July/August 2026

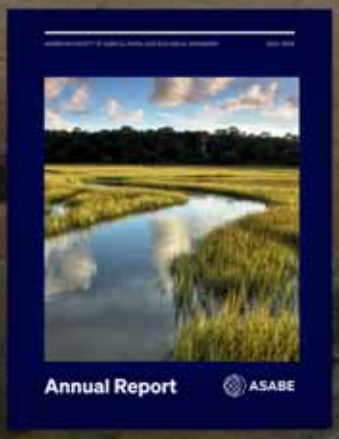
RESOURCE

engineering and technology for a sustainable world

Davidson Prize Winners

Grain Weevil Robotics Platform
OutRun | Tillage

Also inside:



PUBLISHED BY AMERICAN SOCIETY OF AGRICULTURAL AND BIOLOGICAL ENGINEERS

professional listings

upcoming events

ASABE CONFERENCES AND INTERNATIONAL MEETINGS

To receive more information about ASABE conferences and meetings, call ASABE at 800-371-2723 or email mtgs@asabe.org.

2026

July 12-15 **ASABE Annual International Meeting.** Indianapolis, Ind., USA.

Oct. 25-29 **UFoST 2026 World Food Congress** (endorsed event). Hong Kong, China.

2027

Feb. 7-10 **Agricultural Equipment Technology Conference (AETC).** Louisville, Ky., USA.

July 18-21 **ASABE Annual International Meeting.** New Orleans, La., USA.

2028

July 16-19 **ASABE Annual International Meeting.** Denver, Colo., USA.

CONTENTS

July/August 2026

features

inside the fold

ASABE Annual Report

departments

RESOURCE
July/August 2026
Vol. 33 No. 4
www.asabe.org/Resource

Magazine staff: Joseph C. Walker, Publisher, walker@asabe.org; Melissa Miller, Editor, miller@asabe.org; Glenn Laing, Technical Editor; Jill Straub, Consultants Listings, GuideToConsultants@asabe.org; Cedric Calhoun, Executive Director, calhoun@asabe.org.

Editorial Board: Chair Morgan Hayes, University of Kentucky; Secretary/Vice Chair Gretchen Mosher, Iowa State University; Past Chair Erin Webb, Oak Ridge National Laboratory.

Board Members: Igathinathane Cannayen, North Dakota State University; Jane Frankenberger, Purdue University; Roselle Barretto, USDA Forest Products Laboratory; Allison Graham, Vaderstad Industries; Ana Martin Ryals, University of Florida; Joshua Peschel, Iowa State University.

Resource: engineering and technology for a sustainable world (ISSN 1076-3333) (USPS 009-560) is published six times per year—January/February, March/April, May/June, July/August, September/October, November/December—by the American Society of Agricultural and Biological Engineers (ASABE), 2950 Niles Road, St. Joseph, MI 49085-9659, USA.

POSTMASTER: Send address changes to *Resource*, 2950 Niles Road, St. Joseph, MI 49085-9659, USA. Periodical postage is paid at St. Joseph, MI, USA, and additional post offices.

ADVERTISING: www.asabe.org/advertise.

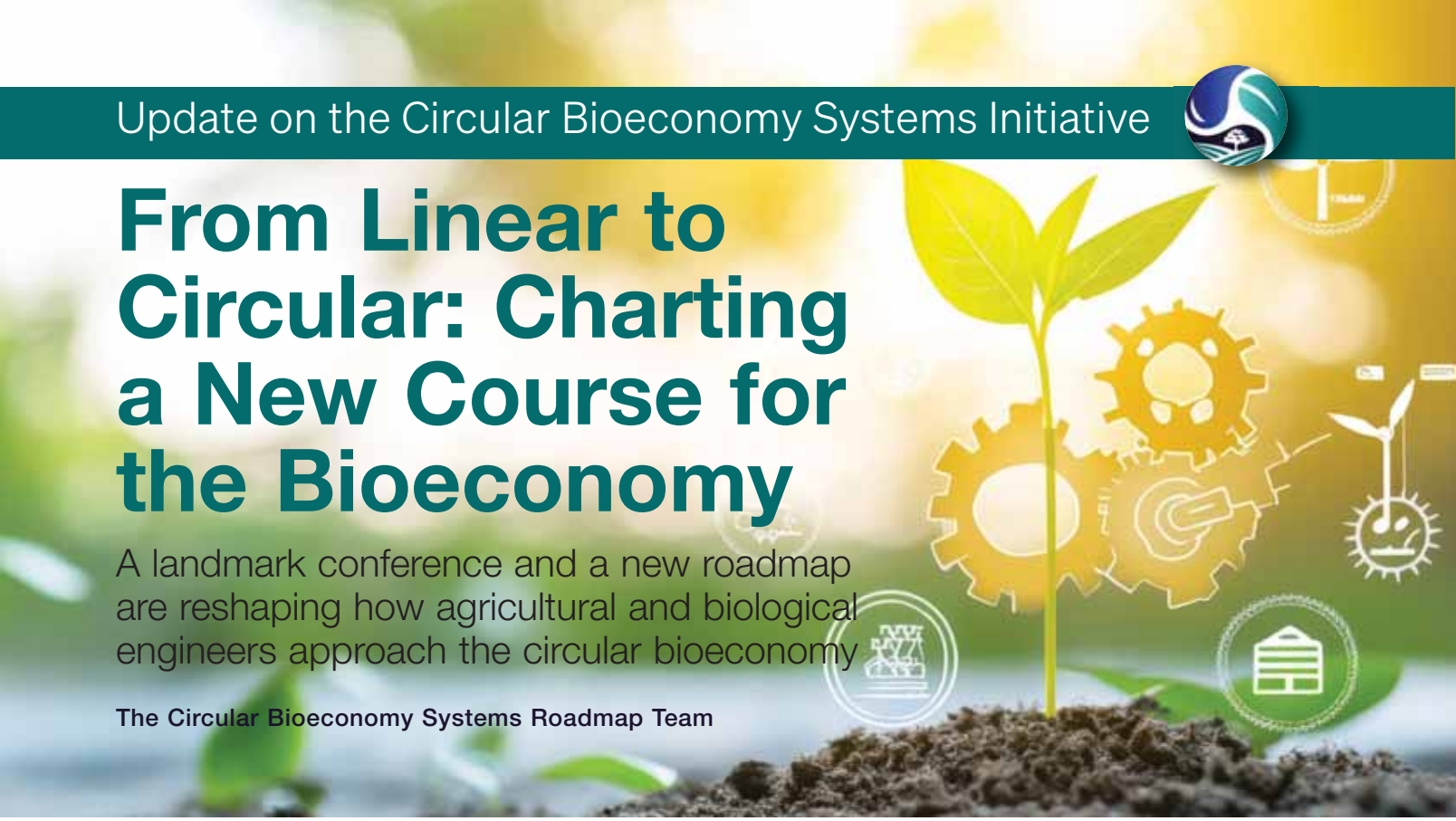
SUBSCRIPTIONS: Contact ASABE order department, 269-932-7005.

