community health workers extending maternal and child healthcare in South Sudan*

With just 124 doctors serving 10 million people, South Sudan has one of the world's worst child (135 in 1,000) and maternal (2,054 in 100,000) mortality rates. A public-private system of micro-franchised mobile health workers, created by this project in partnership with the local government and South Sudanese-Canadian doctors, will help extend healthcare throughout South Sudan.
Video*:* http://bit.ly/1nJjmEF*,* ***Pictures****:* http://bit.ly/1kXaU0N.

Quebec

*** Centre Hospitalier Universitaire de Sherbrooke, Canada (Implementation country: Haïti) (#0473):** *Pessary in the prevention of spontaneous preterm birth in developing countries*

Every year, more than one million of an estimated 15 million babies born preterm die from preterm-related complications, and many that do survive face life-long disabilities or health complications. A pessary (silicone ring) placed around the cervix (during the second part of the pregnancy) in high-risk mothers may help prevent prematurity. This project's goal is to adapt to resource-low countries, validate and then disseminate this technique.
Video: http://bit.ly/QEhlxB, ***Pictures***: .

*** McGill University, Montreal, Canada (Implementation country: Tanzania) (#0478):**
Turning hope into action: youth peer health education in rural Tanzania

Almost one in six people are HIV-positive in Njombe – a region with Tanzania's most uninformed population when it comes to the disease, according to surveys, and the country's highest rate of infection, now increasing among young adults. The area has no formal HIV education program and many children are orphans lacking parental guidance. This project will expand a pilot-tested, site-crafted, formally evaluated HIV/AIDS youth peer health educator program into primary schools in HIV-ravaged rural Tanzania, to empower youth in making healthy decisions.
Video: http://bit.ly/1iIyGMG, ***Pictures***: http://bit.ly/1j3AAgu.

*** Aspire Canada, McGill University, Montreal, Canada (Implementation country: Kenya) (#0479):** *Developing Novel Edible-Insect Farming Technologies to Address Food Insecurity in Slums*

Hundreds of edible species of ants, beetles, moths and other insects, rich in protein and iron (see http://bit.ly/1qam0HU), are only seasonally available for millions of people who consume them. This project will develop and distribute insect farming technologies to make this cheap, nutritious and safe food source available for year-round consumption in Kenya's slum conditions, reducing malnutrition and high rates of anemia, especially among pregnant women.
Video: http://bit.ly/1g1CsGe, ***Pictures***: http://bit.ly/1oxszzJ.

*** Université Laval, Canada (Implementation country: India) (#0484):** *Safe excreta disposal in humanitarian emergencies*

In humanitarian emergencies, a lack of access to adequate sanitation is compounded by crowded, unhygienic conditions, where the spread of diarrhoeal diseases can be a major contributor to the overall sickness and death. This project will develop a sludge treatment system for the safe disposal of excreta in humanitarian emergencies, safeguarding both public health and the environment.
Video: http://bit.ly/1mRIEz2, ***Pictures***: .

Ontario

*** University of Waterloo, Canada (Implementation country: Philippines) (#0505):** *Year-round Provision of Access to Safe Water in Northern Samar, Philippines*

In 15 flood-prone villages of the Catubig municipal area of the Philippines, this project will build a modular, low-cost biofiltration system to provide a year-round supply of safe water and to develop a business model for commercializing the technology.
Video: http://bit.ly/1l4FSW1, ***Pictures***: .

*** NuPhysics Consulting Canada (Implementation country: Philippines) (#0501):** *VisuFLUID – Computer Software for Sanitation and Wastewater Treatment Facility Design*

A software tool developed by this project will offer an integrated approach to optimize sanitation solutions in developing countries by modelling local soil, water quality, and environmental conditions, essential to designing effective, small-scale sanitation systems in developing countries.
Video: http://bit.ly/1omHe3I, ***Pictures***: .

*** University of Ontario Institute of Technology, Canada (Implementation country: Bangladesh) (#0494):** *Affordable and simple paper-based arsenic detection tests*

A 2008 WHO report estimated that up to 70 million people in Bangladesh drink water that contains unsafe arsenic levels. A simple, low-cost, paper-based test for arsenic developed by this project will help forewarn people when water's arsenic content exceeds safe levels.

*** H20 for All, Oakville, Canada (Implementation country: Dominican Republic) (#0475):** *Synergy for Water Now*

In the Dominican Republic, an estimated 55% of deaths of children under five were attributed to diarrhea, due in part to water contamination caused by severe flooding episodes. This project is creating an affordable ceramic water filtration process involving silver and copper nanoparticles.
Video: http://bit.ly/1ooLcsp, ***Pictures***: http://bit.ly/1jHT4Ss.

