INTERSESSIONAL PANEL OF THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)

Geneva, Switzerland
23-25 January 2017

Contribution of the United States of America

to the CSTD 2016-17 priority theme on 'The role of science, technology and innovation in ensuring food security by 2030'

1) Feed the Future: Advancing Food Security through Science, Technology and Innovation (

http://archive.constantcontact.com/fs182/1112173962119/archive/1115482938669.html)

This is the electronic copy of USAID's Feed the Future monthly newsletter from Oct 2013. This contains several projects with results and impact. USAID in particular highlighted the Soybean Innovation Lab (brochure attached) which is focused on four key research pillars that comprise the essential components of sustained production, improved livestock and household nutrition and sustainable market linkages for soybean development.

- Advancing Food Security through Science, Technology and Innovation
- Mobile Technology Transforming Smallholder Farmers' Access to Fertilizer
- Disease-Resistant Cassava Increases Yields and Builds Resilience in Kenya
- Surplus in Senegal, Even Without the Rains
- 136 Smallholder Farmers in Ghana Claim Drought-Index Insurance for the First Time

2) Feed the Future: Partnering for Innovation (

https://feedthefuture.gov/model/feed-future-partnering-innovation)

This USAID program helps the private sector scale and market agricultural technologies for smallholder farmers through investing in technology commercialization and knowledge exchange. Through USAID Missions, the program creates and manages public-private partnerships that can improve agricultural productivity and supports the AgTechXChange to facilitate connections and knowledge sharing among entrepreneurs, investor, and nonprofit organizations. USAID highlighted the following:

- Farmforce: Connecting Smallholder Farmers to Global Markets
- Post Harvest Loss Reduction: Organic Fertilizer Pellets Processing
- Innovations in Cassava Processing Reduce Waste & Increase Food Security
- Can Selling Drip Irrigation Supplies to Smallholders be Big Business?
- UdderCheck
- New Storage Options Reduce Postharvest Losses

3) Feed the Future: Eight Ways Feed the Future Fights Hunger with Science (

https://www.feedthefuture.gov/article/8-ways-feed-future-fights-hunger-science)

In partnership with research institutes, U.S. universities, and the private sector, Feed the Future has supported the development of **more than 900 innovations** that are helping farmers increase yields, fight pests and adapt to changing climatic conditions. These innovations—like new drought-tolerant maize that is now being grown by more than 4.8 million farm families on 2.4 million hectares across Africa and pest biocontrol for papaya growers that has led to $1 billion in added crop value".

4) Powering Agriculture

According to Dr. Ryan Shelby, this "initiative focuses on the development and deployment of clean energy innovations that increase agriculture productivity and stimulate low carbon economic growth in the agriculture sector of developing countries to help end extreme poverty and extreme hunger." The factsheet for Powering Agriculture is located here and they just completed a program and innovator level midterm evaluation that can be accessed here. The program has 24 innovators in its cohorts implementing technologies ranging from: Solar Irrigation, Cooling & Cold Storage Refrigeration, Decentralized Power/Minigrids, Energy Efficient Value Added Processing/Mechanization, Solar Thermal

Aeration and others. Dr. Ryan highlighted the following example:
The 2013 innovator "Promethean Power Systems" is improving milk processing in India and has sold over 400 rapid milk chilling systems in the country. To date, none of the 400 Promethean chillers have required a diesel generator. Without Promethean's Thermal Battery, a traditional milk chiller would have run diesel generators to chill milk in these villages. They are now partnering with Fonterra, the dairy cooperative behind Anchor milk brand, to introduce a new rapid milk chilling technology that will drastically improve the quality of milk in Sri Lanka.
In terms of tools to disseminate technology and innovation, Powering Agriculture has developed a MOOC on Sustainable Energy for Food and a clean energy and agricultural information resource hub, which have detailed data on the policy, economic, gender and energy requirements to end extreme poverty and extreme hunger in developing countries. Powering Agriculture and the UNFAO has a series of studies on climate and energy smart agricultural technologies that they are working on. The first study can be accessed here.

5) LAUNCH Food (http://launch.org/food)

USAID is a core partner for LAUNCH Food. A fact sheet is attached for your reference. LAUNCH Food is part of LAUNCH, which was founded in partnership with State Department, USAID, NASA and Nike.

6) Securing Water for Food

Securing Water for Food (SWFF) aims to enhance access to innovations that help agricultural producers grow more food with less water, enhance water storage, and improve the use of saline water and soils to produce food. Through a competitive process, the program has pre-screened and selected only the highest potential water-for-food innovations and is providing grant funds and ongoing acceleration assistance to support their business development. Two detailed fact sheets are attached. The first (SWFF Program & Innovators Combined….pdf) contains the one-pager describing the program along with innovators summaries. The second attachment (V6-Sumary of Innovators….pdf) contains a brief description of 'what is game-changing' about each of the innovations they are currently funding.

7) World Food Prize

Feed the Future and USAID supported all of this year's laureates who worked to develop and scale the adoption of bio-fortifies orange flesh sweet potatoes (rich in vitamin A and help to prevent blindness), and we supported this year's winner of the Prize for Field Application for his research on rain-indexed insurance for pastoralists (which is helping to protect herders from losses due to drought). Here, you can find the Keynote Addressed delivered by USAID Administrator Smith at the 2016 World Food Prize. USAID's Mitchell Craft highlighted Dr. Andrew Mude as a World Food Prize 2016 award recipient. His research aimed to find a sustainable way to help farmers recover from livestock losses during severe droughts. Dr. Mude designed, ground-truthed and implemented a pioneering social safety net strategy that is answering this and other fundamental questions. Additional information here.

2016 Training Costs Tamale, Ghana

Item	Cost $U.S. per attendee
Hotel	$180
Meals	$100
Travel	$35
Safety gear	$30
Shirts and certificates	$14
Seed Money	$500
Training manuals	$7
Hand tools	$10

Item	Total Cost $U.S.
Facility charge	$2000
Pedal powered thresher	$400
5 hp engine powered	$900
Cheapest engine powered	$600

USAID
FROM THE AMERICAN PEOPLE

The Soybean Innovation Lab (SIL) is a USAID funded Feed the Future Innovation Lab. The mission of SIL is to provide researchers, extensionists, the private sector, NGOs, and funders operating across the entire value chain the critical information needed for successful soybean development.

The Soybean Innovation Lab focuses its efforts on four key research pillars that comprise the essential components of sustained production, improved livestock and household nutrition and sustainable market linkages for soybean development:

Pillar I: Genetic Improvement
Pillar II: Crop Productivity and Quality
Pillar III: Nutrition (Livestock and Human)
Pillar IV: Value Chains & Socio-Economic Research

About Feed the Future: Feed the Future is the U.S. Governments' global hunger and food security initiative. With a focus on smallholder farmers, particularly women, Feed the Future supports partner countries in developing their agriculture sectors to spur economic growth and trade that increase incomes and reduce hunger, poverty, and undernutrition. For more information, visit www.feedthefuture.gov.

FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Customized Training for Smallholder Thresher Fabrication

Soybean Innovation Lab
Feed the Future Innovation Lab for Soybean Value Chain Research

soybeaninnovationlab.illinois.edu

Teaching innovative thinking to meet production needs in environments with limited energy and raw materials

Build it Local

Many smallholder farmers in the tropics do not have access to durable and affordable harvest equipment such as crop threshers. Imported threshers are often too costly and too large and cumbersome for small farmers, have too high of energy needs or end up in the scrap pile if repair parts cannot be located or fabricated.

Creating a local, skilled workforce for the fabrication of small to medium sized threshers can solve many of the problems of availability and affordability that prevent smallholder farmers from scaling up production.

Locally-made also means locally-repaired. Local fabricators can listen to customer concerns and customize equipment to the needs of the individual or groups of end-users.

The Soybean Innovation Lab is offering customized training workshops in small thresher fabrication. Our instructors can either train your selected local blacksmiths/welders or we can train your own trainers.

Gabriel Abdulai, the SIL primary trainer and small equipment engineer is a graduate of the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana.

Workshops include designs and fabrication of both motorized and bicycle powered threshers

Workshops also include business training and ideas on how to price to be profitable but still attract customers

Workshop Specifics

Workshops require 8 days. One day for discussion and training on three-dimensional design reading, basic thresher components, construction calculations, welding methods, and safety. One day for business training and 6 days for fabrication.

Contracting organizations will have to supply a facility with power, appropriate tools, and welders. Training can also be contracted for Tamale, Ghana or Missouri, U.S.A where SIL will provide access to a training facility

Workshop Costs

Contracting organizations will need to pay salary, travel costs and per diem for two SIL trainers for twelve days.

We suggest that trainee travel and per diem costs be covered by your organization and that some seed money be provided to participants so that they can build a model thresher to attract customers on their return home.

Example costs from a 2016 training in Ghana are shown on the back of this pamphlet.

Contact Us

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LAUNCH

LAUNCH Food

Enabling Healthy Food Choices

LAUNCH Food is calling for innovators, entrepreneurs, organisations, and individuals from around the world to put forward innovative solutions for improving global health outcomes by enabling people to make healthy food choices.

The Problem

There's more to healthy eating than meets the eye. What people feed themselves and their families is driven not just by cultural norms, personal habits, and choice, but also by the range of food they're able to access. That's why LAUNCH is taking a system-level approach to enabling healthy food choices.

The quality and quantity of the world's food supply is changing – and so is the way that people eat. The result is malnutrition and poor health in communities across the world. Deep divisions in global food equity exacerbate this burden for poor and vulnerable populations.

How can we make healthy food more affordable? More nutritious? More sustainably produced? How can we inspire and enable people to make healthier food choices for themselves and their families?

The Challenge | Choice

LAUNCH seeks supply- or demand-side innovations that will ultimately impact people's food choices, whether in the home, market, street, restaurant or community.

Along with Australia's Department of Foreign Affairs and Trade, the U.S. Agency for International Development, and other partner organisations, LAUNCH Food will support and accelerate a portfolio of high-quality innovations that address these questions and more. In the process, LAUNCH aims to create a worldwide coalition of the committed focused on transforming food systems while respecting the planet's resources.

Get Involved!

Submit your innovation by November 16, 2016 to be considered for the LAUNCH Food challenge.

Selected LAUNCH Food innovators will be mentored by the LAUNCH Food network to scale their technical capabilities and increase the impact of their innovations. This will include one-on-one mentorship, access to market partners, and facilitated opportunities for investment with LAUNCH partners and others. Innovators will receive visibility for their own work, exposure to new ways of thinking, and access to a network of key experts and stakeholders across disciplines, sectors, and industries who stand ready to accelerate the trajectory of their innovations into the marketplace.

The challenge is open for anyone to apply – interested applicants can find out more or share their submissions at **launch.org/food**. Winning innovators will be announced in December 2016.

The Story of LAUNCH

Since 2010, LAUNCH has harnessed the power of collective innovation. Founding partners NASA, NIKE, Inc., the U.S. Agency for International Development, and the U.S Department of State formed LAUNCH in an effort to bring collective genius, unprecedented networks, and new resources to overcome some of humanity's toughest sustainability challenges. LAUNCH aims to move beyond incremental change and make an impact at a systemic level.

So far, LAUNCH has sourced and supported life-changing, sustainable solutions in water, health, energy, materials, and waste. Hundreds of innovators have accepted the challenge, and to date, over 80 innovators have been accelerated by LAUNCH, collectively receiving some US$95 million in funding.

Challenge launch date: September 19, 2016

#LAUNCHFood www.launch.org/food @LAUNCHorg

Australian AID

USAID FROM THE AMERICAN PEOPLE

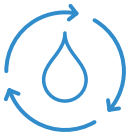
SECURING WATER FOR FOOD:

A GRAND CHALLENGE FOR DEVELOPMENT

Who We Are

Securing Water for Food aims to enhance access to innovations that help agricultural producers grow more food with less water, enhance water storage, and improve the use of saline water and soils to produce food. Through a competitive process, the program has pre-screened and selected only the highest potential water-for-food innovations and is providing grant funds and ongoing acceleration assistance to support their business development.

What We Focus On



Efficiency

Helping farmers use water more effectively

Salinity

Removing salt from water to make more food

Storage

Improving water storage for lean times

USAID FROM THE AMERICAN PEOPLE

Government of the Netherlands

SWEDEN

science & technology Department: Science and Technology REPUBLIC OF SOUTH AFRICA

How Securing Water for Food Works

GROWING MORE FOOD WITH LESS WATER

Approximately 70 percent of the world's freshwater supply is used for agriculture. As the world's population continues to rise, we'll need more water to grow enough food. Further compounding this issue is climate change, which affects the salinity of soils and water and changes the way farmers work.

THE CHALLENGE

Since 2013, USAID, the Governments of Sweden and South Africa, and the Ministry of Foreign Affairs of the Kingdom of the Netherlands have invested $32 million and provided critical acceleration support to promote science and technology solutions that enable the production of more food with less water and/or make more water available for food production, processing, and distribution.

Securing Water for Food's approach is as unique and innovative as the 30 solutions supported. Decision-making is driven by hard data and evidence. Once innovations reach pre-established milestones, the Securing Water for Food Technical Assistance Facility provides advisory and acceleration services, grants and financial management support, M&E guidance, and connections to a variety of partners and networks.

THE IMPACT

Since 2013, over 280,000 people in 25 countries have benefitted from our investments. We've been able to save 250 million liters of water – enough to fill 200 swimming pools – and to produce nearly 4,000 tons of food – imagine 300 elephants piled up. This approach has been so successful, we are taking the lessons we have learned and are applying them to achieve our broader water goals across the SWFF partnership.

Timeline

FIRST CALL FOR INNOVATIONS

Announced in November of 2013, 16 innovators received over $6.5 million in funding to scale up access to commercially viable water approaches.

THE DESAL PRIZE

Released on World Water Day 2014, this over $1.5 million call uncovered two environmentally sustainable, small-scale brackish water desalination system solutions.

THIRD CALL FOR INNOVATIONS

Launched in March 2015, 12 awardees where chosen from over 400 applicants from 67 countries for their focus on cutting-edge, advanced technologies and business models, as well as innovations that engage women. The awardees will receive between $100,000 and $3 million in funding and acceleration support to bring their innovations to scale.

