

2 HIGHLIGHTS



The following are highlights of the main activities that were implemented during the reporting period.

2.1 Partners Meeting

The Partners held their annual Partners Meeting at the USAID headquarters in United States over June 1 to 3, 2016. Representatives from USAID, GIZ, and Sida were in attendance. The key decisions coming out of the meeting were as follows:

- On Day 1, the Partners attended the Agriculture Innovation Investment Showcase (AIIS) at USAID's headquarters.
- On Day 2, the Partners in attendance reviewed the findings and recommendations from the midterm program and Innovator level reviews.
- The Partners in attendance on Day 2 agreed to the following action items:
 - to utilize the newly hired gender specialist to further expand gender integration support for all Innovators with a focus on gender equity, gender as a social construct, and ensuring that Powering Agriculture does not reinforce negative gender norms
 - to utilize an external consultant to conduct an Innovator level impact study in the 2018/2019 timeframe on a subset of ' high impact' Innovators from the 2013 and 2015 cohorts to measure development impact
 - to utilize an external consultant to conduct an overall program level impact study on Powering Agriculture in 2018/2019 timeframe

- to explore options to leverage private sector capital to scale late stage, high impact innovations in current and future Powering Agriculture cohorts
- to focus on mainstreaming Powering Agriculture with our Missions/other in-country programs where alignment is possible and interest is expressed
- On Day 3, the Partners in attendance discussed plans for expanding acceleration and gender services to Innovators and plans for 'Powering Agriculture 3.0' which would involve a financing facility/PPP.
- The Partners in attendance on Day 3 agreed to the following action items:
 - to actively pursue the release of a solicitation or to review unsolicited proposals for a financing facility/PPP to accelerate the scaling of Powering Agriculture and aid in the mainstreaming of the Innovators and the overall initiative
 - to adopt the proposed gender integration framework
 - to review the budget implications of expanding PAX-like acceleration and scaling support for 'high impact' Innovators for up to three years after their awards have ended if funds are available
 - to hold the next PAX workshop in Kenya to better leverage the resources of the newly established GIZ hub for Powering Agriculture
 - to hold the next Partners meeting in Bonn, Germany, with BMZ and GIZ as the host.
 - to discuss options for expanded partnership and collaboration amongst the donors at the next Partners meeting

2.2 Mid-Term Review

Two midterm evaluations of the overall Powering Agriculture program and its 2013 Innovator cohort were completed during the reporting period.

2.2.1 Program-Level Mid-Term Evaluation

Powering Agriculture commissioned Syspons GmbH, an external evaluation team, to evaluate the program-level structures, processes and impacts of the initiative. The evaluation team conducted an in-depth analysis of relevant documents and data, in-depth interviews as well as an analysis of the results from the 2013 Innovators Assessment. The report includes key findings, conclusions and recommendations, and is intended to inform future decision-making by the Founding Partners. The full report can be accessed at <http://poweringag.org/resources>.

The evaluation indicated that Powering Agriculture is a unique challenge fund that addresses highly relevant global developmental challenges such as food insecurity and climate change with an integrated approach. A comparative study of 50 challenge funds conducted by the evaluation team confirmed the relevance of Powering Agriculture on the international level. It showed that Powering Agriculture currently is the only global challenge fund which takes an integrated approach to fund and support the scale-up of innovative solutions at the interface of the energy and agriculture sector. The setup of the grand challenge allows it to reach new and innovative actors from the private sectors in developing countries and emerging markets, thereby bringing new perspectives into the field of international cooperation. Another strength is the initiative's effective and efficient cooperation and steering structure, which is characterized by a mode of

co-production and the usage of comparative advantages of the partners' competences.

The evaluation also critiqued certain aspects of the Powering Agriculture initiative. For instance, the initiative has not yet accomplished its objective of establishing a financing mechanism via a public-private partnership to support the scale-up of later stage commercial efforts within the energy/ag nexus. The evaluation team noted that the lack of such a mechanism hinders Powering Agriculture's capacity to further partner with and leverage private-sector resources to scale innovations that could address energy poverty, economic growth and food insecurity goals. Another weakness observed by the evaluation team is that Powering Agriculture had not conducted an impact evaluation of its innovators. Given that the initiative's 2013 innovator cohort was composed of rather early stage innovators that required most of their award period to design and test their solution before field implementation, the evaluation team recommended that impact assessment be conducted after the 2013 and 2015 innovators cohort have deployed their technologies with end users and other beneficiaries.

