SECURING WATER FOR FOOD

Annual Report

DECEMBER 1, 2018 - MAY 31, 2019

SECURING WATER FOR FOOD:
A GRAND CHALLENGE FOR DEVELOPMENT

USAID FROM THE AMERICAN PEOPLE

Government of the Netherlands

Sweden Sverige

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

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TERMS & ACRONYMS

AST	Adaptive Symbiotic Technologies
AWP	acceleration work plan
CEO	Chief Executive Officer
COP	Chief of Party
COR	USAID Contracting Officer's Representative
CSA – MNP	Conservation South Africa – Meat Naturally Private Limited
CUT/ITIKI	Central University of Technology, Free State/ITIKI
Desal	Desalination (as in the Desal Prize)
DST	South Africa Department of Science and Technology
ICBA	International Center for Biosaline Agriculture
ICU	Institute for University Cooperation
IIAC	Innovation Investment Advisory Committee
Local	For innovator: located in country impacted by innovation For vendor: located in Africa or Asia
LL	lessons learned
LOE	level of effort
M&E	monitoring and evaluation
MIT/Tata	Massachusetts Institute of Technology, Tata Center for Technology and Design
MOU	memorandum of understanding
NGO	non-governmental organization
Nonlocal	For innovator: not located in country impacted by innovation For vendor: not located in Africa or Asia
PAS	pre-award survey, an evaluation of a prospective contractor's ability to fulfill a proposed contract
Rd.	Round: Rd. 1, Rd. 2, etc.
RVPM	Rapid Vendor Procurement Mechanism
Sida	Swedish International Development Cooperation Agency
SME	small- to medium-sized enterprise
SNV	SNV USA
SOW	scope of work
SWFF	Securing Water for Food
TA	technical assistance (i.e., SWFF TA Facility)
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

SWFF SURPASSES PROGRAM MILESTONES AND TARGETS

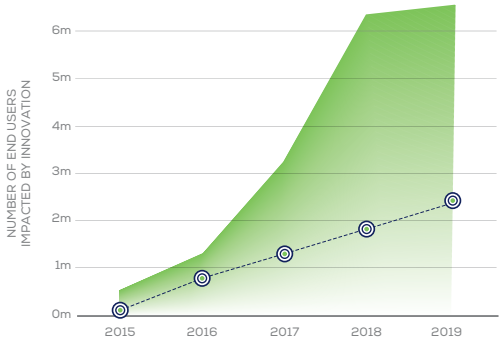
2019 marks the 6-year anniversary of SWFF, with eighty percent of all SWFF- funded innovation awards now either completed or terminated. The Securing Water for Food program has exceeded the expected outcomes envisioned when the program was created, as validated by the Final SWFF external program evaluation. The next page shows that SWFF innovations have impacted more than 6 million farmers, their families, and other customers, helping make them more resilient to economic and climatic shocks and moving them forward on their journey to self-reliance. **For every $1000 that has been spent by the SWFF program, SWFF innovators have impacted more than 240 customers/end users, produced more than 400 tons of produce, helped farmers reduce their water consumption by more than 1.2 million liters of water (compared to traditional practices), improved water management on 515 hectares of grazing lands and 170 hectares of farmland, and generated more than $350 of sales.**

In addition, since the program began, **SWFF innovators have helped nearly 6.3 millions farmers and their families produce more than 6 million tons of food on more than 4.5 million hectares of rangeland and cropland that are under improved practices due in part to SWFF innovations. Both of these numbers are well ahead of the program's expected 2019 targets. SWFF innovations have also helped reduce water consumption by more than 18 billion liters compared to traditional practices, nearly quadruple the 4.5 billion liters expected in the 2019 program target.**

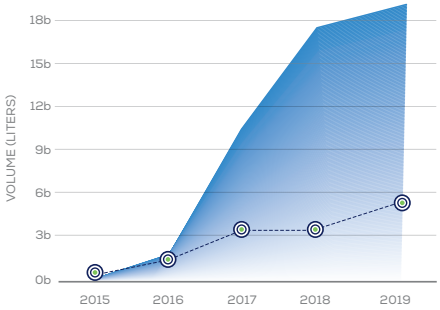
SWFF innovators has also nearly met their $8.5 million sales targets and SWFF innovators have leveraged SWFF funding for more than $20 million in additional funding through nearly 300 partnerships, which helps reduce the need for future donor assistance for these innovations. Of the 27 SWFF innovations that weren't terminated in their first year for not meeting their targets, 16 graduated from the program while 8 are currently active. With one exception, more than two years after their SWFF awards ended, all Rd. 1 graduates are still financially viable and three are now profitable. SWFF is working with Future Water's spinoff to help them achieve financial sustainability.

PROGRAM TARGETS AND ACTUAL IMPACT (2014 – 2019)

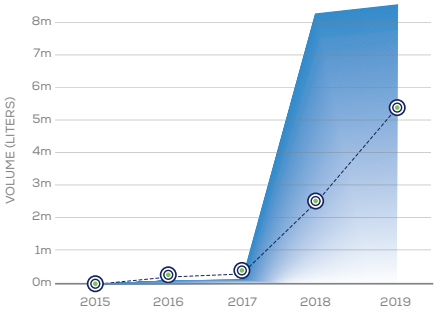
End Users (farmers)



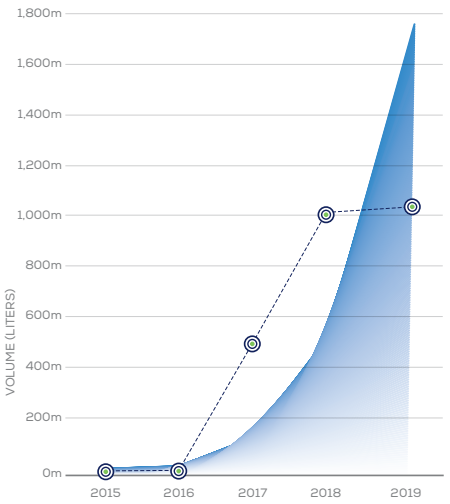
Agricultural Water Consumption Reductions (liters)



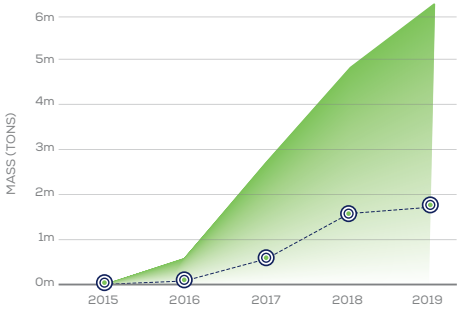
Installed Water Storage Capacity (liters)



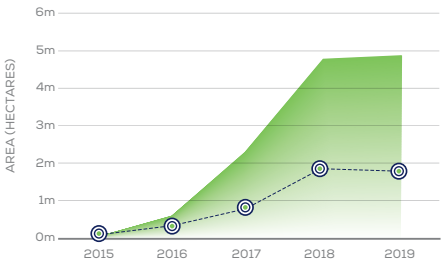
Water Reallocated to the Food Value Chain (liters)



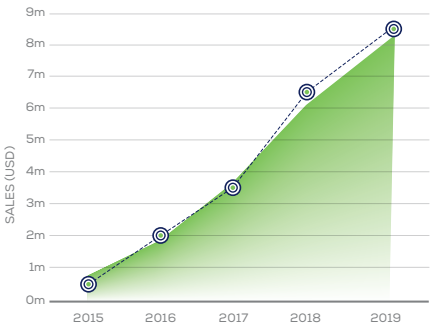
Mass of Crops Grown (tons)



Land Under Improved Production (hectares)



Product Sales (USD)

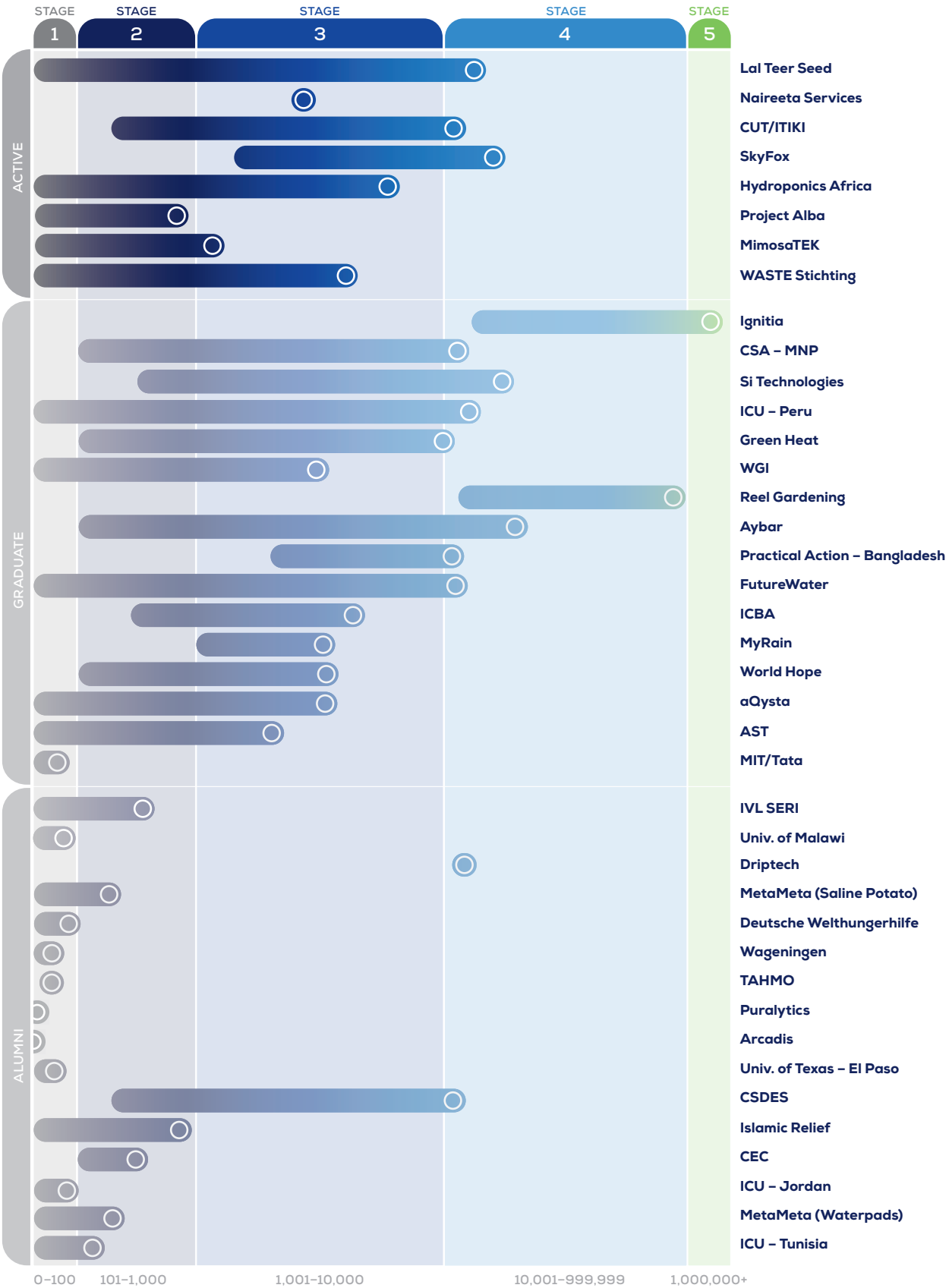


Over the last 6 years, the SWFF program, through the SWFF Technical Assistance Facility (TA Facility), has analyzed the overall impact of the program as a whole and the impact of individual innovations. These analyses and lessons learned have helped the program demonstrate the impact of technical assistance and helped innovators pivot to make more cost-effective, efficient choices in order to increase the likelihood some innovations will reach sustainable scale by the end of the program. So far:

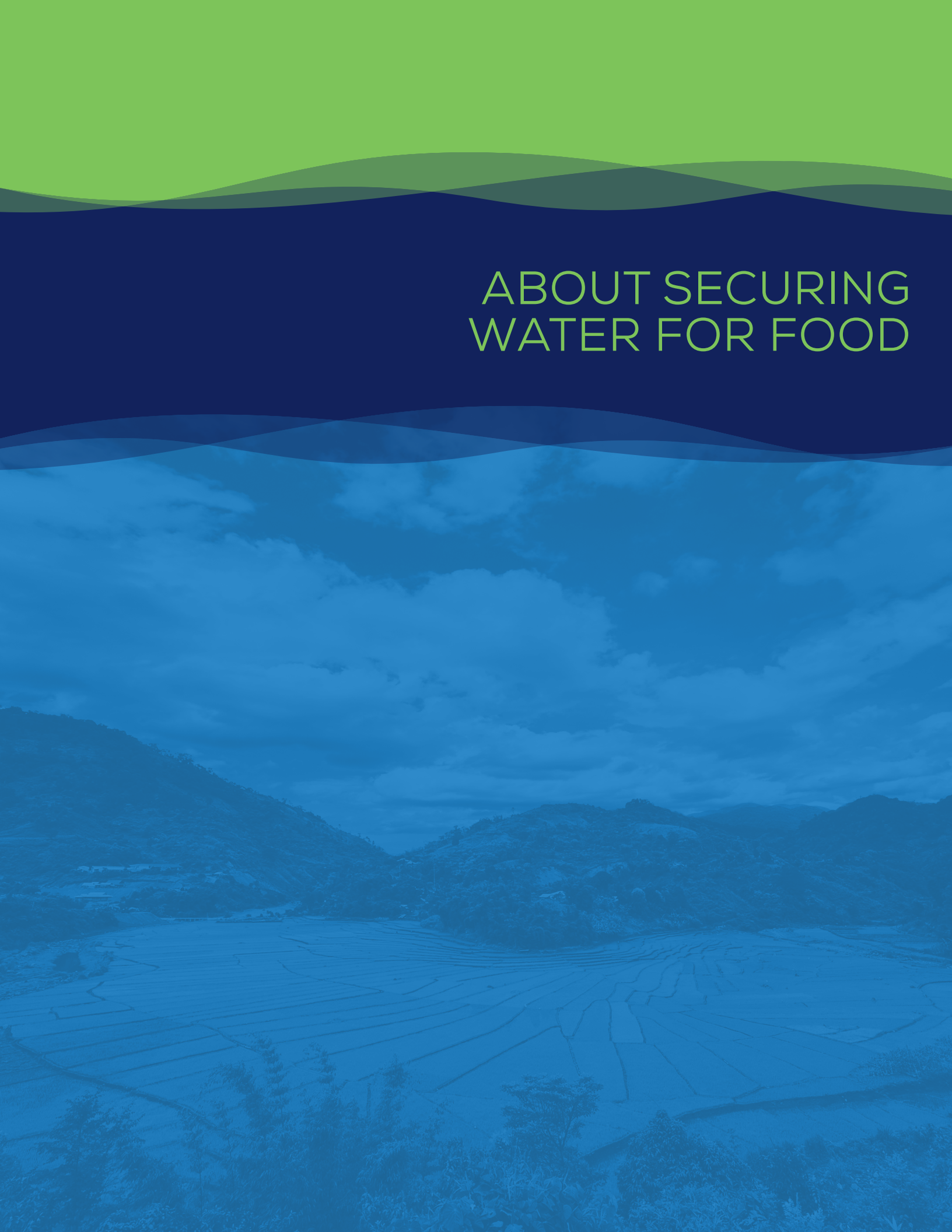
- 100 percent of current SWFF innovations experienced increased usage/uptake.
- 100 percent of SWFF innovators, with support from the SWFF TA Facility, have increased technical capacity.
- 90 percent of acceleration support given to innovators was deemed a long-term success.
- 100 percent of SWFF innovators rate the TA Facility as responsive or very responsive.
- 100 percent of SWFF innovators rate the TA Facility's understanding of their needs as good or very good.
- 100 percent of SWFF innovators rate the TA Facility support as helpful or very helpful towards them meeting their overall goals.

SWFF INNOVATOR PIPELINE (2014 – 2019)

customer base growth over time



ABOUT SECURING WATER FOR FOOD



ABOUT SECURING WATER FOR FOOD

Securing Water for Food: A Grand Challenge for Development (SWFF) works to improve water sustainability and boost food security. SWFF initiatives are formulated to identify and accelerate scientific and technological innovations and market-driven approaches that help agricultural producers grow more food and increase their incomes.

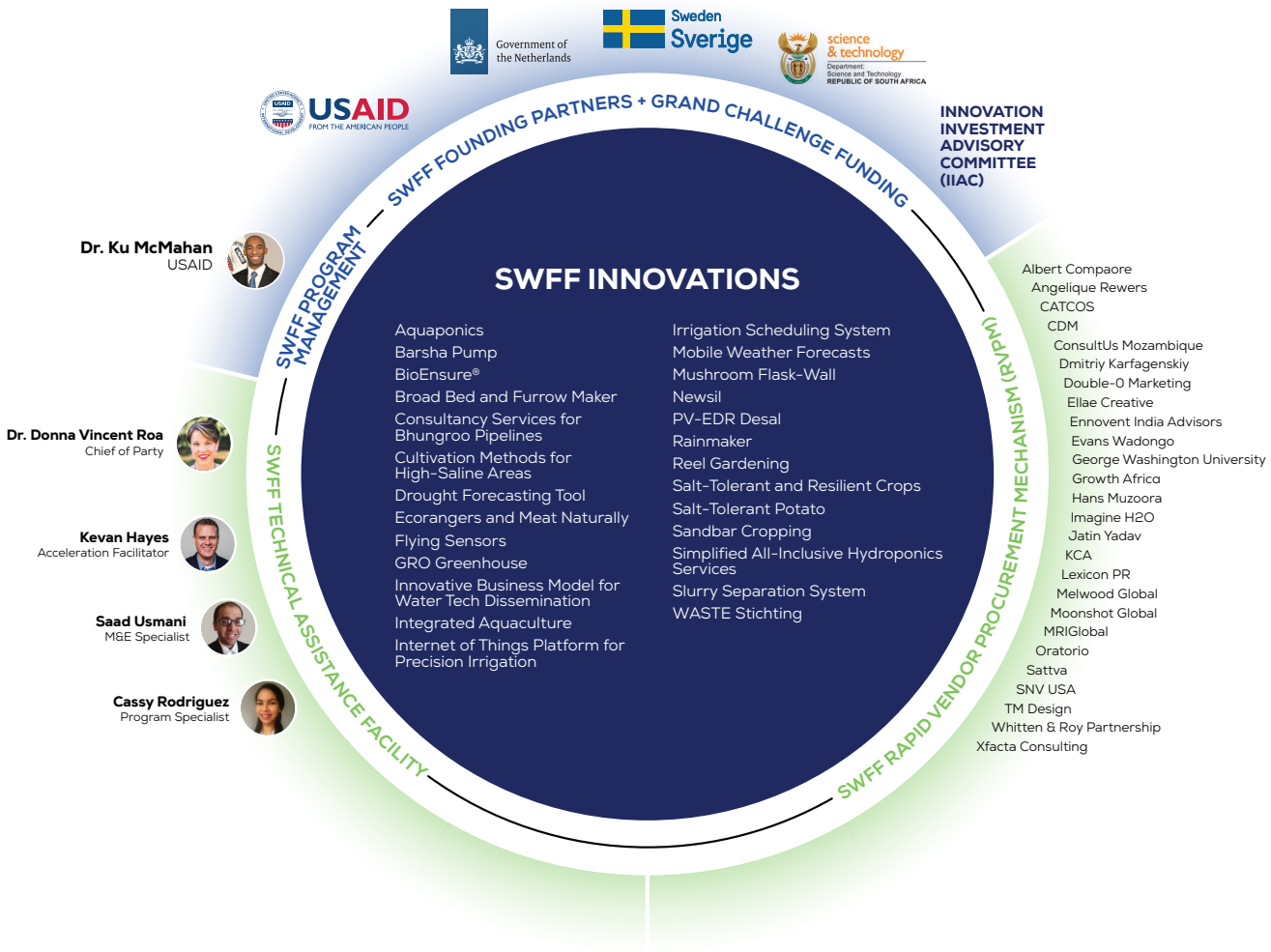
Since its 2013 launch, SWFF has issued four calls for innovation with awards to 40 water-for-food innovators around the world. SWFF's goals include: (1) enhancing access to innovations that help farmers grow more food with less water; (2) improving water storage practices; and (3) increasing the use of saline water and soils to grow and process food.

SWFF INNOVATOR LOCATIONS (35 COUNTRIES) (2014 – 2019)

The Securing Water for Food Ecosystem

The SWFF ecosystem includes four founding partners: the United States Agency for International Development (USAID), Sweden through the Swedish International Development Cooperation Agency (Sida), the Ministry of Foreign Affairs of the Kingdom of the Netherlands (MFA – NL), and South Africa's Department of Science and Technology (DST).

SECURING WATER FOR FOOD ECOSYSTEM



A critical adjunct of the SWFF ecosystem and a unique advisory board in international development, the International Investment Advisory Committee (IIAC) was created to aid in the selection of the SWFF innovators, as well as provide input on innovator technical and financial milestones for initial and future funding tranches. The IIAC comprises world-class technical experts, business specialists, sustainable development experts, and researchers with extensive experience in water and agricultural innovation. The committee's critical contributions help the SWFF Founding Partners ensure that the program supports the most technically sound, commercially viable, and sustainable innovations.

SWFF provides financial and acceleration support through the SWFF Technical Assistance Facility (TA Facility), an enterprise accelerator supported by a $10.76 million contract awarded to The Kaizen Company. The TA Facility staff includes Dr. Donna Vincent Roa, Chief of Party; Kevan Hayes, Acceleration Facilitator; Saad Usmani, M&E Specialist; Cassy Rodriguez, Program Coordinator; Nikki deBaroncelli, The Kaizen Company Home Office SWFF Project Manager; and Sam Weisman, Home Office Program Coordinator.

