INMED Partnerships for Children (INMED) thanks everyone who sponsored, followed and participated in the inaugural *Harvest the Future* International Symposium at the Hilton Rose Hall Resort in Montego Bay, Jamaica on June 14-17, 2015. Chaired by Dr. Linda Pfeiffer, INMED president and CEO, the symposium convened more than 120 representatives of international multilateral agencies, nongovernmental organizations, private sector businesses, academic institutions, smallholder farmers and others to discuss the pressing, interrelated issues of climate change and food security and to offer solutions through innovative climate-smart agricultural practices such as aquaponics. This immersive event allowed participants to learn, observe, engage in conversation, and discover collaborative opportunities to advance shared objectives and programs to support the development of healthy, productive and climate-resilient food systems.

The three-day symposium included lively and informative presentations and roundtable discussions with experts who shared knowledge and expertise across academic disciplines and geographic boundaries, a field tour of intensive aquaponic systems in action, and informal evening receptions to foster partnership development. Both speakers and audience members highlighted optimism in the face of a global climate crisis combined with a growing global population. Together, we can build resilient societies, economic self-sufficiency, and strategic partnerships; develop solutions to future challenges anticipated by predictive climate models; apply innovative, climate-resistant agricultural practices and technologies; nurture and sustain behavioral change and empower smallholder farmers, women, and youth to adapt and secure a healthy future for all.
Purpose

Harvest the Future is a gathering designed as a platform for sharing the latest advancements and initiatives in small-scale climate-smart agriculture. The 2015 inaugural symposium showcased important innovations, including aquaponics, that are providing sustainable food sources as well as jobs and hope for communities that struggle under difficult circumstances. Keynote speakers also addressed issues of nutrition and health, climate action and poverty.

A special thank you to the speakers who included representatives of the United Nations, U.S. Agency for International Development, Inter-American Development Bank, Jamaican and Haitian Ministries, Planning Institute of Jamaica, Development Bank of Jamaica, Caribbean Agricultural Research and Development Institute, University of the West Indies, and other public and private sector partners.

Agenda

June 14, 2015 Check-in and Welcome Reception

June 15, 2015 Setting the Stage: Climate Action Through Innovation
  ▪ Climate-Smart Agricultural Solutions: Minimizing Risk, Maximizing Impact
  ▪ Small-Scale Innovations as Models for Global Solutions

June 16, 2015 Livelihoods and Sustainability
  ▪ Markets and Livelihoods: The Business Case for Investment in Aquaponics and Other Intensive Small-Scale Agricultural Production
  ▪ Field Visit to Aquaponic System Sites

June 17, 2015 Synthesis
  ▪ Human Capital: Bringing It All Together and Making It Work
Day 1 of the symposium included discussion of the realities of climate change and the challenges it poses, the issue of a growing global population and increasing food insecurity, and attaining sustainable development goals, all of which set the stage for innovations in agriculture for small-scale producers. Using predictive models was recommended to help anticipate and plan for changes and aid farmers, and specific innovations, such as greenhouse technology and aquaponics for families and on a commercial scale, were introduced to provide solutions. Presenters shared lessons learned from the application of such technologies in different parts of the world and reminded participants not to become disillusioned, as successful change takes time. Presenters introduced innovative techniques for small-scale producers, including enhancing traditional farming methods, and new and complementary technologies that can improve yields, such as greenhouses and hydroponics. An in-depth look at aquaponics illustrated how this technique can provide additional opportunities for women, youth, and the disabled.

Climate-Smart Agricultural Solutions: Minimizing Risk, Maximizing Impact

Welcome and Introductions
Dr. Linda Pfeiffer, President and CEO
INMED Partnerships for Children

Dr. Pfeiffer welcomed all participants to the conference and introduced the panelist speakers. Putting the first session of the symposium in context, she noted that in considering the UN’s proposed 2015 Sustainable Development Goals, it is evident that climate change will determine if nations can deliver on these ambitions. INMED’s Adaptive Agriculture Program offers climate-smart interventions, which so far has provided successful small-scale aquaponics for development in Jamaica, South Africa and Peru.
Denise Herbol, Mission Director

USAID/Jamaica

*Promoting Sustainable, Resilient Societies in the Midst of Climate Change Adversity*

Ms. Herbol noted that Jamaica, which has had one of the hottest summers in history, is exceptionally vulnerable to the severe weather effects of climate change, including storms, floods, and drought, but no nation is immune to climate change and we all must collaboratively be stewards of our environment. Climate change interventions are a top development priority, and USAID promotes global development that is sustainable, including adaptation, clean energy, and sustainable landscapes.