In addition, it was also noted that Powering Agriculture's innovations and lessons learned are not currently systematically integrated into and fully adopted by the bilateral structures and programs of the partners. Despite the weaknesses, the evaluation concluded that Powering Agriculture has the opportunity to strengthen its position as a unique challenge fund in the energy-agriculture nexus and provided eight recommendations at the strategic and operational levels.

2.2.2 Mid-Term Innovators' Assessment

Tetra Tech ES, Inc., through the USAID-funded PASTO, conducted the Mid-Term Innovators Assessment to determine the progress to date of the 2013 Innovators. This assessment included the following:

- a survey addressing the four main assessment questions
- data collection through virtual check-in meetings with the 2013 Innovators
- document review of award documentation, milestones, deliverables and progress reports
- data verification and stakeholder interviews during project site visits; and
- an analysis of reported performance indicator data.

The assessment presents findings, conclusions, and recommendations that will be used to make mid-course adjustments to improve the effectiveness of the program and to accelerate the development and deployment of Powering Agriculture Innovators' clean energy solutions. The full report can be accessed at: <http://poweringag.org/resources>.


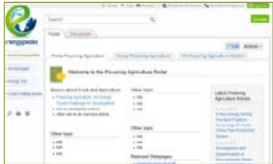




The main finding was that the progress and likely outcomes for the 2013 cohort are consistent with other grand challenges or open competitions that source and develop high potential solutions to overcome critical barriers to development through the application of scientific, technological, and engineering methods. The innovations selected by Powering Agriculture could be considered high risk/high gain due to their potential to be transformative; therefore, the Partners should expect a success rate of 10% to 25%. Given that, the Assessment detailed the support that the Innovators require

to be successful which includes monitoring and evaluation, business acceleration, gender integration and partnerships. The Assessment also recommended that for some Innovators, business acceleration support should be intensified; for others, the support should be focused on the documentation of field testing results; and for a few, support should cease.

2.3 Raising the Public's Awareness

Powering Agriculture utilized multiple approaches and tools to communicate the program objectives and activities; build awareness of the clean energy/ag nexus and to disseminate results and knowledge from the initiative. These tools included the online platforms and communication tools detailed in Table 2.1 below, stories published in various print and online media outlets, and participation in conferences and workshops.

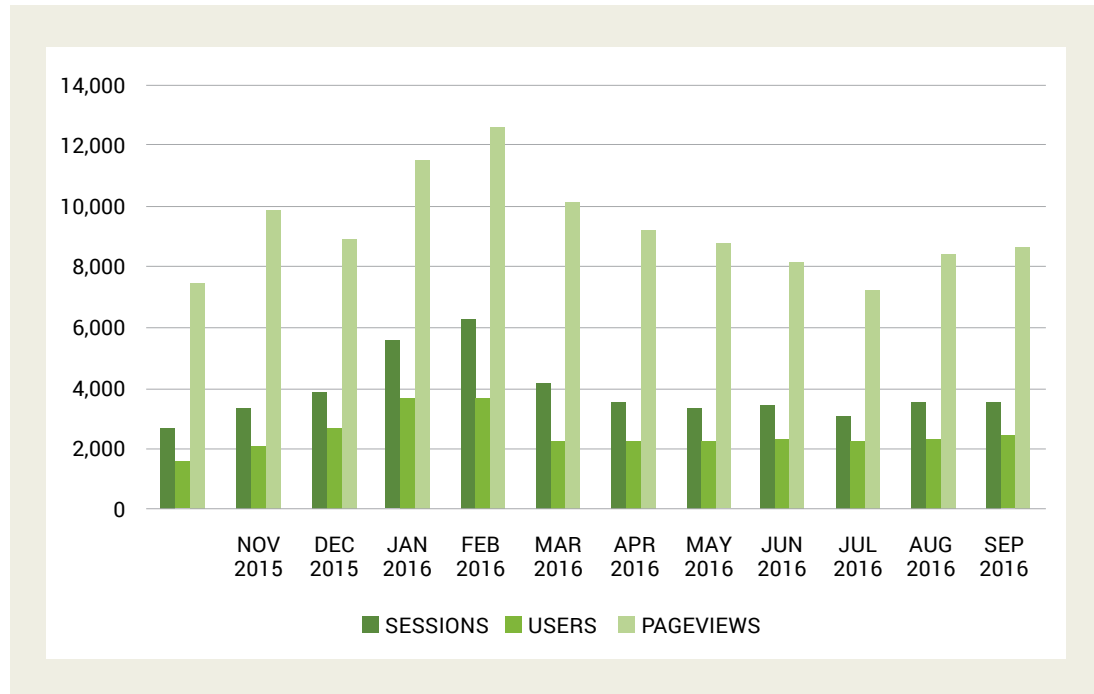
Table 2.1 Powering Agriculture Communication Platforms