ON THE COVER: The Grain Weevil Robotics Platform, a Davidson Prize winner, does the work the no human should. Look for it glowing in the bottom left side of the photo. Find out all the details on page 14.

ASABE
Engineering a Sustainable Future

American Society of Agricultural and Biological Engineers
2950 Niles Road
St. Joseph, MI 49085-9659, USA
269-429-0300, hq@asabe.org,
www.asabe.org

From Linear to Circular: Charting a New Course for the Bioeconomy



A landmark conference and a new roadmap are reshaping how agricultural and biological engineers approach the circular bioeconomy

The Circular Bioeconomy Systems Roadmap Team

For decades, the global economy has run on a simple, and deeply flawed, logic: take natural resources, make something, and then discard it. Agricultural and biological engineers have long understood that this model is wasteful and ultimately unsustainable. Now, a growing coalition of researchers, scientists, industry partners, and policymakers is working to replace it with something better: circular bioeconomy systems, or CBS, that keep materials in use, close resource loops, and treat "waste" as a valuable input rather than a disposal problem. For agricultural and biological engineers and scientists, the challenge is especially visible in the vast quantities of agricultural residues, food processing byproducts, forest resources, and other biomass streams that often remain underutilized.

In September 2025, a coalition met in Pigeon Forge, Tennessee, for the first-ever Bioderived Materials and Chemicals in Circular Bioeconomy Systems Conference. Hosted by several major universities and organizations—including the University of Tennessee, Virginia Tech, North Carolina State University, the University of Georgia, HudsonAlpha Institute for Biotechnology, and agInnovation South—this event built on recent ASABE workshops and brought together 84 participants from 12 states and four countries. It was more than a successful event; it laid the groundwork for a strategic roadmap that's shaping CBS research and investment across the Southeast and beyond.

Why CBS, and why now?

The numbers make the urgency concrete. According to the 2025 Circularity Gap Report, only 6% of materials used globally are cycled back into the economy. Meanwhile, the DOE's 2023 Billion-Ton Report documents vast quantities of underutilized renewable carbon resources in the U.S. alone. CBS offers a pathway through both problems: an economy powered by renewable materials, where products are designed to last, resource loops are closed, and what remains can be converted into something useful.

> CBS offers a pathway through both problems: an economy powered by renewable materials, where products are designed to last, resource loops are closed, and what remains can be converted into something useful.

Rather than adopting a narrow definition, the conference participants defined CBS as a flexible framework for using renewable materials, closing resource loops, and designing waste out of systems from the start—an approach adaptable enough that regions and industries can tailor it to their own resources and circumstances.

Four priorities, one system

During the conference, working groups identified four research and action priorities. What sets this roadmap apart is that it doesn't treat these priorities as separate silos. Instead, they're seen as parts of an interconnected system, with feedback loops linking everything together.

1. Technology for the CBS transition. The Southeastern U.S. offers an exceptional variety of plant feedstocks—switchgrass, miscanthus, hybrid poplar, soybean, camelina, and others—with potential for conversion into bioplastics, chemicals, composites, and bioenergy. But biomass also presents distinct engineering challenges. Unlike petroleum, it varies widely in composition and quality, and it's typically produced across large geographic areas in dispersed, low-density forms. Efficient collection, transport, sorting, and processing of these materials demands new approaches to supply-chain design, logistics, and conversion technologies. The roadmap calls for advances across the entire value chain—from feedstock engineering and improved biorefining to higher-value use of components like lignin. It also highlights the role of AI and robotics in optimizing operations, and the potential of modular, distributed processing to reduce transport costs while supporting rural economic development.

Comprehensive framework of the CBS flexible approach.

2. Industrial scale-up and market integration. Too often, promising technologies stall between laboratory demonstration and commercial deployment—the so-called "valley of death." Bridging that gap requires pilot facilities, strong public-private partnerships, and new models for cross-sector collaboration. Consumer acceptance matters as well. Bio-based products need to meet the performance standards that people already expect, and research into what builds consumer trust will be essential as new materials enter the market.

3. Standardized metrics and policy frameworks. One of the conference's clearest takeaways was that the U.S. lacks a coherent national policy for a circular bioeconomy. While the European Union and Japan have developed comprehensive strategies, the U.S. is still catching up. The roadmap calls for standardized circularity metrics that integrate technical, economic, environmental, and social measures—tools that will give investors, researchers, and policymakers a common language for evaluating progress. It also calls for policy frameworks that encourage coordination across the full value chain, from producers and processors to local communities and end consumers.

4. Community engagement and workforce development. Many advanced bioprocessing facilities will be located in rural areas, making workforce readiness a critical planning consideration. Awareness of CBS careers remains low, training pathways are limited, and industry certifications are sparse. The roadmap calls for building capacity through student outreach, mid-career retraining, vocational programs, and industry partnerships—and for ensuring that rural communities see tangible benefits, from new employment to reduced waste, that make them stakeholders in the transition rather than passive hosts.

Priorities for transitioning to CBS in the Southeastern U.S. with highlighted goals for each priority area.

Priority 1: Developing technologies for the CBS transition	Priority 2: Enabling industrial scale-up and market integration	Priority 3: Developing standard metrics and policies	Priority 4: Engaging the community and building the workforce
Advance feedstock utilization	Bridge the technology readiness gap	Establish standardized multidimensional metrics that encompass technical, economic, environmental, and social dimensions of CBS	Increase workforce awareness and engagement
Develop scalable and modular bioprocessing	Drive market acceptance and adoption	Establish consensus on policy frameworks that support socially desirable transitions to circularity	Develop training pathways and certifications
Innovate product design and engineering, recycling, and upcycling	Align incentives among diverse interest groups to maximize synergies and minimize conflicts		Promote experiential and value-based learning
Integrate data science tools (e.g. AI, ML, -omics)			Involve stakeholders in business model design research

This biofuel refinery processes crops like corn or soybeans into renewable fuel sources.

The CBS building (Bioeconomy Innovation Hub, University of Tennessee) now hosts at least 10 new CBS researchers and a Biomaterial Governor Chair.

What this means for ASABE

Agricultural and biological engineers aren't on the sidelines. We're at the center of this work. The roadmap's core technical challenges—biomass deconstruction, flexible biorefinery design, complex waste-stream management, and systems integration—map directly onto our profession's strengths. So does the ability to think across scales: connecting molecular-level conversion science to supply-chain economics, environmental performance, and community impact.