Toward that end, USAID supported INMED Partnerships for Children’s development of climate change-adaptive aquaponic systems in several locations across Jamaica, including Knockalva Agricultural School and the Metcalfe Street Secure Juvenile Center. Ms. Herbol emphasized the need to find mechanisms to foster partnerships that look beyond our own agencies to help build climate-smart societies, and the urgency to act now to make sure the world we leave to our children and our children's children is cleaner, healthier, more prosperous, and more successful.

Therese Turner-Jones, Country Representative in Jamaica

**Inter-American Development Bank (IDB)**

*Sustainable Agriculture in Jamaica*

Ms. Turner-Jones noted that Jamaica’s growth rate remains weak but is picking up; to sustain gains in growth, the country needs improved economic stability, trade openness, public expenditure on public goods and investment in rural infrastructure. Productivity in agriculture requires connection with markets, access to financial services, land ownership and practices to adapt to climate change.

IDB’s Agricultural Competitive Project in Jamaica aims to increase linkages from farm to market and improve competitiveness through production of safe and good quality domestic agriculture products, and the Agro-Parks model will help develop sustainable value chains. Ms. Turner-Jones advised that the future is in green agriculture, reforming agricultural subsidies, strengthening land use planning and promoting better practices.
Hon. Luther Buchanan, Minister of State
Jamaica Ministry of Agriculture and Fisheries
*Agriculture Priorities and the Future for Small-Scale Farmers*

Minister Buchanan congratulated INMED for promoting innovative systems internationally, because global challenges require global solutions. Indeed, as he noted, “no man is an island,” and climate change is leading to new ways of doing business in order to adapt to water shortages, unprecedented fires and more intense hurricanes. Adaptive agriculture will engage minds and energies as adaptive strategies such as rainwater harvesting and gravity drip systems are adopted.

**Dr. Arun Kashyap, Resident Coordinator and Representative**
United Nations Development Program
*Promoting Strategic Partnerships for Climate Change Mitigation and Adaptation*

Climate change is not a far-off problem—we are experiencing the consequences now. Small-scale producers will be the most impacted by climate change; they are also the most under-funded. The UN’s Green Climate Fund focuses on building adaptation capabilities and insurance for the most vulnerable.

An integrated approach to working together through public-private partnerships, is essential, and the new paradigm for partnerships is to include the voices of the voiceless and to link economic and social development. Echoing UN Secretary General Ban Ki Moon, Dr. Kashyap affirmed that “saving the planet, lifting people out of poverty, and advancing economic growth, they are one and the same.”

**Colin Bullock, Chairman and Director General**
Planning Institute of Jamaica
*Building Resilience to Climate Change Through Agricultural Innovation*

Agriculture contributes 6.6% of Jamaica's GDP and accounts for 17.6% of the employed labor force in Jamaica. Agriculture is essential to growth, and its dependence on the vagaries of weather, which has cost millions, is unacceptable; resilience is imperative. A Pilot Project for Climate Resilience aims to preserve water storage, halt runoff, control soil conditions, cluster farms, diversify fishing and coastal mariculture, and intensify production—including by installing aquaponics systems in collaboration with INMED.
Hon. Fresner Dorcin, Minister of Agriculture  
Haiti Ministry of Agriculture, Natural Resources and Rural Development  
*Strategic Plan to Develop Greenhouse Technology in Haiti*

Haiti has 1 million small farmers who face low land productivity, lack of investment and climate change impacts, but opportunities exist with its geographic location, innovation, and young work force. The vision for Haiti is to modernize agriculture, satisfy the nation’s food needs, increase exports of high quality produce, and raise the standard of living. The plan is to build greenhouses, provide training and financing, and mobilize the export market. Private, public and traditional farming sectors must collaborate and invest to improve production, efficiency, innovation, input availability, training and management.