*** BioDiaspora Inc., Canada (Implementation country: India) (#0471):** *Advanced Decision Support for Infectious Disease Management in India*

New infectious diseases are emerging faster than ever, while many previously controlled diseases are re-emerging. BioDiaspora is a real-time decision support tool for managing the risk of infectious diseases, integrating and synthesizing big data about location and context. This advanced predictive analytics tool will be introduced to India.
Video: http://bit.ly/1gfnvRa, ***Pictures***: http://bit.ly/1joMWyY.

*** HealthBridge Canada (Implementation country: Tanzania) (#0476):** *Diagnosing fevers better: Improving diagnosis of febrile illnesses by uniting disease ecology and satellite imagery*

A lack of diagnostic tools and skills in Tanzanian health facilities are blamed for widespread malaria misdiagnosis, which fails the patient's need, wastes precious resources and contributes to drug resistance. As many as 45% of arboviral infections in the country are misdiagnosed as malaria. Automatically updated local estimates of the relative transmission risk of malaria and arboviral infections, delivered via mobile phone text messages to rural health workers, will help to better inform clinical diagnoses.
Video: http://bit.ly/1gjyLw2, ***Pictures***: .

Saskatchewan

*** University of Saskatchewan, Canada (Implementation country: Bangladesh) (#0495):** *Fortifying Dal to Alleviate Fe Deficiency in South Asia*

Iron is vital to early childhood health, growth and development, and for lifelong wellness, lowering the risk of diarrhea, measles, malaria and pneumonia. Yet a lack of iron is the world's most widespread micronutrient deficiency. This project will fortify a common staple – dal (dehulled lentil, pea, chickpea) – to triple iron intake in the diets of high-risk populations.
Video: http://bit.ly/1mRIg3H, ***Pictures***: http://bit.ly/1uJyE0w.

*** University of Saskatchewan (Implementation country: Vietnam) (#0496):** *Developing a low-cost device for breast cancer detection in Vietnam using ultra wideband technology*

Breast cancer kills more women than any other cancers in Vietnam, where screening programs are not popular nor readily available and are expensive, especially for those in remote areas. A low-cost device and computer software developed by this project to screen for breast cancer will provide a mammography alternative.
Video: http://bit.ly/RAP9wh, ***Pictures***: .

*** University of Saskatchewan, Canada (Implementation countries: Philippines, Russian Federation) (#0498):** *Pathways to Rural/Remote Health Capacity: Moving Technology from Education to Practice*

Deploying new technologies, this project will develop local healthcare-related capabilities by extending universities' abilities to offer nursing education in rural areas. Clinical practice students in rural and remote communities will have the opportunity to learn where they live.
Video: http://bit.ly/1hHTq7H, ***Pictures***: http://bit.ly/1nvNWS9.

Alberta

*** University of Calgary, Canada (Implementation country: Uganda) (#0492):** *Engaging Unlicensed Drug Shops in Uganda*

This project will harness the potential of unlicensed drug shop owners to recognize malaria, pneumonia and diarrhea, and to deliver appropriate diagnostics and treatment that is affordable and accessible to families, helping to reduce Uganda's high death rate among children under five. Private drug shops, though poorly regulated, have proliferated in Uganda, offering a channel through which rudimentary help can be delivered.
Video: http://bit.ly/1mOl3Ux, ***Pictures***: http://bit.ly/Qm734T.

*** University of Calgary, Canada (Implementation country: Tanzania) (#0570):** *Neglected voices, neglected diseases: igniting youth-driven innovation in sanitation solutions for Maasai pastoralists*

Worldwide, 1.1 billion people practice open defecation, resulting in diarrheal diseases – a leading cause of death among children under five. This is a major problem among rural Tanzania's Maasai people. This project will engage and train local youth and community members in scientific data collection to guide development of locally conceived, implemented and evaluated sanitation solutions to open defecation.
Video: http://bit.ly/1jcJJn2, ***Pictures***: http://bit.ly/1gfUyPm.

*** University of Alberta, Canada (Implementation country: Kenya) (#0485):** *Detection of bacteria in food and water in low-resource settings with low-cost, portable electrochemical, paper-based devices*

A low-cost, paper-based device developed by this project will help detect E. coli bacteria and other pathogens in food and water in low-resource settings.
Video: http://bit.ly/QEB4gw, ***Pictures***: .

*** University of Alberta, Canada (Implementation country: Uganda) (#0486):** *A finger prick blood biomarker to replace chest x-ray for pneumonia diagnosis*

Compared with industrialized countries, nations of Africa and Asia report two to 10 times the rate of child pneumonia, the killer of 2.1 million children each year. A bedside finger prick blood test developed by this project will improve pneumonia diagnosis where chest x-rays, essential for pneumonia diagnosis and management, are unavailable, saving lives and resources.
Video: http://bit.ly/1iJSjZ6, ***Pictures***: .