The recently opened Grand Farm innovation center in Perry, Georgia, will enable rapid prototyping and scaling up of developed circular technologies.

Across the Southeast, institutions are already putting these ideas into practice—from recyclable materials initiatives at the University of Tennessee and Oak Ridge National Laboratory to zero-waste systems at the University of Georgia and waste-stream mapping efforts at NC State. The BRIDGES NSF Innovation Engine is working on using perennial grasses like miscanthus as greener alternatives to petroleum-based materials for cars, construction, and packaging.

Funding options are growing, too. Organizations like the USDA, NSF, DOE, and private foundations (such as Schmidt Sciences) are supporting CBS-focused programs. Land-grant universities, which provide most of the publicly funded agricultural research in the U.S., are especially well placed to help bring new technologies from the lab to the field, working across states and disciplines.

Embracing complexity

The CBS roadmap's title "Embracing Complexity" was chosen on purpose. The circular bioeconomy isn't about just one technology, one policy, or one group of people. It means bringing together all the research areas that have been working separately, so that technology, measurement, community trust, and workforce skills all grow collectively. Everything is connected, and progress in one area helps drive the others.

When the conference ended, the participants left Pigeon Forge energized and united by one idea: CBS needs to be adapted for every context, region, resource, and stakeholder. That diversity isn't a problem to solve—it's what makes the system strong.

For ASABE members, the message is direct: the circular bioeconomy transition is already underway. Pilot facilities are being built, funding is expanding, and regional partnerships are actively forming. The question is not whether agricultural and biological engineers will play a role; it's whether we will lead this critical transition.

This article was adapted from the "2026 Circular Bioeconomy Systems Roadmap: Embracing Complexity" developed by the Circular Bioeconomy Systems Roadmap Team: **University of Tennessee:** Nicole Labbé, Jenny Moore, Jessica McCord, Timothy G. Rials, Mary Danielson, Raphael Ployet, Umesh Marathe, Ahmed Chennak, Somnath Koley; **University of Georgia: ASABE Fellow Brahm Verma** and Gopinath Munisamy; **Virginia Polytechnic Institute and State University: ASABE member Haibo Huang; North Carolina State University: ASABE member Joe Sagues; HudsonAlpha Institute for Biotechnology:** Samuel Jackson; **agInnovation South:** Gary Thompson; and **Oak Ridge National Laboratory:** Rebecca Wilkes and Diego Hincapie-Ossa.

The full document is available at:
https://crc.tennessee.edu/circular-bioeconomy-systems-roadmap/

A Foundation for the Future

The purpose of the ASABE Foundation is simple: strengthen the Society by investing in the people, programs, and opportunities that advance agricultural and biological engineering. Over the past year, the Foundation has continued to expand that impact through increased support, stronger engagement, and new initiatives designed to better serve ASABE members.

In 2025, donor support reached new heights. Contributions increased by more than 82% between 2024 and 2025, reflecting growing confidence in the Foundation's mission and its ability to create meaningful impact throughout the Society. This generosity has allowed the Foundation to invest more than $300,000 in ASABE programs, scholarships, student competitions, leadership development opportunities, awards, and other initiatives that strengthen the profession.

Member engagement has also continued to grow. The annual Friends of the Foundation Dinner has become one of the most anticipated events at ASABE's Annual International Meeting, with attendance and support increasing year after year. More than a fundraising event, the dinner serves as a celebration of the individuals whose generosity helps sustain ASABE's mission and invest in its future.

Behind the scenes, the Foundation has focused on building the infrastructure necessary for long-term success. In 2025, the Board engaged Financial Enhancement Group (FEG) as its investment advisor. FEG is a nationally recognized institutional investment consulting firm that advises foundations, endowments, nonprofits, and other mission-driven organizations on investment strategy and stewardship. Their partnership helps ensure that Foundation assets are managed with the long-term perspective and fiduciary responsibility that donors expect.

The Foundation also surpassed $7 million in assets this year, strengthening its ability to support future generations of ASABE members. While careful stewardship remains essential, the Foundation's focus continues to be on putting resources to work to advance the Society's mission.

Several new initiatives are helping position the Foundation for even greater impact. A new scholarship fund was established, expanding educational opportunities for students pursuing careers in agricultural and biological engineering. The Foundation also created an operating fund dedicated to unrestricted legacy gifts, providing future leaders with flexible resources to address emerging needs and strategic priorities.

The Foundation's Ambassador Program continues to gain momentum, connecting members with opportunities to learn about philanthropy and become more engaged in supporting ASABE's future. At the same time, the active E-06 Development Committee is helping shape new processes and strategies that will improve access to Foundation resources across the Society.

Among those efforts are a standardized Letter of Inquiry process for funding requests and a standardized scholarship application system. These initiatives are designed to make Foundation support more accessible, transparent, and equitable while helping ASABE volunteers and staff better connect funding opportunities with Society priorities.

Looking ahead, the Foundation trustees and staff are increasing their presence at regional section meetings, student rallies, competitions, and other Society events. These conversations help ensure that the Foundation remains connected to members' needs while identifying new opportunities to invest in the profession's future.

The Foundation's success is not measured solely by dollars raised or assets managed. It's measured by the opportunities created, the students supported, the programs strengthened, and the members whose generosity continues to shape ASABE's future.

Liz Metts, Director of Development, ASABE, St. Joseph, Michigan, USA, metts@asabe.org.

I wouldn't BE ME without ASABE

Travis Tsunemori

2026-2027 ASABE President
ASABE member since 1996
Manager, Product Compliance
Kubota North America
Sanger, Texas, USA

People often ask me where I grew up, and my standard answer is: "I never grew up, and I don't intend to!" However, I was raised on the family farm in eastern Wyoming and moved to western Nebraska when I was in fifth grade. I was raised on the blister end of a hoe on a sugarbeet, pinto bean, and corn farm, so when I went to college, I wanted nothing to do with agriculture.

After 3+ years studying aerospace engineering at Oklahoma State University (OSU), I discovered the work of **ASABE members John Solie, Marvin Stone, and Dick Whitney,** who used engineering and technology to reduce the need for manual labor, such as chopping weeds with a hoe—like I did on the family farm. So I transferred to OSU's Department of Biosystems and Agricultural Engineering, and I became an agricultural engineer. That was the best decision I ever made!

After graduating with my BS degree, I stayed at OSU for grad school, earning an MS degree from the same department, and I worked full-time as a research engineer, focusing on the use of sensor technology to identify differences in crop health, along with a few other projects.