Hon. Ian Hayles, Minister of State  
Jamaica Ministry of Water, Land, Environment and Climate Change  
*Food Security is Our National Security: Addressing the Realities of Climate Change*

Jamaica is a hazard-prone country (e.g., three major hurricanes and several floods occurred between 2002 and 2007), posing real challenges to food security. The nation must now consider how to feed an increasing population, expected to reach 3.8 million by 2050. Droughts, brush fires and hurricanes have all severely impacted the agricultural sector. It is time for a change, to become more sustainable, productive, technology-driven, resourceful, and climate-smart. Research and application can help tackle the issues of sustainable land management, protecting valuable ecosystems and cultivating resilient crops, which will help Jamaica realize its 2030 vision of being the place of choice to live.

**Additional points from audience questions and associated discussion:**
- Jamaica’s policy priorities include extending the reach of government support to farmers; the kind of information and training that are provided to farmers is important.
- Grenada is an example of a country where farmers have received funding through a UNDP project to receive expertise in specific technologies (e.g., how to farm organically).
- Mobile technologies can work in Jamaica (e.g., for reporting weather or production estimates), unlike in some other parts of the world, because cell phones are generally available throughout the country.
- Currently it is less expensive to import certain foods to Jamaica; stakeholders must have an honest conversation to allow local producers to succeed. St. Elizabeth, for example, is the breadbasket of Jamaica, but all systems—from farmer to market—need to be better linked.
Practical Innovations: Small-Scale Innovations as Models for Global Solutions

Dr. Linda Pfeiffer, President and CEO
INMED Partnerships for Children

Moving into a discussion on innovations in agriculture, Dr. Pfeiffer referred to the Gartner curve to illustrate a common evolution of actions following a technology trigger. Initially, there is a peak of inflated expectations. This peak can then drop into a “trough of disillusionment,” which must be overcome in order to reach an upward slope of enlightenment and finally a sustained plateau of productivity.

Dr. Thad Jackson, INMED Partnerships for Children
Executive Vice President
Climate-Smart Innovations for Small-Scale Farmers for Food Security and Income Generation: Aquaponics in Latin America and the Caribbean and Southern Africa

Faced with the challenges of a population explosion—nine billion people by 2050—and climate change disrupting food resources, the world must double food production, apply climate-smart technologies, and cooperate. The smallholder farmer has a vital role to play; for example, they produce 80% of Asia and sub-Saharan Africa’s food.

To address issues of limited space, poor land, limited water and little capital, INMED developed a low-cost modular aquaponics system. Aquaponics, combining aquaculture and hydroponics, produces fish and vegetables in a closed, highly efficient system, producing 10 times more crops in the same space as conventional agriculture, using 75% less energy, 80%-95% less water, no chemical fertilizers, and much less labor than traditional agriculture; it is also more resilient to extreme weather. The adaptable design has been successfully demonstrated, and the next step is to expand and provide farmers with training and financing.
Christopher Somerville, Urban Agriculture Consultant
United Nations Food and Agriculture Organization

*Agricultural Innovations for Food Security and Income Generation in Urban and Conflict Settings: Lessons Learned from Gaza, the West Bank and Ethiopia*

Among the leading lessons learned from the field is that aquaponics is not ideal for “quick impact” humanitarian projects that target the poorest households. Training is required and the technology is better suited for sustainable development; in fact, a strong correlation is seen between educational capacity and productivity. No one project fits all locations—local materials, inputs, markets, etc. vary, so it is more important to focus on teaching principles over prescriptive designs and to have capable partners.

Mario Kerby, Director, West Africa and Haiti Region
Chemonics International

*Increasing Productivity and Resilience Through Low-Cost Greenhouses: An Agricultural Innovation for Haiti’s Smallholder Farmers*

Chemonics’ five-year Feed the Future project in Haiti more than doubled agricultural income in target areas, improving livelihoods, food security and resiliency using low-cost, easy-to-assemble greenhouses with rain catchment and drip watering systems. Haiti’s rural conditions, with extreme poverty and resource degradation, are among the most challenging in the world. Affordable greenhouses combined with skills training allowed farmers significant year-round revenues without utilizing the traditional yet ecologically destructive slash-and-burn clearing technique.