Innovators from the Portfolio

WATER CAPTURE & STORAGE

- WaterBoxx for Water Collection
- WaterPads for Plant Water Retention at Root Level
- Hydro-Powered Pump
- Sandbar Cropping

WATER EFFICIENCY & REUSE

- Affordable Greenhouses
- Irrigation Design & Installation App
- Silicic Acid for Resilient Crops
- Solar-Powered Drip Irrigation
- Mobile Weather Data for Farmers

SALINITY & SALT WATER INTRUSION

- Salt Tolerant Potatoes
- Salt Tolerant & Drought Resilient Seeds
- Photovoltaic-Powered (PV) Electrodialysis Reversal Desalination System
- Zero Discharge Desalination Technology (ZDD)

Partner With Us

Securing Water for Food represents a multi-governmental partnership aimed at tackling one of the world's greatest challenges—water and food security. To reach our goal, we seek connections and strategic relationships that help our innovators test, implement, and scale water for food solutions.

Interested in partnership opportunities? Contact securingwaterforfood@gmail.com.

Affordable Greenhouses

WORLD HOPE

CHALLENGE

Approximately 70% of Sierra Leone and Mozambique's populations are employed in the agricultural sector, growing, selling, buying, and preparing food for their families. However, with global climate change affecting water availability, agriculture is not always a reliable source of income.

SOLUTION

In partnership with Pennsylvania State University, World Hope is producing and distributing Affordable Greenhouses that enable a year-round growing season and reduction in water consumption. These greenhouses can be constructed in just two days at a price point of $500. The greenhouses are durable and last over five years.

MILESTONES AND ACHIEVEMENTS

World Hope's Greenhouses Revolutionizing Output (GRO) project was able to install dozens of greenhouses in Mozambique and Sierra Leone in year 1 of its participation in the Securing Water for Food program. These greenhouses are actively growing produce and within the next several months, the innovator expects to have nearly three tons of crops. The affordable greenhouses have reached almost 2,000 beneficiaries and resulted in more than 770,000 liters of water savings. Based on their first harvest, World Hope estimates that farmers will see a full payback in the cost of greenhouse expenditures in 2-3 growing cycles. Additionally, the innovator is seeing an unexpected fledgling industry of seedling production that is rapidly growing.

GOALS

1. Support in simplifying highly scientific and complex calculation methods for tracking and reporting on water consumption and reduction results.
2. Review of the innovator's business model to ensure sustainability and viability going forward. Key questions include identifying the most appropriate customer bases, sales and marketing approaches to reach rural farmers, and how to evaluate and select potential partners.
3. Guidance on best practices in marketing to bottom-of-the-pyramid consumers.Expand funding sources and make connections with potential investors.

OBSTACLE
Approximately 70% of Sierra Leone's and Mozambique's populations are employed in the agricultural sector, growing, selling, buying, and preparing food for their families. However, with global climate change, agriculture is not always a reliable source of income.

INNOVATION
Affordable Greenhouses

ORGANIZATION TYPE
Non-Profit

COUNTRIES
Mozambique, Sierra Leone

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www.worldhope.org

AgroSolar Irrigation Technology

ISLAMIC RELIEF KENYA

OBSTACLE
There are 5.4 million hectares of arable land in Kenya, but 83% of that land is unsuitable for rain-fed agriculture leaving it in need of irrigation and water-pumping technology.

INNOVATION
AgroSolar Irrigation

ORGANIZATION TYPE
Non-Profit

COUNTRY
Kenya

CONTACT
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islamicreliefkenya.org

CHALLENGE

There are 5.4 million hectares of arable land in Kenya, but 83% of that land is unsuitable for rain-fed agriculture leaving it in need of irrigation and water pumping technology. Unfortunately, only 4% of the land is currently under irrigation, mainly using diesel, electric or treadle pumps for furrow irrigation. These processes are inefficient, environmentally unfriendly and costly. This trend is not isolated in Kenya, but persists across Africa.

SOLUTION

Islamic Relief Kenya, in partnership with SunCulture, is transforming the status quo with their affordable solar-powered drip irrigation technology, AgroSolar Irrigation. This innovation is designed to meet the needs of smallholder farmers and improve productivity and profitability. AgroSolar Irrigation is both low-maintenance and long-lasting, providing farmers with high-value fruits and vegetables for just a fraction of the cost of traditional irrigation technology.

HOW DOES IT WORK?

AgroSolar Irrigation is a solar powered drip irrigation system built to support the cooperatives in Kenya. SunCulture links potential users to training and financial service providers, who in turn offer loans to cooperative members to acquire the technology. The system is ultra-efficient, saving about 80% of the water used in furrow irrigation, and delivering water and fertilizer directly to crop roots. Farmers can expect yield gains of over 300%.

Utilizing clean energy services over current diesel water pumping practices results in a cost and labor savings of almost $14,000 per acre. This unique business model takes a whole value chain approach to improving upon the fragmented value chain currently found in Kenya and ensures that barriers for smallholder farmers are removed.

Aquaponics Farming

WATER GOVERNANCE INSTITUTE

CHALLENGE

Declining water availability due to climate change paired with limited access to commercially viable farmland are just a few of the challenges facing growers in Uganda. Additionally, the food system in the nation faces hurdles with a declining fish eating culture resulting from dwindling fish supply in lakes, high local and international demand, and high costs. Without access to protein-rich foods like fish, many Ugandans, especially children, cope with nutritional deficiencies.

SOLUTION

Water Governance Institute's Aquaponics system closes the loop between fish and horticultural crop farming to provide much needed nutritional supplements and alternative incomes to Ugandan citizens and farmers living in rural, urban or peri-urban household settings. The all-in-one system uses less water and allows for crop production and fish rearing at home.

HOW DOES IT WORK?

The Aquaponics system is an integrated technology that involves growing crops like sweet pepper and tomatoes in a permeable tray. The tray is filled with a growth medium such as husks or loamy soil, and underneath is a water tank for rearing fish. Wastewater from the fish is routinely introduced to the growth medium via the tray through an irrigation process.

Organics in the water decompose, releasing nutrients that are taken in by the crop, making it a closed loop system. The water in the tanks is recycled several times, so less water is needed to rear the fish and to grow crops. With enough water, farmers and system owners can grow crops all year round. The system is low-cost, gender and disability friendly and yields high value, premium price produce.

OBSTACLE
Declining water availability due to climate change paired with limited access to commercially viable farmland are just a few of the challenges facing growers in Uganda.

INNOVATION
Aquaponics Farming

ORGANIZATION TYPE
Non-Profit

COUNTRY
Uganda

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Biodegradable Seed Tape

REEL GARDENING

CHALLENGE

Planting a home garden can be a daunting task requiring access to large volumes of water, start-up capital, and at least some gardening knowledge. For many low-income communities, committing precious resources to seeds, fertilizer, and water just to have a garden fail can be a deterrent to growing your own produce, which can feed a family or be sold for extra income.

SOLUTION

Reel Gardening has developed a unique seed system that can be grown into a vegetable or herb garden in nearly any climate. The innovator pre-packages a paper strip with seeds and fertilizers so it can be easily planted at the correct depth and maintained. It takes just 5 minutes to plant, uses 80% less water and provides hours of joy and months of food.

MILESTONES AND ACHIEVEMENTS

Reel Gardening has manufactured and delivered over 300,000 household gardens. They have implemented their Garden in a Box technology in 200 schools and have secured the matching funds to meet their Year 1 Securing Water for Food obligations. Reel Gardening has saved 19.5 million liters of water, farmed 30 hectares of land, and produced approximately 1,000 tons of produce from their seed tape. The innovator has established two new partnerships and finalized their first international partnership with an organization based in Kenya.

GOALS

1. Support in developing and implementing an agent distribution model to roll out school gardens and in establishing a process for follow-on sales within a community.
2. Assistance in efficient and effective forecasting and cash flow management processes and help in finding tools to enable the capture and reporting of backup documentation that will support cost share obligations.
3. Aid in developing a buy-one-donate-one retail model to help Reel Gardening determine how this model could be marketed and implemented without overpricing the product and how they can size the market to assess potential uptake for this kind of model.

OBSTACLE
For many low-income communities, committing precious resources to seeds, fertilizer, and water just to have a garden fail can be a deterrent to growing your own produce, which can feed a family or be sold for extra income.

INNOVATION
Biodegradable Seed Tape

ORGANIZATION TYPE
For-Profit Social Enterprise

COUNTRY
South Africa

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BioEnsure®

ADAPTIVE SYMBIOTIC TECHNOLOGIES

OBSTACLE
Drought, rising salinity, poor water quality, and climate change threaten the sustainability of agriculture.

INNOVATION
BioEnsure®

ORGANIZATION TYPE
For-Profit

COUNTRIES
United States, India

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adaptivesymbiotictechnologies.com

CHALLENGE

Some of the greatest threats facing agricultural sustainability are abiotic stresses including drought, rising salinity, and poor water quality, all of which are exacerbated by climate change. Simultaneously, increasing populations, urbanization, soil degradation, and the reduction of arable farmland are decreasing global agricultural growing capacity.

SOLUTION

Adaptive Symbiotic Technologies' BioEnsure® is a fungal seed and plant treatment that, when sprayed onto seeds, helps plants to adapt to water-related stress. By applying BioEnsure®, crops can grow in suboptimal conditions and use 50% less water. BioEnsure® is the only product on or soon to be on the market that can confer stress tolerance.

MILESTONES AND ACHIEVEMENTS

In the first year of its participation in the Securing Water for Food program, BioEnsure® users in India saw a 29% increase in crop yields. Even those farming in difficult growing conditions are seeing an increase in plant resiliency. Currently, BioEnsure® is being applied to 4 food crops–okra, maize, wheat, and millet. Securing Water for Food isn't the only program that believes in Adaptive Symbiotic Technologies' innovation. The innovator has leveraged more than $2 million in outside funding in the first year.

GOALS

1. Expand funding sources and make connections with potential investors.
2. Support in identifying partners in target countries to set up in-country testing facility and conduct seed tests.

Broad Bed and Furrow Maker

AYBAR ENGINEERING

CHALLENGE

Vertisols are important to Ethiopian agriculture. In the Ethiopian highlands alone, there are about 7.6 million hectares of vertisols out of which farmers use only 25% for crop production. In traditionally cultivated fields, farmers' crops are suffocated by water and yields are significantly reduced.

SOLUTION

Aybar's Broad Bed and Furrow Maker (BBM) is used at planting time in order to drain excess water away from crops. It is a multi-purpose ridger and bed maker used to drain excess water and conserve moisture in dry areas. The innovator is currently working primarily in Ethiopia, where only 25% of the land is cultivated due to waterlogging. The BBM has been developed to build the optimum BBMs using lighter-weight materials appropriate for Ethiopian farmer needs. The use of their BBM has improved wheat yields from 0.5 tons per hectare to 3.8 tons per hectare.

MILESTONES AND ACHIEVEMENTS

In Year 1, Aybar has been busy manufacturing their BBMs. The innovator is working with farmers in both the wet and dry areas of Ethiopia to help local smallholders adopt their technology. Aybar seeks to train farmers on their BBMs, so that those farmers can, in turn, act as future trainers themselves.

GOALS

1. Support in navigating the Ethiopian small-plot farmer market and agricultural economy.
2. Review of Aybar's business model with accompanying feedback that will help them solidify and expand their value proposition and operations.
3. Aid in communicating with local government officials to increase engagement with Aybar.

OBSTACLE
In the Ethiopian highlands alone, there are about 7.6 million hectares of vertisols out of which farmers use only 25% for crop production.

INNOVATION
Broad Bed and Furrow Maker (BBM)

ORGANIZATION TYPE
For-Profit

COUNTRY
Ethiopia

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Ecorangers and Meat Naturally

CONSERVATION SOUTH AFRICA

OBSTACLE
Nearly 90% of South Africa's water for agriculture comes from surface catchment areas that are vulnerable to alien plant spread and bush encroachment.

INNOVATION
Ecorangers and Meat Naturally

ORGANIZATION TYPE
For-Profit

COUNTRIES
Botswana, Kenya, Lesotho, Namibia, South Africa

CONTACT
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CHALLENGE

Nearly 90% of South Africa's water for agriculture comes from surface catchment areas that are vulnerable to alien plant spread and bush encroachment, often triggered by communal livestock. Degradation of rangelands across Africa is destroying water catchment functions and driving poverty for livestock farmers. Restoring catchments infested by non-native species is a national priority in South Africa for efficient water management.

SOLUTION

Trained cattle herders and communal herding techniques minimize the negative impacts of climate change and alien plant invasions to wetlands and riparian zones. Conservation South Africa uses an innovative business model, Meat Naturally Pty, to implement communal grazing systems that result in improved water and food availability. The business model is based on training herders and supporting market access in a way that improves livestock condition, croplands, rangeland ecosystems, and, by working at scale, ensures sustainability in formal private sector markets.

HOW DOES IT WORK?

Meat Naturally Pty uses ecological science, a government job creation program, and market interest in sustainable meat to implement communal grazing systems that result in improved water and food security. The system provides a scalable vehicle for African communal farmers to enter into a growing niche market for grass fed and sustainably-produced meat.

The enterprise will have two key revenue streams: one focusing on production and land restoration support by Ecorangers paid by the government, and another focused on sales and auditing support paid by farmers and retailers.

Using Ecorangers to intensely manage grazing will improve soil and allow for crop planning and fertilization to be integrated into resilient food systems. Once established in South Africa, this model can be the driver for development for much of Africa's drylands.

Electrodialysis Reversal System

MIT-JAIN

OBSTACLE
All too often, groundwater is brackish and not suitable for human consumption or crop irrigation.

INNOVATION
Electrodialysis Reversal (EDR) System

ORGANIZATION TYPE
For-Profit

COUNTRY
India

CONTACT
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www.jains.com

CHALLENGE

All too often, groundwater is brackish and not suitable for human consumption or crop irrigation. Irrigation with brackish water is not sustainable and ultimately leads to low crop yield and salinization of the soil. In India, 60% of the land is underlain by salty water. The nation is in need of freshwater supplies for crop, human, and animal consumption. Further, electric grids that can run conventional reverse- osmosis desalination plants are not widely available in India.