PLATFORM		PURPOSE	CONTENTS
Powering Agriculture website www.poweringag.org		Powering Agriculture's primary public website; Communications and Outreach for Information Dissemination about the program	Official documents Calls for Proposals Outreach information (press releases, news articles, videos, event information) Resources
Powering Agriculture Portal on energypedia.info www.energypedia.info/wiki/Portal:Powering_Agriculture		Networking with experts; Research; mutual knowledge exchange	Thematic pages Articles and reports Studies Event announcements
Powering Agriculture E-Newsletter		To raise awareness of Powering Agriculture, its activities, and the successes of its Innovators	News Success Stories Event announcements
@Poweringag Twitter Account		To raise awareness of Powering Agriculture, its activities and the successes of its Innovators	News Event announcements
Powering Agriculture Facebook Account		To raise awareness of Powering Agriculture, its activities and the successes of its Innovators	News Event announcements Innovator Promotion
Powering Agriculture Dashboard		To inform senior management of the Founding Partners of programmatic and Innovator updates	News Event Announcements Resources

2.3.1 Powering Agriculture Website

Powering Agriculture continued to use the website as its primary tool to store and disseminate information and news on the program and drive traffic to the website through social media posts. Figure 2.1 shows the website traffic during the reporting year.

Figure 2.1 Powering Agriculture Website Analytics



2.3.2 Powering Agriculture newsletter

Powering Agriculture disseminated 3 editions of its newsletter during the reporting period, as shown in Table 2.2.

Table 2.2 Powering Agriculture Newsletter Data FY2016

DATE OF NEWSLETTER PUBLICATION	# OF CONTACTS	OPEN RATE (21% – INDUSTRY STANDARD*)	CLICK RATE (9% – INDUSTRY STANDARD*)
January 14, 2016	4,706	34%	24%
April 19, 2016	4,343	31%	15%
July 25, 2016	4,574	32%	11%

* Based on industry standards developed by Constant Contact.

2.3.3 Social Media activities

Powering Agriculture continued to use social media as a means of promoting the program and our Innovators. The Facebook and Twitter accounts were used to post Innovator and program news, along with relevant energy/agriculture nexus stories. Social media also was an important tool in promoting the Powering Agriculture MOOC (described in Section 2.4.2). Each course module was promoted for a week at a time. Powering Agriculture conducted a “Meet the 2015

Table 2.3 Powering Agriculture Social Media Activity FY2016

	FOLLOWERS	NUMBER OF POSTS IN FY2016	HIGHEST CLICKS/ PROFILE VISITS	LARGEST REACH/ TOP TWEET
	2,688	64	82: Join Powering Agriculture's Free Open Online Course, Dec 17 2015	2,036: #DidYouKnow: Agriculture is a powerful tool for reducing poverty. Aug 31, 2016
	2,547	264	1,492 November 2015	6,693 Impressions: Check out how. @poweringag supports. @USAID #cleanenergy efforts to address Global Climate Change #ActOnClimate bit.ly/1KJuMUZ , Oct 22, 2015

Innovator” campaign highlighting one of the 2015 Innovator cohort per week with Tweets and Facebook posts, as well as a “Did You Know Campaign”, highlighting facts about agriculture and clean energy with weekly posts on Twitter and Facebook. Table 2.3 presents highlights of this year’s social media efforts.

2.3.4 Conferences

Powering Agriculture organized two major events this year during which the grand challenge and the work of its Innovators were promoted.

Powering Agriculture Innovator Showcase

(PAIS): This half-day event was held on November 20, 2015, and attended by 130 people. During the event, the 13 finalists comprising the 2015 Innovator cohort were announced, followed by pitches and exhibits by 23 Innovators, as well as speeches by Powering Agriculture Partners, and a keynote speech from Jehiel Oliver, CEO of Hello Tractor.