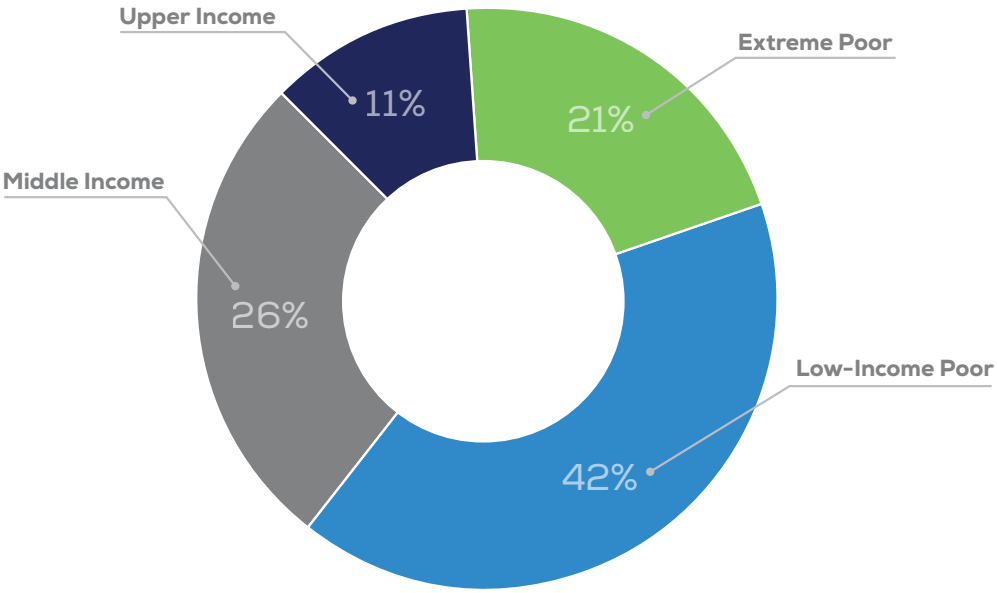
Innovators receive services from the TA Facility's SWFF Rapid Vendor Procurement Mechanism (RVPM), which comprises 28 firms and individuals providing business acceleration support to SWFF innovators in 21 distinct service categories.

Through semiannual and annual reporting, the SWFF TA Facility documents project achievements, major activities, challenges, solutions, and innovators' impact and success stories. This report, which covers innovator progress from December 1, 2018 to May 31, 2019, includes in-depth analysis of innovator and program data amassed since the beginning of the project.

To learn and grow, SWFF periodically performs a program-level analysis of poverty, gender, and environmental sustainability. The next section of this report addresses ways SWFF, through our innovators' work, has influenced farmer behaviors, improved livelihoods, helped alleviate and create resilience to poverty, and stimulated gender-inclusive strategies and activities.

POVERTY

POVERTY LEVELS OF SWFF END USERS ACROSS ALL INNOVATORS (2014 – 2019)



Through the products and service of innovators, SWFF continues to make progress toward improving incomes and yields of farmers who are at or near their country's poverty lines. As noted in previous SWFF annual reports, measuring poverty for specific innovations and across an innovation portfolio is extremely challenging. To determine the proportion of innovators' customers and end users who are at or below the poverty line, SWFF uses a combination of innovator-provided information, household survey data, monitoring and evaluation site visits, and extrapolations from country-level data. Using those sources, SWFF estimates that 62 percent of innovation customers and end users in the program at this time are at or near their country's poverty line.

SWFF innovators remained challenged to create financially sustainable enterprises while meeting the needs of extreme-poor and low-income households. SWFF innovators, and therefore the overall program, focus less on the lowest-income subsistence farmers and most often on customers and end users at or above the poverty line who could fall back into poverty easily with an economic shock or prolonged economic stressors.

Only 21 percent of the 6.3 million SWFF customers and end users fall into the lowest-income category. Those extremely poor farmers rarely earn any income from farming and find it difficult to afford most SWFF innovations. Many NGOs in the SWFF portfolio initially focused on this group, but modified their operations to focus on the low-income poor who have some basic wealth (homestead, land, livestock, etc.). The assets of the low-income poor can be used as loan collateral for farming inputs, which are the basis for increasing agricultural and aquacultural yields, as well as increasing income from livestock.

Many SWFF innovators focus on working with semi-commercial farmers at or above the poverty line who grow a staple crop in one season and vegetables in another season. A substantial number of the farmers own their land and have multiple income streams, including animal husbandry, day labor, and income from small retail shops. However, they have a very limited income overall, with little to spend on anything outside of their agricultural inputs. Those farmers represent 42 percent of SWFF customers and end users.

Lal Teer Seed has helped 18,807 rural households generating more than $700,000 in product sales on more than 4,500 hectares of farmland. In the second year of its SWFF award, Lal Teer Seed increased its saline tolerant seed production from under 1MT to over 12MT. Lal Teer Seed's benefits go beyond crop production as well. This investment addresses the salinity problems faced by farmers in Southern Bangladesh through assisting with improving irrigation techniques, infrastructure and logistics development, providing training to correct knowledge gaps, and creating an opportunity for vegetable production where it did not previously exist due to adverse weather conditions, salinity, and migration of farmers to urban areas for employment. Aside from this, Lal Teer Seed also assists farmers with micro-finance institutions as well as providing extension advisory services.

GENDER EMPOWERMENT AND INTEGRATION

More than 3 million of the approximately 6.3 million customers and end users of SWFF-supported innovations are women. SWFF Rd. 4 innovators, in their Year 2 annual reporting period, have expanded SWFF's overall gender focus. Many innovators have implemented strategies that promote the participation of women smallholder farmers and are actively looking for ways to include gender-inclusive activities in their programming.

Many innovators continue to report positive outcomes of gender-related efforts such as the hiring of women field agents and the creation of partnerships to help increase adoption of products and services by women.

All current SWFF innovators have successfully taken gender into account in their programming or plan to implement gender strategies based on SWFF recommendations. In 2019, seven active innovators reported increased gender activities in programming, including expanding gender-sensitive trainings and increasing focus on women smallholder farmers as customers.

During site visits, SWFF gained further insights into gender issues and found that all Rd. 4 innovators had underreported their gender impact. For example, some innovators directly pursue women customers as a central part of their business model and address gender barriers specific to their country's context.

The Drought Prediction Tool (DPT) created by Central University of Technology (CUT) uses a drought early warning system that integrates both indigenous and scientific drought forecasting through a mobile application, a web portal, and SMS service to pool weather information from a network of sensors monitoring weather conditions for farmers in Kenya, Mozambique, and South Africa. The accuracy of their meteorological forecasts have increased from 96% to 99% in the second year of their SWFF award. To date, CUT/ITIKI is benefiting more than 22,685 end users on

over 23,000 hectares of farmland producing over 14,000MT of produce. It is worthy to note crop production this year was severely hindered by a Cyclone Idai in Mozambique and failing rains in Kenya. On average, the system has led to increases in crop yields by nearly 10 percent. In the field, women constitute 70% of households, noting that the DPT supplements their critical cropping decisions based on indigenous knowledge with easily accessible and interpretable scientific and meteorological data.

Through an innovation attempting to create a circular economy for vegetable farmers in Southern India, WASTE Stichting recycles wastewater from households for the production of high quality compost and the subsequent cultivation of high quality exotic vegetables for farmers. In Year 2 of their SWFF award, WASTE Stichting wanted to better understand how women agri-entrepreneurs could improve their vegetable quality and extend their cropping season. SWFF support sought to identify and validate the challenges and barriers faced by women farmers using WASTE Stichting's service and recommend actionable steps they could take to address women's needs and make the adoption journey easier for them. Although the technical support validated the next actions WASTE Stichting should take to address gender in their activities, focus groups rather than individual meetings were conducted and the recommendations provided were more general than expected.

In Year 2, WASTE Stichting also continued to refine its business models to reach farmers more effectively and sustainably. To date, WASTE Stichting is estimated to have reached more than 1,300 farmers, 6,790 total end users, helping generate more than 25,000 tons of produce on nearly 550 hectares of farmland.

ENVIRONMENTAL SUSTAINABILITY

Since 2014, SWFF has sourced innovations designed to decrease agricultural water consumption, re-allocate water to the food value chain, increase water storage capacity, and address the problems of saltwater intrusion and soil salinity. As the program and its innovators have grown and matured, SWFF has begun to take a more nuanced view of the environmental sustainability of SWFF innovations. Throughout this report, SWFF reports each water metric separately, in addition to combined water metrics (below). SWFF tries to balance the need for simplified public information with the need for increased scientific rigor.

Farmers using SWFF innovations experienced yield increases ranging from 10 percent to 80 percent. They reduced water consumption in agricultural production by 18.6 billion liters of water, re-allocated more than 1.7 billion liters of water to food production, and increased water storage capacity by 8.4 million liters.

Much of SWFF's volume of water reallocated to the food value chain can be attributed to Rd. 4 innovator Skyfox Ltd, which offers smallholder farmers an additional source of income of fish sales from aquaculture as well as an estimated 24% increase in crop yield from nutrient rich water from their established and/or rehabilitated fish ponds. To date they have reallocated over 1.3 billion liters of water to the food value chain accounting for nearly 75% of the total for all innovators. Skyfox Ltd. has helped 13,207 rural households, generating more than $2.2 million in product sales on more

than 891 hectares of farmland in Ghana, Guinea, Sierra Leone, and Burkina Faso. In the second year of its SWFF award, Skyfox Ltd. increased the average income per farmer from $150 to $238. Though this did mark a 7.4% increase of average annual income from last year in Ghana Cedi, it was a decrease of 1.8% against the US dollar due to currency depreciation.

Although SWFF innovators have made tremendous progress toward increasing water efficiency in agriculture and reducing water consumption, some farmers are offsetting water efficiency gains from innovations when they expand their fields. Most farmer customers are increasing crop yields (producing more food) using less water overall than they did before using SWFF innovations. However, there is a risk that some farmers will lose their efficiency gains as they continue to expand their fields, increasing agricultural production and their overall water usage.

In addition to monitoring water savings, SWFF monitors the overall environmental sustainability of SWFF innovations. Of the 8 innovators active this year, 2 caused little to no environmental harm. In cases where scaled innovation impact could cause environmental concerns in the future, SWFF will continue to monitor innovation activity and help innovators and their customers find ways to substantially reduce potential environmental damage.

INNOVATOR UPDATES

Hydroponics Africa

The Hydroponics Africa system is built from local materials, requires no user expertise, and uses as many as five different hydroponic methods to help farmers produce maximum yields in small areas, without soil, while using 80 percent less water. The hydroponic method suggested to end users is determined by crop types, water availability, user type, land area, climate, and culture. The business model is comprised of direct sales of hydroponics units on a fixed fee per month basis, which includes complementary support and maintenance contracts. Hydroponics Kenya also operates a parallel contract farming model with a subset of its clients, pre-purchasing crops grown for markets and other distributors. To date, Hydroponics Africa has installed 1,155 hydroponic units and helped grow more than 2,265 tons of produce. Hydroponics Africa's strategy to sell its innovation via local marketers has increased conversion rates and helped it stay on track to meet targets. Local marketers also help ensure that farmers repay their loans on time.

Lal Teer Seed

Lal Teer Seed combines locally developed saline-tolerant vegetable seeds with easily adoptable methods of cultivating crops in high-saline areas of southern Bangladesh. The innovator's services include microfinance sourcing, Internet communications technology (ICT) support, and extension advisory services. To date, Lal Teer Seed has reached more than 84,000 end users/customers, helping improve more than 4,500 hectares of land and produce more than 121,000 tons of food with its enhanced seed varieties. Lal Teer's farmer-financed target is listed at zero, however, the organization has made significant efforts to bring financing to farmers. The customary repayment timelines and high interest rates offered by many microfinance institutions are not suitable for farmers interested in purchasing Lal Teer seeds. To support the farmers, Lal Teer Seed provides seeds on credit to seed retailers, who also provide the seeds on credit to farmers. This credit system makes things difficult for Lal Teer Seed, because it takes six months to collect payments from retailers.

MimosaTEK

MimosaTEK's solution – an Internet of Things platform for precision agriculture in Vietnam – monitors and analyzes data on farms using sensors to measure soil moisture, rain, wind, and light, then recommends a precise irrigation schedule to farmers in real time. An end user can activate an irrigation system or greenhouse equipment via the mobile application anytime, from anywhere. MimosaTEK has a proven crop optimization model that combines data from sensors with specific crop models to save on average 20 percent of water and water soluble fertilizer while helping to increase crop yields by an average of 10 percent. MimosaTEK also has strong distributor channels with big players in some typical markets. To date, with its innovation, MimosaTEK has reached more than 1,200 end users/customers, helped improve more than 525 hectares of land, and helped farmers grow more than 860 metric tons of produce.

Naireeta Services

Using handmade pipes 10 to 15 centimeters in diameter, Naireeta Services' Bhungroo rainwater harvesting systems filter, inject, and store rainwater underground for use in lean periods. In addition to providing food security during rainy periods and ensuring crop survival in lean periods, Bhungroo systems can supplement household water needs. Naireeta Services trains and empowers women to operate and monitor the Bhungroos. By curtailing desertification, the initiative helps women build resilience to environmental changes. The innovator has installed 50 new Bhungroo rainwater harvesting systems, with the capacity to benefit more than 1,800 end users/customers. However, as of November 2018, the monsoon rains had not yet arrived in the region of implementation, and the Bhungroo units were not able to collect and store water as expected.

Project Alba

Project Alba is a for-profit social enterprise working with smallholder farmers in developing countries. Because of the risks associated with new technologies and new crops, farmers in South East Asia tend to fall back on staple crops such as rice, which generates very low income. Project Alba offers a partnership to farmers providing inputs, tools, and technical advice at no upfront cost while guaranteeing to buy farmers' produce at pre-set prices. Project Alba then resells the produce to wholesalers. Project Alba's ability to reduce farmers' risk of change enables it to work with farmers on new vegetable crops, thus yielding good commercial margins while repaying the upfront costs. To date, Project Alba has reached more than 900 end users/customers and helped farmers grow more than 1,030 tons of produce. As crop prices have fluxuated, Project Alba has faced increasing risks to its long-term viability and profitability. SWFF has given them a no-cost extension as they revamp their business model.

SkyFox

SkyFox Ltd. constructs and leases ponds to resource-poor farmer groups for production. One pond leased to 25 people produces 20 tons of fish and produce per year. By linking customers/end-users to rural banks, they are able to purchase feed for the fish. After paying the lease fee and the capital and interest, customers/end-users are able to make a net profit of $8,080 per pond. With the increase in demand, following success in the last two years coupled with the involvement of the rural banks, SkyFox has the capacity to meet infrastructure demands. To enable poor farmers to participate, SkyFox offers the flexibility to purchase single or multiple shares of 10 kilograms of fish each. To date, SkyFox has reached more than 150,000 end users/customers, and as a result almost 900 hectares of land are under improved practices. The innovation has helped farmers grow more than 56,000 metric tons of produce.

WASTE Stichting

WASTE Stichting provides a waste-to-resource model for agriculture that is scalable and autonomous using the mobilization of private finance and market-linkage to empower women vegetable farmers in India. WASTE Stichting collects household fecal material for use in producing compost to enhance vegetable garden yield and quality. The second part of the innovation involves recycling of household wastewater (kitchen and bathroom) for irrigation use during dry periods. The business model innovation is the institutionalization of women farmers into producer companies and linking them to an agri-marketing partner who procures crops grown by farmers via advance purchase order. The farmers are also linked to local Micro Finance Institutions (MFIs) for access to loans so that they can procure the innovation. To date, WASTE Stichting has reached nearly 7,000 end users/customers, helped farmers grow 25,000 metric tons of produce, and reallocated more than 34 million liters of water to the food value chain.

M&E INNOVATOR PERFORMANCE MONITORING

SWFF SUPPORTS TWO M&E PORTFOLIOS AND A VERIFICATION PROGRAM

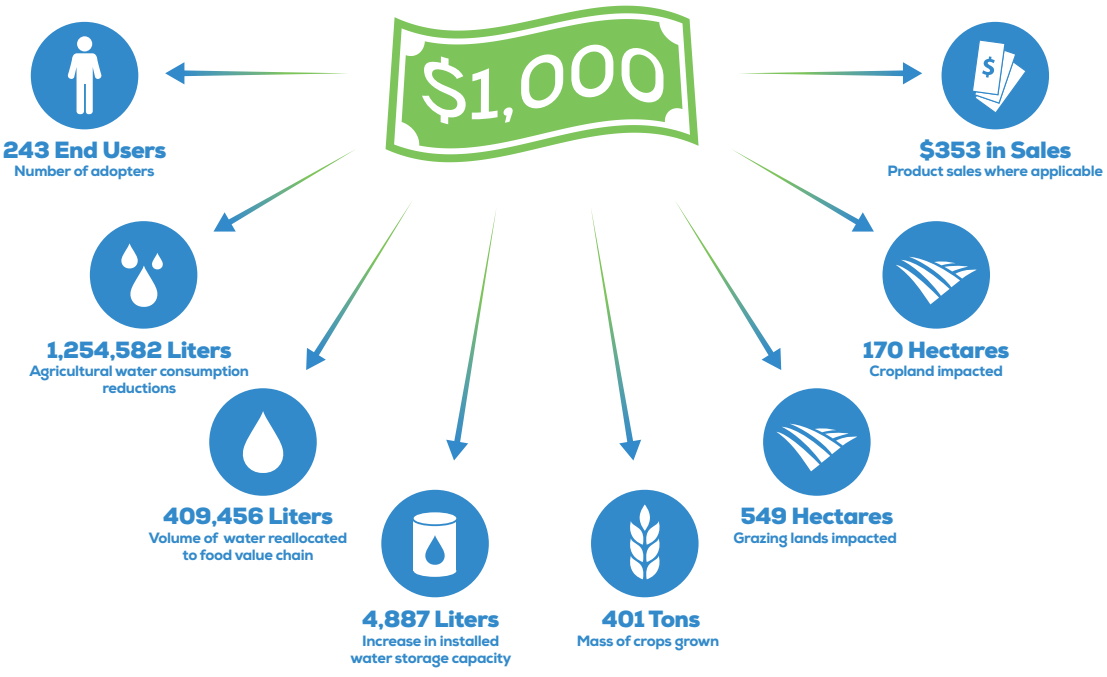
SWFF monitoring and evaluation (M&E) support is divided into two portfolios. The first portfolio builds SWFF innovator performance monitoring capacity and helps SWFF Team Lead Dr. Ku McMahan evaluate data quality and progress reported by SWFF innovators. The second portfolio helps the SWFF Founding Partners monitor the performance of the TA Facility, with results reported in the SWFF TA Facility Performance Monitoring Summary.

The SWFF M&E Specialist completes data quality checks on supporting documentation and conducts program-wide reviews of past data. SWFF also carries out monitoring and evaluation site visits to help innovators better understand end users' needs and to independently validate reported data.

SWFF impact per dollar

Since 2014, for every $1,000 of donor funding spent by the SWFF program, SWFF innovators realized the following: impacted 243 end users and customers; reduced water consumption by more than 1,200,000 liters; produced 401 tons of crops; improved water management on 170 hectares of agricultural land; and generated more than $353 in sales.

ACTIVE INNOVATORS' IMPACTS PER $1,000 OF SWFF FUNDING (2014 – 2019)

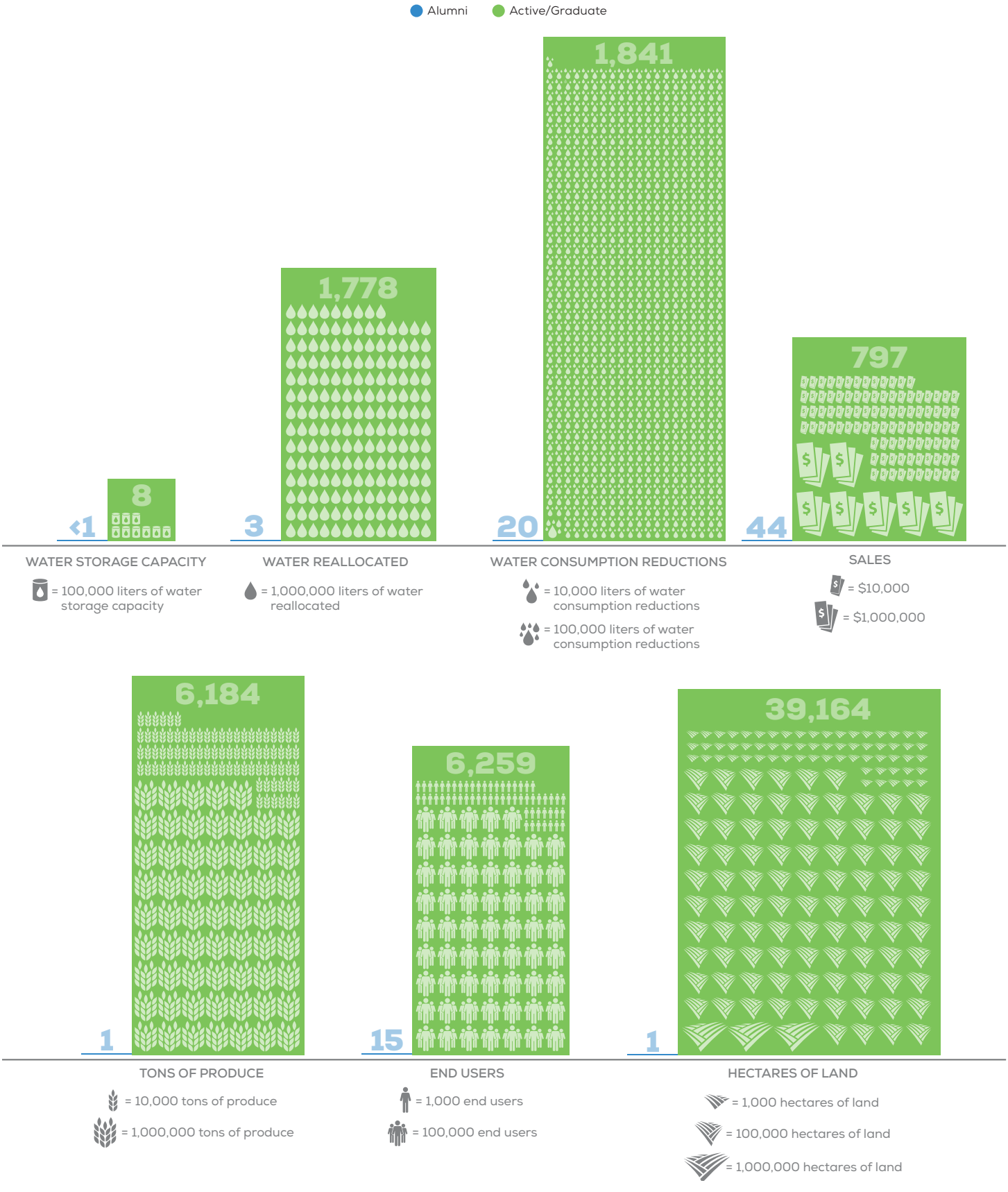


INNOVATOR TREND ANALYSIS

SWFF innovators are required to meet ambitious growth targets, which include reaching significant numbers of customers, reducing water consumption in agriculture, and increasing crop yields. Those that do not meet these targets transition to "alumni" status and no longer receive program funding or technical assistance.