SOLUTION

MIT and Jain Irrigation Systems designed a photovoltaic-powered electrodialysis reversal (EDR) system that desalinates water. This system uses electricity to pull charged particles out of the water and further disinfect it by using ultraviolet rays. The system was designed for low energy consumption, limiting costs especially in off-grid areas.

HOW DOES IT WORK?

Photovoltaic-powered (PV) electrodialysis reversal (EDR) desalinates water through a simple, robust design that uses electricity to pull charged particles out of the water and then further disinfect with UV. The system has low energy consumption, leading to lower system costs and capital expenses, especially in off-grid areas. Jain Irrigation Systems' capabilities in large-scale manufacturing, marketing, distribution, and servicing in rural areas increase this innovation's potential.

As their test pilot period begins, MIT plans to automate their system with electronic valves, so it can automatically turn on and off. Additionally, this automated system would allow for reversal of the electrodialysis process, as well as automatic separation of potable from agricultural water. Jain will roll out training activities for farmers during their test pilot period in India.

Flying Sensors

FUTUREWATER

CHALLENGE

In Mozambique, some of the most common crops—maize, cassava, and sorghum—have very low yields per hectare. Most farmers do not have access to reliable information on the status of their crops and are afraid to risk using costly inputs such as high-quality seeds, on-time irrigation, and fertilizer for fear of wasting these precious resources.

SOLUTION

FutureWater provides smallholder farmers with insights that are critical to improving their application of limited resources such as water, seed, and fertilizer. The Flying Sensor provides high-resolution spatial information beyond the visual spectrum. Flying Sensors are equipped with near-infrared sensors that detect crop stress up to two weeks before it is observable by the human eye.

MILESTONES AND ACHIEVEMENTS

The first year of FutureWater's project had promising results. In Year 1, the Flying Sensor benefitted approximately 2,000 households and conducted flyovers on 660 hectares of land. A subset of beneficiaries reported that using the Flying Sensor resulted in a 39% water reduction.

This year also saw the innovator focused on navigating Mozambique government regulations, increasing public visibility, and resolving a few remaining technical issues with the Flying Sensor. The innovator has now obtained the necessary clearance from the Ministry of Defense and has learned from the Civil Aviation Authority that there are no regulations applicable to their product.

GOALS

1. Support to navigate and accelerate the Mozambique government's approval process so that in-country sales can begin.
2. Create a marketing and communications strategy, which includes channel identification, corporate messaging, customer research, and partner research.
3. Help to establish baseline metrics for water consumption reduction and productivity.

OBSTACLE
Most farmers do not have access to reliable information on the status of their crops and are afraid to risk using costly inputs such as high-quality seeds, on-time irrigation, and fertilizer for fear of wasting these precious resources.

INNOVATION
Flying Sensors

ORGANIZATION TYPE
For-Profit

COUNTRY
Mozambique

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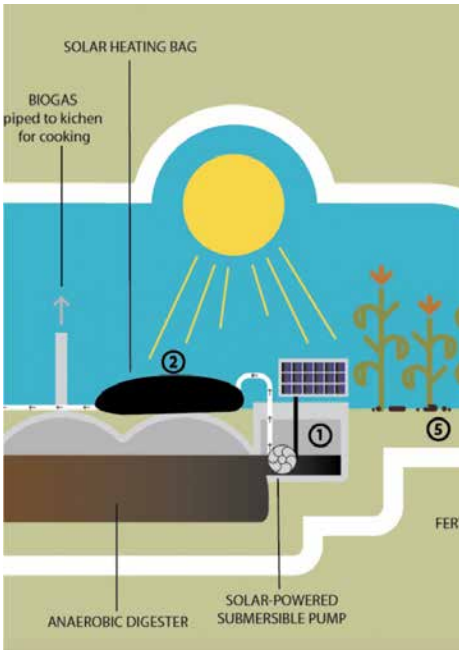

Slurry-Separation System

GREEN HEAT UGANDA LTD

CHALLENGE

Anaerobic digestion transforms organic wastes into methane and fertilizer, which saves money while improving energy security, air quality, public sanitation, and crop yields. Unfortunately, in Uganda, 50% of digesters are abandoned within a year because farmers find the process unsustainable. Current designs require every kilogram of waste to be mixed with a kilogram of water for the system to function. Women and children must fetch more than 80 liters of freshwater a day to feed their digesters, wasting precious natural and labor resources.

SOLUTION

Green Heat Uganda Ltd.'s innovative slurry-separation system greatly reduces water demand. The system creates an easily managed fertilizer product while increasing gas production. Utilizing a solar-powered sewage pump and innovative heating process, slurry is dewatered and converted into solid fertilizer that can be packaged, stored, or applied directly to the fields. Water by-products are separated during the process and re-used to mix with organic wastes later in the system. Green Heat Uganda increases the potential of success by enabling all farmers to enjoy the benefits of digesters, regardless of their water access.

A solar-powered submersible chop pump transfers slurry into a black bag that absorbs UV radiation. Heat is applied to kill pathogens and stimulate microbial activity to increase gas production. Solids are removed from the slurry using dewatering fabric, and can then be used or sold as fertilizer. The remaining liquid is mixed with wastes entering the digester, replacing freshwater. The system is eco- and gender-friendly, efficient, and a true cost-saver.

OBSTACLE
In Uganda, 50% of digesters are abandoned within a year because farmers find the process unsustainable.

INNOVATION
Slurry-Separation System

ORGANIZATION TYPE
For-Profit

COUNTRIES
Ethiopia, Rwanda, Uganda

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OBSTACLE
In MENA countries, a rising demand for agricultural products combined with a fragile natural environment is rapidly adding pressure on scarce land and water resources.

INNOVATION
Groasis Waterboxx

ORGANIZATION TYPE
NGO and Non-Profit

COUNTRY
Jordan

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Groasis Waterboxx

INSTITUTE FOR UNIVERSITY COOPERATION

CHALLENGE

In MENA countries, a rising demand for agricultural products combined with a fragile natural environment is rapidly adding pressure on scarce land and water resources. This unsustainable balance between production limitations and demand calls for a meaningful change in water efficiency in the region.

SOLUTION

The Groasis Waterboxx (GW) is an integrated planting technology that allows fruits, trees and shrubs to grow in degraded farm and rangelands. The GW surrounds the bases of a plant to collect water necessary for crop survival. This innovative and inexpensive technology revitalizes degraded ecosystems, while simultaneously providing valuable nutrient sources of fruits and feed to both humans and animals.

HOW DOES IT WORK?

The GW is a 20-liter box that is placed around a young seedling at transplanting. The box builds up a water column under the plant by collecting dew and rainwater, and distributes it over a long period of time to avoid evaporation.

In practice, the transplanted seedling will receive just enough water from the GW to survive while it searches for water deep in the soil to develop a strong taproot. The taproot developed in this way will make the whole plant resilient to prolonged drought periods. The GW requires less inputs and management when compared to other water-saving technologies such as drip irrigation—and farmers may see a 95% money saving per hectare over a period of ten years.

Irrigation Scheduling System

INSTITUTE FOR UNIVERSITY COOPERATION

CHALLENGE

In Peru, access to information about climate and weather patterns is both limited and expensive. Data that is collected and provided by the public authority covers only a small portion of the country. Marketing companies that sell climate stations exist, but only provide services to large farming institutions because of high costs.

SOLUTION

ICU offers Peruvian smallholder farmers an innovative technology that permits widespread sharing of information on climate and irrigation at an accessible cost. Their innovation consists of an irrigation scheduling system that helps farmers know when and how much to irrigate.

HOW DOES IT WORK?

The irrigation scheduling system provides farmers and agriculture technicians with direct indications on the best irrigation practices. Through a climate station, the system measures air temperature, humidity, wind speed and direction, intensity of solar radiation, and rain. These data points are then processed in a GIS platform. Additionally, this platform considers soil characteristics and the type of food produced, and finally provides recommendations directly to farmers through texts, e-mails or notifications to their tablet. This game-changing solution permits farmers to switch from turn driven irrigation to a demand driven system.

OBSTACLE
In Peru, access to information about climate and weather patterns is both limited and expensive.

INNOVATION
Irrigation Scheduling System

ORGANIZATION TYPE
NGO and Non-Profit

COUNTRY
Peru

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M-Fodder

CENTER FOR SUSTAINABLE DRYLAND ECOSYSTEM AND SOCIETIES (CSDES) – UNIVERSITY OF NAIROBI

OBSTACLE
Livestock feed prices are escalating due to water scarcity caused by lack of space and the effects of climate change, and remain unaffordable to poor smallholder farmers.

INNOVATION
M-Fodder

ORGANIZATION TYPE
For-Profit

COUNTRIES
Kenya, Tanzania, Uganda

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CHALLENGE

There is an urgent need for change in the agricultural and livestock systems of Africa. Livestock feed prices are escalating due to water scarcity caused by lack of space and the effects of climate change and remain unaffordable to poor smallholder farmers. These farmers comprise 80% of the agricultural workforce in East Africa. With high feed prices, large-scale livestock and crop production are stunted.

SOLUTION

M-Fodder, a mobile phone application, connects smallholder livestock farmers to high-quality fodder through SMS messages. This technology is game changing in two ways. First, it promotes production of high quality affordable hydroponic fodder, which utilizes about 10% less water than traditional fodder. Second, the production, technology dissemination, and marketing of the fodder utilizes the fastest and most affordable means of communication—mobile phone technology.

MILESTONES AND ACHIEVEMENTS

M-Fodder's SMS system enables farmers to access a reliable source of low-cost, sustainable hydroponic fodder right through their phones. Livestock farmers send the distributor an SMS with the fodder quantity required and their location. The farmer will receive a call from the fodder producer within minutes and receive a delivery of hydroponic fodder within seven days.

M-Fodder is capitalizing on the rapid uptake of mobile technology by farmers and creates a gateway for communication between growers and fodder producers. Hydroponic fodder is water efficient and sustainable and may help decrease the number of farmers out of work due to drought and feed price.

Mobile Weather Forecasts

IGNITIA AB

OBSTACLE
Extreme weather variability due to climate change hinders farmers from capitalizing on rainfall for crop production.

INNOVATION
Weather Model

ORGANIZATION TYPE
For-Profit

COUNTRIES
Ghana, Mali, Niger, Nigeria, Senegal

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CHALLENGE

Extreme weather variability due to climate change hinders farmers from capitalizing on rainfall for crop production, especially in regions near the equator. Predicting the weather based on traditional forecasts is often insufficient for small-scale farmers living in these weather volatile regions. Of the estimated 1.4 billion hectares of cropland worldwide, around 80% is rainfed and accounts for about 60% of the global agricultural output. Reliable and accurate weather forecasts help farmers sow, fertilize and harvest at the ideal time to realize greater yields.

SOLUTION

Ignitia AB has developed a highly accurate weather model to help small-scale farmers in West Africa manage their daily activities to predict water availability and improve their yields to optimize food production. Working in partnership with major telecommunications firms, Ignitia sends daily, customized weather forecasts to farmer's phones.

Weather forecasts are delivered daily via text message to mobile phones and depict the predicted weather for the next 48 hours specific to the subscriber's location. Farmers receive updates on the likelihood of rain, timing of rainfall, and intensity of precipitation. Messages are low-cost at $0.03/day and constructed to be user-friendly so that even low-literacy subscribers are able to extract useful information after very little training.

Current global weather forecast models all fail to provide accurate forecasts in the tropics. Ignitia's forecasts are accurate 84% of the time compared to its competitors, which are accurate only 39% of the time. Designed with end-users in mind, Ignitia delivers highly localized, accurate forecasts and a lightening-fast warning system to alert farmers in case of sudden storms.

NewSil

SI TECHNOLOGIES INTERNATIONAL

CHALLENGE

Worldwide droughts cause severe agricultural losses. Prolonged lack of rainfall from climate change inhibits the photosynthesis of plants, causes chlorophyll changes, and damages of the photosynthesis apparatus. Plants are inhibited from photochemical activities and see decreased enzyme activities.

SOLUTION

Si Technologies found a way to stabilize silicic acid to strengthen crop resilience against droughts and extreme weather. With their product, NewSil, food crops can absorb silicon, resulting in a reduction of water consumption of 30-50%. Applying silicic acid to food crops is an affordable and environmentally friendly solution to reduce drought stress so crops can overcome periods of water shortages, which saves harvests.

HOW DOES IT WORK?

Silicic acid, an important element in plant growth, is highly unstable. In the creation of NewSil, Si Technologies stabilized silicic acid in its monomeric form and added the element boron—making it the first and only product that found a way to increase silicon uptake by plants. NewSil is simply sprayed over crops, allowing for rapid uptake of the product. Plants will have increased drought tolerance by maintaining proper water balance, photosynthetic activity, and erectness of leaves and structure of xylem vessels under high transpiration rates. The best part: NewSil is a completely safe and natural product, with ingredients found widely in nature.

OBSTACLE
Prolonged lack of rainfall from climate change inhibits the photosynthesis of plants, causes chlorophyll changes, and damages of the photosynthesis apparatus.

INNOVATION
NewSil

ORGANIZATION TYPE
For-Profit

COUNTRY
India

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OBSTACLE
Practical Action's sandbar cropping technique enables landless families in Bangladesh to diversify their incomes by growing pumpkins and other crops on previously barren land.

INNOVATION
Sandbar Cropping

ORGANIZATION TYPE
Non-Profit

COUNTRY
Bangladesh

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Sandbar Cropping

PRACTICAL ACTION

CHALLENGE

After the rainy season ends each year in Bangladesh, large barren sandy islands appear in the main rivers. These sandbars usually disappear after five months and thus cannot be cultivated year-round. However, during the dry season these lands can be used by extremely poor farmers to grow high-nutrition crops.