After grad school, I worked briefly for Phoenix International, John Deere's electronics branch, on special harvesting projects. We were installing sensors, control systems, and other technologies on combine harvesters to reduce the need for operators to interact with the machine as frequently. I take pride in seeing where agricultural machinery is today, knowing that the work we did was the precursor to today's highly automated machines and modern precision agriculture.

Next, I started working at ASAE (now ASABE) headquarters to support the many technical committees, particularly the Standards committees. Working with members across the various technical communities gave me a solid understanding of the broad range of topics within ASABE. I hope to use that experience, and the extensive network of colleagues and friends I've acquired over the years, to help the Society during my term as President.

I now work for Kubota as the manager of product compliance for North America. Our team covers all the products that Kubota sells in North America, as well as machines that are exported from North American manufacturing facilities. We're responsible for product compliance (standards, regulations, and supporting the legal team), chemical and other regulations that impact parts, and supporting our marketing team regarding product use in marketing materials.

My beloved dog, Morgan, and I picking up trash to keep our favorite local park clean.

When did you first become involved with ASABE?

That's an interesting question. I joined ASABE as an undergraduate student, but I was not an officer in the OSU student branch. And even though I'm a founding member of the Young Professionals Community (YPC), I never held a YPC office. Later, while working at ASABE, I supported all the technical committees, but I never held an office. In fact, I never held a Society office until I started working at Kubota.

However, when I started at Kubota, I was a well-known person in the technical committees, so I was asked to join the leadership rotation for the committees that Kubota participates in. Officially, my involvement in ASABE started during my last year of undergraduate studies, but the involvement that led me to this position really didn't start until ten years ago.

Socializing during early years of YPC.

My team covers all Kubota products sold in North America (not pictured: implements and attachments).

Looking back, what experiences or people had the biggest influence on your career?

That's both a difficult question and an easy question. The short answer is "all of it"—the work ethic that my dad, brother, and uncle showed on the farm; the way my dad interacted with other people; the people I met and became friends with at OSU; the faculty at OSU, their work, and their dedication to successful outcomes for the students; and seeing how the work we did, at every step along the way, makes the production of food, feed, fiber, and fuel more effective, more efficient, and more environmentally friendly. All of that experience shaped me and makes me feel like the work that I've helped with, and the work that agricultural and biological engineers, technologists, and everyone in our profession is doing, is more than worthwhile—it's essential. In the words of Past President Doug Otto, we work "on things that make a real difference."

A specific experience that helped me focus on this profession occurred shortly after my dad passed away. I was starting my second semester of grad school, and I was seriously considering dropping out and going to work, not in agriculture. However, my involvement with the OSU student branch and with the quarter-scale tractor competition, now the International Quarter-Scale Tractor Student Design Competition (IQS), made me realize that I wanted to finish my degree. If I had taken that other job, I would not be in the position I am today.

What motivated you to become more involved in ASABE leadership?

I wasn't looking for it; I was asked. When I started at Kubota, representatives from other companies asked me to join the leadership rotation for several committees. Their confidence that I would provide value in those positions overcame my reluctance. The support I received from our internal leadership at Kubota reinforced my decision.

As time went on, other members asked me to serve in other capacities—on the Nominating Committee, the Foundation, the Board of Trustees, and now the Presidential leadership team. The trust I received from you is humbling, and I will do my best to live up to your expectations!

What have been some of your most rewarding ASABE experiences?

Three things really stand out. First, staying involved in IQS. The relationships I built over the years, with the people my age who competed at the same time, as well as with new students every year, and seeing them get so much from this competition, really is amazing.

Second, seeing the YPC continue to provide transitional benefits to young members is pretty cool. While challenges remain in the retention of student members to full members, the YPC can help, and I've seen many YPC members move on to other roles in ASABE—most notably Past President Candi Engler, the first YPC officer to become ASABE President.

Finally, my first Society-wide elected position on the Nominating Committee gave me an opportunity to use my ASABE network to benefit the Society. Sometimes we forget how many excellent people there are in our Society. Poring over the network of people that I've met over the years reinvigorated my belief that we are in a great position to provide value to our profession and to the world.

Why do you believe professional societies remain important in today's world?

Besides the technical and professional networking, which is not a trivial contribution, engineering societies in general—and ASABE in particular—serve as a key

Oklahoma State alumni Sherry Hunt ('25-'26 President) and I pose with OSU's quarter-scale tractor at the 2025 competition.

component to ensure that educational programs remain accredited. Without that, the degrees that our members earn risk becoming unusable. In addition, professional societies can serve to advocate directly and to support advocacy on topics that impact our organization and its members. ASABE works with several trade associations to be a resource for technical expertise on many topics.

As you prepare to serve as ASABE president, what excites you most about the year ahead?

Over the years, in various roles, I've had the opportunity to represent the Society leadership and staff at many different events—student rallies, section meetings, the Annual International Meeting, and many others. The opportunity, as President, to do more of that is something I really want to take advantage of. I'm really looking forward to meeting members who may not normally attend the AIM, AETC, or other events.

What do you see as the greatest opportunities facing ASABE?

ASABE can grow our collective sphere of influence through our current and upcoming initiatives, increased engagement, and partnerships with other organizations. If we don't work on these items, we risk shrinking our sphere of influence to the point of irrelevance, so our Society leadership and staff are working hard on these topics.

Are there specific priorities you hope to advance during your presidency?

Our Society has to learn to Connect Forward. By that I mean we do a pretty good job of communicating and connecting with each other, but we can also provide value to people outside of our membership. We have to find ways to get our information, knowledge, and expertise into the hands of other people and organizations that are working in our space.

As younger people, and new types companies and organizations, become more involved in the production of food, feed, fuel, and fiber, the preservation and remediation of clean water and air, and all of the other amazing work that our members do, we have to ensure that our message gets out to prospective students and the workforce that ASABE has the knowledge and expertise.

Just "Ask ABE"—or ask an agricultural or biological engineer or technologist! But people won't know to ask if we don't get our message out there, and with generational shifts in communication, we have to get that message out in ways that younger generations can relate to and get excited about. Connect Forward means that we share our individual and collective work in ways that drive engagement and encourage engineers, technologists, and any related professionals and students to participate in ASABE.

Talking with students at IQS about potential jobs.

What is one thing about you that many ASABE members may not know?

At the time of writing this, I have visited 48 of the 50 U.S. states and gone fishing in 30 of them. I currently hold annual fishing licenses in four different states.

When your presidential year concludes, what would you hope members say was accomplished?

I hope that they don't remember it as the year I was President, but rather as the year when ASABE gained momentum and expanded our sphere of influence and impact. I hope the collective work by the Board, the Foundation, headquarters staff, and the members of ASABE will transform our Society's trajectory.

What gives you optimism about the future of agricultural and biological engineering?