Dr. Leslie Simpson, Natural Resources Management Specialist
Caribbean Agricultural Research and Development Institute (CARDI)

*Developing Climate-Resistant Agricultural Practices in the Caribbean*

CARDI and collaborating agencies are working to help regional agricultural producers adapt to climate change, and hosts workshops and trainings on climate policy, modeling, etc. toward that end. As agriculture is currently the second greatest cause of carbon emissions, climate-smart practices are being promoted to reduce its carbon footprint. Research includes sequestering atmospheric CO₂ in soils, developing drought-tolerant plants and soil/water conservation systems, and promoting protected systems such as aquaponics.
Dr. Michael Taylor, Director, Climate Studies Group
University of the West Indies
*Climate-Smart Agriculture: Potential Role of Modeling as Part of the Solution for the Caribbean*

Dr. Taylor drove home the fundamental points that climate change is real and that it represents a real challenge. Although natural CO\(_2\) variability exists, it has spiked significantly in the past 100 years. Temperatures are increasing, rainfall is more variable and extreme (e.g., hurricanes), and sea level is rising at 1.7 mm per year. The challenge lies in the unfamiliarity, unpredictability and unreliability of climate change. Computer models/equations can simulate past, present and future climate and crop conditions to help reduce uncertainty, explore possibilities and define potential strategies and solutions to climate change challenges.

Sebrenia Holness, Assistant Superintendent
Jamaica Department of Correctional Services
*Innovations Making a Difference for Troubled Youth*

With support from USAID, INMED Partnerships for Children established an aquaponic system at a juvenile remand center in Kingston, Jamaica, leading to significant—and some unexpected—benefits for the adolescent wards. Using a small space allocated to the agricultural teaching program, the aquaponic system is maintained daily by the young wards, who benefit not only from the educational experience, but also gain entrepreneurial skills, reduce tension, depression, and anxiety, increase self-esteem, and build teamwork and leadership. In addition to these important life skills, aquaponics provides the facility with fresh, nutritious, organic foods.

**Additional points from audience questions and discussion:**
- Modeling data does not necessarily reach the smallest farmers; thus, regional resource centers are becoming sources of information dissemination and science translation, including through the application of mobile technology in Jamaica.
- Since behavior change can be difficult, training trainers and community leaders is an effective way to make new approaches accessible to more people.
- Communities that are more integrated into adaptive agriculture projects will be more motivated to protect their aquaponic systems. When security is needed, however, it should be built into the cost of operations.
- Inputs are site-specific and buying locally is preferable, but sometimes solutions must be creative (e.g., using duckweed to supplement otherwise imported fish food for aquaponic systems).
Day 2 – Livelihoods and Sustainability

Following the first day of the symposium that discussed the global issues of climate change and food security and introduced innovative solutions such as greenhouses and aquaponics to address those issues, Day 2 focused on how small-scale farmers can apply such innovative techniques and technologies.

A key challenge that small-scale farmers often must overcome is access to financing, as well as lack of adequate experience, education, business planning, and access to markets. Presenters discussed these necessary inputs and the opportunities to access them, including gaining capital and opening new markets. Markets require confidence in reliable supplies and product quality and, therefore, commitment and education by small-scale farmers to plan a business, manage financial capital, and produce reliable and quality products are essential for successful implementation of new climate-friendly agricultural practices.

Day 2 also included a field visit to local aquaponic systems to observe first-hand the successful implementation of the technology.

Markets and Livelihoods: The Business Case for Investment in Aquaponics and Other Intensive Small-Scale Agricultural Production

Wayne Beecher, Senior Specialist, Multilateral Investment Fund (MIF) Inter-American Development Bank

*Business Planning and Marketing for the Small-Scale Farmer; Loans for Small-Scale Agriculture*