SOLUTION

Practical Action's sandbar cropping technique enables landless families in Bangladesh to diversify their incomes by growing pumpkins and other crops on previously barren land. Farmers can overcome seasonal food shortages and reduce risks that threaten their livelihoods with sandbar cropping. Practical Action teaches farmers how to identify suitable sandbar cropping space, dig pits, fill them with compost, and add pumpkin seeds. Crops thrive and the pumpkins last for up to a year, enhancing food security and improving earning potential amongst extremely poor farmers.

MILESTONES AND ACHIEVEMENTS

In Year 1, Practical Action has reached 750 beneficiaries, 150 of which were families of female farmers. Their unique sandbar cropping technique has lead to a 54% reduction in water usage and produced approximately one million kilograms of pumpkins. The innovator has made 30 hectares of land farmable and seen a 100% repayment rate from pumpkin farmers to-date. The project team has identified five sandbar locations managed by five irrigation entrepreneurs in the Rangpur district.

GOALS

1. Support in water quality testing to ensure that water supplies downstream from the sandbar cropping are not adversely affected by the pumpkin growing process.
2. Assistance in creating a business and marketing strategy at the national and international level and identifying opportunities for pumpkin export to other countries.
3. Help in exploring the potential for growing and exporting other pumpkin varieties and vegetables using the sandbar approach.

Rainmaker

MYRAIN LLC

OBSTACLE

In India, 41 million small-plot farmers rely on flood irrigation, a method that stunts crops and washes away valuable soil nutrients.

INNOVATION

Rainmaker

ORGANIZATION TYPE

For-Profit

COUNTRY

India

CONTACT

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CHALLENGE

In India, 41 million small-plot farmers rely on flood irrigation, a method that stunts crops and washes away valuable soil nutrients. Drip irrigation increases the efficiency of water and fertilizer by 20% to 50% and increases yields by 30% to 100%. Drip irrigation also preserves nutrients in the soil and increases land longevity. Due to weak distribution chains and product complexity, drip technology has proliferated to only 5% of these farmers.

SOLUTION

MyRain is a wholesaler of drip irrigation products. MyRain's Rainmaker (patent-pending) is a point-of-sale and design application that makes it easy for retailers to customize drip irrigation systems for small-plot farmers based on entering a few parameters. This intuitive app removes the barrier of retailer engineering expertise and increases the ease and opportunity to advise, sell, and order drip irrigation components.

MILESTONES AND ACHIEVEMENTS

In year one, MyRain has focused on increasing access and usage of micro irrigation in India. To date, the innovator has seen over 235 million liters of water savings and reached 660 beneficiaries. Farmers have used MyRain-supplied irrigation products on 162 hectares of fields. Additionally, sales have been good. MyRain sold more than $80,000 worth of irrigation and hardware products at a gross profit margin of more than 21%.

GOALS

1. Support to better understand the agricultural retailer market in the Indian states of Tamil, Karnataka, Andhra Pradesh, and Telangana.
2. Assist in making connections with local Indian banks to link MyRain's retailer network to working capital and financing.
3. Introductions to potential investors.

Salt Tolerant Potato

METAMETA & SALTFARMTEXEL

OBSTACLE
With limited freshwater resources available, farmers are forced to use brackish groundwater to water their crops, reducing overall yields and quality.

INNOVATION
Salt Tolerant Potato

ORGANIZATION TYPE
For-Profit

COUNTRY
Pakistan

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CHALLENGE

The UN estimates that at least 1 billion hectares of land are currently affected by salinity and the world loses at least 3 hectares of arable land every minute due to salinization. In Pakistan, 4.2 million hectares of land are affected by salt. With limited freshwater resources available, farmers are forced to use brackish groundwater to water their crops, reducing overall yields and quality.

SOLUTION

MetaMeta is a Netherlands-based development consultancy that partnered with SaltFarmTexel to introduce salt-tolerant potatoes to the Pakistani market. In Pakistan, floods and sea water intrusion wipe out crops with increasing regularity. Their salt-tolerant potato crop offers an alternative to 250 million people globally that live on salt-afflicted soil.

MILESTONES AND ACHIEVEMENTS

After the first year, MetaMeta has produced 16 tons of salt tolerant potatoes and saved nearly 10.3 million liters of water. The innovator successfully grew their crop in water with a salinity of 8.7 dS/m. In 2014, MetaMeta planted demonstration crops in Pakistan. The innovator held two "open days" this year, attended by USAID, Al Jazeera, the Dutch ambassador to Pakistan, local farmers, distributors, and sales representatives. The first potato crops were successfully harvested in April of 2015. MetaMeta is building a cohort of farmers interested in testing their potato varieties, and have 10 beneficiaries so far. Numerous restaurants and hotels have also expressed interest in testing the quality.

GOALS

1. Advice in creating a legal structure upon which the three partners in the innovator's consortium can operate and conduct business.
2. Assistance in building brand awareness among potential growers of the salt-tolerant potato and promotion of partnership opportunities with local growers.

Salt-Tolerant and Resilient Crops

INTERNATIONAL CENTER FOR BIOSALINE AGRICULTURE

OBSTACLE
Many of the groundwater-based agro-ecosystems and river-based irrigated agricultural lands in this region are affected by salinity and water logging, which is a major constraint to crop production.

INNOVATION
Salt-Tolerant Quinoa

ORGANIZATION TYPE
Not-For-Profit

COUNTRIES
Egypt, Yemen

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CHALLENGE

The West Asia and North Africa regions are two of the most water-scarce regions in the world with agriculture consuming over 75% of freshwater resources. Many of the groundwater-based agro-ecosystems and river-based irrigated agricultural lands in this region are affected by salinity and water logging, which is a major constraint to crop production.

SOLUTION

ICBA is working to establish salt-tolerant seed production and exchange chains in Yemen and Egypt, where freshwater is scarce.

Specifically, the innovator is looking at key crops such as barley, triticale, fodder beet, pearl millet, sorghum, safflower, and quinoa. They seek to improve the livelihoods of small-scale farmers.

MILESTONES AND ACHIEVEMENTS

The primary objective for ICBA in the first six months of their SWFF award is shifting their focus from production in the Sinai to scaling in the New Valley region of Egypt. Partner meetings took place in early May to ramp up activities in the New Valley. The innovator's efforts are now centered on recruiting farmers for seed production. In the second year of the award, they intend to turn towards seed sales.

GOALS

1. Advisory support to help ICBA work through a business model that will be most successful in Egypt and Yemen.
2. Support in helping the innovator establish a better understanding of developing an integrated supply chain.
3. Consulting on sales and marketing to help ICBA clarify the value proposition to better engage and mobilize the private sector.

OBSTACLE
Half of the arable land in India is subject to low rainfall and prone to frequent drought.

INNOVATION
SWAR

ORGANIZATION TYPE
Non-Profit

COUNTRY
India

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SWAR

CENTRE FOR ENVIRONMENT CONCERNS

CHALLENGE

Half of the arable land in India is subject to low rainfall and prone to frequent drought. Risk derived from unfavorable weather patterns drives debts and leaves farmers vulnerable to financial and mental disrepair—farmer suicides are not uncommon. Irrigation sourced from canal and groundwater has a limited scope and current pressure on natural resources leaves irrigation practices in India in need of improvement.

SOLUTION

The Centre for Environment Concerns introduces SWAR: the world's first sub-surface drip irrigation system that release moisture when 'asked' for by the crop. This underground, gravity-based irrigation system provides moisture to plants at the root level. SWAR enhances soil nutrients, uses harvested or stored water, provides irrigation to low rainfall areas, and in turn, transforms the livelihoods of poor farmers to help them grow more food.

HOW DOES IT WORK?

SWAR technology consists of low-pressure drip irrigation components like overhead tanks and drip lines, but is extended with adapted and permeable clay pots. Pots are placed at the root zone and connected to drip lines. Water oozes out of the pots and wets the soil and then 'sweats' to maintain a favorable soil moisture condition. This method assures moisture is spread at the plant's root zone to cultivate vegetables, flowers, fruit and forestry trees using only one fifth of other drip irrigation systems in India. SWAR is automated but doesn't require electricity and results in huge water savings.

The Barsha Pump

AQYSTA HOLDING BV

CHALLENGE

For small and medium-sized farmers in the Himalayan Mountains of Nepal, watering crops can be a challenge. Irrigation solutions such as diesel and solar-powered pumping exist, but are not sustainable, requiring constant repairs, refueling, or large upfront investments. Simple solutions are needed to help farmers keep crops watered.

SOLUTION

aQysta's Barsha pump is a low-cost, innovative solution for smallholder farmers to irrigate their fields without using any fuel or electricity. The hydro-powered pump is easily implemented anywhere there is flowing water nearby and requires little maintenance.

MILESTONES AND ACHIEVEMENTS

To date, aQysta has reached 241 beneficiaries with its hydro-pump technology. The innovator has installed 5 Barsha pumps across Nepal in diverse socioeconomic conditions. In Year 2, aQysta hopes to install 40 new pumps. Additionally, the innovator has leveraged more than $200,000 in outside funding, and has seen a profit margin of 21%.

GOALS

1. Counsel on aQysta's overall business model in order to identify the most optimal path to scale.
2. Help collaborating with USAID's Nepal projects and help positioning the pump technology to local farmers.
3. Recommendations on connecting with relevant investor audiences such as venture funds, impact funds, and family foundations.
4. Support in developing a micro-financing option model to approach micro-financing institutions.
5. Help in designing a complete irrigation and pump system for packaged sales.

OBSTACLE
For small and medium-sized farmers in the Himalayan Mountains of Nepal, watering crops can be a challenge. Simple solutions are needed to help farmers keep crops watered.

INNOVATION
The Barsha Pump

ORGANIZATION TYPE
For-Profit

COUNTRY
Nepal

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The Buried Diffuser

INSTITUTE FOR UNIVERSITY COOPERATION

CHALLENGE

In Tunisia, 43% of the families are completely dependent on agriculture for their means of survival. Unfortunately, agriculture-based incomes can be unreliable as smallholder farmers are often affected by droughts, especially in disadvantaged rural areas. Drip-irrigation systems, currently the most efficient irrigation system spread on the market, can be costly and energy inefficient for smallholder farmers struggling to survive.

SOLUTION

The buried diffuser is a new underground irrigation technique for trees, shrubs, and vegetables in fields and greenhouses. This innovative technology allows for water and energy savings as well as drought mitigation. In center-south Tunisia, the buried diffuser can keep trees alive during dry periods and improve olive yields that constitute the main source of income for the farmers in the region—thus contributing to poverty reduction.

The buried diffuser provides underground irrigation that delivers water to plants at the root level, and lessens the likelihood of water loss from evaporation. The system is comprised of diffusing parts, which facilitate water infiltration of the soil. A connection to a water distribution pipe helps regulate water flow to plants.

The buried diffuser works with gravity, as well as conventional water pressure to ensure that crops are efficiently getting the water they need. This innovation performs better than currently widespread irrigation methods, and should allow farmers to decrease production costs up to 30%. Additionally, the buried diffuser uses 30% less water to produce the same weight of crop.

OBSTACLE
In Tunisia, 43% of the families are completely dependent on agriculture for their means of survival.

INNOVATION
The Buried Diffuser

ORGANIZATION TYPE
NGO and Non-Profit

COUNTRY

Tunisia

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Waterpads®

METAMETA RESEARCH B.V.

OBSTACLE
Large inequity in water and food accessibility exists in Turkey.

INNOVATION
Waterpads®

ORGANIZATION TYPE
Non-Profit

COUNTRIES
Ethiopia, Turkey

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CHALLENGE

Large inequities in water and food accessibility exists in Turkey. Farmers and refugees living in the arid regions of the southeast struggle to gain access to land and precious resources like freshwater. Currently, the region is home to two million Syrian refugees. With this demand for water and space, the pressure on groundwater sources during the six months dry period starting in April, is enormous.

SOLUTION

Waterpads, through the organization MetaMeta Research B.V., increases water efficiency in the international vegetable and fruit tree sector through their low-cost water buffering technology. This innovation is essential for water-deprived farmers who need to grow a lot of food with just a little bit of water. The low weight polymer pads are placed close to the roots of plants, avoiding evaporation and the loss of useful runoff water.

Waterpads are a sandwich of paper and jute with an inner layer of granular polymers in dry form. The polymer absorbs 100 times its own weight of water, retaining water at binding tension. Placed at root level, the pads increase farmers' irrigation efficiency by 40%, while increasing yields between 10 and 25%. With this technology, young plants and trees are significantly more likely to survive the dry times. Costing about mere pennies per plant with lifetime of 5 years, Waterpads are low-cost, easy to produce and reliable for farmers in arid regions.

GOALS

1. Increase the likelihood of young plants and trees to survive the dry times.
2. Provide low-cost Waterpads for farmers in arid regions.

Zero Discharge Desalination

UNIVERSITY OF TEXAS – EL PASO

CHALLENGE

By 2050, water demand is projected to increase by 55% globally, meaning that the number of people impacted by water scarcity and stress will continue to rise. Importantly, more than 70% of global water use occurs in the food value chain. By 2025, two-thirds of the world's population could be living in severe water stress conditions and developing countries will see the impact on human health and food production. To satisfy future water demand, we must augment traditional water supplies with brackish groundwater.

SOLUTION

The University of Texas at El Paso (UTEP) Center for Inland Desalination Systems (CIDS) designed a zero discharge desalination (ZDD) technology that reduces water waste in the desalination process.

HOW DOES IT WORK?

Zero discharge desalination (ZDD) technology provides an order-of-magnitude reduction in the amount of water wasted in the desalination of groundwater by conventional processes. Electrodialysis metathesis uses a DC voltage to remove undesirable ions from water and strategically pairs them with other ions to produce a precipitate that can then be used by farmers for soil augmentation. UTEP plans to optimize their technology primarily by simplifying their operational process to include control set points.

The team plans to go to a single electrodialysis stack and to feed sodium chloride precipitated from their system back into the process, forming a closed loop. The team plans to work with local agriculture extension agents affiliated with the university to provide farmer outreach and to coordinate farmer training at the pilot test location in Honduras.

OBSTACLE
To satisfy future water demand, we must augment traditional water supplies with brackish groundwater.