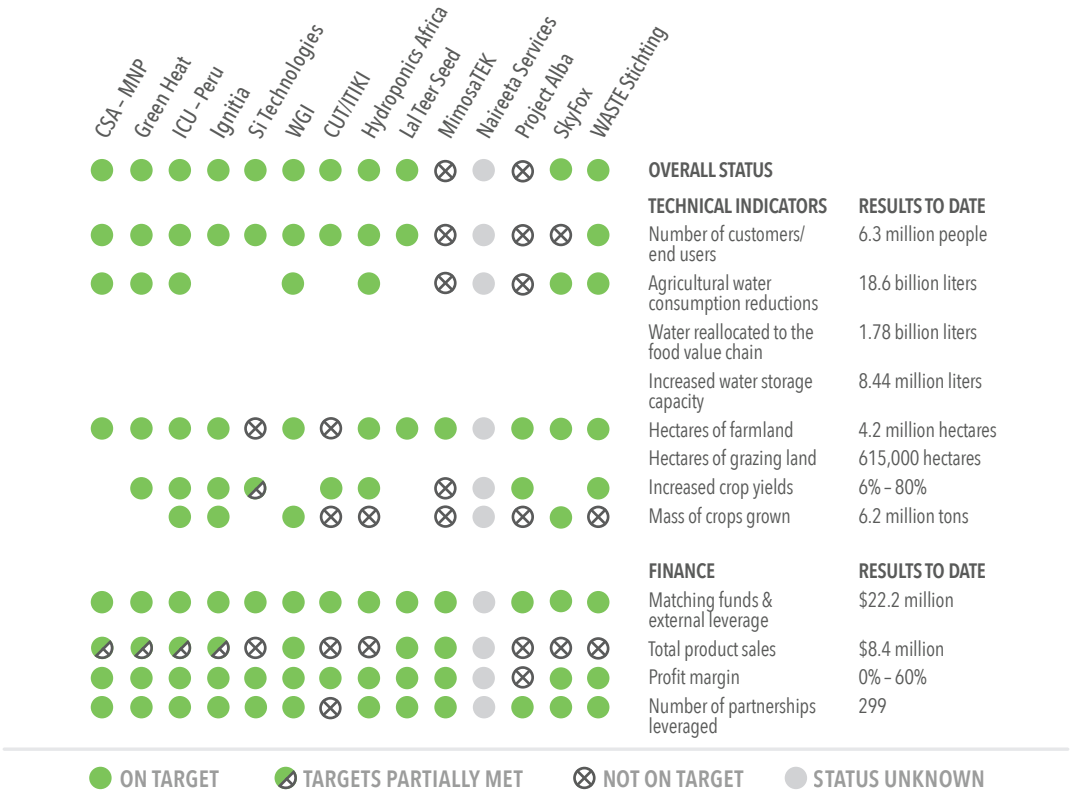
Over the six years of SWFF's operation, 16 innovators have exited the program and become alumni, 16 have graduated from the program, and as of this reporting period, eight are current or active SWFF innovators. Looking across seven key indicators noted in the graph below, it is clear that active/graduate innovators have significantly outperformed those that exited the program. Since 13 of the 16 alumni exited the program after one year, the graph below only compares progress of innovators during their first year in the SWFF program.

IMPACT OF ACTIVE/GRADUATE INNOVATORS VS. ALUMNI INNOVATORS (2015 – 2019)

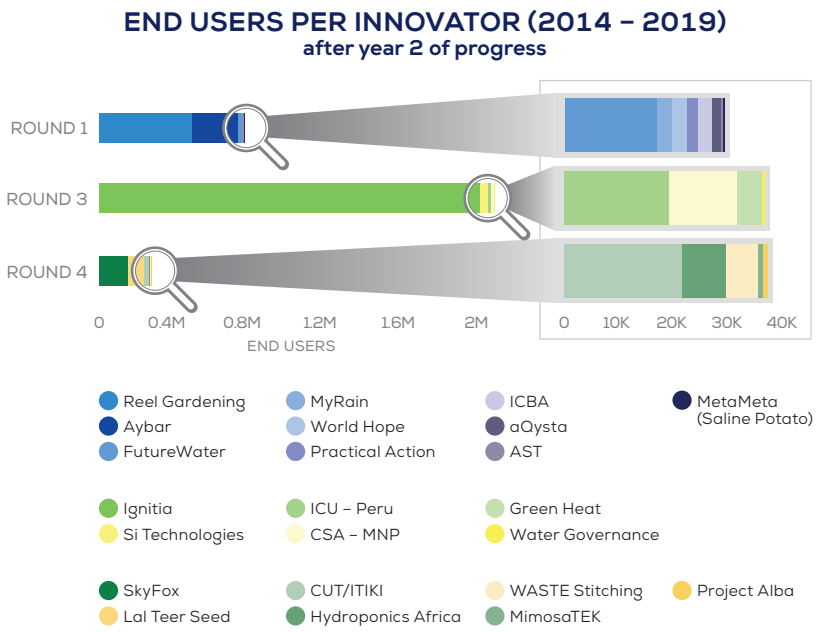


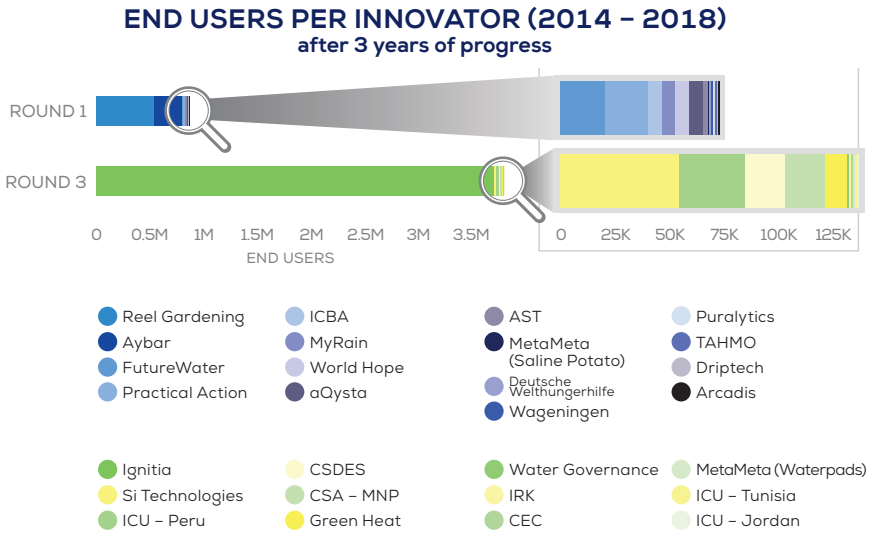
Overall, SWFF innovators have made significant progress toward achieving and reporting their milestones. Innovators are considered to be "on target" if their cumulative results to date meet or exceed their cumulative targets. Out of the six Rd. 3 innovators, five were on target for all indicators except total product sales. For that indicator, all innovators except Water Governance Institute either partially met or did not meet the target. Si Technologies International was the only innovator that did not meet targets on multiple indicators (increased crop yields and hectares of farmland), but the IIAC determined that the organization had made significant progress and deemed it a graduate of the program.

INNOVATOR MILESTONE PROGRESS (2014 – 2019)



One Rd. 4 innovator met all targets (Lal Teer Seed), while six did not meet two or more targets (MimosaTEK, Project Alba, WASTE Stichting, SkyFox, Hydroponics Africa, and CUT/ITIKI). The target status for Naireeta Services is unknown, because the lack of rain has hindered impact and monitoring.



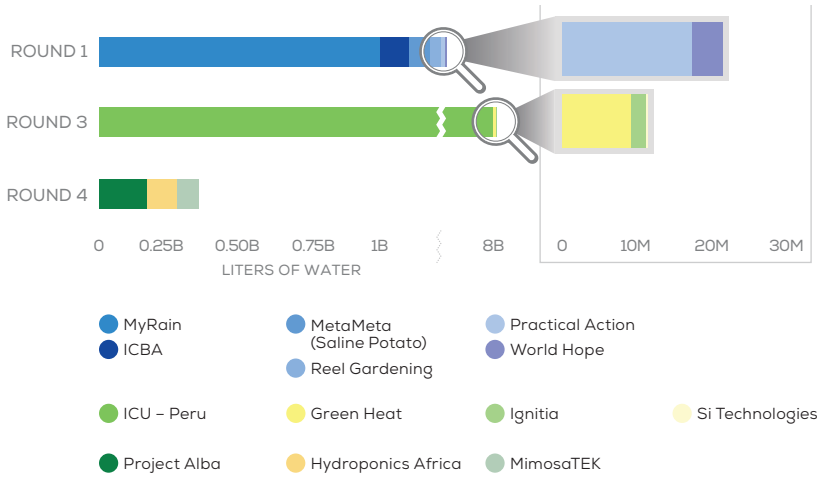


End users per innovator

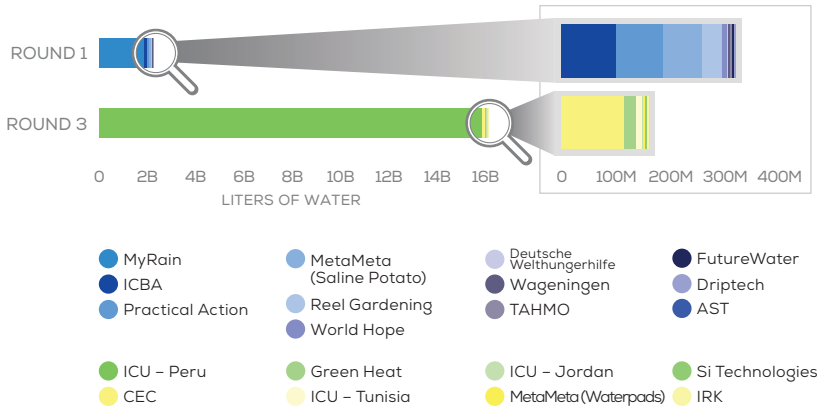
To provide a fair comparison across all four SWFF rounds, the first chart in this section examines all SWFF innovators after two years of progress. The second chart examines only SWFF innovators that continued for the full three years of the program.

Both charts show that most innovator impact to date has been achieved by three innovators with a combined 6 million customers and end users: in Rd. 1, Reel Gardening (416 customers per $1,000 spent) and Aybar Engineering (297 customers per $1,000 spent); and, in Rd. 3, Ignitia (915 customers per $1,000 spent). Because both Reel Gardening and Ignitia are Tier 2 innovators that received increased grant funding, this result is expected.

AGRICULTURAL WATER CONSUMPTION REDUCTIONS PER INNOVATOR (2014 – 2019)
after year 2 of progress



AGRICULTURAL WATER CONSUMPTION REDUCTIONS PER INNOVATOR (2014 – 2018)
after 3 years of progress



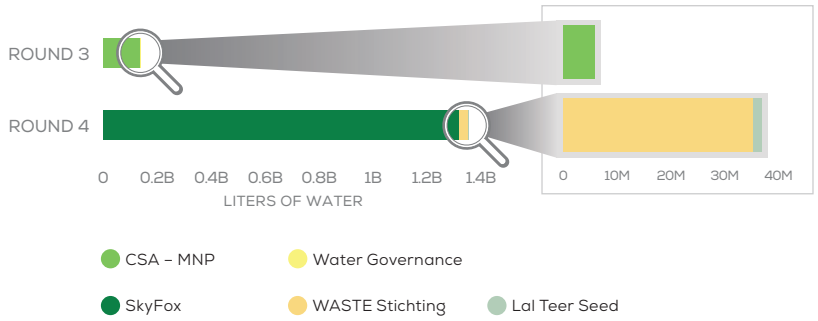
Water impact of SWFF innovators

SWFF innovators reduce water consumption and increase the re-allocation and re-use of water via a variety of methods. Five of the eight active innovators in the program operate in rainfed areas with innovations that increase crop yield per amount of water input. Those types of efficiency gains are not quantified as water gains per se, but rather as a percentage crop-yield increase, as shown in the Innovator Milestone Progress chart.

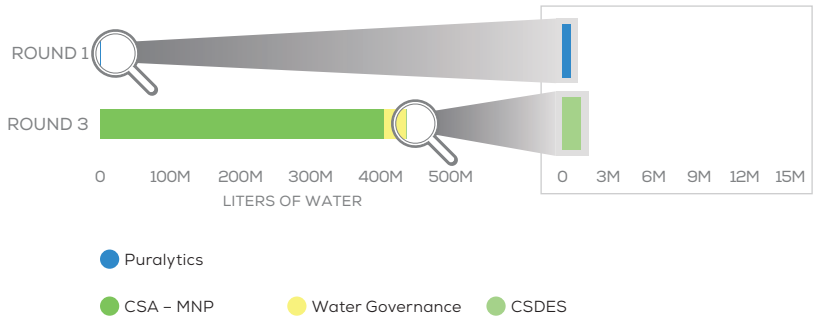
To provide a fair comparison across all four rounds, the first chart for each water metric examines all SWFF innovators after two years of progress. The second chart for each water metric examines only water impact for SWFF innovators that continued for the full three years of the program. Of the 18.6 billion liters of water consumption reductions achieved through SWFF innovations during the three years, 17.9 billion liters of the reductions came from two Rd. 3 innovators: MyRain in Rd. 1 and ICU – Peru in Rd. 3.

After two years of progress, in all three rounds one innovator dominated agricultural water consumption reductions (MyRain in Rd. 1, ICU – Peru in Rd. 3, and MimosaTEK in Rd. 4) with MyRain and ICU – Peru maintaining dominance after three years of progress.

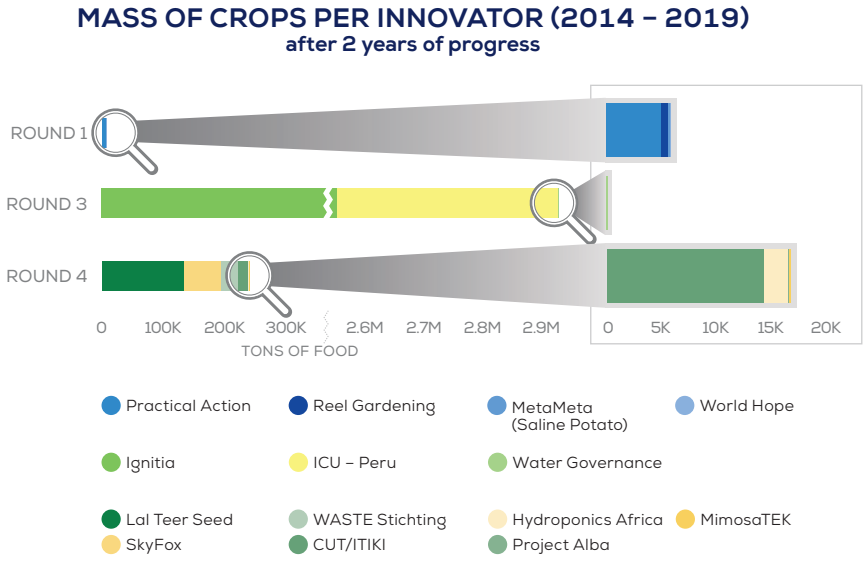
VOLUME OF WATER REALLOCATED PER INNOVATOR (2014 – 2019)
after 2 years of progress

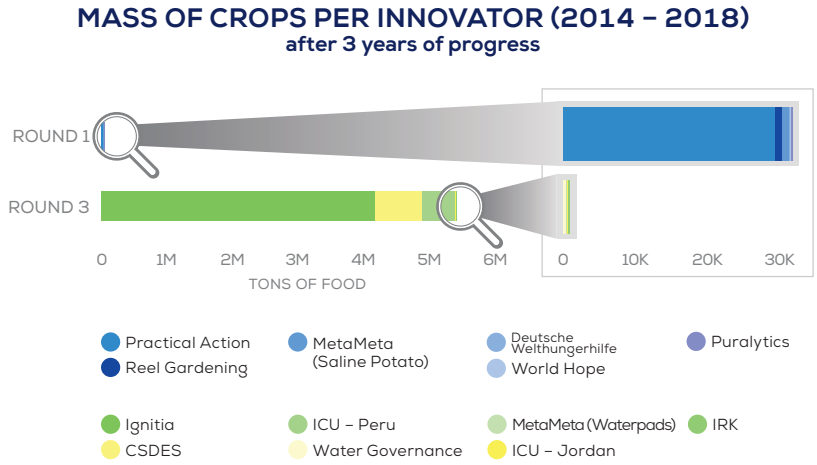


VOLUME OF WATER REALLOCATED PER INNOVATOR (2014 – 2018)
after 3 years of progress



Water reallocation, while significant, is a secondary SWFF impact in terms of magnitude. Approximately 1.7 billion liters of water was reallocated in total. SkyFox accounts for the majority of that amount, having re-allocated 1.3 billion liters, while Meat Naturally re-allocated more than 394 million liters of water over three years.



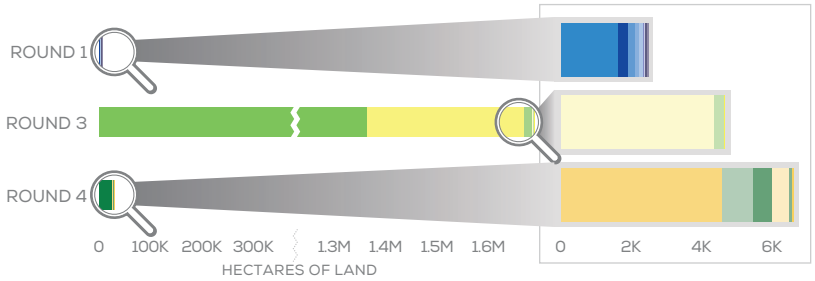


Agricultural impact of SWFF innovators

SWFF's impact on crop yields is partially gauged by the tons of produce that farmers grow using SWFF innovations. The vast majority of SWFF's impact in this regard comes from two innovators, Ignitia and ICU – Peru, whose innovations benefit large numbers of farmers by providing information that improves farming practices. In many cases, SWFF innovators have helped double crop yields for individual farmers.

SWFF's impact on grazing and agricultural lands is concentrated among three innovators: Aybar Engineering in Rd. 1 and Meat Naturally and Ignitia in Rd. 3. Aybar Engineering and Ignitia have affected agricultural land through their broad user bases, while Meat Naturally's innovation has brought vast swaths of communally grazed land under improved management.