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British Columbia

*** University of British Columbia, Canada (Implementation country: Uganda) (#0489):** *The Post Discharge Survival Project*

Some five to 10 per cent of African children with a serious infection die in hospital. Alarmingly, an even higher percentage of children die in the weeks after their discharge. Doctors and parents are often unaware of this period of high vulnerability and are poorly equipped to identify or handle recurrent illness. A mobile phone application developed by this project for hospital use will help to identify at-risk children who need referral to a community health worker, while parents will receive a discharge kit to help guide care for their recovering child.
Video: http://bit.ly/1jThV5T, ***Pictures***: http://bit.ly/1mI8vxJ.

*** University of British Columbia, Canada (Implementation country: India) (#0488):** *Cheap drugs for bad bugs: engineering natural product synthesis*

By engineering bacteria, this project aims to produce natural, low-cost drugs for the developing world. The prototype objective: an antibiotic called violacein, which may help treat diseases such as leishmaniasis and malaria, but stalled in clinical development due to its high cost.
Video: http://bit.ly/1mSjctl, ***Pictures***: .

*** University of British Columbia, Canada (Implementation country: Cambodia) (#0490):** *Thiamin-fortified fish sauce as a means of combating infantile beriberi in rural Cambodia*

Low levels of the vitamin thiamin (B1) in the diet of breastfeeding mothers in Southeast Asia results in widespread beriberi disease in their infants, causing heart failure and thousands of child deaths. In Cambodia alone, the problem kills about 700 children per year. The project will introduce fortified fish sauce to mothers' diets, a simple, cost-effective and sustainable way to raise maternal blood and breast milk thiamin levels, helping to lower the rate of infantile beriberi.

*** University of British Columbia, Canada (Implementation country: Thailand) (#0487):** *Discovery of new HIV1 viroporin inhibitors from local natural products*

Anti-Retroviral Therapy (ART) has significantly reduced HIV1-related illness and death, but less than half of patients in many low and middle income countries have access to it. Using electrophysiology (EP) and cell assays, this project aims to discover natural products from Southeast Asia that block HIV1, leading to local, affordable therapies.
Video: http://bit.ly/1ldFxPz, ***Pictures***: .

*** Twothirds Water Inc., Canada (Implementation country: Philippines) (#0483):** *Tapp – A water filtration device for developing countries*

In developing countries, the most common way of treating household water is to boil it, which results in other risks, such as lung disease, burns, fire-hazards and deforestation. A simple, user-friendly household water filter developed by this project, in combination with an innovative business model, offers the promise of safe drinking water for millions of families in developing countries. ***Video***: ., ***Pictures***: http://bit.ly/1hCf9hp.

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*** University of Victoria, Canada (Implementation country: El Salvador) (#0504):** *Affordable, long-term detection of water quality using a modular microsphere-based system*

An affordable, stable monitoring system developed by this project will detect pathogens in water supplies, signalled by a simple, immediate readout colour change from red to purple.
Video: http://bit.ly/1l9NLti, ***Pictures***: http://bit.ly/1kXasj9.

*** Design Association for International Development (DesignAID), Bangladesh (Implementation country: Bangladesh) (#0474):** *The Incinerator Initiative: Managing medical waste in low-resource settings*

High equipment costs prohibit the appropriate incineration and safe disposal of medical waste for many hospitals in resource-poor countries, leading to contaminated supplies and sharps being landfilled or dumped on roadsides, infecting animals and people with agents that can lead to sepsis, hepatitis and HIV. A modular, low-cost incineration system developed by this project will be locally built and adapted to meet hospital waste disposal needs.
Video: http://bit.ly/1mitN2v, ***Pictures***: http://bit.ly/1fU9JTz.

*** Mercy Ships Canada (Implementation countries: Congo, Guinea) (#0482):** *Sterile Processing Education in Developing Countries – Phase 1*

Incidence of post-operative infection in developing countries occurs in 5 to 50 percent of patients. Neonatal infection rates are 3 to 20 times higher than in industrialized nations. This project will supply low cost sterilizers and provide education for health workers sterilizing surgical instruments, with a focus on improving operating room infection control practices and reducing the incidence of post-operative infections in West African countries such as Guinea and Republic of the Congo.
Video: http://bit.ly/1jD7vrI, ***Pictures***: http://bit.ly/1su9Ibf.

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About Grand Challenges Canada

Grand Challenges Canada is dedicated to supporting Bold Ideas with Big Impact® in global health. We are funded by the Government of Canada; we support innovators in low- and middle-income countries and Canada. The bold ideas we support integrate science and technology, social and business innovation to find sustainable solutions to health challenges – we call this Integrated Innovation®. Grand Challenges Canada focuses on innovator-defined challenges through its Stars in Global Health program and on targeted challenges in its Saving Lives at Birth, Saving Brains and Global Mental Health programs. Grand Challenges Canada works closely with Canada's International Development Research Centre (IDRC), the Canadian Institutes of Health Research (CIHR) and the Department of Foreign Affairs, Trade and Development Canada (DFATD) to catalyze scale, sustainability and impact. We have a determined focus on results, and on saving and improving lives.

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