INNOVATION
Zero Discharge Desalination (ZDD)

ORGANIZATION TYPE
University

COUNTRIES
Honduras, Latin America

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Freshwater Management System

ARCADIS

CHALLENGE

Water demands in coastal Mexico are on the rise while fresh water resources are increasingly becoming limited. Economic growth, growth in population, and climate change exacerbate existing freshwater shortages and increase pressure on shallow fresh groundwater reservoirs. Additionally, saltwater intrusion is making aquifers unsuitable for irrigating agricultural lands.

SOLUTION

Subsurface water technologies provide an innovative, practical approach to freshwater management in coastal areas. ARCADIS's Freshkeeper product stops and reverses salinization of aquifers and water wells by intercepting intruding brackish groundwater. Fresh and brackish water are pumped simultaneously from different depths, to control the fresh-brackish intercept.

MILESTONES AND ACHIEVEMENTS

ARCADIS has completed an analysis for a business case in Mexico that highlights opportunities for their product in the Mexican market. The innovator is exploring a potential customer base of both farmers and municipalities. Their first working visit to Mexico entailed establishing a coordinated effort among local stakeholders and gathering information on the local geohydrology and salinization problems.

OBSTACLE
Water demands in coastal Mexico are on the rise while fresh water resources are increasingly becoming limited.

INNOVATION
Freshwater Management System

ORGANIZATION TYPE
For-Profit

COUNTRY
Mexico

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OBSTACLE
Long winters reduce the amount of time for growing crops in Tajikistan.

INNOVATION
Greenhouses

ORGANIZATION TYPE
Non-Profit

COUNTRY
Tajikistan

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Greenhouse

DEUTSCHE WELTHUNGERHILFE E.V.

CHALLENGE

From October to April, irrigation canals are closed for repairs, making water extremely scarce for food production.

SOLUTION

Deutsche Welthungerhilfe e.V. has combined a rainwater harvesting mechanism with greenhouse technology. In their focus country, Tajikistan, greenhouses enable vegetable production from October to April, which will significantly reduce the cost to consumers. Rainwater is captured by roof catchments. Greenhouses are sinotype and use an isolation system to capture heat.

MILESTONES AND ACHIEVEMENTS

Deutsche Welthungerhilfe e.V's primary goals were to increase broad knowledge of the technology among the potential customer base, select the initial group of farmers to implement the greenhouse, and construct and put into operation 10 greenhouses.

Deutsche Welthungerhilfe e.V held 14 information sessions to build knowledge and conducted individual meetings with 45 farmers. They learned that their customers wanted a greenhouse twice their planned size so that multiple families could use the same one and cut down on running costs. To date, five greenhouses have been completed with two additional under construction.

Lilypad

PURALYTICS

CHALLENGE

Man-made ponds and large diameter open tanks have chemicals and micro-organisms.

SOLUTION

Puralytics has pioneered a photochemical technology for water purification. The Lilypad provides both an environmentally safe and effective water treatment solution for cleaning ponds and managing catchment areas. This reusable, floating purifier continuously destroys chemicals and micro-organisms and works in man-made ponds and large diameter open tanks.

MILESTONES AND ACHIEVEMENTS

Puralytics has developed a strong relationship with Driscoll's, a berry producer in Mexico. Driscoll's has agreed to serve as a demonstration partner to prove out the Lilypad product. Puralytics is negotiating with Hidro Industrial to be a distribution and installation partner.

During the company's first year in Securing Water for Food, its goals included developing the value proposition for the small farmer, developing their business model, and identifying the minimum viable system that is affordable for their customers.

OBSTACLE
Man-made ponds and large diameter open tanks have chemicals and micro-organisms.

INNOVATION
Lilypad

ORGANIZATION TYPE
For-Profit

COUNTRY
Mexico

CONTACT
Mark Owen
mark.owen@puralytics.com
www.puralytics.com/html/lilypad.php

Salt-Tolerant Quinoa

WAGENINGEN UR

CHALLENGE

In agricultural lands impacted by high salinity, smallholder farmers realize lower than average yields and reduced incomes. In these regions, improving food production and creating new opportunities for earning a livelihood are desperately needed.

SOLUTION

Researchers at Wageningen UR have come up with a non-genetically modified salt-tolerant quinoa that not only grows, but also thrives in saline soils. By making this high-value super grain available to farmers in areas impacted by high salinity, there is a potential to reduce fresh water consumption, reduce food scarcity, reclaim unused or underused agricultural lands, and create new livelihood opportunities for smallholder farmers.

MILESTONES AND ACHIEVEMENTS

Wageningen has sown field trials of the salt tolerant quinoa in China and Vietnam, as well as set up tests to determine maximum salt level tolerance. In Chile, they have harvested 60 hectares and, through their partner AbbottAgra, signed an agreement with SPS Chile, a production chain managing company that licenses them to use the non-bitter varietals in country. Wageningen has submitted an EU-H2020 project proposal aimed at improving productivity of quinoa under abiotic stress conditions and improving agronomy by extensively testing genotype, environment, and management interactions.

GOALS

1. Improve farmer adoption of salt-tolerant quinoa crops.
2. Enhance volume of seed sold.
3. Build networks in China and Vietnam.

OBSTACLE
In agricultural lands impacted by high salinity, smallholder farmers realized lower than average yields and reduced incomes.

INNOVATION
Salt-tolerant quinoa

ORGANIZATION TYPE
University

COUNTRIES
Chile, China, Vietnam

CONTACT
Robert van Loo
robert.vanloo@wur.nl
www.wageningenur.nl/en.htm

Weather System

TRANS AFRICAN HYDRO-METEOROLOGICAL OBSERVATORY (TAHMO)

CHALLENGE

Without climate information, you cannot optimize crop selection or ensure it without knowing the risks.

SOLUTION

The TAHMO weather system is the first continent-wide weather network that allows free data to non-commercial users including researchers. The innovative, solar-powered sensor system delivers accurate, localized, and timely meteorological and water resource information to farmers multiple times per day via a mobile device. The network helps enhance food security and reduce the risk to smallholder farmers that rely on rain-fed agriculture to cultivate crops.

MILESTONES AND ACHIEVEMENTS

In addition to reducing agricultural water consumption in targeted areas, TAHMO tested alternative business modalities and is having some success with a direct-marketing approach to schools. The system was presented at the Addis GEF meeting, where weather observation was the focus of the meeting for East Africa. Ministers saw the stations and invited TAHMO to pilot in 5 countries.

OBSTACLE
Without climate information you cannot optimize crop selection or ensure it without knowing the risks.

INNOVATION
Weather System

ORGANIZATION TYPE
For Profit

COUNTRIES
Burundi, Kenya, Rwanda, Tanzania, Uganda

CONTACT
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www.tahmo.org

SECURING WATER FOR FOOD: A GRAND CHALLENGE FOR DEVELOPMENT

Securing Water for Food Technical Assistance Facility

Summary of Innovator Information

SECURING WATER FOR FOOD TECHNICAL ASSISTANCE FACILITY

Awardee Company Name	Innovation Title	Key Contact(s)	Product Summary Language/Descriptor	Goals	What is Game-changing About the Technology?	Location
Adaptive Symbiotic Technologies (Private Enterprise)	**BioEnsure** (fungal seed & plant treatments) (fungal endophytes)	Dr. Rusty Rodriguez, Zachery Gray, Regina Redman. Zachery Gray has 18 years of business experience and holds an MBA. Contact Person: Zachery Gray Address: 10738 Durland Ave NE Seattle, WA 98125 Email: zgray@adsymtech.com	A fungus found in Yellowstone National Park that reduces water consumption, increases drought tolerance, and enhances crop yields with no negative impact when applied to seeds. Fungal mixture that helps plants adapt to water-related stress. Enhances crop yield. Grows crops in sub-optimal conditions. Reduces water consumption by 50%.	1) Decrease water consumption/unit of crop yield in irrigated and non-irrigated crop areas; 2) Increase volume of seeds sold; 3) Enhance hectares of land impacted by product; 4) Improve crop yields in dry-land cultivation; 5) Increase the number of farmers with access to this technology	The technology is sprayed on the seeds. When the seeds germinate the fungi activates and establishes a symbiosis with the plantlets and after that the plant takes on many benefits. For decades, people have been trying to come up with the holy grail of agricultural, which are stress-tolerant crops. That has been done through breeding traits from native plants and through genetic modifications, neither of which has borne much fruit in terms of stress tolerance. Our product is very unique. It's the only product soon to be on the market that can confer stress tolerance.	Global; licensed in 18 states.
aQysta (Private Enterprise)	**Barsha pumps**	Pratap Thapa (Co-founder of aQysta and Project Manager for Securing Water for Food Program). Fred Henny (Co-founder & Chief Executive Officer of aQysta) Fred (Netherlands) is an Industrial Design Engineering with an MSc. in Integrated Product Design. Lennart Budelmann (Co-founder & Chief Operations Officer of aQysta). Contact Person: Pratap Thapa Address: Molengraaffsingel 12 Delft, Zuid-Holland, 2629 JD Email: pratap@aQysta.com Website: www.aqysta.com	A low-cost, hydro-powered irrigation pump that does not require any fuel or electricity, has no operating expenses, and does not emit any polluting greenhouse gases.	1) Enhance number of hectares of land impacted by this innovation; 2) Improve farmer adoption of Barsha Pumps in Nepal	We are developing a hydro-powered irrigation pump that utilizes kinetic energy of rivers to pump water, and it doesn't use any fuel or electricity to pump water. Meaning it does not require operating cosst. It's an environmentally friendly solution. This technology has never been applied at an industrial scale before. We are the first ones to attempt to bring this to the market.	Nepal, Spain, Ecuador; working on global expansion
ARCADIS Nederland BV (Private Enterprise)	**Subsurface Water Technologies**	Contact Person: Petra Ross Address: Beaulieustraat 22 Arnhem, Gelderland, Netherlands 6814 DV Email: Petra.ross@arcadis.nl Website: www.arcadis.com	Provides a robust, effective, sustainable, and cost-efficient freshwater solution to areas where groundwater supplies are impacted by elevated salinity levels. SWT increases the natural storage capacity for fresh water in the subsoil, making it available during periods of high water demand and/or low rainfall, and preventing intrusion of salt water.	1) Improve hectares of land covered by SWT; 2) Scale up number of farmers benefitting from SWT	These technologies increase the natural storage capacity for fresh water in the subsoil, thereby promoting the storage of fresh water during the wet season. This is achieved by actively pumping (and when appropriate using) brackish groundwater and/or by actively injecting fresh water into brackish water aquifers. The technologies can be applied at a range of scales, from the agricultural field to the scale of small watersheds or water well fields. SWT makes optimal use of the natural capacity of the subsoil to store fresh water. They thus enlarge the availability and sustainability of fresh water resources. A paradigm shift is the pumping of brackish water in areas experiencing salinization, whereas the standard approach is to turn away from the intruding brackish water and stop groundwater pumping.	Mexico, eventually global
Aybar Engineering PLC (Private Enterprise)	**Broad Bed and Furrow Maker (BBM)**	Melesse Temesgen and Abebe Tesfaye Contact Person: Melesse Tem Address: P.O. Box 186556 Addis Ababa, Ethiopia 186424 Email: melesse_tem@yahoo.com Website: www.aybareng.com	Managing water to reverse its negative impacts on smallholder farming. The Aybar Broad Bed and Furrow Maker (BBM) has been developed to build the optimum BBFs using lighter-weight materials appropriate for Ethiopian farmer needs. The Aybar BBM is helping farmers increase yields, plant earlier and more often, conserve soil, store excess water, and make more land usable for cultivation.	1) Increase agricultural water productivity; 2) Make more land available for farming through the use of Aybar BBM; 3) Improve number of households that have access to Aybar BBM	It allows farmers to drain the excess water and store it in another pond so they can use it later for a second or third crop. The main advantage of Aybar is that it can effectively drain excess water – it's the only technology that can do the job in Ethiopia.	Ethiopia, Kenya, South Sudan
Deutsche Welthungerhilfe e.V. (Non-Profit Organization)	**Rainwater Harvesting for Greenhouse Irrigation**	Davlatbibi Imomberdieva, National Coordinator; Jens Steuernagel, Country Director. Contact Person: Jens Steuernagel Address: Friendrich-Ebert-Str. I Bonn, Nordrhein-Westfalen, Germany 53173 Email: jens.steuernagel@welthungerhilfe.de Website: www.welthungerhilfe.de	An innovative combination of low-cost rainwater harvesting and greenhouse technology that allows vegetable production during colder months when no water for agricultural production is typically available.	1) Reduce the volume of agricultural water consumed; 2) Increase the volume of produce sold; 3) Improve the number of smallholder farmers impacted by this technology	Combines low-cost techniques and adapts to the climatic conditions of the target area. Rainwater harvesting based on roof catchments. The innovation of this combination of sino type greenhouse technology addresses two main obstacles: production of fresh vegetables during the winter season in Zerafshan valley, and access of rainwater which wasn't collected before – this will be a new practice in the valley.	Tajikistan
Driptech Inc. (Social Enterprise)	**Affordable Drip Irrigation**	Sarah Huber, CEO, past 4 years at Driptech, McKinsey project manager previously Jofi Joseph, Director of Sales, previously head of rural sales at Nokia India. Peter Frykman, Founder and CEO. 95% of team has prior business experience. Contact Person: Sarah Huber Address: 5855 State Route One Bolinas, CA 94924-0001 Email: sarah@driptech.com Website: www.driptech.com	A high-quality, low-cost drip irrigation system that uses an innovative laser punching technology that ensures uniform water application at the root zone of all crops in a field. The system provides the same benefits of drip irrigation that large-scale farmers use at 70% lower cost.	1) Increase number of farmers receiving financing to purchase Driptech systems	Our laser system technology makes it easy to make drip irrigation anywhere in the world. We can drop our laser system in shipping containers and send it to any irrigation factory in the world for less than $50,000.	India
FutureWater (Private Enterprise)	**Flying Sensors**	Contact Person: Dr. Peter Droogers Address: Costerweg 1V Wageningen, Netherlands, 6702AA Email: p.droogers@futurewater.nl Website: www.futurewater.nl	Simple-to-operate drones that provide farmers with real-time information on soil and crops. Information provided by drones will enhance farmers' use of limited resources, maximize yields, and simultaneously reduce unnecessary waste of resources. Provides high-resolution spatial information that helps smallholder farmers make better decisions on where and when to use limited resources. Farmers can learn about crop stress up to two weeks before the naked eye can and optimize the application of water, seeds, fertilizer, and labor resources based on this feedback.	1) Reduce agricultural water consumption; 2) Enhance number of farmers benefitting from information gathered by Flying Sensor; 3) Improve total number hectares of land covered by Flying Sensor technology; 4) Scale-up number of Flying Sensors in operation and number of operators trained	Farmers don't have information and typically only 10% have access to extension services. They don't have information on water, seeds, fertilizer. We provide information for them with high spatial resolution so they can see what happens to the square meter within their field. By using the drones, we provide access to infrared spectrum and can show crop status. Our technology is a technical game changer. More business case is that we plan to have a set of operators – about 20 – and flying sensor operators will visit communities in flight and give results and farmers can make a decision about where to use their limited resources. It's a new experience for Mozambique – it's a useful tool to enhance the productivity of local farmers.	Mozambique
International Center for Biosaline Agriculture (ICBA) (Research Organization)	**Salt-Tolerant and Resilient Crops**	Dr. Abdullah J. Al-Dakheel; Celine Papin. Contact Person: Abdullah Dekheel Address: Dubai- Al Ain Road, Al Ruwayah; P.O. Box 14660 Dubai, United Arab Emirates Email: a.dakheel@biosaline.org.ae Website: www.biosaline.org	A market-driven model that makes salt-tolerant and resilient non-GMO crop genotypes available to smallholder farmers through seed production and distribution facilities and by providing training on planting and growing best practices.	1) Reduction of fresh water consumption for agriculture by optimizing the use of low water quality; 2) Increase water productivity; 3) Expand access to smallholder farmers by providing genotypes suitable for marginal and dry-land cultivation	Adapted salt-tolerant and resilient crop genotypes for key crops such as barley, triticale, fodder beet, pearl millet, sorghum, safflower, quinoa, and others have the potential to be game-changers in high-salinity agricultural areas. By identifying and scaling existing, non-genetically modified seeds and developing distribution networks to smallholder farmers, the International Center for Biosaline Agriculture believes these seeds can enhance land and livestock productivity by at least 30%.	Yemen, Egypt
MetaMeta Research B.V. (Research Organization)	**Salt Tolerant Potato**	Frank van Steenbergen, owner and managing director of MetaMeta since 2004. The primary leader of Salt Farm Texel is Marc van Rijsselberghe; he put already over 150+ products into the (inter)national market and has 30+ years business experience. The primary leader of Jaffer Brothers branch JASPL is Pierre Dupont. Contact Person: Martin van Beusekom Address: V Violenstraat 1 Rosmalen, Brabant, Netherlands, 5241AJ Email: mvanbeusekom@metameta.nl Website: www.metameta.nl, www.saltfarmtexel.com	A non-GMO, salt-tolerant potato that requires very little fresh water for cultivation. Scaling up access to this potato will contribute to better use of lands and waters that have high salinity and will reduce the pressure on freshwater resources.	1) Reduction of agricultural fresh water consumption; 2) Enhance reach and use of salt tolerant seed potato Increase crop yields in brackish areas and waste lands; 3) Expand access to smallholder farmers in most-impacted areas	Salt Farm Texel has identified a salt tolerant potato variety, which is four times more salt tolerant than regular potato varieties. Even irrigation with saline water directly after planting does not affect the yield of this potato variety.	Pakistan, The Netherlands,
My Rain LLC (Social Enterprise)	**Rainmaker**	Steele Lorenz - CEO - Management consulting background. Sri Latha Ganti - COO - Engineering and management background. David Kurzman - CFO - 20+ years of startup and fund management. Contact Person: Steele Lorenz Address: 2718 Dana Street #6 Berkeley, CA 94705-1139 Email: steele@myrainindia.com Website: www.myrainindia.com	A customized irrigation system design tool that removes the complexity of drip irrigation design and installation for small agro-retailers across India. The application enhances water efficiency by up to 50%.	1) Expand adoption of micro-irrigation system use; 2) Reduce agricultural water consumption; 3) Increase crop yields and improve farmers' incomes; 4) Create jobs and opportunities along the micro-irrigation distribution value chain	This techology can increase the productivity of small plot farmers throughout the world. We launched our company as a wholesaling organization in India to deliver those products. We built a distribution network of local retailers to distribute these products. Today, its 60+ members throughout southern India. While we were building this network, we realized the main challenge to the distribution of drip irrigation is the complexity of irrigation design. Fluid mechanics to design and install system are quite complex, even when we talk about an irrigation system only one acre in size. Drip irrigation lags far behind other ag products. We built a mobile application to design irrigation systems without an understanding of fluid mechanics. We have installed this and given to our dealer base. With little knowledge of drip irrigation, they can become local irrigation experts and design and install high quality systems with about 2 hours of training.	South India
Practical Action Bangladesh (NGO) (Non-Profit Organization)	**Sandbar Cropping**	Mr. AZM Nazmul Islam Chowdhury, Mr. Nirmal Chandra Bepary, Mr. Dr. Faruk-Ul Islam. Contact Person: Nazmul Islam Chowdhury Address: The Schumacher Centre Rugby, Warwickshire, United Kingdom CV23 9QZ Email: nazmul.chowdhury@practicalaction.org.bd Website: www.practicalaction.org	A low-cost model that transforms previously unused sandy islands that appear after each rainy season into large-scale pumpkin farms.	1) Reduce agricultural water consumption; 2) Enhance volume of produce grown; 3) Expand adoption of sandbar cropping in the appropriate regions; 4) Increase crop yields and improve farmers' incomes	Millions of people living besides these sandbar areas where intervention is proposed. We have been working in this business for 10 years and have done a pilot. We're testing the commercial design for pumping. We expect this to become a market driven process. Access to resources is a game changing element of this innovation. They can grow food for themselves and for others. We can see a 50% increase with the technology – we are talking about an irrigation system that will increase the efficiency. Are the efficiency savings theoretical or have you been able to demonstrate in pilot? For irrigation and pumping we have our own experience for 10 years – we are running projects here. We've done it -- drip and manual irrigation.	Bangladesh