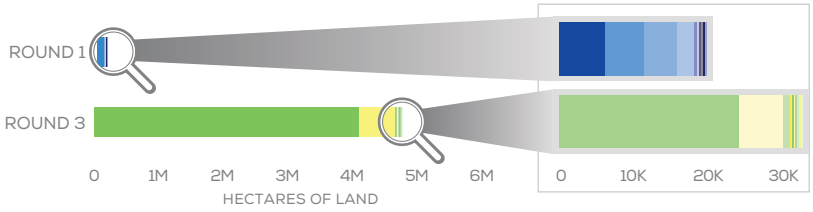
HECTARES AFFECTED PER INNOVATOR (2014 – 2019)
after 2 years of progress



- FutureWater
- MyRain
- AST
- ICBA
- Practical Action
- Reel Gardening
- aQysta
- World Hope
- MetaMeta (Saline Potato)
- Ignitia
- CSA – MNP*
- ICU – Peru
- Si Technologies
- Green Heat
- Water Governance
- CUT/ITIKI
- Lal Teer Seed
- SkyFox
- MimosaTEK
- WASTE Stichting
- Project Alba
- Hydroponics Africa

*Hectares of grazing land

HECTARES AFFECTED PER INNOVATOR (2014 – 2018)
after 3 years of progress

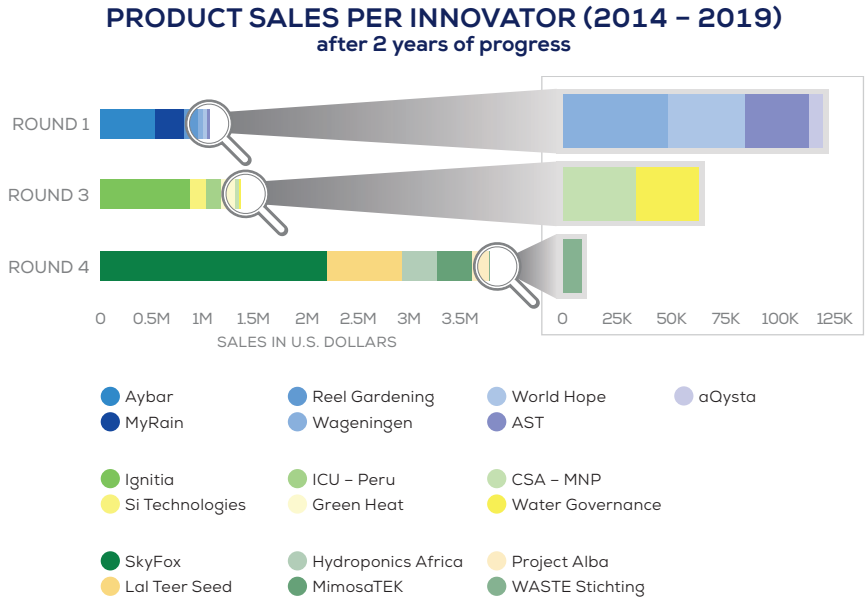


- Aybar
- FutureWater
- Driptech
- AST
- ICBA
- Practical Action
- MyRain
- aQysta
- Wageningen
- Reel Gardening
- World Hope
- MetaMeta (Saline Potato)
- Puralytics
- Deutsche Welthungerhilfe
- TAHMO
- Arcadis
- Ignitia
- CSA – MNP*
- ICU – Peru
- Si Technologies
- Green Heat
- CEC
- ICU – Tunisia
- ICU – Jordan
- IRK
- Water Governance
- CSDES
- MetaMeta (Waterpads)

*Hectares of grazing land

Product sales impact of SWFF innovators

Among SWFF innovators that sell products, sales have been much more evenly spread than with other SWFF metrics noted above. Four Rd. 1 innovators (Aybar Engineering, MyRain, aQysta, and Reel Gardening) and six Rd. 3 innovators (Ignitia, Meat Naturally, Si Technologies International, ICU – Peru, Water Governance Institute, Green Heat Uganda) each sold products worth more than $150,000 over three years of operation. After two years, Rd. 4 innovators have made more progress than all other innovator groups.



Four Rd. 4 innovators have achieved more than $300,000 in sales (SkyFox, MimosaTEK, Lal Teer Seed, and Hydroponics Africa), and 50 percent of active Rd. 4 innovators reached $300,000 in sales by the end of their second year in the SWFF program.

Given Two Minutes to Impress Investors, Weather Guru Tells Compelling Story

SWFF innovator Dr. Muthoni Masinde was a delegate to The World Bank's Water Week conference in Washington, D.C. in April 2019. Undaunted by the several hundred experts in the audience, she told the unusual story of how the arrival of dragonflies could help predict drought. She had only two minutes to explain her innovative solution to determining weather patterns, which combines local indigenous knowledge with scientific forecasting, and what makes it a worthwhile commercial bet.

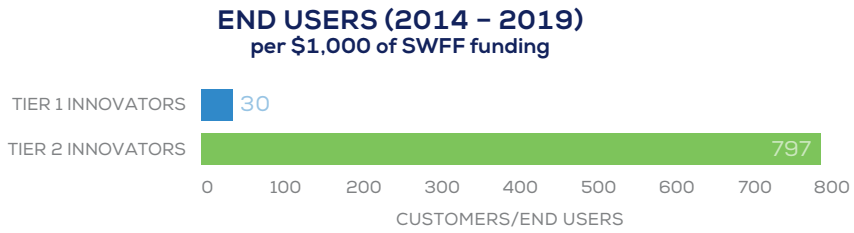
Dr. Masinde was competing against several dozen other enterprises in a lightning round of presentations. While the verdict is still out on investment, she did have several delegates visit her demonstration booth during the flagship conference and is hopeful her contacts will pay off.

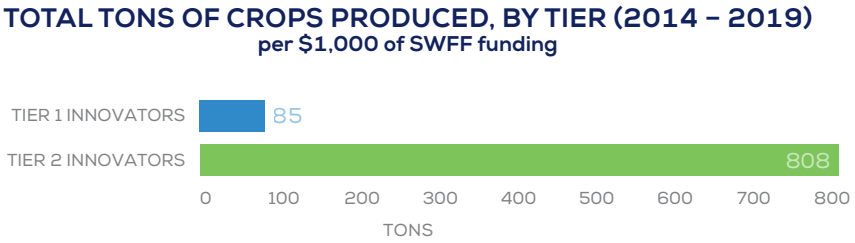
A for-profit enterprise, her business is based at the Central University of Technology/ITIKI program at Bloemfontein, located in central South Africa. She is a professor at the university, and her program serves Mozambique and Kenya as well as South Africa. "If farmers can predict when and where rain will and will not fall in a specific region, they can plan accordingly with water conservation, planting, and irrigation," she told the convention delegates.

"Drought accounts for more than 80 percent of the calamities that befall this region of Africa," she said. "It was just such conditions in my native Kenya that spurred my research and interest in drought prediction. Growing up, I would see news reports of starving children. I wanted to do something about it. Giving farmers a better opportunity to have successful crops was one answer."

Dr. Masinde, who has been in South Africa for the last decade, said scientific knowledge of the weather fails at the micro-level. That gave her the idea to combine local and historical information with scientific weather mapping. "Basically, what we have is a bridge between two knowledge systems," she said.

Many farmers found that the weather bureau's reported data was simply too difficult to understand. Dr. Masinde's team sends out SMS reports in many different tribal languages. "We aim for three areas of impact," she said. "Accuracy is first and foremost, followed by relevance to small farmers. However, the real payoff is in increasing yields for the farmers."



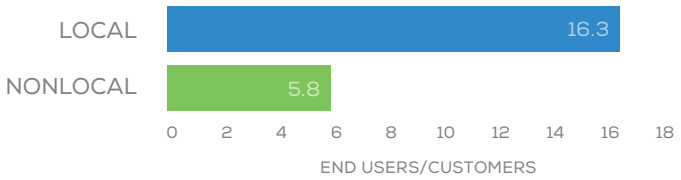


Innovators are split into two tiers, with Tier 1 winners receiving awards of as much as $500,000 and Tier 2 winners receiving awards of as much as $2.5 million. There are substantial differences in impact per dollar between tiers.

To date, excluding technical assistance, SWFF has funded $12 million in Tier 1 awards and $6.3 million in active Tier 2 awards. Innovators receiving Tier 2 awards served significantly more end users and impacted significantly more produce per dollar of donor funding than innovators who received Tier 1 awards. This likely is due to economies of scale, with Tier 2 innovators farther along the commercialization pipeline than Tier 1 innovators.

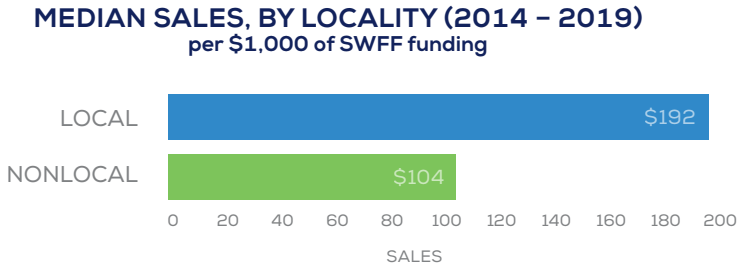
Receipt of either Tier 1 or Tier 2 funding has not had a significant impact on hectares of land affected or product sales generated per dollar of donor funding. However, Tier 1 innovators reduced water consumption significantly more per dollar of donor funding than Tier 2 innovators. The large Tier 1 reductions in water consumption per dollar are largely due to a single Tier 1 innovator that currently generates 87 percent of the entire SWFF program's accumulated total. Even with that outlier removed, Tier 1 innovators reduced water consumption by 178,861 liters of water per $1,000 in donor funds. This greatly exceeds Tier 2 water impacts.

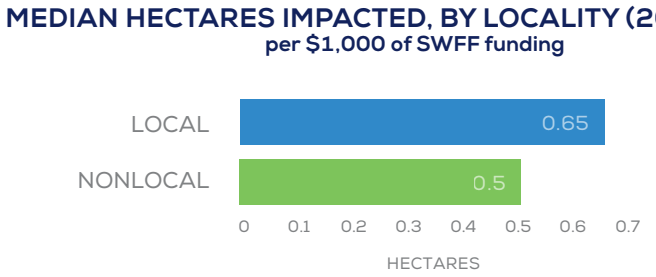
MEDIAN NUMBER OF END USERS IMPACTED, BY LOCALITY (2014 – 2019)
per $1,000 of SWFF funding



The SWFF program classifies innovators as either "local" or "non-local" depending on whether innovators' headquarters and leadership are located within the country impacted by the innovation.

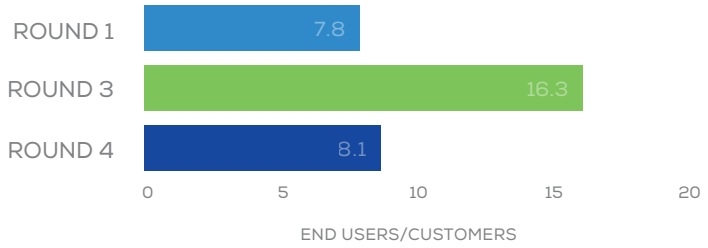
In SWFF's examination of Tier 1 innovators that received as much as $500,000 (as listed below), local innovators served more end users than non-local innovators as indicated by median sales. However, there wasn't a large difference between innovators' achievements in median tons of crops or hectares per $1,000 of SWFF funds, with the exception of sales in which Tier 1 innovators had 48 percent more in product sales than Tier 2 innovators per $1,000 of SWFF funds.



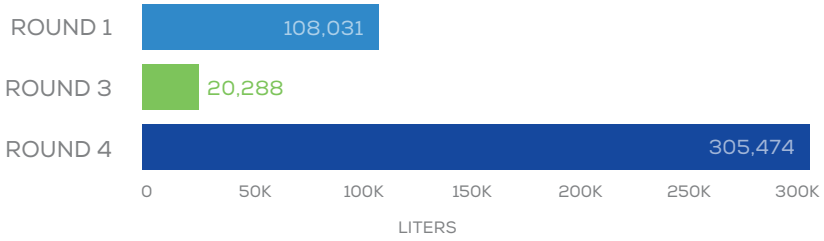


Analyzing innovators by round of entry into the program shows that the median innovator accepted into Rd. 3 of the program serves more end users, grows more produce, and affects more land than Rd. 1 innovators. The median Rd. 1 innovator saves more water than the median Rd. 3 innovator but has achieved similar sales. Rd. 4 innovators are significantly behind in median tons of crops produced and hectares impacted, while they are ahead in agricultural water consumption reductions, liters of water re-allocated to the food value chain, and median sales.

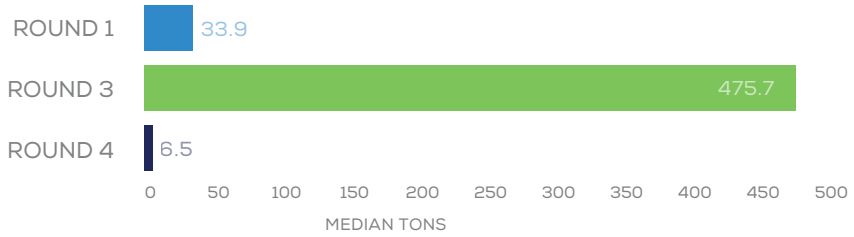
MEDIAN NUMBER OF END USERS IMPACTED, BY ROUND (2014 – 2019)
per $1,000 of SWFF funding



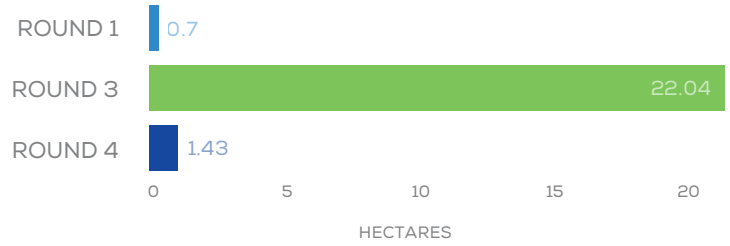
MEDIAN AGRICULTURAL WATER CONSUMPTION REDUCTIONS, BY ROUND (2014 – 2019)
per $1,000 of SWFF funding



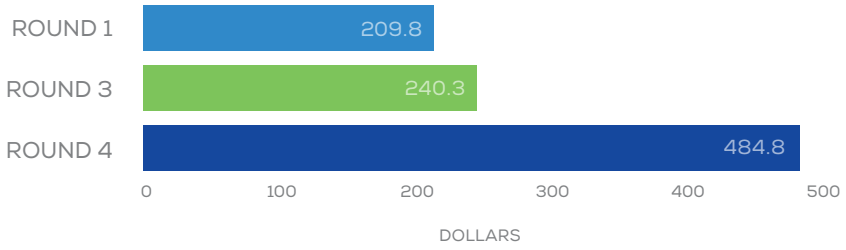
MEDIAN TONS OF CROPS PRODUCED, BY ROUND (2014 – 2019)
per $1,000 of SWFF funding



MEDIAN HECTARES IMPACTED, BY ROUND (2014 – 2019)
per $1,000 of SWFF funding



MEDIAN SALES, BY ROUND (2014 – 2019)
per $1,000 of SWFF funding



Teach a Man Aquaponics, Feed Him for a Lifetime

If you can raise guppies in an aquarium, it's logical to produce those whiskered catfish for dinner tables in poverty-stricken areas across Uganda. That was the "wild idea" Henry Mugisha Bazira, a water resources expert in Kampala, had five years ago. "I looked around and thought – chickens and hogs were raised, why not fish?" But that was only half of the equation.

The second half was using wastewater from various-sized fish tanks to nourish gardens. The water is filtered and returned either manually or automatically to the fish tanks. The process is called aquaponics, and it has led to a small industry for Bazira's team at the Water Governance Institute, where he is the director.

Bazira came up with the idea nearly 10 years ago and proceeded to peruse the internet to learn everything he could about aquaponics. The program began gaining traction four years ago, using an initial grant as seed money.

One could say the program is a twist on the old Chinese proverb: "Give a man a fish, and you feed him for a day. Teach a man to fish, and you feed him for a lifetime."

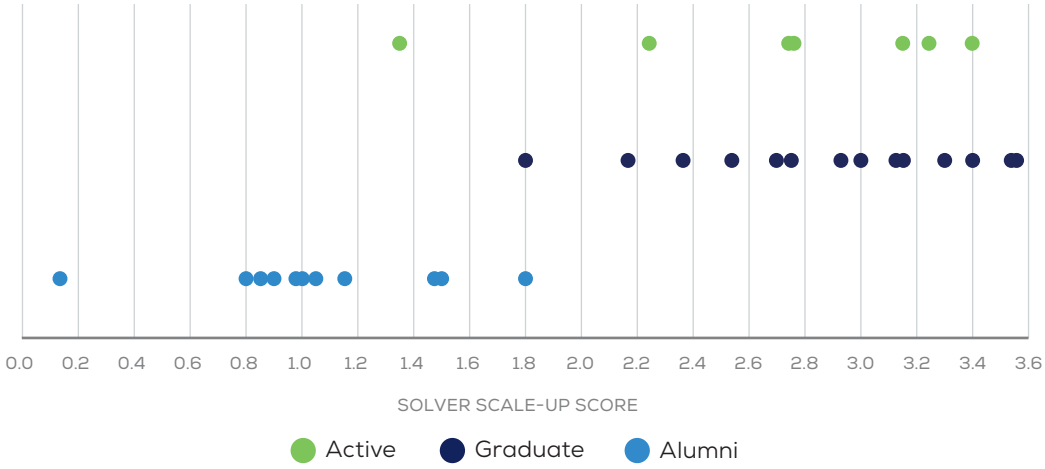
A water resources expert, Bazira recognized the desperate need in his country for quality fruits and vegetables, which were expensive. Due to overfishing, the cost of fish also had risen beyond the means of most people.

Bazira wants to spread the technology, the know-how, and equipment (installations), into poor areas of Uganda, where the poverty rate is more than 50 percent. For him, business is all about scalability. He believes he has reached the critical mass to move to the next level.

The fish tanks come in various sizes but Bazira says to date, the cost-benefit ratio favors the larger tanks where fish have a better chance of survival. From the brood stock, he separates the males from the females, using mostly males in tanks because they tend to grow faster.

The tanks range in cost from $4,500 for the largest, to $1,500 for the popular mid-size prototype, to as little as $850 for a small installation. The project has grown exponentially, from 8 growers in the first year to 32 in the second, 64 in the third, and 148 at the close of last year. Bazira has ambitious goals for 2019, hoping to see the number of installations grow to 500 or even 1,000.

INNOVATOR SCALING-POTENTIAL SCORE AFTER THREE YEARS – BY INNOVATOR STATUS (2015 – 2019)
each dot represents one SWFF innovator



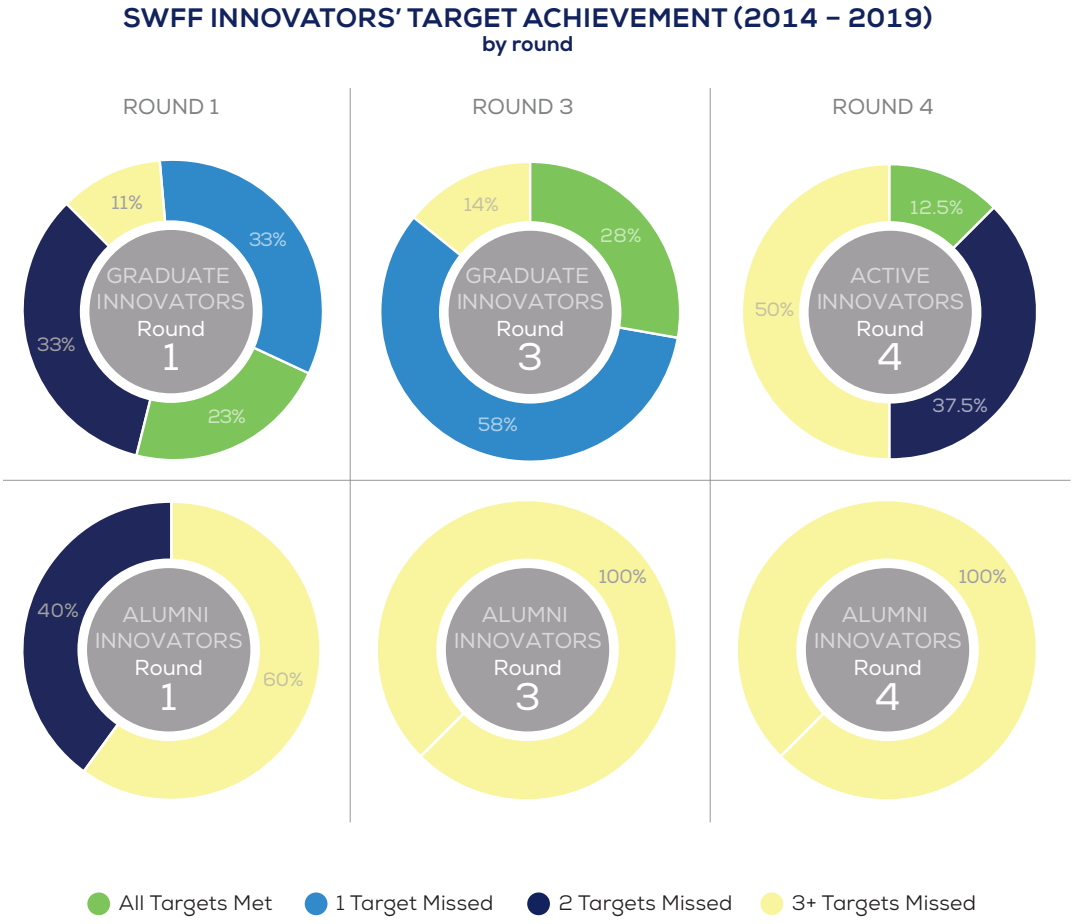
Progress in scaling

SWFF aims to fund innovations that will reach increasing numbers of end users through market-sustainable channels, so that after donor funding concludes the innovations can continue to grow, either through the awarded organization or through replication in a local context. Every six months, innovators rank their organizations along six scaling dimensions. They report changes in areas such as the policy environment, plans to scale, and affordability of products in their target markets. SWFF reviews those individual ratings and then combines them into a weighted Solver Scale-Up Score that tracks scaling potential over time.

Composite scores of active and graduate SWFF innovators after their first year in the program diverged significantly from those of alumni. With a median score of 2.18, half of the active/graduate innovators had a higher rating than the highest-scoring alumni. This divergence is largely due to reported differences in affordability, cost structure, and customer-base growth.

Seventy-five percent of active innovators had a growing customer base with more than 1,000 end users, compared to only 7 percent of alumni. After Rd. 1, SWFF refined its selection criteria for new innovators, moving away from funding organizations still piloting innovations and toward funding organizations that can serve a minimum of 10,000 end users within three years.

This shift is apparent in the early progress of Rd 1 innovators as compared to Rd. 3 innovators. After three years, the median Rd. 1 innovator had a composite rating of 1.5 versus a median of 2.6 among Rd. 3 innovators. Active Rd. 4 innovators had a median rating of 2.175 after two years.