When I attend student rallies, I see the future leaders of our profession already being proactive and strategic, and growing their networks. The student rallies have a tremendous impact on our Society that is already paying dividends. As long as we serve the needs of those young members, our future will be in good hands. In addition, our student competitions, the IPC and YPC, and the young member awards are proving that our future is bright, and that members of all ages, experience, and technical interests want to help secure that future.

If you had to complete the statement, "I wouldn't be me without ASABE because..." how would you finish it?

...if I hadn't been involved in ASABE as a student, I wouldn't have stayed in grad school, and I wouldn't have been asked to join the headquarters staff, and I wouldn't have the breadth of knowledge about the industry, and I wouldn't have met my late wife, and I wouldn't have talked to Kubota about compliance engineers, and I wouldn't have my job at Kubota, and I wouldn't be serving as ASABE President!

AMERICAN SOCIETY OF AGRICULTURAL AND BIOLOGICAL ENGINEERS 2025–2026

Annual Report

ASABE

2025–2026 Board of Trustees

President
Sherry L. Hunt

Past President
Douglas R. Otto, PE

President-Elect
Travis S. Tsunemori

Executive Director
Cedric Calhoun

Treasurer
Gary E. Seibel

Trustees

Gayle C. Baker, PE
Mari S. Chinn
Jeremiah D. Davis, PE
Anthony Doss, PE
Stéphane Godbout, Eng
Carol L. Jones, PE
Kyle R. Mankin
Bradley P. Marks, PE
Paula N. Steiner, PE
Mark R. Wilkins, PE

President's Message

At the 2025 ASABE Annual International Meeting (AIM) in Toronto, Ontario, Canada, our keynote speaker, Julie Borlaug, set the stage with her presentation, "Stronger Together: Telling Our Stories, Shaping Our Future." Some say we are the masters of our own destiny, yet I believe Sandra Day O'Connor is right in that "We don't accomplish anything in this world alone." I contend she is also correct in that it is the individual threads so uniquely woven together that create a beautiful tapestry, our strong Society.

Having been blessed with supportive, caring, and knowledgeable mentors throughout my career, I've learned the value of how crucial these connections are as they help shape our stories and our path to success. Passing it forward from our mentors through us to the next generation of agricultural and biological engineers and technologists becomes part of this interwoven tapestry that creates the legacy of our profession.

In Toronto, I embarked on my ASABE presidential year by challenging our members to "embrace your story." In subsequent *Resource* magazine articles, I continued to encourage our members to engage and connect by becoming a mentor or volunteer to support our next generation of biological and agricultural engineers and technologists.

I learned very quickly that I could not take on this challenge alone. Having grown up in the baseball town of Binger, Oklahoma, I remember our team's mantra: TEAM—together everyone achieves more. I can proudly say your ASABE leadership did not sit idle as we embraced this challenge and celebrated many triumphs along the way.

As we set out on our journey from Toronto, we found ourselves in celebratory mode, with the centennials of the Northeast Agricultural and Biological Engineering Conference and South Dakota State University's agricultural and biosystems engineering department, and the 75th anniversary of the Farm Equipment Manufacturers Association. Applauding these milestones should not go unnoticed!

Next, we met with the Association of Equipment Manufacturers. This meeting was a step towards renewed bonds, with an emphasis on how we could leverage each other's expertise that would synergize areas of mutual interest like creating a direct talent pipeline for workforce development, unifying our voices on innovation, amplifying our communications, integrating engagement opportunities, and streamlining and ensuring global relevance of standards.

Our ASABE leadership's goal was simple: raise the visibility of ASABE, our agricultural and biological engineering and technology professions, our advancements in agriculture, and the impacts we make on humankind daily!

One of my priorities over this past year was for our ASABE leadership to engage with our future —namely, our young professionals, collegiate students, and secondary school children across the world. Investing our time and energy into our future Society leadership is paramount. If we want to continue to push the bounds and inspire the next innovations of engineering solutions, then we must embrace our stories by sharing them, and we must connect with these students and young professionals.

The Board of Trustees started it off by engaging with our student members at the fall Board of Trustees meeting. As the new year approached, our leadership geared up for more adventures by making ASABE's presence known at student rallies, friendly engineering competitions, section meetings, campus visits, and conferences.

I want to express my heartfelt thanks to our ASABE leadership team, past and present, along with staff, for their time and dedication to our members. Just as important, I thank the families of these dedicated leaders who spent many nights away to engage with you.

It was phenomenal to see how the *team* came together to divide and conquer when event schedules demanded it, so we could engage with as many members as possible over the year. Without them, the success we attained would have been out of reach.

Likewise, I want to express my gratitude for the countless volunteers of faculty, students, and industry leaders for graciously welcoming us to your campuses and businesses while attending student rallies, section meetings, and celebrations. These events were some of the highlights of my year, as I personally loved attending and witnessing students rise to the challenge of planning, organizing, learning, managing time and money, networking, and supporting one another at student rallies across the country.

The skillsets these students developed are ones they will have for life, and I have no doubt ASABE will reap the benefits as these future Society leaders continue to cultivate their leadership and professional skills in the coming years. I can't wait to see what is in store for them in the future.

To see this level of hard work and dedication for secondary school students at DiscoverE's Future City Competition was just as impressive as they prepared their "Farm to Table" Future City to feed millions. I know the future of agriculture is bright because of the innovations these students as young professionals will bring when they join our growing profession.

Speaking of the future, your ASABE Board of Trustees was hard at work developing a strategic plan and prioritizing goals over this past year. The Board identified Optimizing Member Engagement as its foundational priority for 2026.

With this priority, ASABE staff, leadership, and a select group of member volunteers, with the help of a strategic partner, began preparing something new—designed to help our community connect, learn, and move forward, so our profession can tackle complex challenges that impact food systems, water resources, energy, sustainability, and the environment.

The time is now, as our future demands it! Past President Doug Otto was not wrong when he said, "Agriculture isn't waiting—and neither should we!" What better place to launch this new product than at AIM 2026 in Indianapolis, Indiana! Regardless of whether you attend AIM or not, this is something that will reap benefits for *all* ASABE members.

In closing, I want to give a special thanks to my husband, Brad, and our daughters, Jaley and Loran, for putting up with my hectic travel schedule and for supporting me so that I could support you!

In addition, I want to thank my USDA-ARS leadership for enabling me to support our profession, so we can continue to impact agriculture through scientific discovery for the establishment of critical safety and production standards for the cost-effective and safety-promoting design of not only agricultural machinery and food production and processing equipment, but also water and energy systems that protect the health, safety, and liability of farmers, ranchers, and producers worldwide on a daily basis.