SECURING WATER FOR FOOD: A GRAND CHALLENGE FOR DEVELOPMENT

Securing Water for Food Technical Assistance Facility

Summary of Innovator Information

SECURING WATER FOR FOOD TECHNICAL ASSISTANCE FACILITY

Awardee Company Name	Innovation Title	Key Contact(s)	Product Summary Language/Descriptor	Goals	What is Game-changing About the Technology?	Location
Puralytics (Private Enterprise)	**LilyPad**	Mark Owen, CEO, has started other companies and has been a CEO for 14 yrs. Ed Kolasinski, COO, has led many companies thru exit. Rob Anthony, started and exited his own company. Contact Person: Tom Hawkins Address: 1523 6 NW Greenbrier Pkwy Beaverton, OR; 97006-5764 Email: tom.hawkins@puralytics.com Website: www.puralytics.com	A solar-activated photochemical water treatment product—designed to break down the harmful molecular bonds of contaminants and chemicals in streams, ponds, ditches, and other waterways near agricultural lands.	1) Expand the number of LilyPad treatment ponds installed and operators trained; 2) Scale-up adoption of LilyPad technology among smallholder farmers	Developed something that uses only sunlight. We cover all the entailments and only input is sun, no chemicals used. Can be deployed in places where there is no consistent power supply. Doesn't require a lot of technical innovation from the user.	Mexico. Though some activity in Kenya, Malawi, Cameroon, finishing up a complicated process in Nigeria.
Reel Gardening (Social Enterprise)	**Reel Gardening**	Claire, Sean and Kate. David Wilcox. Contact Person: Claire Reed Address: 61 Barkston Drive Johannesburg, South Africa 2194 Email: claire@reelgardening.co.za Website: www.reelgardening.co.za	Places seed and fertilizer in a biodegradble paper tape. Paper biodegrades.	1) Reduce agricultural water consumption; 2) Enhance volume of produce grown; 3) Increase adoption by consumers/households of Reel Gardens	Product made using no electricity. Retail, school and agent trainer network. Reel gardening is a patented technology in SA. What differentiates us in the market – the fact that the seed and fertilizer are placed in the correct distance apart in a custom made biodegradable organic paper.Protects seeds from birds and pits and save up to 80% of water consumption (tested twice). Save up to 80% of water usage – and the plants come up stronger, we get a larger harvest, and we find its far more successful in the field because you don't need education or mathematical understanding to plant it or access to large resources.	South Africa
Trans African Hydro-Meteorological Observatory (TAHMO) – Weather Index Micro-Insurance (Non-Profit Organization)	**Weather Index Micro-Insurance**	Dr. John Selker, Dr. Nick van de Giesen, Zachary Dunn. Contact Person: Zachary Dunn Address: Stevinweg I-5e etage Delft , Zuid-Holland, Netherlands 2628 CN Email: z.dunn@TAHMO.org Website: www.tahmo.org	Innovative solar-powered sensor system that delivers accurate, localized, and timely meteorological and water resource information to farmers multiple times per day via mobile device. The network will help enhance food security and reduce the risk to smallholder farmers that rely on rain fed agriculture to cultivate crops.	1) Reduce agricultural water consumption in targeted areas; 2) Increase hectares of land covered by the TAHMO network; 3) Scale-up adoption of TAHMO network among smallholder farmers	Sustainability for weather observation in Africa has not been found – based on governments investing in weather stations where they get ROT. This business model is sustainable and is a game changer – first continent wide weather network that allows free data to non-commercial users including researchers. Without climate information you cannot optimize crop selection or ensure it without knowing the risks. These are all game changing aspects. These are all made possible by cell phone networks that allow running station on a solar cell slightly larger than postage stamps.	Burundi, Kenya, Rwanda, Tanzania, Uganda
Wageningen University & Research Center (Research Organization)	**Salt-Tolerant Quinoa**	Contact Person: Dr. Robert van Loo Address: Droevendaalsesteeg 4 Wageningen, Gelderland, Netherlands 6708 PB Email: robert.vanloo@wur.nl Website: www.wageningenur.nl	A non-GMO, salt-tolerant quinoa that can enable significant food production in saline soils, without the need for fresh water.	1) Reduce agricultural water consumption; 2) Enhance volume of seeds sold; 3) Improve farmer adoption of salt-tolerant quinoa crops	We've developed a new quinoa variety. Quinoa originates from South America – WU has developed a variety that can grow in other areas (e.g., China, Vietnam). In Vietnam we are in the top in the world for rice exportation, but we have rising population and food insecurity. We have 7 million hectares of land in mountainous area at high altitude – we can't grow rice there because of salinity and the cold. Quinoa is the ideal crop for these conditions.	Chile, China, Vietnam
World Hope International (Non-Profit Organization)	**Affordable Greenhouses**	Jonathan Shafer (Director of Business Development) - Yes, John Lyon (CEO) - Yes Gayle Rietmulder (CFO) - No; Dr. Khanjan Mehta. Contact Person: Jonathan Shafer Address: 1330 Braddock Place, Suite 301 Alexandria, VA 22314-6400 Email: jonathanshafer@worldhope.net Website: www.worldhope.org	Affordable greenhouses targeted to women that address food insecurity, conserve water, and promote the equal participation of women in the economy.	1) Reduce agricultural water consumption; 2) Increase volume of produce sold; 3) Improve total number hectares of land with affordable greenhouses; 4) Enhance farmer adoption of the greenhouses	The design for the context of Sierra Leone – these are greenhouses that can be put together by 2 people in 2 days with materials that add up to $400. All of the materials are locally available. We have done horticultural products survey and of greenhouses, and all of the products available are more expensive than what smallholder farmers can afford.	Installation is in 11 countries (Sierra Leone, Mozambique, Kenya, Rwanda)