Target achievement

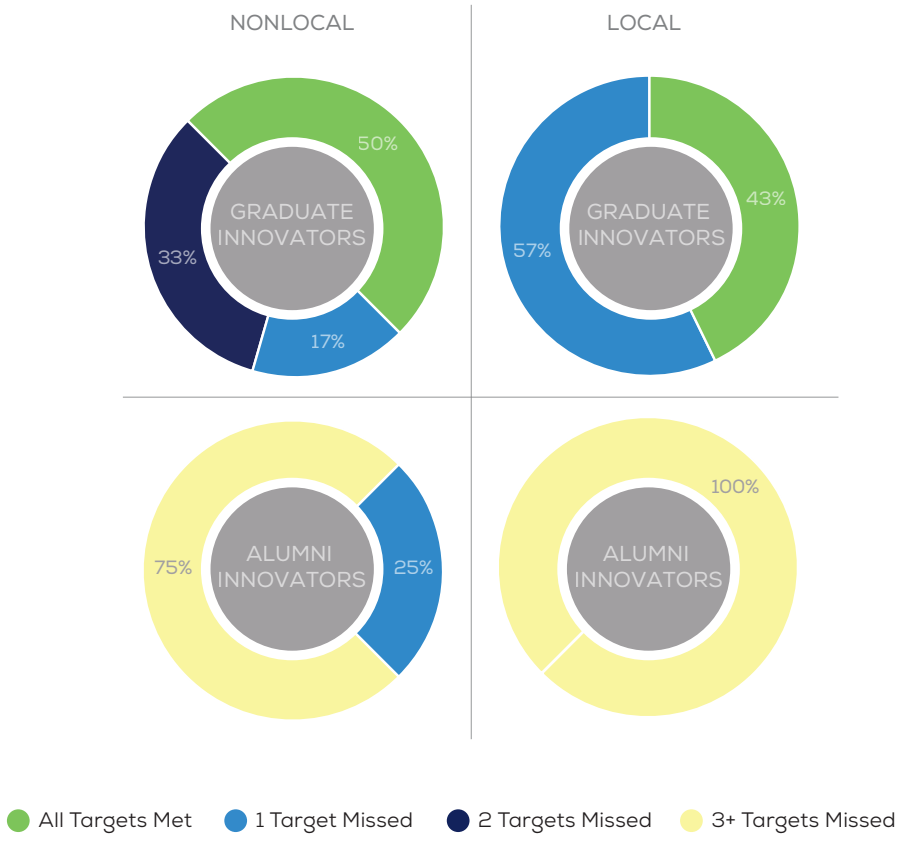
SWFF monitors progress through 25 program indicators, 10 of which are binding and used to decide whether innovators progress to the next year's funding. To progress, innovators are expected to achieve 80 percent of each binding target and miss targets in no more than two indicators. This general criteria is used to guide funding decisions, with an allowance for the Innovation Investment Advisory Committee (IIAC) and the Founding Partners to deviate from the recommendations where external circumstances have negatively impacted otherwise sound innovations.

When viewed according to the round in which innovators entered the program, graduate Rd. 3 innovators excel, with 86 percent meeting all targets or all but one target, as compared to 60 percent of graduate Rd. 1 innovators, who achieved the same. While all Rd. 3 alumni removed from the program missed three or more targets, only 60 percent of Rd. 1 alumni missed three or more targets.

The reason for this discrepancy is that the specific targets missed by Rd. 1 innovators were central to their inclusion in the program, and the shortcoming was deemed a serious one by the IIAC. It is likely that the program's shift toward innovators who are closer to commercialization resulted in fewer cases where one or two targets were the core of an innovator's success.

Only 12.5 percent of active Rd. 4 innovators met all targets or all but one, and 37.5 percent missed three or more in the Year 2 annual reporting period.

SWFF INNOVATORS' TARGET ACHIEVEMENT (2014 – 2019)
by origin



When categorized according to their origin, local innovators have on average achieved more of their targets to date than non-local innovators. Given the special circumstances surrounding the alumni who missed only one or two targets, it is unclear whether their origin played any role in their level of success.

SUMMARY OF TA FACILITY METRICS

The SWFF TA Facility structures its portfolios to address the following metrics: usage/uptake, technical capacity, financial sustainability, public awareness, and efficient management of milestone-based funds. The table beginning on page 46 summarizes TA Facility progress according to these metrics.

Overall, SWFF innovators' technical capacity has increased with assistance from the SWFF TA Facility. In Year 1, 86 percent of innovators demonstrated increased technical capacity as a result of SWFF assistance. That number rose to 96 percent in Year 2 and 100 percent in Year 3 - Year 5.

Uptake of SWFF innovations increased, with 100 percent of innovators showing at least a 20 percent increase in customer base from the previous year. The average level of documented evidence for SWFF innovators rose from 2.3 on a 5-point scale in Year 2 to 3.25 in Year 5, reflecting an increasing number of innovators that have demonstrated impact with real-world customers.

The TA Facility made significant improvements in many categories of acceleration support it provided to innovators, exceeding the target for promoter scores. On-time service delivery increased from 41 percent to 44 percent between Year 1 and Year 2, rising to a high of 93 percent in Year 3 before sliding down to 80 percent of services delivered on time in Year 4 and rising back up to 100 percent in Year 5.

TA FACILITY PROGRESS INDICATORS

TECHNICAL ASSISTANCE & SCALING	
1.2.1	Average Promoter Score received on innovator service delivery surveys
	The Promoter Score is a rating of how likely a given innovator is to recommend to other innovators the service they received on a 10-point scale from "Not at all likely" to "Extremely likely."
1.2.2	% of SOWs started and completed within the time frame agreed with the innovator during the support planning discussions
	Scopes of work (SOWs) that have a clearly defined time frame for delivery agreed upon when they are created. The TA Facility measures how many have been completed within the agreed-upon time frame.
1.2.3	% of SOWs with providers from emerging markets
	When SOWs are awarded, they are classified geographically to determine if the provider is based in the same region as the innovator being served. Target was set at 65% in Y3 to balance the goal of increased capacity of support delivery in emerging markets and quality of service delivered to the innovator, and increased over time.
1.2.4	% of innovators with increased technical capacity from SOWs
	Increased "technical capacity" is defined as: (a) technical improvements in the product/approach, (b) improvements in selling the product/approach to stakeholders (i.e., customers, investors, donors), (c) improved understanding of the needs of customers/stakeholders in a sustainable way, and (d) improvements to business processes and organizational structure. During quarterly calls the team determines if, after a SOW has been completed, the innovator has actually increased its technical capacity. If at least 50% of a given innovator's SOWs have increased its technical capacity, it is tallied as an overall success toward this indicator.
1.2.5	% of innovators with increased usage/uptake of SWFF innovations
	"Increased usage/uptake" is defined as an increase in the current customer base of at least 10% in a given year. "Customer base" is defined as both primary customers and associated family members/users. Innovators with a customer base (users) under 1,000 are not considered to have "increased."
1.2.6	% of SOWs where defined "desired outcomes" were met
	All SOWs have a section specifying measurable "desired outcomes" to be completed by the end of the engagement. The post-engagement survey includes the question "Did the service achieve the desired outcomes?" with a 5-point scale from "Not at all" to "Completely," with the target set at "4 – To a great extent" for a tallied success.
GRANTS & FINANCIAL MANAGEMENT	
2.1.1	% of innovators reporting positive effects of the pre-award survey (PAS) process on their organization
	Question: "Did the pre-award survey requirements have a positive impact on strengthening organizational, administrative, and financial systems?" (Answers: Yes/Neutral/No)
2.2.1	% of innovators with an increased rating of awardee financial systems from TA Facility (Acceptable/Operational/Advanced)
	Upon entering the SWFF program, innovators' financial systems are graded on a scale of Acceptable/Operational/Advanced. The % is calculated by tallying all innovators who have increased their rating with TA Facility assistance.

Y1 TARGET	Y1 ACTUAL	Y2 TARGET	Y2 ACTUAL	Y3 TARGET	Y3 ACTUAL	Y4 TARGET	Y4 ACTUAL	Y5 TARGET	Y5 ACTUAL	TARGET MET?
6/7	6.93	8/10	8.06	8/10	8.49	8/10	9.00	8/10	9	Yes
50%	41%	50%	44%	88%	93%	85%	80%	85%	100%	Yes
25%	21%	30%	30%	65%	56%	75%	75%	80%	88%	Yes
75%	86%	80%	96%	80%	100%	80%	100%	80%	100%	Yes
50%	62%	60%	81%	80%	80%	90%	100%	95%	100%	Yes
75%	50%	80%	88%	90%	84%	90%	100%	90%	100%	Yes
75%	65%	80%	100%	50%	92%	75%	n/a	n/a	n/a	Yes
0% of Acceptable move to Operational	0% of Acceptable move to Operational	25% of Acceptable move to Operational	100%	100% of Acceptable move to Operational	100%	100% of Acceptable move to Operational	100%	n/a	n/a	n/a
13% of Operational move to Advanced	13% of Operational move to Advanced	10% of Operational move to Advanced	10%	13% of Operational move to Advanced	31%	25% of Operational move to Advanced	74%	30% of Operation move to Advanced%	74%	Yes

TA FACILITY PROGRESS INDICATORS

MONITORING & EVALUATION	
3.1.1	Average level of evidence of SWFF innovators
	The level of evidence is a 5-point scale that tracks the degree to which outcomes can be attributed to an innovator intervention. Given that the current innovator average is 3, the target is set at 2.75 overall to factor in the new Rd. 4 innovators. For reference, the ratings for 2 and 3 are as follows: 2 - Capturing positive changes in outcomes, but unable to establish causal attribution; and 3 - Using a treatment and control group, a reasonable case for impact can be claimed when there is a direct relationship between an innovation and a known beneficial good with proper usage.
3.2.1	% of innovators using M&E data to advance their innovation or business
	Innovators are surveyed to determine whether their data collection for SWFF supports the following aspects of their business/ enterprise: publicizing impact, strategic decision-making, managing partners, customer analysis, sales/marketing, and others. Those that identify themselves as using their SWFF data collection to support any of the above uses are tallied as a success.
COMMUNICATION, VISUAL IDENTITY & PARTNERSHIPS	
4.1.1	# of LL/communication materials produced by TA Facility (including reports, stories, case studies, etc.) that are shared
	Lessons learned (LL) documents and communication materials shared with external audiences (e.g., the general public, donors, investors, other stakeholders) are tallied and disaggregated by type.
4.2.1	# of partnerships leveraged by TA Facility to address the critical barriers of the SWFF Grand Challenge
	Partnerships that serve more than one innovator or have a benefit that is determined to be program-wide by the USAID COR are counted. Rapid Vendor Procurement Mechanism vendors are not counted, unless they provide a pro bono/discounted service.
4.2.2	% of innovators with increased partnerships
	Innovators who increase the number of partnerships due to acceptance into the SWFF program, or during the SWFF program, are tallied. Those with partners where a prior ongoing working relationship existed are not counted.
4.2.3	$ and % of outside funding beyond SWFF award funding
	Outside funding is counted from both public and private sources, from both in-kind and cash equivalents.
TA FACILITY ADMINISTRATION	
5.1.1	% of innovators that rate TA Facility responsiveness at 6/7
	Overall TA Facility responsiveness will be rated on a 7-point scale from "Very unresponsive" to "Very responsive." Target: 80% of innovators rate the TA Facility at a 6/7 or higher.
5.1.2	% of innovators that rate TA Facility understanding of innovator needs at 6/7
	Overall TA Facility understanding of innovator needs is rated on a 7-point scale from "Very poor" to "Very good." Target: 80% of innovators rate the TA Facility at a 6/7 or higher.
5.1.3	% of innovators that rate TA Facility as helpful toward innovator goals at 6/7
	Overall TA Facility helpfulness toward innovator goals is rated on a 7-point scale from "Very unhelpful" to "Very helpful."
5.2.1	$ value of volunteer services/$ value of paid services (ratio)
	The value of free services and the value of discounts are compared to the value of paid services provided through the SWFF Rapid Vendor Procurement Mechanism. Note: Metric discontinued due to change in USAID instruction.

Y1 TARGET	Y1 ACTUAL	Y2 TARGET	Y2 ACTUAL	Y3 TARGET	Y3 ACTUAL	Y4 TARGET	Y4 ACTUAL	Y5 TARGET	Y5 ACTUAL	TARGET MET?
1.50	1.65	2.0	2.25	2.75	3.3	2.9	3.46	3.2	3.25	Yes
n/a	n/a	80%	86%	80%	92%	80%	100%	80%	100%	Yes
16	22	75	124	175	216	75	158	75	197	Yes
2	3	2	2	1	1	n/a	n/a	n/a	n/a	n/a
50%	75%	50%	45%	50%	54%	75%	100%	100%	86%	No
$3,000,000 120%	$6,092,064 254%	$7,000,000 140%	$10,600,000 163%	$12,000,000 175%	$13,271,923 135%	$13,000,000 200%	$20,140,057 131%	$14,000,000 n/a	$22,222,000 n/a	Yes
80%	95%	80%	100%	80%	92%	80%	100%	80%	100%	Yes
80%	75%	80%	95%	80%	92%	80%	100%	80%	100%	Yes
80%	79%	80%	76%	80%	84%	80%	100%	80%	100%	Yes
0%	0%	5%	4%	25%	0.00%	n/a	n/a	n/a	n/a	n/a

The "Big Stomach": Turning Waste Into Energy

When Vianney Tumwesige sees a blue flame in the kitchen of a farmhouse in Uganda, he gets a little giddy. There's a good chance the gas fire comes from one of his "big stomachs." The big stomach is Tumwesige's term for the digester he and his team came up with to turn organic waste into fuel and fertilizer, firing cooking stoves and nourishing crops. Tumwesige is the founder of Green Heat International, a for-profit company with a mission of helping farmers improve their crop yield while at the same time bringing a clean-burning fuel to their households.

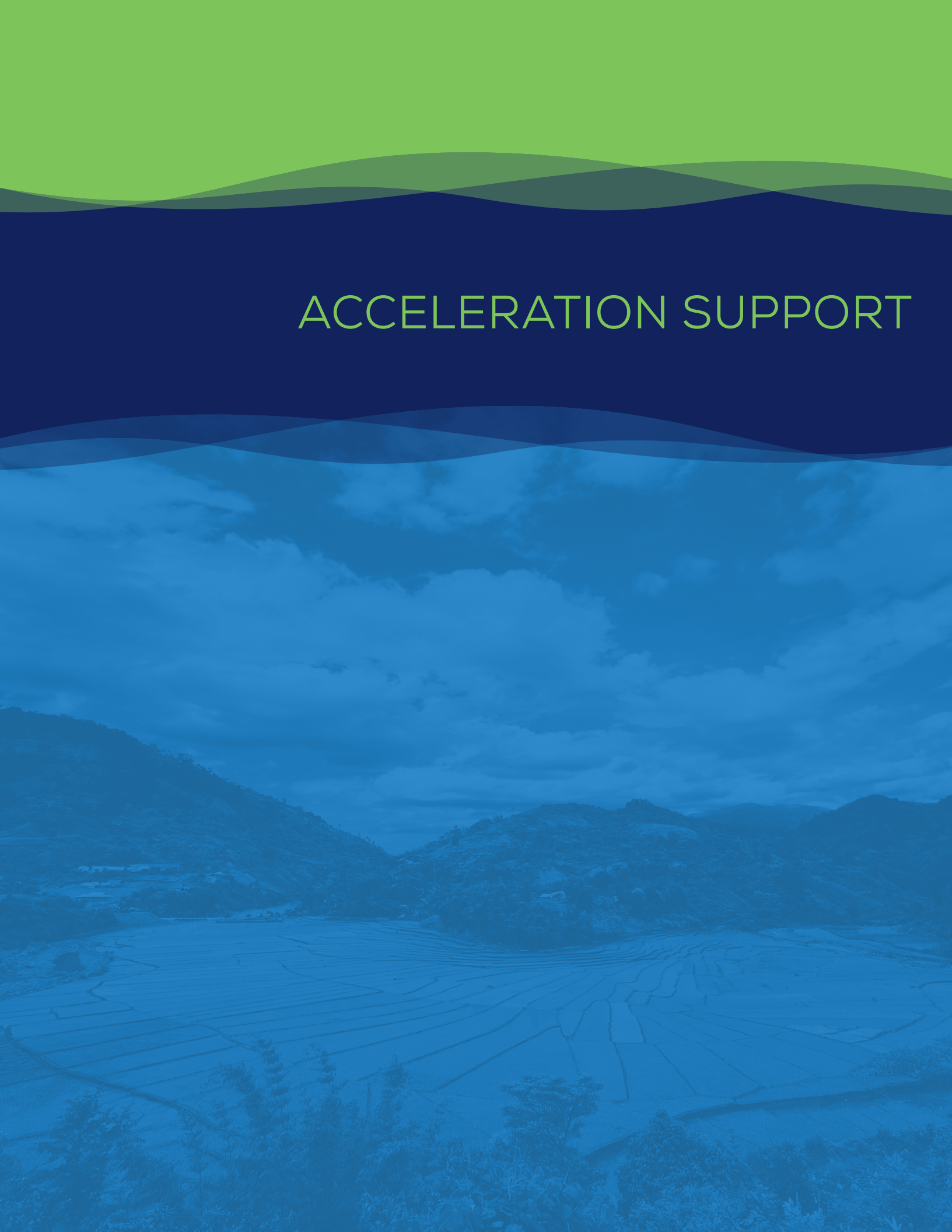
In Uganda, the use of other biogas resources has meant that citizens don't have to purchase wood for fuel. Wood was previously being used in 90 percent of households and was becoming scarcer and more expensive. "I love to see that blue flame," said Tumwesige. "That means organic waste is being used for cooking, piped in through the digester near the house."

Organic waste is waste from any biodegradable organism, from banana peels and paper to human and livestock waste. All types of organic waste are fed into the digester. There was only one problem with the original technology: it needed too much water to mix with the organic waste, and farmers – who are mostly women – found it was inconvenient to haul 80 liters of water each day. "We found that while we had solved an energy problem, we had created another problem – a water problem," said Tumwesige. "We went back to the drawing board and figured out how to separate and reclaim the water."

Tumwesige explains the entire process this way: "The stomach (digester) is airtight, so it gives the right conditions for bacteria to produce gas, which is fed through a pipe into a family's kitchen. When it is not flowing into the kitchen as gas, it decomposes. We separate the water so the solid waste remaining can be used as fertilizer. It's a natural fertilizer and doesn't harm or deplete the soil."

The digesters now use 80 percent less water than previously and Green Heat has installations in other African countries and as far away as Haiti in the Caribbean. Green Heat has installed more than 1,200 units and offers support for six months after installation. The cost of the know-how and equipment includes a one-time charge of $1,000 for a family of six, which provides about six hours of cooking a day. The larger models cost $500 more. "The process is becoming more and more acceptable," said Tumwesige. "One might think there would be a reluctance to produce energy from waste products, but there's not. If farmers have cheap fertilizer and cooking gas, they are happy."

ACCELERATION SUPPORT



OVERVIEW AND ANALYSIS

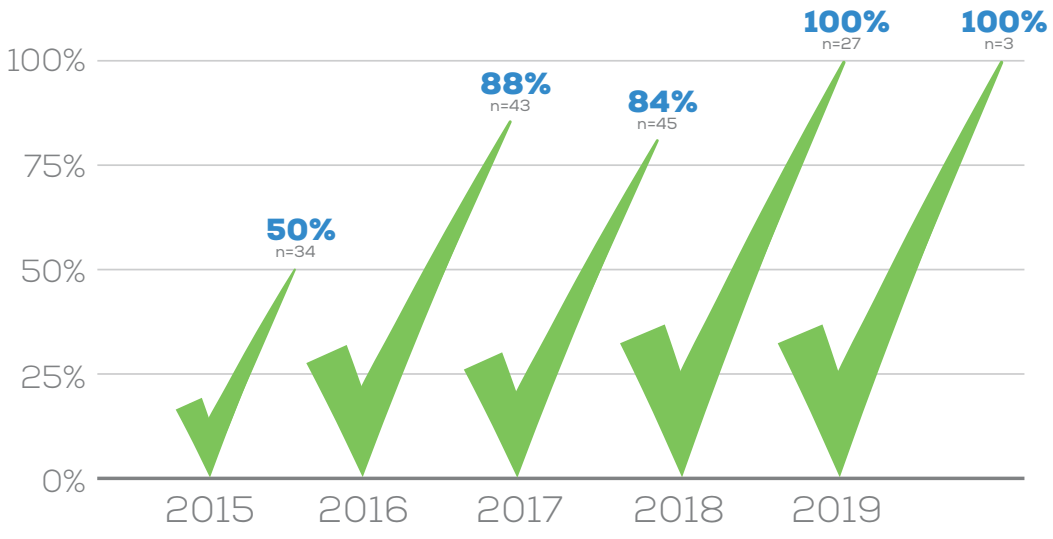
SWFF provides acceleration through three lines of support: the SWFF TA Facility, USAID and its partners, and the Rapid Vendor Procurement Mechanism. An increasing number of vendors in the RPVM are based locally, reflecting innovators' preference for support providers that can offer local/country context and knowledge. Approximately 60 percent of the vendors in the system are now local.

Since its inception, the TA Facility has delivered 152 business service engagements directly to innovators, with an additional 10 engagements to be completed by the end of the 2019 reporting period. The total value of business service engagements completed to date, plus those in process or planned for 2019, is approximately $1.558 million.

Short-term success and long-term value of SWFF technical assistance

The TA Facility assesses both short-term success and long-term value of each support engagement. Short-term success is determined simply by answering the question "Did the innovator receive what it expected to receive from the acceleration support?"