When I attended my first ASABE Annual International Meeting as a student more than 28 years ago, I had no idea that my journey would bring me to one of the most memorable highlights of my career.

Thank you for entrusting me to serve as your ASABE president. *Embrace Your Story,* as you never know who you may inspire to become an agricultural and biological engineer or technologist, let alone your future ASABE president!

Sherry L. Hunt

SHERRY L. HUNT

ASABE President 2025–2026

Journals and Publications

***Resource* magazine:** The "Explore" special issue of *Resource* magazine will be available in September/October of 2026. This special issue is published every three years as the annual student-focused issue. "Explore" will feature careers in agricultural technology and systems management. Hundreds of reprints are distributed at various venues, including National Engineers Week events and the annual FFA Expo, and to individuals and teachers who request career materials.

CPD at AIM: Several journal editors will conduct a continuing professional development class at the 2026 Annual International Meeting to certify attendees as ASABE journal reviewers.

Impact factors: For the 2024 publishing year, the journal impact factor (JIF) for the *Journal of the ASABE*, formerly *Transactions of the ASABE*, is 1.0. The JIF for *Applied Engineering in Agriculture* is 0.9, while the *Journal of Agricultural Safety and Health* has a JIF of 0.9. The JIFs for the 2025 publishing year will be available at the end of June.

Author outreach: In March, an email from ASABE Publications, on behalf of the ASABE Editor-in-Chief, went out to over 12,000 authors. The email issued a call for manuscript submissions, inviting original research articles, reviews, and technical notes across the field of agricultural and biological engineering. The email highlighted the benefits of publishing with ASABE, including global visibility, a rigorous peer-review process with an average first decision time of 50 days, and eligibility for annual Superior Paper Awards. It also promoted submissions to several open special collections and provided guidance on submission procedures and author support resources.

Special Collections: Several special collections are currently in progress, including:

- LLM and Generative AI Applications in Agricultural and Biological Engineering
- Ecosystem Evapotranspiration: Advances, Challenges, and Future Needs in Measurement, Modeling, and Application
- Regenerative Agriculture
- Water Quality Monitoring: Technologies and Data Stewardship for Low-Cost, High-Frequency, and In Situ Data Collection
- Sustainable Groundwater in Agriculture

Standards and Technical Activities

This year, ASABE published six new and eleven revised standards, on topics that included biochar testing methods, hygienic design for specialty crop machinery, grain bin wind loads, and electromagnetic radiation systems for plants (the third LED-related standard from the Energy Systems Technical Community).

ANSI Reaccreditation: ASABE's standardization procedures undergo ANSI audit every five years; the latest began March 2026. Results will guide a procedures revision by our Standards Policy and Procedures committee, STC-01, after which ASABE will be reaccredited for another five years.

Biochar Standards: ASABE published its first biochar standard, with more in development. The American Biochar Institute funded public access to this standard—ASABE's third publicly available standard—and aims to ensure future biochar standards remain public.

International Data Standards: Through ISO Technical Committee 347, Data-driven agrifood systems, fourteen working groups are exploring potential data standards for agriculture (soil sensors, drone imaging, yield modeling, satellite monitoring). Interested members should contact ASABE Technical Committee ASE-347.

NPPC Collaboration: ASABE is helping the National Pork Producers Council maintain its Good Environmental Livestock Production Practices (GELPPs), leveraging overlapping member expertise despite NPPC's separate ANSI procedures.

ASABE Standards: 291 Standards Published and Maintained • 27 Projects

ISO Activities: 15 ISO Committees • 456 ISO Standards Published and Maintained, 61 Projects

Thank you to our generous supporters!

ASABE, AES Form Partnership

ASABE and the Aquacultural Engineering Society (AES) formalized a strategic partnership to accelerate innovation and professional growth in aquatic engineering. As the world's fastest-growing protein sector, aquaculture demands robust engineering for sustainability and food security. AES will leverage ASABE's ANSI-accreditation, and the societies will jointly develop new technical standards starting in 2027.

Meetings

Annual International Meeting

Toronto, Ontario, Canada
July 13–16, 2025
1353 attendees

Agricultural Equipment Technology Conference

Louisville, Kentucky
February 9–12, 2026
227 attendees

Supporting Our Members

Professional Licensure

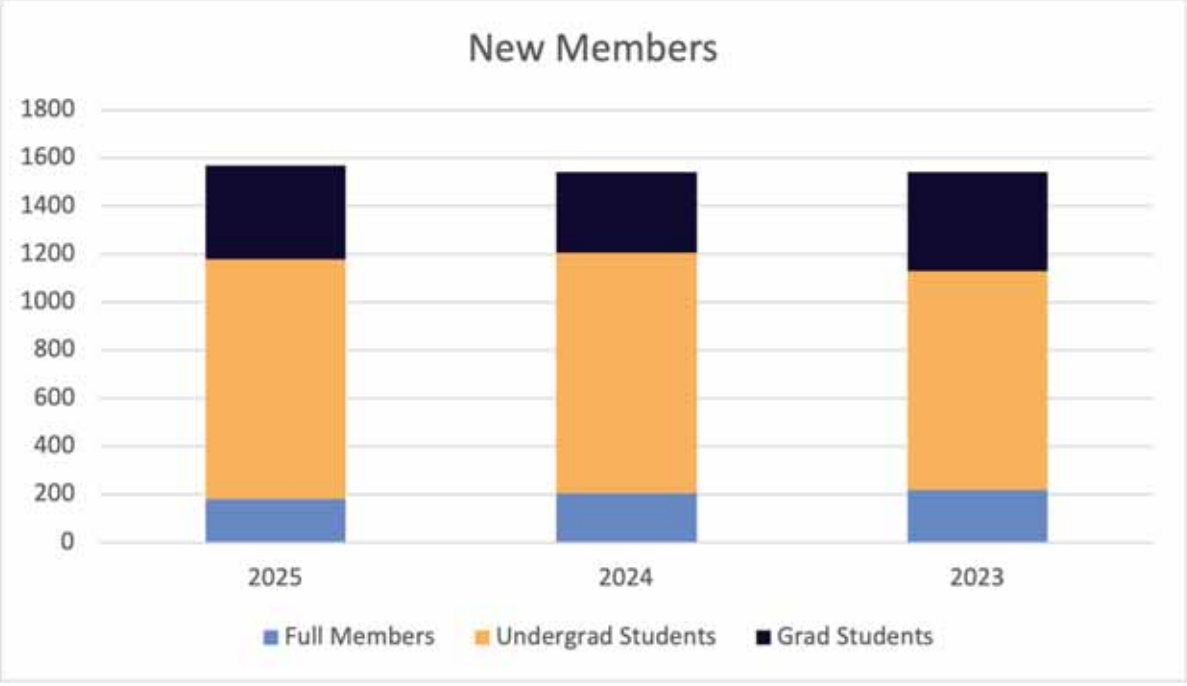
Of the 33 individuals taking the agricultural and biological engineering professional licensure exam in 2025, 91% (30) passed the exam, the highest pass rate of any of NCEES' Professional Engineering exams.