The showcase also served as the official launch of “Opportunities for Agri-food Chains to Become Energy-Smart”, a report co-authored by Powering Agriculture and the Food and Agriculture Organization of the United Nations (FAO). Dr. Alessandro Flammini, Natural

Resources Officer for the FAO, and one of the report’s primary authors, presented remarks about the report during PAIS. Printed copies of the report were available for attendees at the event. A speaker highlight video can be viewed at the [Powering Agriculture website](#).

Agriculture Innovation Investment Summit

(AIIS): On June 1 and 2, 2016, Powering Agriculture, along with Securing Water for Food Grand Challenge and the USAID Feed the Future Partnering for Innovation, hosted the first-ever Agriculture Innovation Investment Summit (AIIS). The Summit, held in Washington, D.C., brought together nearly 60 Innovators— including 14 representing Powering Agriculture, along with representatives from the investment community and development organizations. The two-day program included an Innovator Marketplace, a pitch competition, and TED-style talks from Innovators, along with remarks from [USAID Administrator Gayle Smith](#), [BMZ’s One World, No Hunger Initiative Dr. Stefan Schmitz](#), [One Acre Fund’s Tony Kalm](#) and the White House Office of Science and Technology’s [Tom Kalil](#). Innovators who participated in the TED-style talks and pitch competition received support and feedback in the development of their presentations.



African Bamboo meets with Powering Agriculture Partner representatives



2013 and 2015 Innovators

Powering Agriculture also hosted sessions and exhibited at several conferences as follows:

- The 16th National Conference of the National Council for Science and the Environment (NCSE) “The Food-Energy-Water Nexus” in January 19-21, 2016, in Arlington, Virginia. Powering Agriculture was promoted at a booth and represented on the Opportunities and Challenges in Integrated Food-Energy Systems panel. Approximately 150 individuals visited the booth; 100 copies of the FAO landscape study were distributed; and other materials were distributed including the Powering Agriculture fact sheet, MOOC flyer and Innovator Profile books.
- SE4All Technical Workshop Water-Energy-Food Nexus, February 22, 2016, Vienna, Austria. The members of the **Nexus HIO** (High Impact Opportunity) explored opportunities to operationalize the water-energy-food nexus in the context of the SDGs. Powering Agriculture contributed its implementation experiences within the energy/ agriculture nexus.
- **Intersolar**, June 22-26, 2016, Munich, Germany. The world’s leading exhibition for the solar industry attracted more than 1,077 expositors and about 43,000 visitors. Powering Agriculture Partner GIZ/BMZ presented the solar-powered irrigation system (SPIS) stocktaking study, manual, and toolkit, while 2015 Powering Agriculture Innovator Village Infrastructure Angels (VIA) presented their clean energy solution (CES).
- **Biogas Africa Forum 2016**, July 11-13, 2016, Nairobi, Kenya. Platform for the key stakeholders in the biogas value chain to discuss and exchange on ‘industrial size’ biogas activities of private developers, policy makers and development partners in Sub-Saharan Africa. Powering Agriculture Partner GIZ / BMZ gave a brief presentation of the Powering Agriculture initiative and Powering Agriculture Innovator SimGas presented their CES and activities in East Africa.
- International Off-grid Renewable Energy Conference – **IOREC**, September 30-October 1, 2016, Nairobi, Kenya. Global platform for sharing experience and best practices about renewables. Powering Agriculture Partner GIZ / BMZ co-organized two side events together with the International Renewable Energy Agency. The Powering Agriculture studies “**Opportunities for Agri-Food Chains to become Energy-smart**” and “**Solar Powered Irrigation Systems – Manual and Tools**” (forthcoming) were received with great interest by the audience. The Powering Agriculture Innovators SunCulture and Futurepump contributed to a panel discussion, discussing eco-system requirements.

2.3.5 Media Outreach

During the reporting year, 984 media outlets/reporters were contacted; 156 pitches were made to media outlets to introduce the Powering Agriculture initiative and its Innovators; 16 interviews were conducted with Powering Agriculture representatives or Innovators; 60 stories were published highlighting the Powering Agriculture program or Innovators. Table 2.4 presents the stories published during FY2016.