The MIF is the research and development group of the IDB, pioneering and testing market-based approaches and providing technical assistance in Latin America and the Caribbean to help solve development challenges. Bringing about a desired future requires that businesses 1) create a strategy that is differentiated from others in the marketplace, 2) develop a business model that delivers, identifying customer needs, resources and a profit formula, and following the build-measure-learn feedback loop, and 3) maintain a positive mindset that is passionate, tenacious, focused, adaptable and tolerant. Funds will follow a viable business.
Edison Galbraith, General Manager for Loan Origination and Portfolio Management  
Development Bank of Jamaica (DBJ)  
*Increasing Access to Financing for Small-Scale Farmers*

Owned by the Jamaican government, the DBJ provides a dedicated line of credit, distribution channels, grants, venture capital and capacity building, with a focus on financing micro, small and medium-sized enterprises (MSME) in the agriculture sector. In the past five years, DBJ has issued 4,800 loans worth millions of dollars for agriculture, covering 90% of project costs up to 10 years. The Innovation Grant From New Ideas to Entrepreneurship (IGNITE) supports MSMEs to develop innovative practices. Technical assistance is provided in the form of adopt-a-school programs, scholarships, grants, training vouchers, payment mechanisms, technical and market information, supply chain development and partnerships.

Francesca Laursen, Director of Global Partnerships  
INMED Partnerships for Children  
*Access to Financing for Climate-Smart Aquaponics for Small-Scale Farmers in Latin America, the Caribbean and the World*

Climate change demands alternative intensive income-generating methods of food production. Through its Jamaican Adaptive Agriculture Program, INMED and its partners established 13 modular, low-cost aquaponics systems in Jamaica in the past four years, with more planned. INMED has also launched similar systems in Peru and South Africa. Farmer ownership, however, is a better guarantee of long-term success, which is why access to financing is critical. Obstacles include lack of collateral, down payment, financial knowledge, and the ability to prepare business plans and make payments. INMED is currently developing an aquaponics loan program for small-scale farmers with banks/credit unions to provide technical and business training, certification, mobile wallet options and financing with repayment built in.

Paul Barrett, Program Manager  
INMED Caribbean  
*Aquaponics Business Planning*

A business plan provides a road map for establishing a business, to plan operations, finances, staffing and marketing. To plan for aquaponics, consider the market and projected yields when planning what to produce, since buyers require consistent supply and quality. INMED’s commercial-scale system that includes eight plant grow beds, four fish tanks, a central sump tank/bed, air pump, rainwater tank and solar system costs about US$17,000 to construct, plus input costs for fingerlings, fish feed, seedlings,
packaging, transportation, marketing materials, etc. and operational costs, but the returns can far exceed costs, especially after the first year of operations.

**Neil Curtis, Founder and CEO**  
**Farm Up Jamaica**  
*Reducing the Importation of Foreign Foods into Jamaica*

Producing organic foods in an affordable way, feeding a growing niche market, will not only increase access to healthy foods, but will also help Jamaica’s agriculture sector. To increase local production, Farm Up Jamaica helps raise awareness, establish markets, plan farms and crops, create jobs, provide training, cultivate non-GMO organic foods, package and distribute products, sell to agreed-upon markets and manage the proceeds. This approach can also help reduce unemployment in Jamaica.

**Taji Alleyne, General Manager at GK Foods & Services, Grace Agro Processors Division**  
**Grace Kennedy**  
*Role of Manufacturing Sector to Support Small Farmers and Reduce Food Imports: The Grace Agro Processors Model*

The Grace Agro processing model aims to reduce food imports, which in turn stimulates local economic growth and employment and improves food security. The program seeks to stabilize the supply of raw materials that are needed for making the company’s sauces and seasonings by partnering with small farmers, buying produce even in a glut, and being able to preserve inventory (e.g., processing peppers into mash). Farmers supply produce at a specified volume/price, and receive financial and technical assistance and a guaranteed market in return.
Field Visit to Aquaponic Systems

Symposium participants traveled by bus from the conference center to the Knockalva Agricultural School and the Westmoreland Organic Farmers’ Society to visit two aquaponic systems established as part of INMED’s Jamaican Adaptive Agriculture Program. Participants viewed grassroots production techniques and system innovations by small-scale producers.