PERCENTAGE OF SUPPORT ENGAGEMENTS MEETING INNOVATOR EXPECTED OUTPUTS (2015 – 2019)



n = total number of engagements evaluated

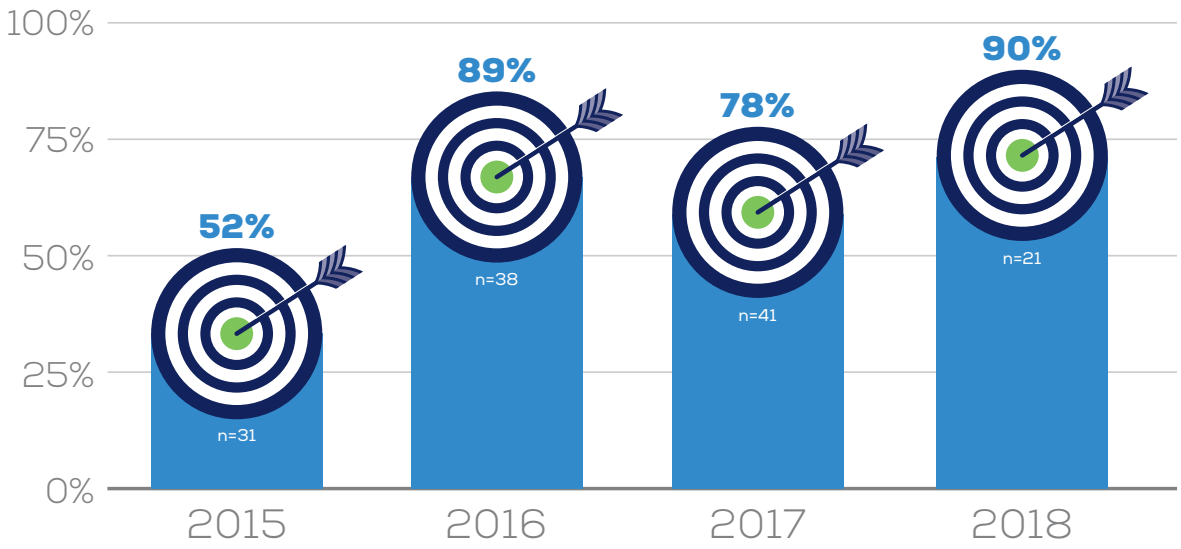
Source: SWFF Scope of Work Tracker

In 2015, only 50 percent of business services delivered by the TA Facility met innovator expectations. In 2016, 88 percent did so. In 2017, 84 percent of completed support engagements met expectations. With 27 support engagements completed in 2018, 100 percent met innovator expectations. Thus far in 2019, three engagements have been completed, with all of them meeting innovator expectations. (Note: For many charts in the Acceleration Section, the number of support engagements in 2018 and 2019 is lower than all other years because Rd. 1 and Rd. 3 innovators have graduated, with very few continuing to receive technical assistance.)

The improvement in meeting expectations is likely a result of enhancements made to the acceleration support planning process in Year 2, when SWFF introduced and implemented the Innovator Needs Diagnostic Tool. That tool, which has been used since then, systematically identifies organizational, strategic, and operational gaps at the beginning of the acceleration support process. It enables a highly focused support discussion with the innovator and results in very specific support goals and expected outcomes.

The TA Facility also revised the work plan template in Year 2. Before delivering acceleration support, the TA Facility uses the template to document specific activities, deliverables, assumptions, and stakeholder commitments. The work plan now itemizes what is and is not in the scope of the project to ensure its proper orientation and clearly outlines time commitments expected from innovator staff and the support provider. The revised template allows the Acceleration Facilitator to play a more proactive role in focusing the work plan for greater specificity and clarity. SWFF made these changes with the intention of removing ambiguity in deliverables and increasing the likelihood innovators will receive the services they expect.

PERCENTAGE OF SUPPORT ENGAGEMENTS LEADING TO VALUABLE INNOVATOR OUTCOMES (2015 – 2018)



n = support engagements

Source: SWFF Scope of Work Tracker

As the program has progressed, innovator feedback has indicated that top-performing vendors have delivered an increasing number of planned business service engagements – more than other vendors. Therefore, a higher percentage of all engagements have been delivered by the highest-quality vendors. Also, the top-performers were competing and being selected for subsequent engagements with innovators they had previously assisted. In those cases, the prior experience increased continuity with the innovator and enabled the vendor to deliver assistance from a deep base of knowledge of the innovator's goals and the challenges they faced. This is likely a strong contributor to the 100 percent scores in 2018 and 2019.

A support engagement is rated as a long-term success if the innovator adopts and applies services and advice delivered and if the support results in recognized valuable outcomes such as a shift in strategy, an effective partnership, additional funding, new financial forecasting capabilities, or an improved manufacturing approach or product design. In 2015, only 52 percent of TA Facility support engagements resulted in long-term success. In 2016, long-term success rose to 89 percent.

For 2017, the program-wide assessment found that long-term success remained strong, at 78 percent. The drop from 2016 was related primarily to two issues. First, SWFF made several connections to third parties that did not lead to valuable partnerships. Second, some innovators believed that SWFF advisory sessions on business model enhancements to improve gender equality outcomes, though highly useful, were too brief to influence long-term thinking in those areas.

In 2018, gender advisories were scoped to assess specific opportunities over a longer period of time. Innovator feedback for those engagements has been much more positive overall. Scopes of work to assess specific opportunities for gender impact provide more tangible outputs and insights based on a deeper dive into the context and objectives. With nearly 80 percent of 2018 engagements reporting on

PERCENTAGE OF SUPPORT ENGAGEMENTS DELIVERED BY PROVIDERS BASED IN AFRICA AND ASIA (LOCAL, 2015 – 2019)

n = support engagements

Source: SWFF Scope of Work Tracker

longer-term impact, indications are that long-term value delivered is improving. Of the current number of support engagements reporting, 90 percent cite long-term impact. This likely coincides with the improvements in the short-term outcomes with improved scoping, better defined expectations from the beginning of an engagement, and greater consistency in the quality of service provider delivering the work.

It makes sense that SWFF innovator uptake has improved since 2015 as a result of TA Facility advice, because with each passing year the SWFF TA Facility gains a deeper understanding of each innovator and the local context in which it operates. As a result, support providers have become more aware of potential root causes of challenges in scaling. In some cases, promoting support engagements that can address those root causes increased the Acceleration Facilitator's credibility as a proactive adviser who can more consistently meet innovator expectations and have an impact.

Innovator satisfaction: local vs. non-local vendors

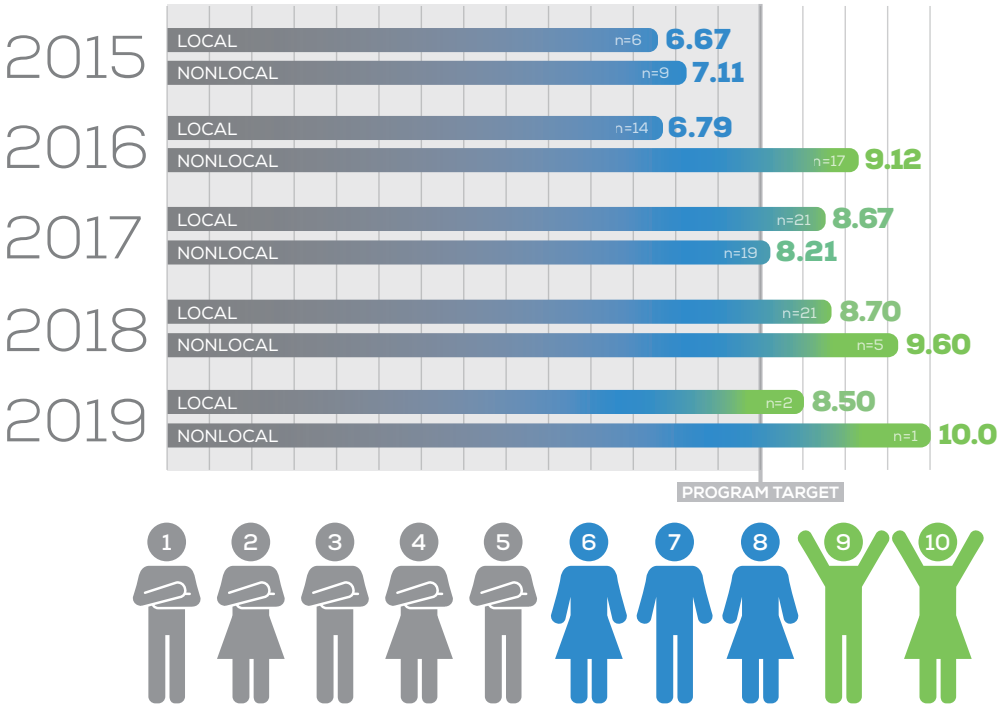
Because the SWFF Founding Partners believe support provided by local vendors is more valuable than support delivered from a distance by a vendor with limited or no firsthand experience in-country, the TA Facility has worked to increase the number of local vendors in the Rapid Vendor Procurement Mechanism where possible. For SWFF purposes, a vendor is considered local if it is based in Africa or Asia, where most innovators operate.

Currently, more than half of SWFF's Rapid Vendor Procurement Mechanism vendors are based in regions where innovators operate. In 2015, local providers accounted for 21 percent of SWFF business service engagements. In 2017, that percentage more than doubled, to 56 percent. Seventy-eight

AVERAGE PROMOTER SCORE, BY YEAR (2015 – 2019)

local and nonlocal providers

likelihood an innovator would recommend a service provider to other SWFF innovators
(1 = would not recommend, 10 = would highly recommend)



n = total number of local and nonlocal support engagements

Source: Post-support engagement innovator feedback surveys

percent of the business service engagements in 2018 were delivered by local providers. With vendors now determined for eight out of 13 expected support engagements in 2019, 88 percent of those engagements are being or will be delivered by a locally based vendor.

In the fourth year of emphasizing local support, two metrics (promoter scores and innovator satisfaction with support received) confirm the strength of local vendors. Promoter scores indicate the degree to which SWFF innovators would recommend a provider to other SWFF innovators. Based on innovator feedback surveys, the average 2018 promoter score for local vendors is 8.70 out of 10. This rating far exceeds the local vendor promoter score of 6.67 in 2015 and is slightly above the previous high score of 8.67 in 2017.

With just 3 out of an expected 13 support engagements completed in 2019, local vendor promoter scores remain strong, at an average of 8.50, and continue to exceed the program target of 8.00. The significant improvement from 2015 reflects the staying power of the strongest local providers and the removal of providers that were not performing to SWFF innovators' satisfaction. Promoter scores for non-local vendors are strong, at 9.12 (2016), 8.21 (2017), 9.60 (2018) and 10.0 (2019).

Local and nonlocal vendors as a group, on average, are meeting or exceeding SWFF program promoter score targets. SWFF believes this is due to the expanded network of local vendors covering a significant proportion of TA Facility support services. The expanded network has improved overall alignment between innovators' business needs and support providers' expertise and regional knowledge.

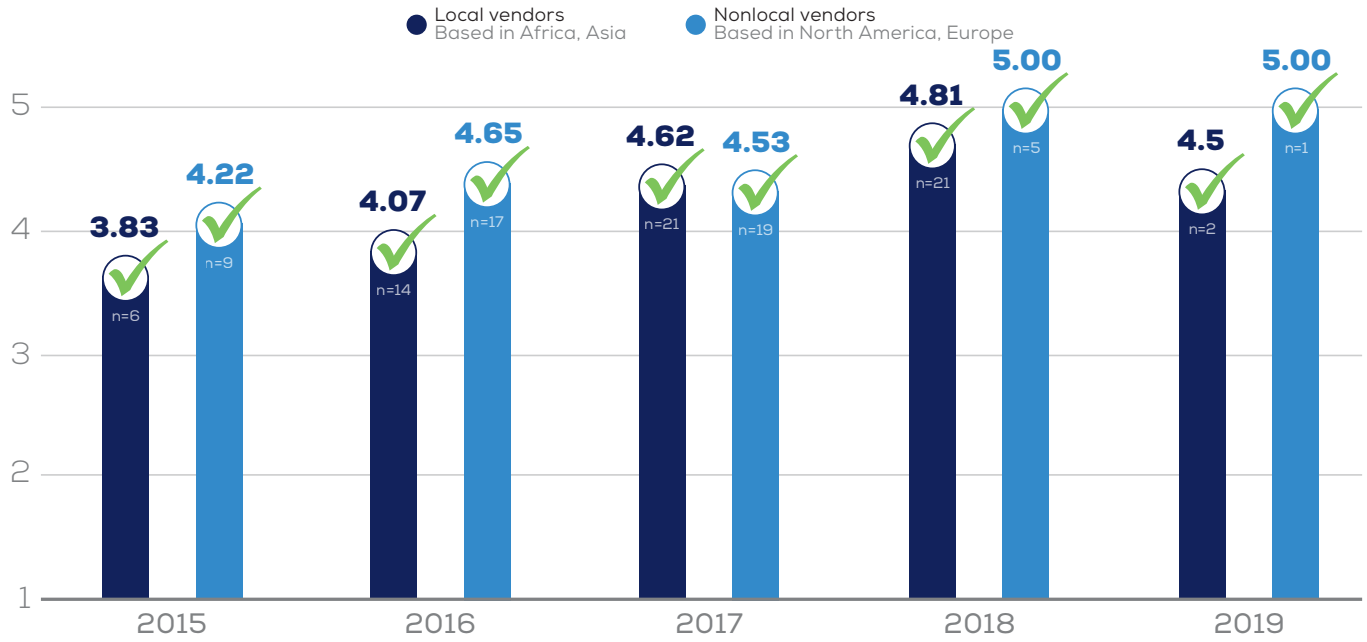
Additionally, in some cases, vendors win repeat business service engagements with individual innovators and as a result are able to work from a foundation of trust and rapport and with a body of previously established knowledge. Nonlocal vendors continue to excel in support categories such as business model development and marketing materials design, including website and infographic development, for which local context is less critical.

A similar trend exists in overall innovator satisfaction with support received. Satisfaction with support delivered by local vendors has increased steadily since 2015. Overall satisfaction with support delivered by local vendors in 2015 was 3.83 out of 5.00. In 2018, overall satisfaction with locally delivered support was 4.81. With three of 13 support projects completed thus far in 2019, overall satisfaction remains strong, at 4.50.

Overall satisfaction with support delivered by non-local vendors also has improved throughout the life of SWFF. While only one engagement has been completed to date in 2019, the trend of perfect overall satisfaction scores from 2018 related to support delivered by non-local vendors continues.

Other TA Facility adjustments that may be favorably impacting scores for both local and nonlocal vendors include: Innovators now participate in the final selection of the vendor that works with them. Each innovator has the opportunity to interview the top two or three vendors selected in a two-phase proposal evaluation process. Through this exercise, innovators learn about the expertise each vendor brings to the assignment, assess each vendor's knowledge of the marketplace, and gauge their ability to work well with the vendor.

AVERAGE OVERALL SATISFACTION SCORE BY YEAR (2015 – 2019)



n = total number of local and nonlocal support engagements

Source: Post-support engagement; innovator feedback surveys

Beginning in Year 2, the Acceleration Facilitator took a more active role in ensuring each support engagement work plan drives toward greater specificity. A stronger emphasis on specificity led to a more realistic expectation of the time commitment required of each innovator's internal team and reduced the risk of misaligned expectations regarding deliverables.

As mentioned above, after several years with SWFF, some vendors now have worked with individual innovators on multiple engagements. This leads to a vendor's deeper understanding of the innovator's goals and, for the innovator, builds trust and confidence in the vendor over time.

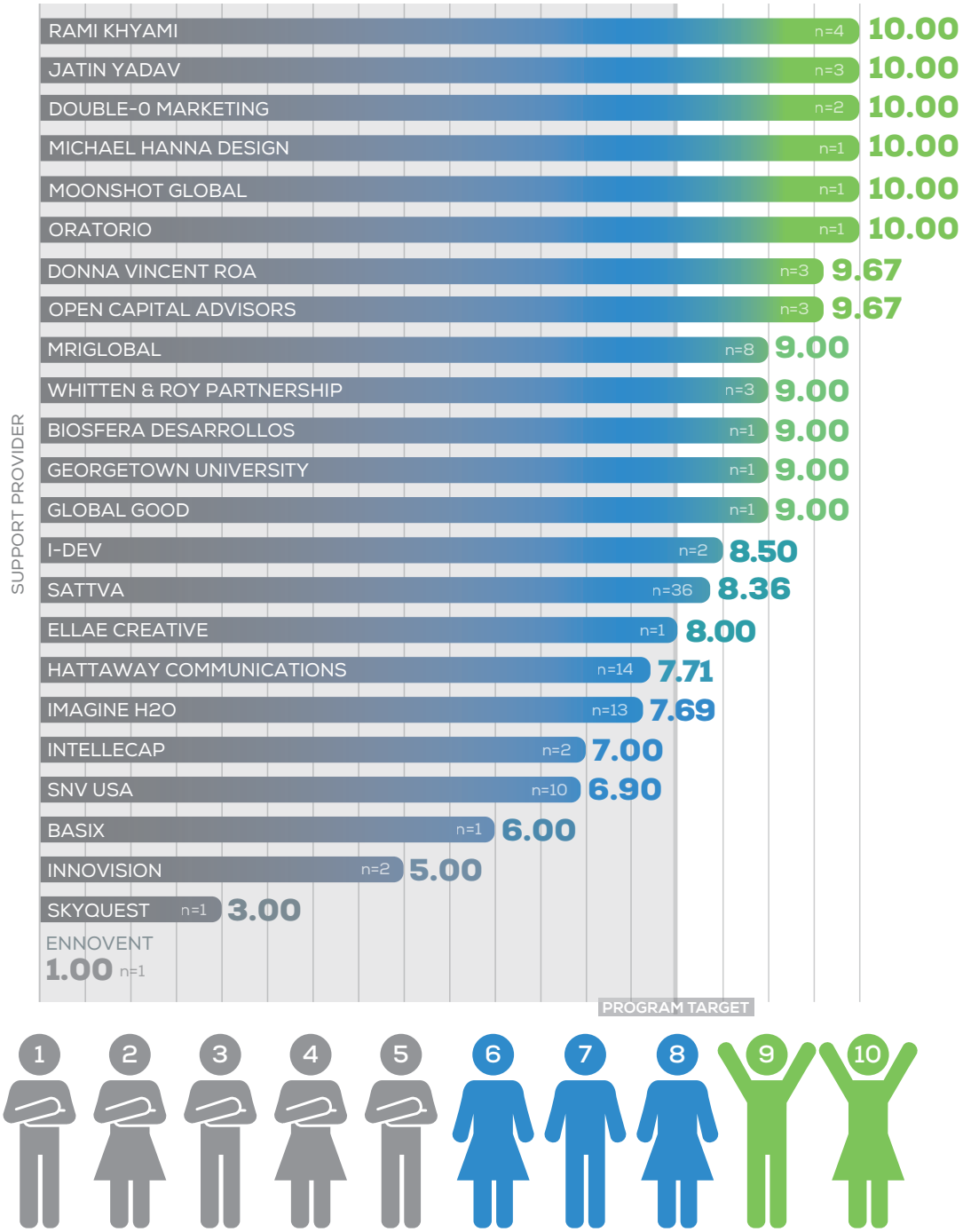
The TA Facility has made one additional change that is expected to assist in maintaining high satisfaction scores. Vendor proposal reviews and the innovator interviews of finalist vendors will include a check on their study of the innovator background material available to them, so that they come to the table with a foundation of knowledge for a rapid and informed start.

Emerging high-performance vendors

With more than 150 business service engagements completed since 2015, certain vendors stand out in terms of the degree to which innovators recommend them to other innovators. For example, when considering only vendors that have delivered at least three support engagements, seven out of ten of them average promoter scores higher than the program target score of 8.00 out of 10.00.

PROMOTER SCORE BY VENDOR ACROSS ALL SUPPORT CATEGORIES (2015 – 2019)

likelihood an innovator would recommend a service provider to other SWFF innovators
(1 = would not recommend, 10 = would highly recommend)

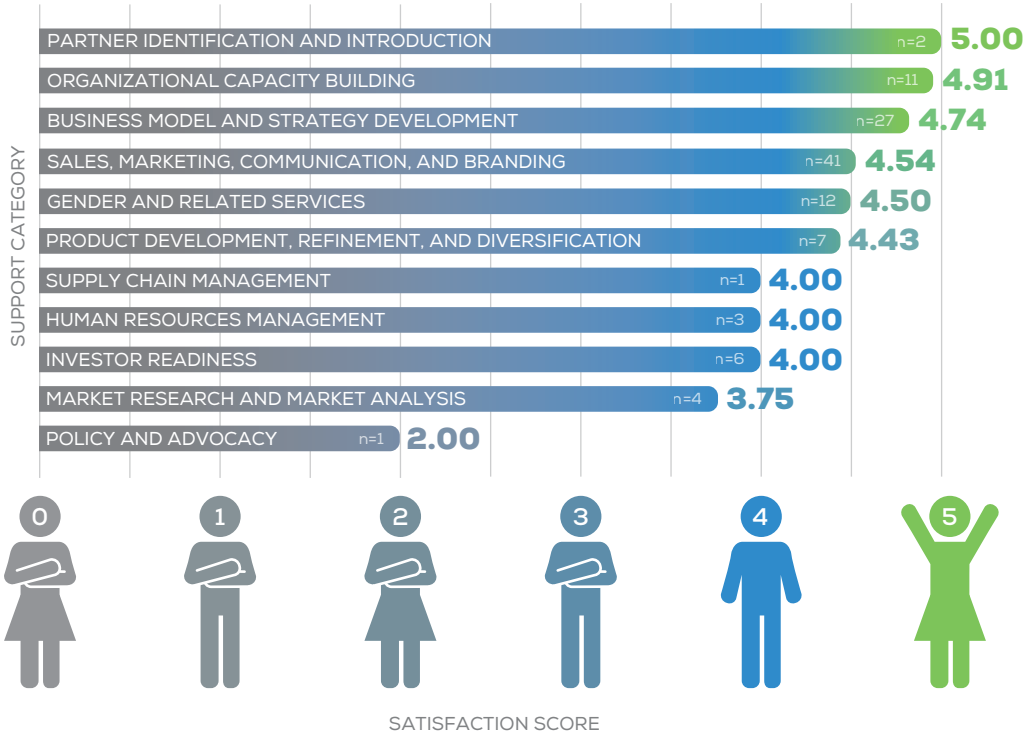


n = support engagements

Source: Post-support engagement; innovator feedback surveys

AVERAGE OVERALL SATISFACTION SCORE BY SUPPORT CATEGORY (2015 – 2019)

how satisfied the innovator is with the acceleration support delivered
(1 = very dissatisfied, 5 = very satisfied)



n = support engagements

Source: Post-support engagement; innovator feedback surveys

When looking at the vendor pool as a whole without considering the number of support engagements, 16 vendors have received scores exceeding the 8.00 goal. These higher promoter scores may in part be a result of improvements the TA Facility made to support delivery as noted above, with associated higher target scores for support providers.