Table 2.4 FY 2016 Powering Agriculture Media Coverage

MEDIA OUTLET	TITLE
Farmers Review Africa	Solar Powered Pumps Reduce Irrigation Costs
Microgrid Knowledge	First Microgrid in Haiti: The Road to Feminist Electrification
RMI Outlet	Changing Lives With Solar Microgrids
PRI	An MIT Lesson in Failure Helps Deliver Fresh Milk to Millions in India
Redshift (formerly line/shape/space)	How KickStart International Is Pumping up Entrepreneurial Spirit in Africa
Forbes	A Conversation With Praveen Penmetsa, CEO/Founder of Motivo Engineering
Financial Times	Kenyan Farmers Use SunCulture Solar Power to Help Water Dry Land
Humanosphere	Solar-powered Irrigation Promises Relief to Southern Africa, but Is It Sustainable?
Devex Impact	The Art of the Pitch: How Startup Social Enterprises Pitch Impact Investors
ClimateWire	From Bamboo to Solar Irrigation, Entrepreneurs Eye New Markets
Green Prophet	U.S. Supports Hydroponics to Revitalize Mideast Food, Water and Security
She Shapes the City	Caroline Makenzi Shapes Nairobi with Solar Engineering
Farmbiz Africa	Biogas Chiller Extends Milk Shelf-life for 14 Hours
VentureWell	The Challenge of Hardware Startups
Global Ag Investing	Innovative Solar Poised to Drive Down Costs for Small Farms
Hindu Business Line BL ink	The Rot Stops Here
DEM+ND	Reinventing the Steam Engine
DEM+ND	The Scaled-Down Solar Pump
Your Story	The Story of Delhi-based Claro Energy, the Pioneers of Solar Pumping Solutions
The Daily Star	iDE Launches Clean Energy Project for Hatcheries
Power for All	Insight: The Rise of Solar-Powered Irrigation
ISTG	One-on-One with Samir Ibrahim of SunCulture
Pioneers Post	What The World Needs to Know About African Enterprise
Trust – Thomson Reuters Foundation	2015: Year Zero of Sustainable Development?

Table 2.4 FY 2016 Powering Agriculture Media Coverage (Continued)

MEDIA OUTLET	TITLE
How We Get to Next	Solar-Powered Farming, Built in Kenya
Carbon Pulse	Four Years on, World Bank CDM Fund Signs up First PoA
Business Daily Africa	Four Kenyan Firms Picked for Sh1.3bn Green Energy Fund
AgFunder News	6 Questions with Kenyan Irrigation Tech Provider SunCulture on Startup Funding Challenge
NPR – Goats and Soda	A SkyMall For Farmers Would Have Fish Bubblers And Poop-Powered Coolers
Sustainable Brands	\$13M in Clean Energy Investment to Power Agriculture Innovation in Emerging Markets
AgFunder News	Government-led Coalition Invests \$12.9m into Clean Energy Agtech Innovations for Emerging Markets
Grist	Hold on to your straw hats. Farming is about to go low-carbon
Onultalia.com	ICU premiata a Washington da USAID per progetto irrigazione Libano e Giordania
News Today	Domestic Firm Makes It Big in International Agri Contest
Fast Company Co.Exist	A New Kind Of Irrigation Could Boost African Farming—And It's Powered By The Sun
AllAfrica	Africa: USAID and Partners Announce Winners of Agriculture Innovation Competition
The Economic Times	Indian Firm Among Agriculture Innovation Competition Finalists
TechCabal	FuturePump, SunCulture And 11 Other Clean Energy Innovators To Receive \$13 Million In Funding
The Guardian	The Top 10 Sustainability Innovations of 2015
EcoWatch	10 Groundbreaking Solutions for a Sustainable Planet
Trust – Thomson Reuters Foundation	From Hearing Aids to Farming, Solar Energy Powers Climate Innovation
CNBC	Transforming the way milk is stored
USAID Global Waters	Improving Water Services for a More Water Secure Middle East
Stanford Engineering	Dr. Martin Fisher of KickStart International Named Stanford Engineering Hero

Powering Agriculture also prepared a [collection of videos](#) featuring the 2015 Innovators and members of the Partner organizations (see below), as well as a [speaker highlight video](#) from the PAIS event.

SPEAKER VIDEOS FROM PAIS

Jehiel Oliver of Hello Tractor on Innovation and Market Development

John Morton of OPIC on Multi-Agency Solutions

Philipp Ackermann on Market-Based Renewable Energy Ideas

Ann Mei Chang on the Transformative Nature of Unexpected Ideas

Björn Lyrvall on Addressing Global Challenges

Alessandro Flammini of the U.N. FAO on Energy–Agriculture Linkages

Powering Agriculture MOOC—Sustainable Energy for Food

A number of the Innovators were also featured in other videos, including:.