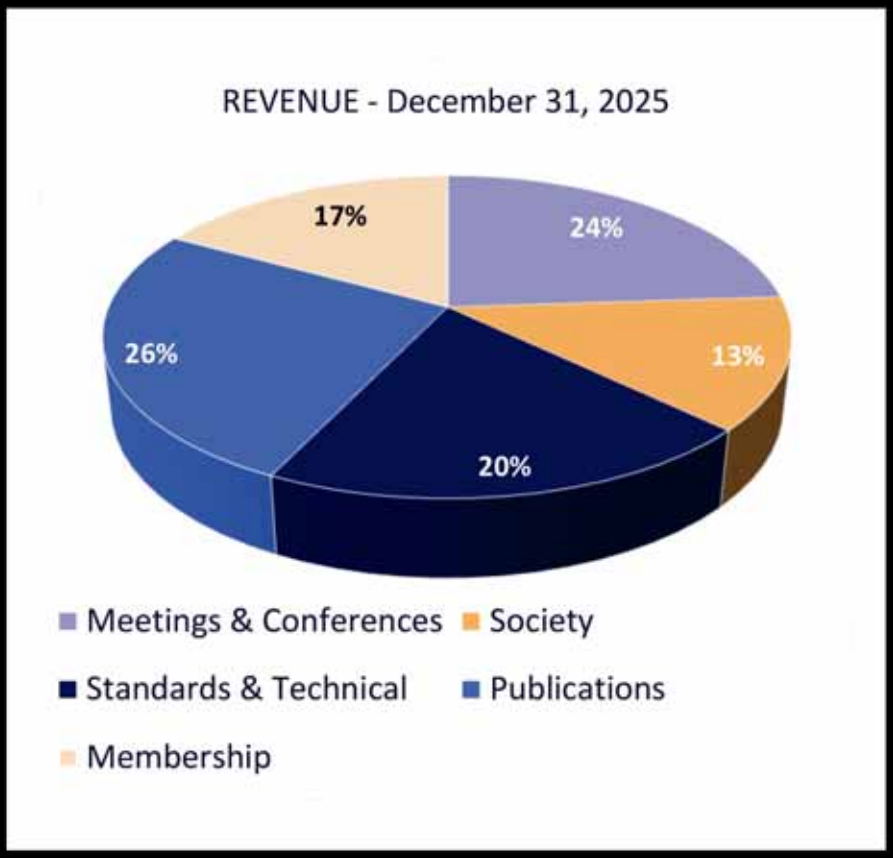
There is a strong correlation between the high quality of preparatory materials ASABE offers and an extremely high exam pass rate. We offer a live study webinar series throughout the late summer and fall. There are recorded presentations of the past few years of webinars, and many electronic reference materials, including a subset of the ASABE standards that are referenced in the exam.

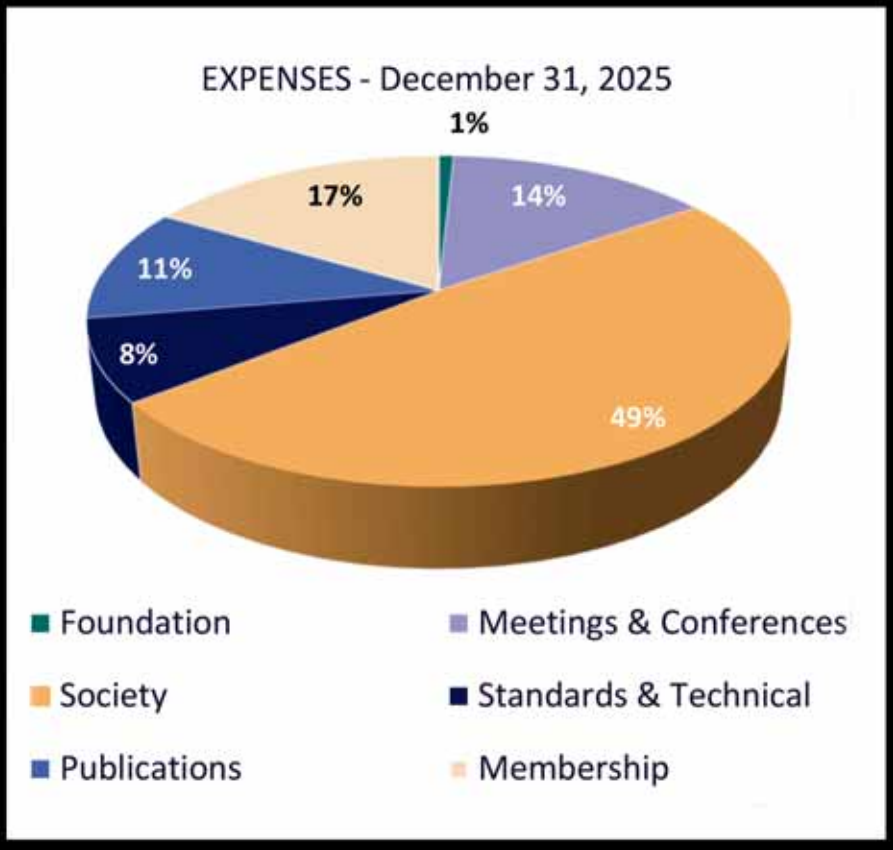
Professional Development Series

This spring we launched a new chapter in our commitment to professional growth: a dedicated continuing education webinar series. It's more than just a convenient way to earn professional development hours at a member discount; it's a platform designed to close the loop on innovation. By inviting our own members to lead these sessions, we're turning individual expertise into a shared community resource, ensuring that the latest breakthroughs in the field don't just stay in the lab, but reach the hands of the practitioners who need them. At the time of writing, 56 individuals have attended the initial two sessions, "AI Tool Development in Agriculture" and "Active Learning: Successes in Core and Project-Based Courses."