KNOCKALVA AGRICULTURAL SCHOOL
WESTMORELAND ORGANIC FARMERS’ SOCIETY

[Images of a greenhouse and a sign for the Jamaica Adaptive Agriculture Program.]
Day 3 – Synthesis

Following the second day of the symposium that discussed inputs required to successfully adopting climate-friendly agricultural techniques, such as access to financing and markets, Day 3 focused more on the human aspect of adopting new technologies, and what farmers, including women and youth, need to be successful. Adaptive agriculture and aquaponics practitioners from Latin America and the Caribbean, Africa, and the USA discussed challenges and solutions in the field, including the benefits of farmer-to-farmer training and support, the importance of systematic behavioral change, and the patience and tenacity needed to implement new systems for long-term benefit.

Human Capital: Bringing It All Together and Making It Work

Jozimo Santos Rocha, Senior Technical Advisor for Agriculture and Economic Development
Adventist Development and Relief Agency (ADRA)

Scaling Up Agricultural Innovations: A Case Study from Democratic Republic of Congo (DRC)

Challenges faced by farmers in the DRC include small land holdings, low productivity, erratic rainfall, crop disease and little technical assistance. ADRA’s smallholder extension model program offered and compared Farm Field Schools (FFS) with demonstration plots and Farmer-to-Farmer (F2F) training. The FFS proved to have the greatest positive impact; however, due to cost and complexity, it was better combined with F2F transmission of knowledge, which had more variable impact, but was less costly with greater reach. Starter input packs (donated seeds, and tools) were least effective, lacking training and a sense of ownership among farmers.
Shorna Newsome Myrie, Manager of Employment and Career Services, Northwest Region  
Human Employment and Resource Training Trust  
*Behavior Change: Opening Up to Change in the Face of New Ideas, Technology, Markets and Opportunities*

Ms. Newsome Myrie emphasized the need to continually adapt to new situations, such as new technologies, new markets, and the re-emergence of agriculture, but cautioned that behavior change is difficult. Three systematic steps can lead to change: 1) unfreeze, being aware of the need to change, 2) change, adapt and build competence in new approaches, and 3) refreeze, although only relatively permanently, to allow the process to occur again in the future. Mental toughness, tenacity and empowerment are key components for effective behavior change.

Sydney Henry, Projects Manager  
Sandals Foundation  
*Increasing the Opportunities for Women and Youth in Agriculture*

Although agriculture is currently a male-dominated profession, women are equally interested in pursuing it, and there are examples of successful female farmers in Jamaica. Like men, they face challenges of financing, land access and buyer relationships, as well as balancing family care with work. Youth initially show interest in agriculture, but few pursue it beyond high school. Encouraging women and youth to pursue agriculture as a career requires opportunities for them to focus their energies, broadening the scope of the profession with emergent technologies, and establishing cooperatives for women and youth that provide a reliable platform for support.

O’Brian Clarke and Jovan Johnson, Co-Founders of the Taylor Hall Aquaponics Project  
University of the West Indies  
*Aquaponics, Opportunities and Challenges: Experiences in Learning for the Future*

While students at the University of the West Indies, Mr. Clarke and Mr. Johnson took the initiative to implement an aquaponics system at their university, including securing funding, maintaining and upgrading the system, and adapting to lessons learned about equipment, water quality, pests, etc. Additions included a plastic bioreactor to increase filter surface area and “greening up” with solar power and rainwater harvesting. Benefits included consistent supply of climate-resilient, environmental friendly, water-efficient, organic produce for both consumption and sale, and learning the life skills of responsibility and patience.
Additional points from audience questions and discussion:

- In situations where farmer literacy is poor, agricultural teaching tools can include pictures and hands-on practice, and can even incorporate literacy education within such training.
- To improve success of farmer-to-farmer knowledge transfer, an agricultural agent can monitor in-field demonstrations and group farming, leader farmers can help guide group farming activities, and all participants should feel accountable for their contribution.
- It is important to take advantage of existing linkages within the agricultural sector so that all stakeholders work together for mutual benefit.

Closing

Thank you to all who participated in the inaugural Harvest the Future International Symposium. INMED Partnerships for Children looks forward to building new partnerships and nurturing existing ones, and to working together to help find solutions to the global challenges of climate change and a growing population to help improve food security and health for all. The world clearly requires solutions that are high-yielding, environmentally sustainable, and nutritious. Now is the time to Harvest the Future!
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