OUTLET	TITLE
Hub Culture	COP21 Hub Culture Paris 2015 Interview with Samir Ibrahim & Charlie Nichols - SunCulture
The Economist	Solar Frontiers
National Geographic	How a Town-Size Solar Grid is Changing Lives in Haiti
TV2Africa	Bamboo Farming Market Expands in Ethiopia
Sida	African Bamboo: Innovating for Change
Smart Villages	Webinar: Off the Beaten Path: Rural Energy and Remoteness
Smart Villages	Webinar: The Big Chill: Off-grid Cooling for Water, Refrigeration, Spaces, and More...



2.3.6 Publication activities

The Energypedia Wiki Portal “Powering Agriculture” published a multitude of articles in order to create awareness and provide an overview of information related to clean energy technologies. Strong emphasis was given to

promoting the value of energy efficiency to enhance agricultural production. There were an average of about 12,000 page views per month and 127 articles on the clean energy/ag nexus, 70 of which were prepared by Powering Agriculture.

Figure 2.2 Screenshot of https://energypedia.info/wiki/Portal:Powering_Agriculture

Welcome to the Powering Agriculture Portal

The **Powering Agriculture Portal** aims to provide an overview of information related to clean energy technologies as well as increased energy efficiency to enhance agricultural production and value.

Newsticker: Check out the guidelines for the safe use of biogas technology: [Biogas: Safety first!](#)

Introduction to the Energy Agriculture Nexus

- [Introducing the Nexus](#)
- [Energy Needs of Smallholders](#)
- [Renewable Energies in Agriculture](#)
- [GHG Emissions from Agriculture](#)
- [Co-optimizing Solutions: Water and Energy for Food, Feed and Fiber](#)
- [Energy within Food and Agricultural VCs](#)
- [Role of Gender in the Nexus](#)
- [Literature on Energy and Agriculture](#)
- [Study: Renewable Energy Benefits: Decentralized Solutions in the Agri-food Chain](#)

Solar-powered Irrigation

- [Irrigation](#)
- [Comparative Financial Analysis of Irrigation Solutions](#)
- [Solar Powered Irrigation Systems in Egypt](#)
- [Study: Solar Powered Irrigation Systems](#)
- [Study: Solar Pumping for Irrigation: Improving Livelihoods and Sustainability](#)

Solar-powered Cold Storage

- [Cooling for Agriculture](#)
- [Solar Cooling](#)
- [Solar Milk Cooling](#)

Energy Efficiency in Agriculture

- [Basics of Energy Efficiency](#)
- [Energy Efficiency in Agriculture](#)
- [Energy Auditing](#)

Map of Pilot Projects

Click on the red markers for country specific projects or the regions to go to regional overview pages.

Map Satellite United Kingdom Poland

PoweringAg: An Energy Grand Challenge for Development

- [MOOC Powering Agriculture](#)
- [Powering Agriculture Annual Report](#)
- [Powering Ag: An Energy Grand Challenge for Development \(PAEGC\)](#)
- [The 24 Innovators of PAEGC](#)
- [Study: Energy-Smart Agri-food Chains](#)

Policy Framework

- [Policies and Regulations for the Nexus](#)
- [Comparison of various Policy Tools for Promoting Renewable Energies](#)

Financing of Sustainable Energy

- [Business Models](#)
- [Financing Instruments](#)
- [Agri-food Enterprises](#)
- [Techno-Economic Analysis in Agricultural Value Chains](#)
- [Water-Energy-Food Nexus: Agrifood Business Cases](#)

Start a Discussion

Have a query? Discuss it with the agriculture experts on energypedia [here!](#)

Report of the Month

[Solar Pumping for Irrigation: Improving Livelihoods and Sustainability](#)

Latest Powering Agriculture Articles

28 Nov 2016
[Atelier "Le Photovoltaïque: Opportunités dans l'Agriculture et l'Industrie Agroalimentaire" dans La Région Nord-Ouest](#)

28 Nov 2016
[Powering Agriculture: Collection of Sources](#)

Latest Powering Agriculture Reports

[Opportunities For Agri-Food Chains To Become Energy-Smart](#)