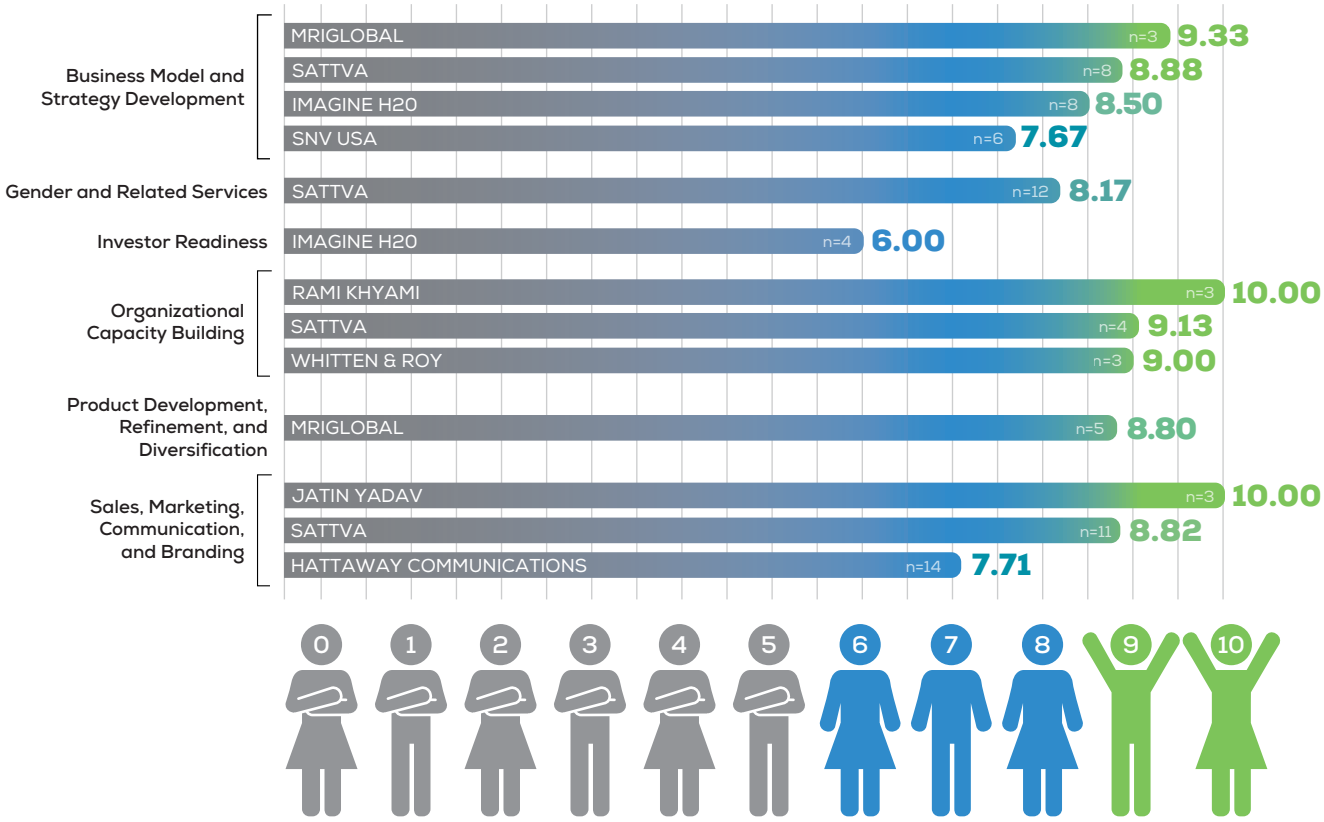
Rami Khyami, Grant & Financial Specialist for the TA Facility, earned a perfect promoter score of 10 across the four support engagements he delivered. Jatin Yadav also earned a perfect score across the three engagements he delivered. Double 0 Marketing has provided excellent support in creating infographics and websites, also earning a perfect 10 promoter score. Dr. Donna Vincent Roa, the SWFF TA Facility Chief of Party, earned a 9.67 promoter score across a variety of support engagements delivered. MRIGlobal, which transitioned from the TA Facility Consortium to the Rapid Vendor Procurement Mechanism, earned an average promoter score of 9.00 across all engagements it delivered. Whitten & Roy Partnership also earned an average score of 9.00 across the instances of sales support it delivered. Sattva, a consulting firm based in India, earned an average promoter score of 8.36 across the 36 support engagements it delivered.

With a substantial number of support engagements delivered during the past four years through the TA Facility, SWFF now can identify specific support services emerging as strengths within the program's support-provider network.

PROMOTER SCORE BY CATEGORY AND VENDOR (2015 – 2019)

minimum of three engagements delivered by vendor in a support category

likelihood an innovator would recommend a service provider to other SWFF innovators
(1 = would not recommend, 10 = would highly recommend)



n = support engagements

Source: Post-support engagement; innovator feedback surveys

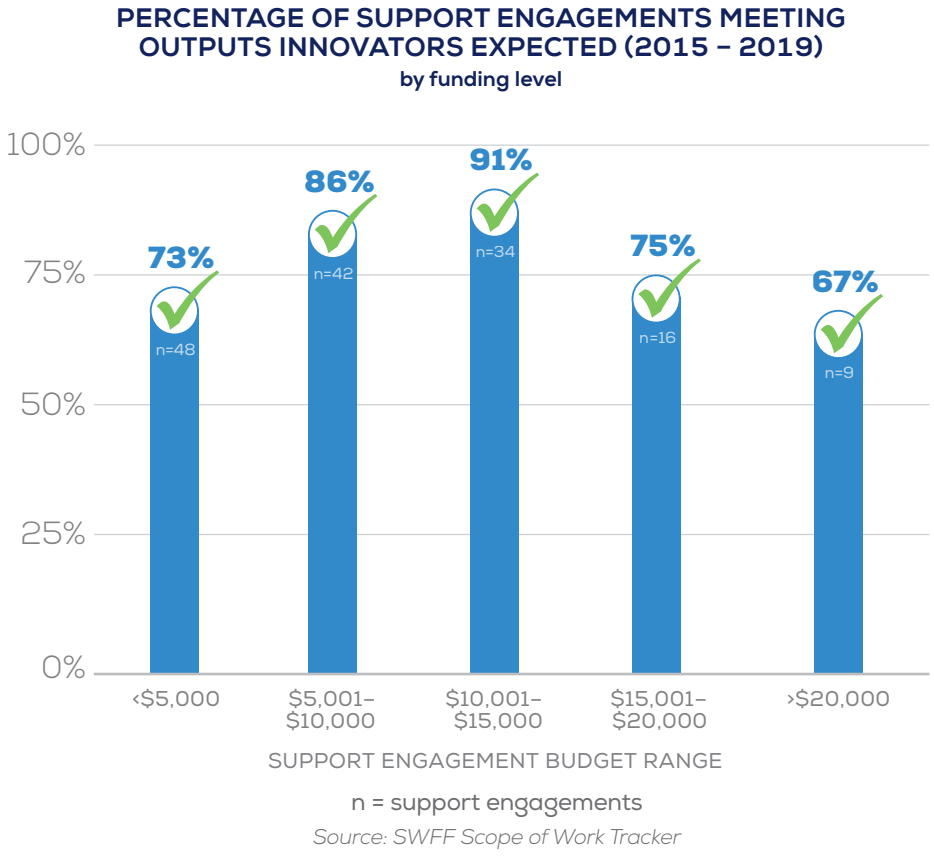
For the following service categories, the TA Facility has delivered at least three engagements and innovators report being "somewhat satisfied to very satisfied": Organizational Capacity Building; Business Model and Strategy Development; Sales, Marketing, Communication, and Branding; Gender and Related Services; and Product Development, Refinement, and Diversification.

On average, innovators report they are "somewhat satisfied" with support received in the categories of Investor Readiness and Human Resources Management. Service categories with a long track record of success (more than 10 engagements delivered, overall satisfaction score of at least 4.50 out of 5.00) include Organizational Capacity Building; Business Model and Strategy Development; Sales, Marketing, Communication, and Branding; and Gender and Related Services. The TA Facility considers those to be SWFF's core strengths when it comes to the services vendors offer to innovators.

Specific support providers are emerging as leaders within certain categories. Sattva and Imagine H2O stand out for their support in Business Model and Strategy Development; Sattva also brings strong capabilities when delivering Gender and Related Services; Organizational Capacity Building; and Sales, Marketing, Communication, and Branding. MRIGlobal is a highly recommended provider for Product Development, Refinement, and Diversification engagements.

Support-engagement size and scope

The SWFF TA Facility looks at success rates of support engagements to determine whether the rates of short-term or long-term successes vary in relation to the following support engagement budget ranges: $5,000 and under; $5,001 to $10,000; $10,001 to $15,000; $15,001 to $20,000; and over $20,000.

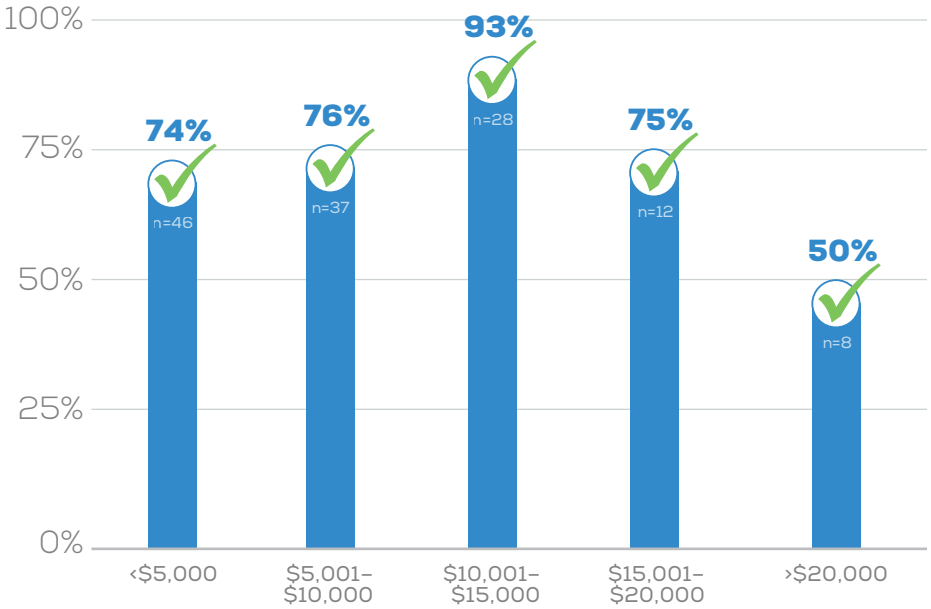


Source: SWFF Scope of Work Tracker

SWFF found the strongest success rates for both short-term expectations and long-term value occurred with support engagements budgeted at $10,001 to $15,000. Engagements in this budget range successfully met short-term expectations 91 percent of the time, while also delivering on long-term value 93 percent of the time.

Innovators at the early stages of commercializing and scaling cannot afford to miss on the impact of support on their businesses. Proper needs identification and support scoped correctly and delivered in a timely manner are critical. Given SWFF's experience working with innovators at all budget levels, the organization determined that defined and focused projects with budgets of $10,001 to $15,000 are large enough to comprehensively meet well-scoped innovator needs in a relatively short time but not so large that objectives are too complex and outcomes more difficult to tie to the support received.

PERCENTAGE OF SUPPORT ENGAGEMENTS LEADING TO MEANINGFUL CHANGE IN INNOVATOR OUTCOMES (2015 – 2019)
by funding level



n = support engagements

Source: SWFF Scope of Work Tracker

The next most effective engagements fell within the $5,001 to $10,000 budget range. Engagements in this range met innovator expectations 86 percent of the time, while delivering meaningful long-term value 76 percent of the time. SWFF hypothesizes that these engagements likely were successful because they were tightly focused on a very specific objective – such as development of a business model canvas, a website, or an infographic that could be completed quickly for a short-term result.

Engagements budgeted above $20,000 were the least successful. SWFF believes these projects were too complex and too time-consuming to see short-term results. Also, in a startup environment, entrepreneurs need quick wins to meet milestones and build momentum for success. With this lesson learned, the TA Facility now breaks up larger scopes of work into smaller, sequenced support plans to ensure that the innovator receives value at an accelerated rate.

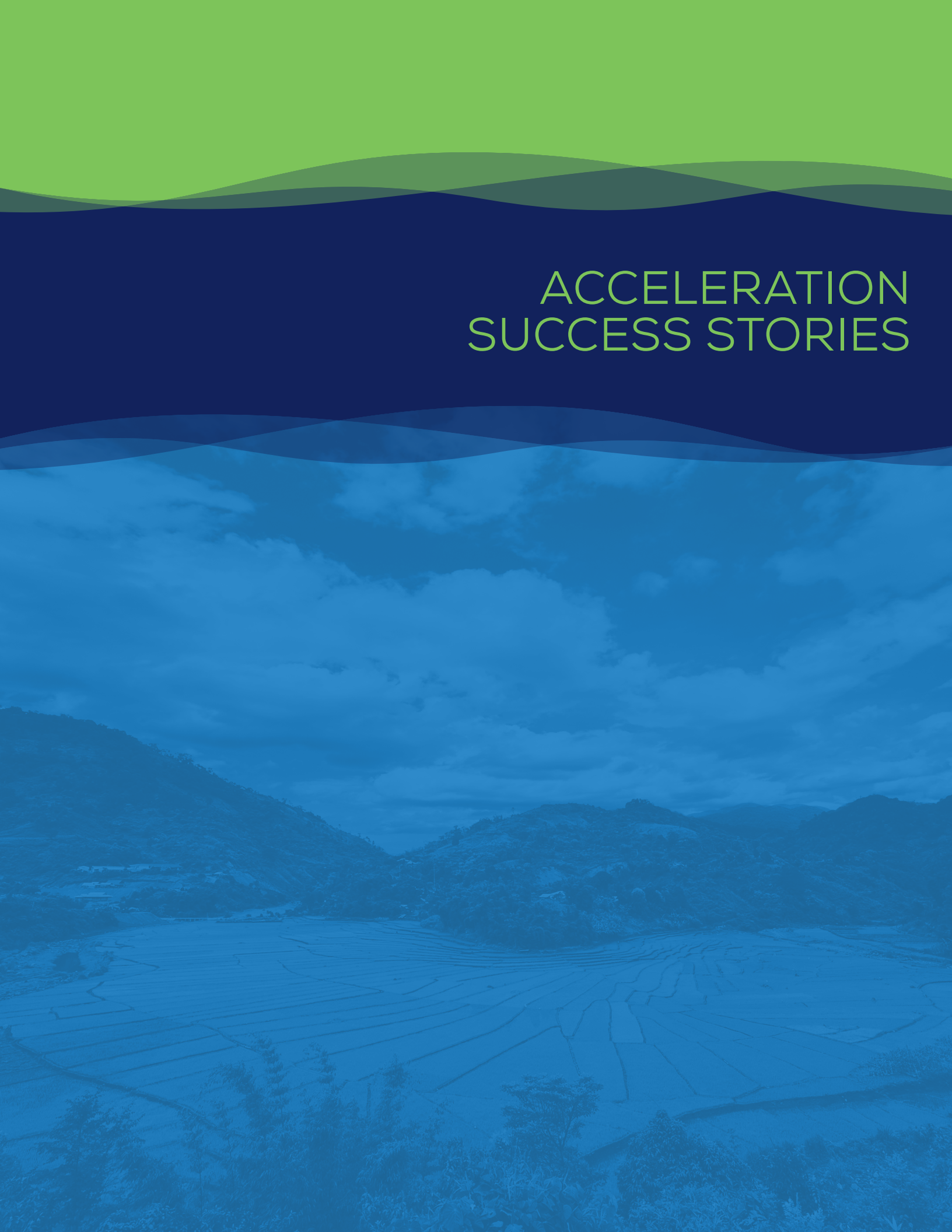
Roadmap of support guides innovators' tenure with SWFF

Drawing on this experience, the TA Facility is building and providing a roadmap of support that paints a clear picture of organizational development and guides each innovator's tenure with SWFF. In the first year, SWFF supports and helps solidify an innovator's foundational business requirements. During this period, each innovator generally receives business model support to either create a business model canvas or review its existing business model for opportunities to integrate other pieces of the value chain and better appeal to customers' interests. In Year 1, SWFF frequently provides support focused on customer validation to ensure that the innovator has an accurate understanding of the target customer profile and proper customer segmentation.

Often, in the second and third years of an award, innovators receive support in sales and marketing. As a result of the business model support, innovators better understand how customers want to be engaged and which problems must be solved. Sales and marketing support includes assistance with drafting and piloting strategies, refining the strategy over time, and providing sales training to the innovator's staff.

Drawing on lessons learned from the many times SWFF has delivered these kinds of support, the TA Facility developed core offerings for each service support category that can be tailored to the specific needs and context of each innovator. SWFF has learned that, for an innovator to be successful, at least 20 percent of the support provided should be contextualized to the specific needs of the innovator. The greatest value of this evolved suite of support services is that it provides each innovator with a clear picture of the benefits it will receive while collaborating with SWFF's Acceleration Facilitator, which makes it more likely the engagements will lead to realization of the innovator's goals.

ACCELERATION SUCCESS STORIES



ITIKI Builds Rigor Into Business Model Reviews And Pivots

The TA Facility highly recommends that all innovators entering the SWFF program receive a business model canvas and strategy planning exercise as one of their first support engagements. The TA Facility believes this initial support helps to set up the innovator to maximize their success within the program. The business model canvas support helps an innovator formulate and document the early hypotheses upon which they are building their business. This exercise provides the innovator a path for commercializing and scaling. As the hypotheses documented in the business model canvas are applied and tested in the marketplace, the innovator learns what is working and what is not and what components of its business model need to shift and pivot.

ITIKI, now an independent business spun off from the Central University of Technology, Free State, combines indigenous knowledge and weather indicators with weather station data to provide highly localized weather forecasts and farming guidance through an SMS service. ITIKI leveraged the business model canvas advisory provided by the TA Facility through Imagine H2O to define a foundational understanding of its business.

With guidance from Imagine H2O, Muthoni Masinde and her team at ITIKI took a disciplined approach to working through high potential customer segments and reaching them with marketing and communications efforts; the various revenue streams the company should pursue; and the anticipated expenses of service delivery, among other business model components. Imagine H2O also built a financial forecasting tool, enabling Muthoni to experiment with different values for key input parameters to see how specific shifts would impact the bottom line. As a result of this assistance, Muthoni's team is applying rigor and discipline to the development of their business. It was from this support engagement that the idea of an ITIKI Ambassador was born as a core component of the business selling strategy.

Muthoni says, "The business model canvas came at a critical time for ITIKI and has been instrumental in focusing our strategic decision-making. This was a 10 out of 10 derivable and should give us a great chance of succeeding."

Hydroponics Africa Becomes Investable And Creates Markets For Its Customers

Hydroponics Africa received investments from the Kenya Climate Innovation Center (KCIC) in the form of a $60,000 grant and a $350,000 loan. The KCIC is funded by the governments of the United Kingdom and Denmark.

Investing in a new venture always comes with risk. "One of the challenges with early-stage entrepreneurs is that just because they have a good idea doesn't make them good business people," says Felix Magalu of KCIC. "There is a big difference between a company with a unique product and a company that is 'investable.'" When it came to Hydroponics Africa, KCIC wanted to make sure the entrepreneur, in this case, Peter Chege, had a viable business model, a track record, "and could look to the future and see the horizon."

For KCIC, Hydroponics Africa's involvement with SWFF and the technical assistance it had received helped to ensure that the company had dotted the "i"s and crossed the "t"s in terms of the entrepreneur's financial accountability. In Chege's view, the technical help made his innovation "much more sophisticated and investable."

SWFF, through Rapid Vendor Procurement Mechanism vendor, Sattva, specifically focused on addressing the business model: smallholder farmers' ability and willingness to make the capital investment in the hydroponics units without financing assistance. Hydroponics Africa must demonstrate to the customer that a profitable market exists for the farmers' produce, with a compelling return on investment. Sattva assessed the opportunity for and financial viability of a contract farming model, which would relieve the customer from the burden and uncertainty of building a market for the produce. Hydroponics Africa would share the risk with its contract farming customers, rather than asking the farmers to assume all the risk. Hydroponics Africa has now entered into supplier contracts worth approximately $300,000 annually. And with a customer base for the produce established, banks are more willing to lend to the farmers. "With contracts in place, the banks were more confident that the farmers would be able to turn a profit and be able to pay back their loans. As a result, it was easier for farmers to secure financing," said Chege.