SECURING WATER FOR FOOD: A GRAND CHALLENGE FOR DEVELOPMENT

Securing Water for Food Technical Assistance Facility

Summary of Innovator Information

SECURING WATER FOR FOOD TECHNICAL ASSISTANCE FACILITY

Awardee Company Name	Innovation Title	Website	Definition of Success	Biggest Risk of Failure	Scale Notes	Sources of Funding
Adaptive Symbiotic Technologies (Private Enterprise)	**BioEnsure** (fungal seed & plant treatments) (fungal endophytes)	www.adsymtech.com	Bring AST's technologies to market in SWFF countries.	Depending on the country, AST must work with national or regional regulatory agencies to register our products. The biggest risk of failure is if BioEnsure is not able to clear regulatory hurdles in host countries. If this is the case, AST might have to bio-prospect and produce BioEnsure in host country.	Early plan in place to scale innovation. Currently, we are very close to signing a distribution agreement with DuPont. If our two companies are able to finalize the agreement, DuPont would like to exclusively test BioEnsure Corn, Soy and Canola, with the intent of have an exclusive rights for these three products. AST is launching BioEnsure Rice on December 8, 2014 at the USA Rice Conference. This is the first time that we have brought a product to market, we have a plan, however it is not proven at this time.	Series A, grants. Funded through federal grants, NSF, USDA, some international grants. Last year, funded primarily by Investment College – from individuals.
aQysta (Private Enterprise)	**Barsha pumps**	www.aqysta.com	Within the SWFF award, we envision to introduce the Barsha pump to Nepal and scale up its implementation through a localized value chain. After a successful SWFF project, the implementation of the Barsha pump in Nepal should be a state-of-the-art example, which can be applied to introduce and scale implementation of the Barsha pump in other countries around the world. The project should be highlighted as a prime example of how innovations can be brought to scale in developing countries.	Willingness/means to pay the total price of the pump upfront when sold through private market. Expected occurrence: From second year of the project. Sales, distribution and aftersales channel to cover a wide geographic area of Nepal develops slower than intended. Expected occurrence from third year of the project. Social perception of the technology inhibits rapid upscaling of demand for the technology. Expected occurrence: From third year of the project	Over the past, the team of aQysta has incorporated user feedback in the design process by means of surveys, piloting the technology and by interviewing experts in the local country. Based on the feedback, the product design and the specifications of the product have evolved. We are expecting more user feedback and insights on the user behavior to determine the product variants.	Public, In-kind support, Grants, Prize funds
ARCADIS Nederland BV (Private Enterprise)	**Subsurface Water Technologies**	www.arcadis.com	First of all, a successful pilot implementation and adaptation by local community in Mexico. Besides a strong network of people, businesses and institutions supporting our ideas and that enables us to expand businesses worldwide.	Part of our project is the transfer of knowledge from The Netherlands to our local partners in Mexico. This is the first time we will be working together and even though we had some very good explorative conversations it is always a question on how exactly this works out. Especially during year 2 when we start up the pilot, this will be a test. However, in order to minimize the risk, we will put quite a lot of effort in getting ourselves organized in the beginning.	We have successfully ran some pilots at different locations and clients (early adopters). These proof points help us gain momentum with future potential clients, however we experience till now that new clients in different settings (geological, businesses, countries) ask for closely proof points, which we do not have yet.	Public, In-kind support, Grants. Above funding options relate to our innovation Subsurface Water Technologies (SWT)
Aybar Engineering PLC (Private Enterprise)	**Broad Bed and Furrow Maker (BBM)**	www.aybareng.com	Promotion of Aybar BBM such that private distributors start buying the product from us.	Other than a slow process that may hinder us from achieving our goals in time, the risk of failure is small.	Early plan in place to scale innovation. We have set up plans on how to scale the product. We have so far sold close to 50,000 units although this has been largely to government extension departments and NGOs.	Debt/loans, prize funds, own savings
Deutsche Welthungerhilfe e.V. (Non-Profit Organization)	**Rainwater Harvesting for Greenhouse Irrigation**	www.welthungerhilfe.de	Farmers will be able to efficiently use the greenhouses and new farmers are encouraged to construct such types of GHs as well - replication. Farmers who use GHs have increased agricultural production and consequently income.	Time constraints; as the project funding is guaranteed for the first 12 months only, and it remains unclear if we are able to reach all milestones after the 1st 12 months and receive further funding. The whole concept is based on 36 months project cycle, but the admin requirements force us to deliver results already after the first year.	Currently, we are in discussion with three different institutional donor organizations to scale up these GIs and to construct them elsewhere in the country, wherever appropriate. We expect to enter into at least one funding agreement with one organization to scale up.	Public, grants, prize funds, donations
Driptech Inc. (Social Enterprise)	**Affordable Drip Irrigation**	www.driptech.com	Convert flood irrigating smallholder farmers to Driptech in a predictable and large scale way	Ability to go deep and convert flood irrigating farmers vs. skimming surface of many villages is the key challenge for Driptech. Our #1 goal in the next year is to demonstrate predictable unit economics for this. Our 2nd risk would be that grant payments are delayed and don't come in w/in 30 days of invoicing which may lead to cash flow issues.	We make our own manufacturing technology and products, and run a factory in Pune, India.	Angel, gridge, Series A, revenue driven, grants
FutureWater (Private Enterprise)	**Flying Sensors**	www.futurewater.nl	Farmers using our services based on Flying Sensors. Viable business model.	Legal permit restrictions to operate Flying Sensors	Early plan in place to scale innovation. Some testing of products/services has occurred leading to changes in offerings with resulting slight increase in adoption by users.	In-kind revenue, grants, commercial projects
International Center for Biosaline Agriculture (ICBA) (Research Organization)	**Salt-Tolerant and Resilient Crops**	www.biosaline.org	Amount of seeds produced and sold of the targeted climate resilient varieties. Adoption by the targeted number of farmers - documented increased in yield and improved water use efficiency /productivity.	1) Weak NGO facilitation of seed exchange and distribution to farmers on the large scale; 2) Lack of support from national seed specialized agencies for wide scale reach and dissemination; 3) Weaker involvement of local private sector companies due to lack of proper incentive/ support to establish the links for subsequent investment and to develop the market chain; 4) Such situations can be faced at the early stages, which give time to adjust and overcome any of them.	The key elements for the scaling up including machinery and instrumentation are available locally or can be procured through local resources (agents).	Angel, Series A, revenue driven, grants, prize funds
MetaMeta Research B.V. (Research Organization)	**Salt Tolerant Potato**	www.metameta.nl (Brand Review Score - 6.5) www.saltfarmtexel.com (Brand Review Score - 6.0)	Seeing an increasing number of farmers, now being affected by salt affected land and water resources, testifying that the salt tolerant potato (and other salt tolerant crops) increased their yield and household income, contributing to their food security, financial stability and contentment.	Farmers or organizations who start growing this potato without prior consultation with us, so they are not aware of crop management requirements, which might lead to crop failure or limited crop response and hence might results in negative communication.	Early plan in place to scale innovation. He selection was dominantly based on (1) previous work experience in selected countries; (2) climate zone and (3) salt affected area in selected countries. Scaling up plan exists, and will be adapted (if necessary) after results of the demonstrations in year 1 are known. Seed multiplication area will be in The Netherlands until consortium reach other understanding. Shipping of large quantities of seed potatoes will require pre-investment.	Public, in-kind, grants
My Rain LLC (Social Enterprise)	**Rainmaker**	www.myrainindia.com	Expanded user base of the Rainmaker application in South India.	Indian economic downturn.	Our irrigation products are actively selling in the marketplace without financing. We offer our app free of charge.	Angel, revenue driven, grants, prize funds
Practical Action Bangladesh (NGO) (Non-Profit Organization)	**Sandbar Cropping**	www.practicalaction.org	Through this award, we will be able to develop and demonstrate a commercial model of sandbar cropping and low cost irrigation and find ways to large scale integration. The project will transform barren transitional land in the river basin to a productive land.	Natural shock (i.e., extreme cold). Transitional nature of land and its definition for large commercial operation. We are expecting to face it at very large scale level of operation. Or in case of global trade, we may face challenges.	We have worked with over 15,000 farmers over 10 years, using donor money and investment from farmers. Now, we are in a position to test the business model of sandbar farming and irrigation to take it to a large commercial scale. We are refining the financial model, exploring processing, value addition and large scale marketing potentials. Looking for investors and lead global farms. We are also interested to diversify our products and to secure quality.	Grants, SWFF innovation grant and credit from NGO

SECURING WATER FOR FOOD: A GRAND CHALLENGE FOR DEVELOPMENT

Securing Water for Food Technical Assistance Facility

Summary of Innovator Information

SECURING WATER FOR FOOD TECHNICAL ASSISTANCE FACILITY

Awardee Company Name	Innovation Title	Website	Definition of Success	Biggest Risk of Failure	Scale Notes	Sources of Funding
Puralytics (Private Enterprise)	**LilyPad**	www.puralytics.com	Demonstrated and validated field use. Expanding deployment within Mexico. Expanding deployment outside of Mexico.	Effects of algae on the LilyPad - within three months, we should find out if field deployments need to be adjusted to prevent or provide a cleaning process if algae overwhelms LilyPad.	Some testing of products/services has occurred but more needs to be done to understand user needs/behavior in order to lead to increased adoption. The LilyPad is at the beginning of field pilots of this technology, and requires some basic deployment developments to get the initial products to field.	Angel, Series A, revenue driven, grants, prize funds
Reel Gardening (Social Enterprise)	**Reel Gardening**	www.reelgardening.co.za	1000 schools planted, production scaled and market grown	Biggest risk is people not watering or looking after the product and then when it does not grow they blame the failure on the technology. This is a very real risk that could disrupt our milestones. We would only know this from month three onwards of each garden.	Significant testing of products/services has occurred leading to increasing adoption by users. More refinement of offerings needs to be done to capture more of the market.	Revenue driven
Trans African Hydro-Meteorological Observatory (TAHMO) – Weather Index Micro-Insurance (Non-Profit Organization)	**Weather Index Micro-Insurance**	www.tahmo.org	Economically viable, reliable operations of the organization and weather station network.	Failure to get enough stations into the field to justify companies buying our data sets. This will be critical in about 2 years.	Early plan in place to scale innovation (evidence quantitative). We have a business model with rates required to achieve viability. That said, we are having some challenges getting the contract put in place. At the same time, we are testing alternative business modalities, and are having some good success with a direct-marketing approach to schools. So, we have our first-cut approach, which is moving slowly, and some alternatives which are coming along. We took part in GEF meeting in Addis in March, where weather observation was the focus of the meeting for East Africa. Ministers saw our stations and were excited about them. We've been invited to pilot in 5 countries covered by proposal.	Grants, university support
Wageningen University & Research Center (Research Organization)	**Salt-Tolerant Quinoa**	www.wageningenur.nl	When successful, the results of this project can also be used in other saline areas in the world. Farmers can already be involved in this project for carrying out field tests and thereby act as co-innovators.	Important to set up high quality sowing seed production – our partners/research institutes in cooperation with farmers cooperatives will be able to set this up. Distribution to poor farmers will depend on money issues – may need to figure out distribution for pay at the end – that is one model – for the less poor people that work on selling crops and have money they will buy the sowing seed and in the price will be remuneration for the cost of breeding varieties.	In Chile we've already done the first trials – we're ready to scale up – one of the things is we take up the challenge of moving to the saline soils. We have taken 3 regions and that is a challenge – after the first revenues would come – time to scale to neighboring countries – too ambitious for this project. Better to have a smaller, successful example in 3 regions.	Looking for funding and partnerships
World Hope International (Non-Profit Organization)	**Affordable Greenhouses**	www.worldhope.org	The launching of two successful and sustainable independent businesses (one in Sierra Leone and one in Mozambique). Focused on building and installing our low cost greenhouses. We had a lot of requests from farmers – spoke to 50 farmers and 50 ag enterprises to know their needs. It was about size, moving greenhouse and putting it in a different location to make the most of the resource.	1) Local market conditions preclude the uptake of the product (i.e., vegetable market earnings are relatively low compared to a relatively high greenhouse cost due to high input costs) - very soon. 2) Slow/delayed acceptance of new technology - 1 to 2 years. 3) Lack of interest from local business community. Ultimately, we will not run the new businesses. We must find interested local partners in the next two 2 years.	There is a general desire in Sierra Leone, Mozambique and the broader global context to increase food security and decrease water consumption. Towards that end, the policy environment is generally supportive. That said, we are not largely influenced and/or impacted by these kinds of policies.	Grants