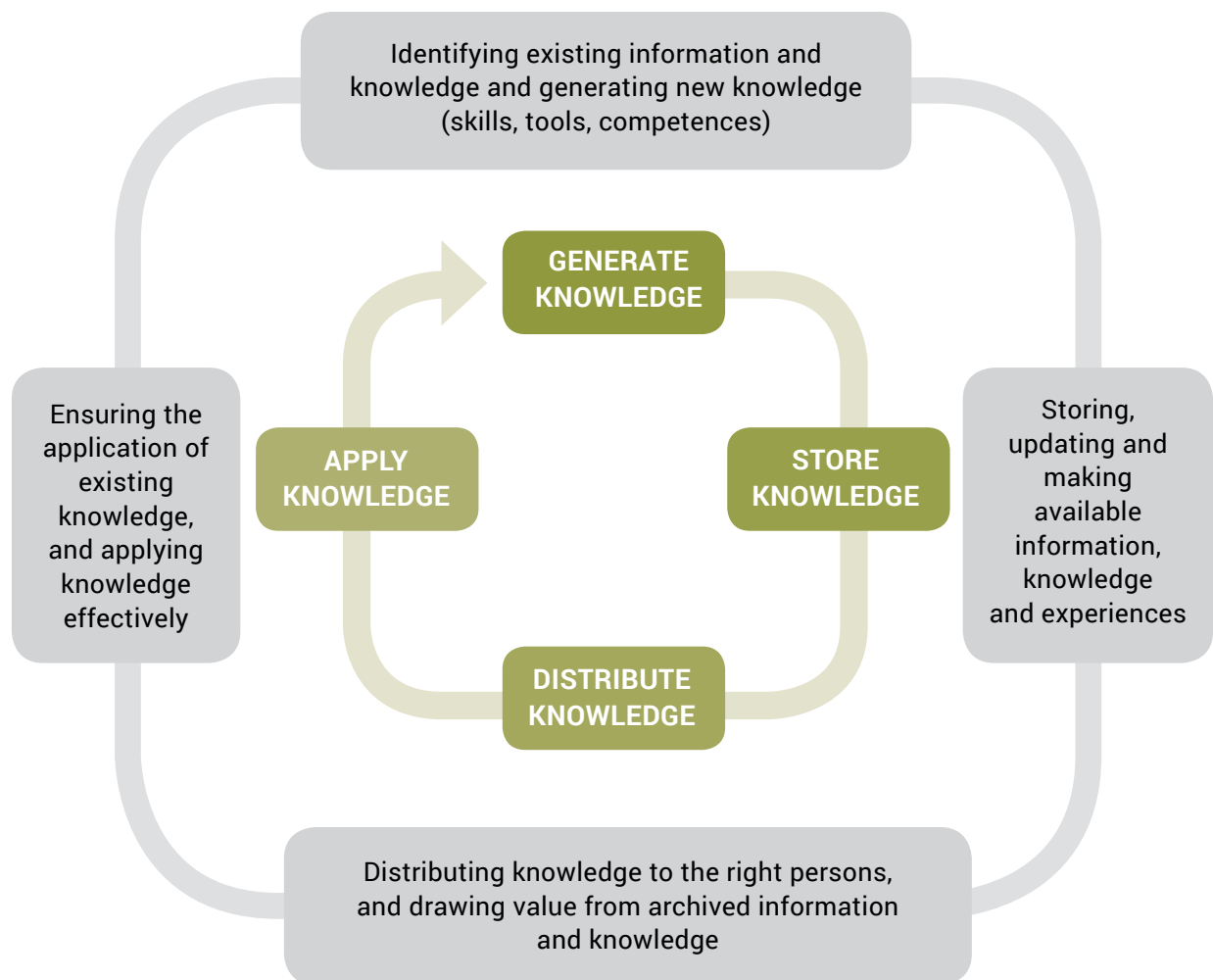
Powering Agriculture Events

2.4 Knowledge Management and Mainstreaming

Analyzing and disseminating experiences and knowledge complements Powering Agriculture's overall goal of supporting new and sustainable approaches to accelerate the development and deployment of CES for increasing agriculture productivity. Knowledge management – including generating, analyzing, disseminating and supporting the application of knowledge – leverages Powering Agriculture's support to the Innovators to further integrate clean energy solutions within agricultural supply

chains in developing and emerging countries and adapt CES to local context. Figure 2.4 illustrates Powering Agriculture's approach to knowledge management. Powering Agriculture utilizes the regional Powering Agriculture Hub in East Africa and collaborates with U.S. presidential initiatives such as **Power Africa** and **Feed the Future** to mainstream the results, knowledge gained and lessons learned from the implementation of Powering Agriculture and to catalyze the integration of clean energy within regional/national agriculture production and food security programs.