Water Governance Institute Refines Its Sales Strategy

Uganda-based Water Governance Institute (WGI) offers an Aquaponics Farming System that closes an ecological loop between fish farming and crop farming. The fish- and crop-growing unit provides nutritional supplements and alternative income streams for customers living in rural, urban, or peri-urban household settings.

The TA Facility, through Rapid Vendor Procurement Mechanism vendor Sattva, worked with WGI to develop a sales and marketing strategy and a plan to pilot and refine it based on practical learnings.

Sattva helped WGI refine its approach to pitching the value proposition of the aquaponics system to potential customers and converting interest into sales. WGI now tailors advertising to audiences in specific regions and communities rather than using a one-size-fits-all approach. By developing a better understanding of the aspirations of potential customers, the company is better able to guide them to the aquaponics unit that best fits their purposes.

The support was critical in the development of a community-based sales agent approach to get closer to the customer and reduce the cost of customer acquisition. WGI also has implemented a dedicated feedback desk to create a relationship with customers and actively support them as they develop their aquaponics farming skills.

Since the engagement with Sattva, WGI has sold 48 Aquaponics units and registered 73 additional expressions of interest for the adoption of Aquaponics.

ONGOING CHALLENGES AND POTENTIAL SOLUTIONS

In Year five, the TA Facility is applying insights gained from analysis of the acceleration support it has delivered and feedback received from SWFF innovators. Insights into the processes the TA Facility put into place to identify ways to increase short-term and long-term success rates for future support engagements are being included so that acceleration support can be provided more responsively during the engagement.

Accelerating the impact of support provided. The TA Facility provides a wealth of resources on a shared Google Drive that is available to vendors as background context to inform their proposals to innovator support scopes of work and project implementation. The innovator's original application to SWFF is stored on that shared drive along with their acceleration work plan, their responses to the Needs Diagnostic, and deliverables from previous support engagements.

The goal of sharing these documents with vendors is to help them get up to speed on the innovator's business model, progress and challenges to date, upcoming milestone targets, and advisory outcomes provided previously. This helps first-time vendors come to an engagement with a body of knowledge that enables them to ask more informed questions earlier in their interactions with the innovator. The innovator is then spared the burden of covering ground and answering questions that they have addressed with prior vendors.

When conducting vendor proposal assessments for innovator support scopes of work, the evaluators are looking for specific evidence that the vendor has reviewed available background documentation and that it has informed their proposal responses. During the innovator interview phase of vendor selection, when the innovator speaks with the top two finalists, the innovator is specifically seeking to understand how much background and context the vendor is bringing to that initial interaction. A vendor able to ask second-level questions and integrate contextual knowledge into the discussions is looked upon more favorably.

Introducing a preferred-vendor mechanism. The TA Facility has now implemented a rolling admissions mechanism to qualify and onboard vendors recommended and requested by SWFF innovators as needed. During the annual acceleration support planning process, if an innovator suggests a preferred vendor outside of the SWFF network to deliver the work, the TA Facility now has the means to invite the vendor to apply to the system and qualify them for membership. For those situations an additional step has been added in the qualification process to avoid potential conflicts of interest. This rolling admissions mechanism enables the TA Facility to better align to the timing needs of the innovator, rather than force them to wait until another formal call for vendors is conducted.

MAJOR ACTIVITIES AND EVENTS

SWFF FIELD EVALUATOR PROGRAM

After two successful cohorts of the SWFF Young Professionals Field Evaluator Program in 2017 and 2018, SWFF launched the 2019 call for Field Evaluators to conduct an impact assessment of 10 SWFF innovators. The innovators are: aQysta Holdings, Adaptive Symbiotic Technologies, Aybar Engineering, Central University of Technology Free State/ITIKI, Green Heat Uganda, Hydroponics Africa, Meat Naturally, SkyFox, WASTE Stichting, and Water Governance Institute. The Field Evaluator program received 145 applications from candidates all over the world, including from India, Kenya, Sweden, Uganda, the United Kingdom,and the United States.

Twenty-two candidates currently are in the second round of interviews. They were chosen for their high qualifications and experience in agriculture, water technologies, interviewing farmers, and research skills. The final selected field evaluators will be matched to one of the SWFF innovators noted above and will spend 8 to 12 weeks in the field verifying data and directly interviewing customers/ end-users. At the conclusion of their field research, field evaluators will submit a final thought leader report that will be published on the SWFF website.

What Happens When There's Too Much Irrigation? Tech Entrepreneur in Vietnam Found the Answer

Farmers around the world lack water to properly irrigate their crops. But in the Central Highlands of Vietnam, farmers were using too much water for irrigation. When Nguyen Khac Minh Tri left a high-tech job and returned to a mountainous region in Dalat to grow strawberries, the need for irrigation efficiency was apparent to him. Over time and through trial and error, he applied technology to his farming practices and created a reputation for delivering greater crop yields and healthier plants. He was able to demonstrate to farmers that irrigating crops with too much water wasted precious resources and negatively impacted their crop yields.

Tri realized his technical education and agrarian background could fuel his entrepreneurial ambitions and help farmers in Vietnam. He became an innovator and co-founded MimosaTEK, a company named after the flower that grows in abundance all over the country.

The MimosaTEK system works by placing sensors in farmers' greenhouses or fields to measure environmental factors such as soil moisture, precipitation, air temperature, and wind speed. The sensors provide real-time information and guidance on irrigation schedules through a smartphone app. Farmers can then plan accordingly how much water to use.

Tri serves as CEO of MimosaTEK. Lan Anh Le was named COO two years ago and she now manages the overall business for the leadership team. "The farmers would tell Tri that the soil had to be irrigated such that water dripped from a handful of dirt," she said. "Just the opposite was true. Water resources were being wasted, and the over-watering was causing unhealthy crops. The Central Highlands often had a dearth of water and farmers were wasting that dwindling resource."

Lan Anh said MimosaTEK's greatest challenge was to reach older farmers and convince them that a little investment in technology could increase their crop yields. "We are doing this by bringing on early adopters of our technical measurement systems and having them demonstrate it to older farmers." She added that MimosaTEK is holding demonstrations at government-sponsored events. "We're not there yet," she says, "but we are making progress."

ANNEX A: SWFF INNOVATORS

SWFF INNOVATORS

INNOVATOR	INNOVATION	PRODUCT SUMMARY
SWFF INNOVATORS, RD. 4		
CUT/ITIKI (University)	**Drought Prediction Tool**	Early warning system integrates indigenous and scientific drought forecasting using a mobile application, web portal, and SMS service to pool weather information through a network of sensors that monitor weather conditions for small-scale farmers
Hydroponics Africa (For-Profit)	**Hydroponics Services**	Simplified, all-inclusive hydroponics services leverage use of local materials to grow healthy plants and help smallholder farmers produce maximum yields in small areas without using soil, while using 80 percent less water
Lal Teer Seed (For-Profit)	**Salt-Tolerant Vegetable Cultivation Methods**	Locally developed salt-tolerant vegetable seeds, combined with easily adoptable cultivation methods in high-saline areas of southern Bangladesh – innovation package includes microfinance assistance, information and communication technology (ICT) support, and extension advisory services
MimosaTEK (For-Profit)	**Internet of Things Platform for Precise Irrigation**	Internet of Things (IoT) platform for precision agriculture monitors and analyzes farm data using sensors (to measure soil moisture, rain, wind, and light) and then recommends a precise irrigation schedule in real time
Naireeta Services (For-Profit)	**Bhungroo Rainwater Harvesting Technology**	Handmade pipes 10 to 15 centimeters in diameter are used to filter, inject, and store rainwater underground for use in lean periods to provide food security – also can supplement household water needs
Project Alba (For-Profit)	**Technology and Farming Practices Advisory Services**	Business model addresses barriers related to both technologies and practices for efficient water use and increased crop yields – allows for rapid dissemination of water management technologies to smallholder farmers in Cambodia
SkyFox (For-Profit)	**Integrated Aquaculture and Crop Production**	Top-of-hill aquaculture ponds capable of producing two tons of catfish twice a year, as well as enough nutrient-rich water to irrigate 25 acres of land at the base of the hill – services include leasing ponds and irrigation land and providing extension services to resource-poor farmers
WASTE Stichting (Non-Profit)	**Circular Economy with Black and Grey Water Recycling**	Circular recycling system for black and grey wastewater aids in exotic vegetable cultivation
SWFF INNOVATORS, RD. 3 GRADUATES		
Conservation South Africa – Meat Naturally (For-Profit)	**Communal Grazing Systems and Ecorangers**	Services combining ecological science, a government job-creation program, and market interest in sustainable meat help implement communal grazing systems that result in improved water and food availability
Green Heat Uganda (For-Profit)	**Slurry Separation System (SST)**	Slurry separation system vastly reduces water demands of anaerobic digesters, creates an easy-to-handle solid fertilizer, increases gas production, and improves removal of contaminants in the bio-slurry

SWFF INNOVATORS (CONT.)

INNOVATOR	INNOVATION	PRODUCT SUMMARY
Ignitia (For-Profit)	**Mobile Weather Forecasts**	Accurate weather forecasts help farmers sow, fertilize, and harvest at the optimum time, manage their daily activities, improve crop yields, and optimize food production
Institute for University Cooperation (ICU) – Peru (Non-Profit)	**Irrigation Scheduling System**	Irrigation scheduling system provides farmers with direct indications of when and how much to irrigate – using a climate station, the system measures air temperature, humidity, wind speed and direction, intensity of solar radiation, and rains
Si Technologies International (For-Profit)	**NewSil Growth Enhancer**	Silicic acid applicator – applies acid to food crops in an affordable and environmentally friendly way that substantially reduces crop loss in times of water stress and drought
Water Governance Institute (Non-Profit)	**Aquaponics Farming System**	All-in-one aquaponics system allows for crop production and fish rearing at home – closes the loop between fish and horticultural crop farming to provide nutritional supplements and alternative incomes to farmers
SWFF INNOVATORS, RD. 2 (DESAL PRIZE)		
Center for Technology and Design (For-Profit)	**Electrodialysis Reversal (EDR) System**	Desalination process separates salts from water by applying electric potential to electrodes and pulling dissolved salt ions through ion-exchange membranes
SWFF INNOVATORS, RD. 1 – GRADUATES		
Adaptive Symbiotic Technologies (For-Profit)	**BioEnsure Microbial Inoculant**	Fungus found in Yellowstone National Park reduces water consumption, increases drought tolerance, and enhances crop yields with no negative impact when applied to seeds
aQysta Holding (For-Profit)	**Barsha Pump**	Low-cost, hydropowered irrigation pump requires no fuel or electricity, has no operating expenses, and does not emit polluting greenhouse gases
Aybar Engineering (For-Profit)	**Broad Bed and Furrow Maker (BBM)**	Cultivation equipment reduces planting time and drains excess water away from crops – made of lightweight materials appropriate for farmers
FutureWater (For-Profit)	**ThirdEye Flying Sensor**	Drones carrying sensing equipment provide smallholder farmers with insights critical to improving their application of limited resources, such as water, seed, and fertilizer
International Center for Biosaline Agriculture (Non-Profit)	**Salt-Tolerant and Resilient Crops**	Non-GMO, salt-tolerant quinoa enables significant food production in saline soils without the need for freshwater
MyRain (For-Profit)	**Rainmaker Custom Drip Irrigation System**	Customized irrigation system design tool helps small agro-retailers across India avoid the complexity of drip irrigation design and installation – enhances water efficiency by as much as 50 percent
Practical Action Bangladesh (Non-Profit)	**Sandbar Cropping Technique**	This low-cost cropping technique transforms previously unused sandy islands appearing after each rainy season into productive large-scale farms

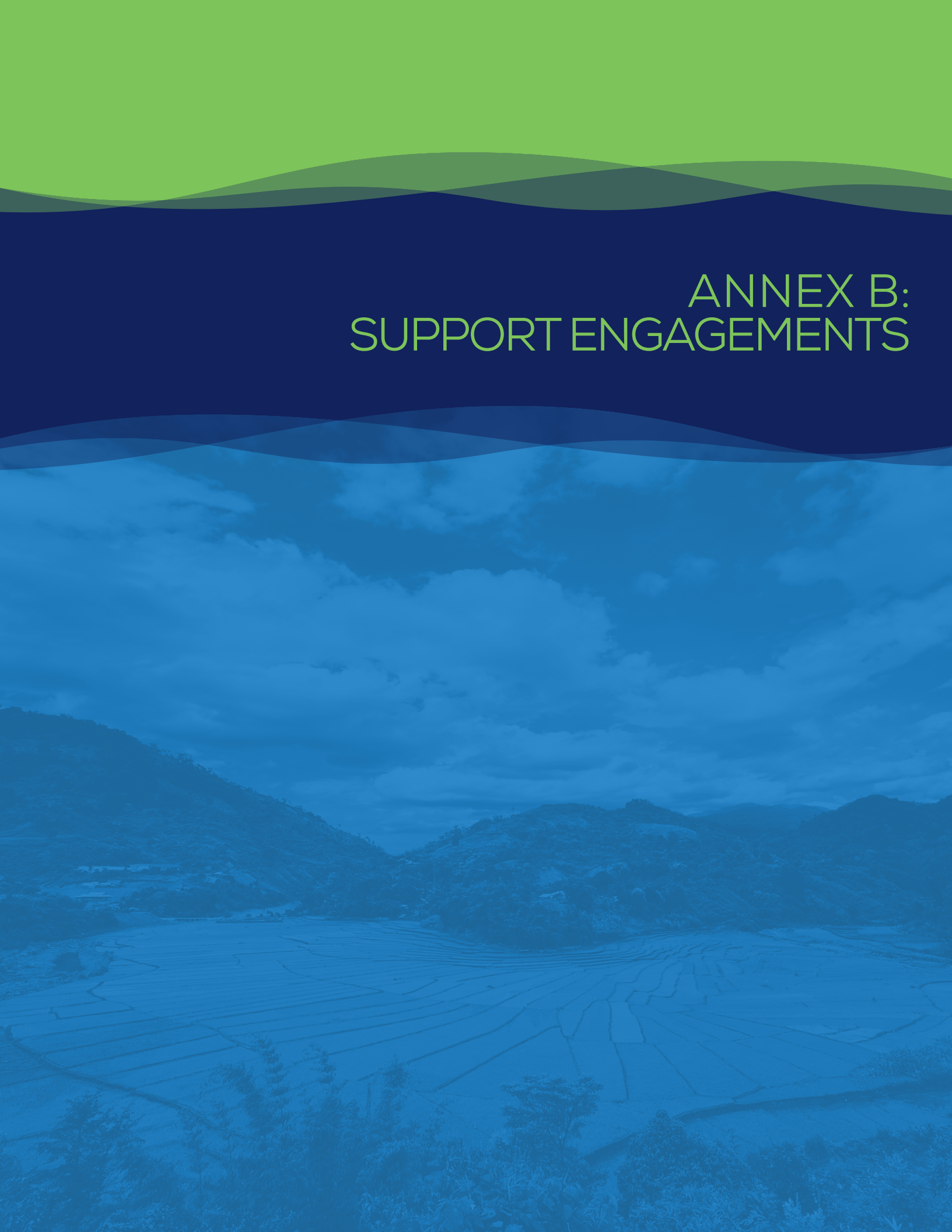
SWFF INNOVATORS (CONT.)

INNOVATOR	INNOVATION	PRODUCT SUMMARY
Reel Gardening (For-Profit)	**Biodegradable Seed Tape**	Simple, quick, and effective biodegradable paper tape encases organic fertilizer and seeds at the correct depth and distance apart, resulting in potential savings of 80 percent in water consumption
World Hope International (Non-Profit)	**Affordable Greenhouses**	Affordable greenhouses enable a year-round growing season, address food insecurity, conserve water, and promote the equal participation of women in the economy
SWFF ALUMNI		
Arcadis (For-Profit)	**Freshwater Management System**	Sustainable, innovative freshwater management system prevents groundwater salinization in coastal areas
Center for Sustainable Dryland Ecosystem and Societies – University of Nairobi (For-Profit)	**M-Fodder Mobile Ordering System**	Mobile phone SMS system enables smallholder livestock farmers to send an SMS and receive high-quality hydroponically produced fodder for livestock
Centre for Environment Concerns (Non-Profit)	**SWAR Subsurface Drip Irrigation System**	Subsurface drip irrigation system spreads moisture at plant root zone, improving cultivation of vegetables, flowers, and fruit/forestry trees and using only one-fifth the water of other drip irrigation systems
Deutsche Welthungerhilfe (Non-Profit)	**Greenhouse Technology**	Combination of low-cost rainwater harvesting and greenhouse technology allows farmers to produce vegetables during colder months when no water for agricultural production typically is available
Driptech (For-Profit)	**Affordable Drip Irrigation**	Low-cost drip irrigation system uses an innovative laser punching technology to ensure uniform water application at the root zone of all crops in a field – provides the same benefits as drip irrigation used by large-scale farmers at a lower cost
ICU – Tunisia (Non-Profit)	**Buried Diffuser Irrigation Technique**	Patented underground irrigation technique for field and greenhouse trees, shrubs, and vegetables enhances efficiency of water resources, increases crop productivity, and makes rainfed agriculture sustainable
ICU – Jordan (Non-Profit)	**Groasis Waterboxx Planting Technology**	Integrated planting technology allows farmers to plant fruit, fodder, trees, and shrubs in degraded farmland and rangelands in Jordan
Islamic Relief Kenya (Non-Profit)	**SunCulture AgroSolar Irrigation Kit (ASIK)**	Off-the-shelf, no-frills, cost-effective solar-powered drip irrigation technology
IVL Swedish Environmental Research Institute (Research Organization)	**SPONGE Irrigation Technology**	Techno-biological irrigation system greatly improves water use and supply – uses water from fog and dew to increase water reliability in a region that has abundant but highly intermittent water availability

SWFF INNOVATORS (CONT.)

INNOVATOR	INNOVATION	PRODUCT SUMMARY
MetaMeta/Salt Farm Texel/ Jaffer Brothers (For-Profit)	**Salt-Tolerant Potato**	Non-GMO, salt-tolerant potato requires very little freshwater for cultivation – scaling up access to this potato will contribute to better use of lands and waters with high salinity and will reduce pressure on freshwater resources
MetaMeta (Non-Profit)	**WaterPads Water Buffering Technology**	Sandwich of paper and jute with a 0.5 mm inner layer of large granular polymers in dry form – granules retain water at binding tension, absorbing 100 times their own weight in water (7 grams of granules absorb one liter of water)
Puralytics (For-Profit)	**LilyPad Water Treatment System**	Reusable, chemical-free, solar-activated water treatment product floats on a body of water where it kills viruses, bacteria, and protozoa in water used for agriculture
Trans-African Hydro-Meteorological Observatory (Non-Profit)	**Weather Sensing Stations and Mobile App**	Weather stations measure meteorological and water resource variables (rainfall, radiation, temperature, humidity, wind speed/ direction, soil moisture, etc.) and send the data via GSM networks to a data server – provides accurate, localized, timely weather information to farmers via mobile devices
University of Malawi (University)	**Flask-Wall Mushroom-Growing House**	Water-efficient flask-wall mushroom-growing house is designed for smallholder farmers in Malawi
University of Texas – El Paso (University)	**Zero Discharge Desalination (ZDD) Technology**	Hybrid process uses reverse osmosis (or nanofiltration) as the primary desalter and electrodialysis metathesis (EDM) to recover additional water from desalination brine
Wageningen University & Research (Research Organization)	**Salt-Tolerant Quinoa**	Non-GMO, salt-tolerant quinoa enables significant food production in saline soils, without the need for freshwater

ANNEX B: SUPPORT ENGAGEMENTS



The table below is a summary of Year 4 and Year 5 support engagements assigned to the TA Facility's lines of support, which include USAID staff, the SWFF vendor network, TA Facility staff, and other vendors.

SUPPORT PROVIDER	SUPPORT CATEGORY	INNOVATORS SUPPORTED
DONNA VINCENT ROA	Sales, Marketing, Communication, Branding	Central University of Technology, Free State
DOUBLE-0 MARKETING	Sales, Marketing, Communication, Branding	Meat Naturally
IMAGINE H2O	Business Model and Strategy Development	Central University of Technology, Free State
JATIN YADAV	Sales, Marketing, Communication, and Branding	aQysta
	Sales, Marketing, Communication, Branding	Central University of Technology, Free State Hydroponics Africa WASTE Stichting
MICHAEL HANNA DESIGN	Sales, Marketing, Communication, Branding	Project Alba
MRIGLOBAL	Business Model and Strategy Development	University of Malawi
	Product Development, Refinement, and Diversification	Adaptive Symbiotic Technologies
SATTVA	Business Model and Strategy Development	Hydroponics Africa IVL Swedish Environmental Research Institute Naireeta Services WASTE Stichting
	Gender Advisory	Green Heat Ignitia Meat Naturally
	Organizational Capacity Building	Project Alba Si Technologies
	Sales, Marketing, Communication, Branding	Water Governance Institute Ignitia Lal Teer Seed MimosaTEK SkyFox
SNV USA	Business Model and Strategy Development	ICU – Peru
WHITTEN & ROY PARTNERSHIP	Organizational Capacity Building	Green Heat Project Alba
	Sales, Marketing, Communication, Branding	ThirdEye

SECURING
WATER
FOR FOOD:
A GRAND CHALLENGE
FOR DEVELOPMENT

Securing Water for Food has sourced and invested in a portfolio of innovative solutions that aim to help farmers use water more efficiently and effectively, improve water storage for lean times, and remove salt from water to make more food. Our cohort of innovators are helping people in 30 low-resource countries with tools they need to produce more food with less water.

To learn more about Securing Water for Food,
visit www.securingwaterforfood.org.