Securing Water for Food Technical Assistance Facility

Summary of Innovator Information

Awardee Company Name	Innovation Title	Scaling Strategy	Needs	Partners Needed and Interested Partners	Markets, End Users & Customers	Potential Synergies
Adaptive Symbiotic Technologies (Private Enterprise)	**BioEnsure** (fungal seed & plant treatments) (fungal endophytes)	We have already begun testing products in India and have associations established there for testing, marketing, sales and distribution. We're getting near the end of finalizing relationships in Chile and Argentina. We have contacts in South Africa and Mauritania. They'll start this fall or next spring.	If you are asking about internal or external skills needed: In regards to external skills, we will require expertise on importing regulations to SWFF countries. We plan to hire external consultants to help manage this process.	IncaTech (distribution and sales partner from the Netherlands). They will handle sales and marketing.	Farmers. Subsistence Farmers who buy from a dealer or distributor. Distributor buys from seed companies. Independent seed dealers (corn and soy market). AST sells to distributors. End user is the farmer. We sell it directly to sea traders and farmers. We have established local partners in India who will distribute.	MetaMeta (potato); Driptech (drip irrigation)
aQysta (Private Enterprise)	**Barsha pumps**	Early plan in place to scale innovation. Over the past year, aQysta developed a three- phased approach, consisting of (1) demonstration, (2) remote supply, and (3) localization as a strategic plan to scale the implementation of the Barsha pump in Nepal. Moreover a thorough model has been developed to quantify the impact of different approaches to scale the implementation of the Barsha pump in Nepal. By means of different models and based on quotations from European suppliers, the team of aQysta could derive the cost of the pump for different batch sizes and could conclude that it is possible to sell the product at a reasonable cost if batch sizes exceed 1000 units. If most components of the pump are sourced locally, the cost for the pump are expected to decrease further at a given batch size. Thus, after reaching a "critical mass" of Barsha pumps in the Nepalese markets, it is probable to sell the Barsha pump at an appropriate price. However, to get to this point initial financial support to the Barsha pump might be needed that helps to create market demand and to reach economies of scale in the production of the Barsha pump. Thereby, it is crucial to shift as many elements of sourcing and assembly to Nepal as early as possible to optimize shipping and assembly costs. Barsha pumps are affordable for commercial farmers, but not to the subsistence farmers yet. Reduction in product costs, as well as availability of financing mechanisms, would help in making the product affordable to subsistence farmers as well.	Branding/Marketing, expertise on rapid scaling innovations, building up of sales and distribution channels, sales skills, negotiation skills, micro-financing mechanisms. Clients/sales/customer acquisition, PR/branding/ marketing, funding and financial management.	Distributors, finance institutions, government, agricultural co-operatives, investment groups and corporations	Small to mid-sized commercial farmers of cash crops in Nepal. We have been conducting market surveys and meeting with stakeholders, government organizations, Ministry of Agriculture, INGOs, agricultural cooperatives. Farmers are willing to pay $600-$700. There is a subsidy program with the government of Nepal, which subsidizes agricultural technologies. The government is interested in including Barsha pump in their subsidy program after a successful demonstration. There is also a similar subsidy with the alternative energy promotion center which subsidizes renewable energy technologies and they are interested to include Barsha pump after a successful demonstration as well. In Nepal, we see a potential of 125,000-200,000 pumps as an addressable market.	Driptech
ARCADIS Nederland BV (Private Enterprise)	**Subsurface Water Technologies**	With acquiring more proof points, we also were able to grow faster. We are in the stage of jumping from innovators to early adopters. The help of grants does play an important role here.	Strategy, PR/branding /marketing, funding and financial management. We could use TA Facility expertise in identifying which business model would fit best for SWT.	We are thinking that we would need investment groups and government agencies. But this is typically something we would want to explore with the TA Facility.	However, we see in The Netherlands that drinking water companies and greenhouses and fruit growers are willing to pay for our innovation, since this does pose financial benefits to them. In the NLs the testing has been more extensive and proven. In Mexico (our focus country during SWFF), this is still in the exploring phase.	
Aybar Engineering PLC (Private Enterprise)	**Broad Bed and Furrow Maker (BBM)**	All the raw materials are available in Ethiopia. However, it would be feasible to import them from outside. Moreover, machinery has to be imported from outside. The benefits that farmers get from using Aybar BBM is several folds of its price. The issue is that of making farmers aware of the product. Since farmers live in remote areas with limited access to mass media, a lot of effort is required to promote the technology.	Policy & advocacy, PR/branding/marketing, Funding and financial management and procurement. There is a gap in the promotion of the technology. Since the promotion is carried out by the government bodies, their activity is not very efficient. The sales are the same as they are decided rather by government bodies.	Government, farmers unions and private distributors	Initially we focus on water logged vertisols followed by dry areas and small scale irrigation. We will then expand to sub-Saharan Africa. About 5 million households who would buy this equipment in the next 3-5 years.	
Deutsche Welthungerhilfe e.V. (Non-Profit Organization)	**Rainwater Harvesting for Greenhouse Irrigation**	The technology is a low-cost model and all materials are locally available, at least nationally available. Once farmers see tangible results we assume that they will start developing interest and replicate this GH installation.	Specific greenhouse farming techniques (occasionally) and national marketing of the GH product (or fundraising). PR/branding/marketing.	Donor agencies, advanced farmers, government of Tajikistan	Farmers (maybe traders) at local level (these who are better off) or group of farmers. Our organization is an NGO, we do not have customers as such, we deal rather with so called beneficiaries, and those are in this specific case our customers. We plug in at a higher level, by selling to the distributor, but bottom line, end user is the farmer. Most of the vegetables are being imported from foreign countries like Iran or Pakistan. Also considering the border with Uzbekistan has been closed for several years, there is a high demand for vegetables.	
Driptech Inc. (Social Enterprise)	**Affordable Drip Irrigation**	Early plan in place to scale innovation. Driptech has reached 25,000 acres with 17,000 customers, but through a variety of approaches. Our work in the next year will focus on creating more predictable unit economics. Part 1 is introducing financing to farmers, part of this lowers the upfront cost; the other part is reducing risk. Farmers are still not paying full amount up front if they don't get back return on investment. Part 2 of the strategy is more concentrated market activation teams within our existing geography. We've established distribution particularly in Maharashtra, and three other states: Andhra, Karnataka and Tamil Nadu. We are working with 150 active dealers, 20 institutional partners/contract farming organizations. Our ability to actually go and train all those stores and do market activation at each of those stores is limited by our contract right now.	Rural marketing expertise to start both on messaging and audience selection; later on, how to integrate microfinance offering in a way that easily digestible to channel partners. Clients/sales/customer acquisition, PR/branding/ marketing, funding and financial management. Product offering is strong and clear, but communication of value proposition and a more clear go-to-market strategy are required.	We are currently seeking an equity investment. Partnerships with major food companies would be most valuable in terms of supplying Driptech to the farmers that grow for them. We could also use connections to major government /multilateral/NGO livelihood programs.	Smallholder vegetable and sugarcane farmers in southern and western India.	BioEnsure, aQysta, Barsha pumps/ Practical Action, Puralytics
FutureWater (Private Enterprise)	**Flying Sensors**	As soon as you come with drones – we want to be realistic that it won't solve all the problems. We want to be clear that we're giving more information to secure more water for food. We hope at the end of these few years to reach about 8,000 farmers by having 20 operators. I think it's very realistic because 20 operators are not a lot. We hope to have 5 operators after the first year – since they will serve villages/farmers, people will be attracted to this business.	Legal, PR, branding, marketing; Legal advice on UAV permits	Investors, farmer organizations	Farmers don't have information – only 10% have access to extension services. They don't have information on water, seeds, fertilizer. We provide information for them with high spatial resolution so they can see what happens to the square meter within their field. By using the drones, we provide access to infrared spectrum.	
International Center for Biosaline Agriculture (ICBA) (Research Organization)	**Salt-Tolerant and Resilient Crops**	Early plan in place to scale innovation; The seed production model has been initiated in the partner countries (Egypt and Yemen) for more than two years. Already 25 farmers participating in the seed production activities in Egypt, out of them 10 farmers were selected to produce and supply seeds to other farmers. They produced around one ton of the selected five crops (barley, triticale, safflower, sorghum and pearl millet) and shared among farmers. At the NARS station, around 600 kg of the selected species were produced and distributed to farmers. In addition two nurseries were established to produce seedlings of non-conventional species. In Yemen, a similar situation exist, also in both countries seed producers. Groups/ associations were established (or in place) to facilitate community-based seed production and marketing. Private sector companies were also introduced to the process and expected to take larger role in the scaling up stage.	Commodity development, NGO engagement, product or model refinement, PR/branding/ marketing, supply chain development	Government Agency: Partner Research Center (DRC), Agriculture Directorates in the targeted governorates, Ministry of Agriculture); Corporation: Seed Producer Groups; Investment: Private Seed Companies	15,000 families, 620,000 acres potentially can benefit in the future in Egypt. Similar situation in Yemen where more than 20,000 families can potentially benefit rom the innovation. Farmers in the same community and other neighboring ones, in addition to small commercial companies and distributors will be the key buyers in the targeted markets in both countries.	
MetaMeta Research B.V. (Research Organization)	**Salt Tolerant Potato**	Enormous global demand. We have however chosen to start trials only at a limited amount of countries. The selection was dominantly based on: 1) previous work experience in selected countries; 2) climate zone; and 3) salt affected area in selected countries. Scaling up plan exists, and will be adapted (if necessary) after results of the demonstrations in year 1 are known. Sales occurring in The Netherlands. Market and customer group differs however completely in Pakistan.	Strategy, clients/sales/ customer acquisition, funding and financial management: 1) Soil expertise: understanding inter-action with different salts on soil structure and micro-life - Soil-crop interaction; 2) Crop Management (Irrigation and fertilization strategy); 3) Client and Market Identification; where are which clients located; 4) Business Start-Up and Growing - Supply chain development; and 5) International transactions.	A mix of partners	Globally, first years, however, salt affected areas in tail-end areas in Indus Irrigation Basin and abandoned lands in Sindh. Total market in Pakistan is at minimum 50,000 hectare at maximum 4.2 million hectare.	
My Rain LLC (Social Enterprise)	**Rainmaker**	Initial plan in place to scale innovation. Strong market mandate for our irrigation products but uncertainty remains around our mobile application. Smart phone proliferation will aid this barrier. We procure and build everything locally in India.	USAID program management. Experience with rural India tech adoption. Experience with india retail and distribution operations. Staffing and management, legal, and supply chain development.	Investment groups	Small retailers in rural, emerging, and semi-urban areas in South India. There are 41 million smallholding farmers that are currently candidates for micro irrigation. While we sell unhindered in Tamil Nadu, it is likely that around half of those customers will require financial assistance of some sort to afford an irrigation system. Our customer base has grown more than 10X since July 2014. We now work with more than 400 retailers throughout Tamil Nadu.	
Practical Action Bangladesh (NGO) (Non-Profit Organization)	**Sandbar Cropping**	Tech components/manufacturing available locally in implementation country. Improved irrigation technology is needed for its further improvement (i.e., drip irrigation or solar based irrigation etc.). There is an urgent requirement of quality pumpkin, squash seed, currently importing from outside. Pumpkin product diversification and processing and export.	Product or model refinement, PR/branding/ marketing, supply chain development. Business development, trade and export linkage. Global and regional networking. Improved low cost and appropriate irrigation technology. Global exposer of crop diversification in sandy lands. Transitional land management (institutional framework).	Corporations (i.e., Driptech for irrigation, global lead farm for pumpkin processing, marketing, export), Government Department of Agriculture Extension and donors.	Local, national and global. There is a future potential to link this product with China, Germany, USA, Middle East, etc. Currently, it is sold in local, national market with reasonable cost. A small proportion of pumpkin is exported in different countries. This marketing is being supported by 164 middlemen for marketing the produces from farm gate to national level.	Driptech

Securing Water for Food Technical Assistance Facility

Summary of Innovator Information

Awardee Company Name	Innovation Title	Scaling Strategy	Needs	Partners Needed and Interested Partners	Markets, End Users & Customers	Potential Synergies
Puralytics (Private Enterprise)	**LilyPad**	Initial plan in place to scale innovation. The LilyPad has completed lab testing for a related stormwater application, and is starting a scale up for that application. The LilyPad has other supporting information for the technology in that we have SolarBag and Shield testing on many chemicals and contaminants. The LilyPad has not been used at scale for a period of time in a raw water application, so these early stage lab results are anecdotal for this application. Initial scale will be just on berry farmers.	Market understanding, analysis, and competitive positioning. Product or model refinement, Clients/sales/ customer acquisition, PR/branding/marketing.	Financial support for the developing world organizations implementing this solution. Partners with water treatment experience in country. Anaberries came to us looking for a solution to a problem; they were worried about shipping contaminated berries to the US market. Bristol's is one of the leading members of Anaberries.	Agriculture water sources - lakes, streams, wells, that are polluted, and stormwater runoff. We have potential customers and partners we are talking to who like the technology and predicted performance, and the price seems to be better than their alternatives. More work is needed to quantify all of their alternatives, and pilot test results needed to prove the performance of our solution. Certainly the stormwater and large agriculture farms can afford the solution. The smaller farmers in the developing world we are still unfamiliar with their resources and requirements outside the target region of this field trial. The LilyPad innovation in this project already has some paying customers exploring other pilot test applications, like pond remediation and stormwater.	Solution compatible with drip irrigation
Reel Gardening (Social Enterprise)	**Reel Gardening**	We have executed a successful pilot with Unilever. We have proven that the market wants to buy the product we now need to educate more people on the product and make it easily available for purchase. From the household gardens through this project, it will be upwards of 600,000 households over the 3 years, and it will be 1,770 schools over the 3 years. For expanding, we have had a lot of interest from Kenya and from Nigeria – we have sent some sample stock to an NGO in Nigeria that is testing it at the moment, same for Kenya. We have planted in Botswana and Zimbabwe. Part of SWFF proposal we have both local SA schools, and we put in proposal and spreadsheets non-SA schools – we hope to expand our footprint into areas in which this product is needed and NGOs in these areas have already made contact with us.	Financial skills. Project management skills. Reporting skills. Strategy, Staffing & management, Legal, Funding and financial management.	Market penetration. Unilever. Sodexho.	Our retail range is targeted to a middle to upper class income bracket - we then use a percentage of these sales to cross subsidies the school and community products which are positioned at a lower income bracket. Demand stretches from the upper to middle to lower income. We have a different product range for each of them. Summer vegetable garden in a box – it will plant 2 sq. meters – this is being sold in a retail environment in SA and we sell it online – they sell easily and we have a good success rate with people purchasing. We expanded and launched yesterday in the UK selling this. Upper to middle class the product does sell. Selling the product to base of pyramid or informal market – over the last 3 years we've been getting into this market and planting gardens in schools through CSR money. Companies are buying gardens and we are implementing for community. We've had requests over 8 months for those living in these environments asking where they could purchase for their own home use. As a pilot we set up one agent in Soweto township and one in cape town – they've now grown from 2 to 5 agents, and they're selling to this market – either per meter.	
Trans African Hydro-Meteorological Observatory (TAHMO) – Weather Index Micro-Insurance (Non-Profit Organization)	**Weather Index Micro-Insurance**	Significant testing of products/services has occurred leading to increasing adoption by users. More refinement of offerings needs to be done to capture more of the market. Need to get enough stations into the field to justify companies buying our data sets.	Strategy, staffing, management, legal	Earthworks, IBM, Acre (Kenya). GEF. The GEF of the World Bank, and other funding agencies seem to see our work as central to their mission. This may well lead to some long-term opportunities, and now has yielded a very nice set of 3-year projects.	Businesses depending on weather - crop insurance, cell-phone app providers, large farms. Also school science education is a key market.	
Wageningen University & Research Center (Research Organization)	**Salt-Tolerant Quinoa**	In Vietnam we have large amounts of land with favorable conditions for quinoa growing – it's a new crop in Vietnam. We can export this product to Australia and Japan nearby. We've also been approached to export to the UK. We have markets for healthy foods company in Vietnam. Also a tourist market for international tourists. Quinoa is not popular yet in Vietnam – companies import them at a very high price.	[blank]	Nestle. In Chile, Nestle is involved also in the wider collaboration and they have a desire to take up quinoa in the food products.	Chilean people - the native population of Chile. Other countries from South and Central America, Colombia, Ecuador, Brazil, a huge market, is very interested to buy quinoa from chile. Finally, we think that we develop the crop in Chile we can export to north America, Europe, but also to China and Asian countries. Nestle would like to continue exportation of quinoa and to use quinoa to put in soups and other products for exporting to Latin American countries.	
World Hope International (Non-Profit Organization)	**Affordable Greenhouses**	Early plan in place to scale innovation. We are building on previous work with the current greenhouse technology (from Penn State University) in Kenya and Rwanda. We know the technology works very well in those specific contexts, and we have built an implementation model in Sierra Leone and Mozambique based on the prior experience. That said, each context is unique, and we will need to tweak the model for the setting. That is the primary work that is to be done during this project. The true innovation of our technology is the use of nearly all local materials for the construction of our greenhouses. This keeps the cost low and insures the scalability of the concept. Thus, all but one component of the greenhouse is available locally. The glazing (specialized plastic that covers the exterior) is not available locally, but can be source readily from Kenya and European locations.	We could use assistance with supply chain management, business model development, and marketing/branding. Product or model refinement, PR/branding/marketing, Supply chain development.	Necessary partners include: investment capital, indigenous entrepreneurs and/or existing businesses	Businesses depending on weather - crop insurance, cell-phone app providers, large farms. Also school science education is a key market.	Driptech