Figure 2.3 Knowledge Management Cycle



2.4.1 Research and Studies

As part of Powering Agriculture's work to generate new knowledge in the clean energy/ag nexus, three publications were prepared.

The first joint FAO/Powering Agriculture study "Opportunities for Agri-food Chains to Become Energy Smart", was published in November 2015. The study emphasized the importance of assessing value chains from a nexus perspective to identify clean energy solutions for reducing GHG emissions. It was presented at conferences, disseminated to the media, and its facts were used for Powering Agriculture's "Did you know" campaign and for the MOOC. Five hundred copies were disseminated and the full study was also made available electronically. It was received with great interest by experts from the agricultural and energy sector and cited in many follow-on papers.

The 2nd joint FAO/Powering Agriculture study tentatively entitled "Costs and benefits of clean energy technologies in the milk, vegetable and rice value-chains" was drafted as a follow up to the November 2015 study and focuses on the costs and benefits of clean energy technologies in the milk, vegetable and rice value-chains in specific countries. The report will be made public in early 2017.

Powering Agriculture has developed a manual which introduces solar powered irrigation systems (SPIS) as one technology option to sustain and increase agricultural production in developing countries. The manual, entitled *Promoting, Financing and Advising on Solar Powered Irrigation Systems Manual and Tools for Development Practitioners*:

- targets agricultural extension advisors, providing them with information on technical,

agronomic, economic and environmental risks and benefits of SPIS use on farm level;

- can be used to train financial service providers to assess the financial risks and benefits of SPIS use at the farm level; and
- provides advice that farmers can use to make investment decisions.

The Manual and Tools will be made public in early 2017.

Powering Agriculture prepared two papers for submission in early FY2017 to the *Special Issue on Energy and Food Security in a Humanitarian Context, Journal of Sustainable Energy Technologies and Assessments*. One paper is entitled "Increasing Productivity through Irrigation: Problems and Solutions Implemented in Africa and Asia" and presents three major problems inhibiting the spread of irrigation in areas where agricultural productivity heavily depends on rainfall: lack of access to water, lack of access to energy, and lack of access to finance. It discusses how these problems are interconnected, complicating the use of technological solutions addressing them, and analyzes several solar irrigation approaches tackling these problems in Asia and Africa supported under Powering Agriculture.

The other paper is entitled "Milk Chilling through Use of Clean Energy and Energy Efficient Methods in Developing Countries" and discusses the in-country performance and applicability of various solar and biogas powered innovative milk cooling technologies in East Africa and India supported under the Powering Agriculture. The paper examines the technical and market barriers faced by the milk cooling technology Innovators and system implementers funded by Powering Agriculture,

specific to each country's dairy supply chain and method of milk collection. It also analyses the proposed business models and the innovations' applicability to the various stages of milk production value chains and steps needed to achieve their targeted impacts. If the papers are accepted, they will be published in mid-2017.

2.4.2 Training – MOOC

Powering Agriculture concluded its first, very successful, massive open online course (MOOC) "Powering Agriculture – Sustainable Energy for Food" in spring 2016. The contents were developed together with the TH Köln – University of Applied Sciences, the FAO, the World Bank, the Center for Development Research of the University of Bonn and Tetra Tech through PASTO.

Nearly 1,700 participants from around the globe took part in the course and learned about the sustainable use of energy throughout agricultural value chains. With the large participant turnout, lively discussions, and thousands of comments, the MOOC achieved its main goals: creating awareness and providing

knowledge on the energy/agriculture nexus. The MOOC platform, including all materials and links, remains available [online](#).

2.4.3 GIZ Powering Agriculture Hub

In January 2016, Powering Agriculture Partner BMZ/GIZ established a regional project hub for East Africa based in Nairobi, Kenya, to take advantage of the vast potential for the energy/ag nexus and to capitalize on the fact that most of the Innovators are implementing their projects in East Africa. With staff on the ground and close proximity to the American, Swedish, and German embassies and Missions in East Africa, the hub provides the Powering Agriculture Innovators with exchange and networking opportunities through which the Innovators can present their work, discuss it with likeminded experts, and create business opportunities. The Innovators can also benefit from research undertaken by the hub on topics such as solar-powered irrigation systems, milk cooling, and location-specific business models that will help them to become more competitive in their respective market environment.