MEMBERSHIP TRENDS




REVENUE - December 31, 2025
17%
24%
26%
13%
20%
Meetings & Conferences
Society
Standards & Technical
Publications
Membership


EXPENSES - December 31, 2025
1%
17%
14%
11%
8%
49%
Foundation
Meetings & Conferences
Society
Standards & Technical
Publications
Membership

Statement of Financial Position

December 31, 2025 (Pre-Audit) & 2024

	2025	2024
ASSETS		
Cash	$849,921	$1,713,135
Northern Trust Restricted Reserve	2,925,781	2,590,150
Accounts Receivable-General	50,183	5,218
Prepaid Expenses	65,146	97,337
Book Inventory		59,380
Fixed Assets-Net	152,003	166,657
TOTAL ASSETS	**$4,043,034**	**$4,631,877**
LIABILITIES		
Accounts Payable & Accrued Expenses	443,318	642,176
Deferred Revenue & Other Liabilities	534,843	660,893
TOTAL LIABILITIES	**978,161**	**1,303,069**
NET ASSETS		
Beg Balance-Unrestricted Net Assets	756,380	756,380
Beg Balance-Board Designated-Restricted Reserve	2,690,699	2,533,733
Current Surplus or (Deficit)	(382,206)	38,695
Total Net Assets	**3,064,873**	**3,328,808**
TOTAL LIABILITIES & NET ASSETS	**$4,043,034**	**$4,631,877**
Restricted Reserve Balance	**$2,690,699**	**$2,533,733**
Revenue	$3,907,346	$4,633,169
Expense	4,289,552	4,594,474
Net Loss	**($382,206)**	**$38,695**

ASABE Journals

Recent research from our publications

ASABE has been a trusted source of authoritative research for well over a century. Our peer-reviewed journals contain pioneering research in ag and bio engineering. Here are some highlights from our most recently published journals. All journal articles are available free of charge as a member benefit at elibrary.asabe.org/toc.asp. ***ASABE members are in bold type.***

JOURNAL OF THE ASABE

Porosity and Thermal Properties of Carbon as Affected by Biomass Type and Production Method

Sourabh Chakraborty, Fikret M. Alptekin, Melih Soner Celiktas, **Nurhan T. Dunford**

Highlights

- Pore structure and thermal properties were evaluated for carbon obtained from the pyrolysis of six biomasses.
- Effect of biomass composition and pyrolysis parameters on the pore properties of the resulting carbon was investigated.
- Total pore volume and surface area were the lowest for carbon obtained from algal biomass.
- Carbon obtained from biomass pyrolysis is suitable for application in thermal insulation.

Vol. 69(3): 379-387
doi.org/10.13031/ja.16660

JOURNAL OF NATURAL RES. AND AGR. ECOSYSTEMS

Evaluating Intensified Forage Systems for Water, Soil, and Nutrient Retention in the Southern Great Plains

Duncan Kikoyo, Ann Marie Fortuna, Patricia Smith, **Sherry L. Hunt,** Xunchang (John) Zhang, Paul Flanagan, Phil R. Busteed, **Jaehak Jeong**

Highlights

- Integration of warm-season forages into winter wheat–fallow systems reduced runoff and sediment export by >60%
- Grazed systems had higher runoff and nutrient loss but less sediment yield compared to hayed systems.
- Species-rich rotations enhance water, soil, and nutrient retention relative to monoculture systems.
- Intensive grazing with rest phases can reduce sediment and runoff by over 30% relative to a continuous grazing system.

Vol. 4(2): 35-45
doi.org/10.13031/jnrae.16562

APPLIED ENGINEERING IN AGRICULTURE

Developing DIRT: A Drought Irrigation Response Tool for Furrow Irrigators

Stacia L. Davis Conger, Md. Adilur Rahim, Shifat P. Mithila, Andrew Garcia, Meggan Franks, Robert V. Rohli, Carol J. Friedland

Highlights

- Design of an elevated camera/sensor platform built using common construction materials and tools.
- Economical design.
- Camera mast for in-field observation and remote data collection.

Vol. 42(3): 261-270
doi.org/10.13031/aea.16550

JOURNAL OF AGRICULTURAL SAFETY AND HEALTH

Quantitative Ergonomic Assessment of Long Handle Farming Tools Among Women Farmers Using Camera-Based Analysis

Felix M. Oguche, Karen Funkenbusch, Marcia Shannon, **Jianfeng Zhou**

Highlights

- Moderate handle lift angles (27°–56°) and handle lift heights (545–1111 mm) reduce hip/shoulder flexion.
- Lighter tools (<2.0 kg) lower MSD risk; heavier ones boost leverage for taller users.
- D-grip handles with natural curves enhance wrist alignment and comfort (64% preference).
- Adjustable designs can accommodate diverse anthropometrics to mitigate physical strain.

Vol. 32(2): 75-101
doi.org/10.13031/jash.16385

Honoring the Engineers: Improving How We Farm

The 2026 Davidson Prize Winners

Two innovations—one keeping workers out of dangerous grain bins, and one putting tractors to work without a driver—have earned agricultural engineering's most forward-looking honor.

Every year, the Davidson Prize asks a simple question: which new technologies are genuinely changing agriculture? Not incrementally—but in ways that alter what's possible for farmers, engineers, and the people who work the land. The 2026 winners answer that question with force.

Now in its ninth year, the Davidson Prize is named for J.B. Davidson, widely regarded as the father of modern agricultural engineering, and is awarded to innovations that carry forward his spirit of applied problem-solving in service of those who grow and harvest food. The prize is a collaboration between ASABE and the Association of Equipment Manufacturers (AEM).

> "The Davidson Prize recognizes innovations that have a lasting impact on how we grow and harvest food. This year's winners are leading the way in robotics and autonomous systems, helping farmers work more safely, more efficiently, and with greater confidence."
>
> —Curt Blades, Senior Vice-President for Industry Sectors and Product Leadership, AEM

Each year's winners are drawn from the pool of AE50 Award recipients, which are presented annually at the Agricultural Equipment Technology Conference (AETC) to recognize the year's most innovative engineering in agricultural, food, and biological systems. From that full class of honorees, the Davidson Prize winners are selected as the best of the best—the technologies judged most likely to have a lasting impact on the industry.

The 2026 Davidson Prize was awarded to two products that address two of the most pressing challenges in modern farming: a dangerous and labor-intensive task that puts workers in confined-space hazards, and a chronic shortage of skilled labor at exactly the time when every hour counts.

Grain Weevil Robotics Platform from Grain Weevil Corporation is a compact, remotely operated robot that moves across grain surfaces to handle leveling, maintenance, and cleanout tasks in grain storage, eliminating the need for workers to enter grain bins and delivering up to 50% greater throughput in cleanout operations.

OutRun | Tillage from PTx Trimble is a retrofit system that converts compatible tractor models into autonomous tillage machines, freeing workers for other tasks while capturing the agronomic benefits of timely field operations throughout the crop cycle.

Together, Grain Weevil and OutRun | Tillage offer a compelling picture of where agricultural engineering is headed: smarter, safer, and increasingly capable of doing the work that has long defined what a farm can accomplish in a season. One of these innovations keeps workers out of one of agriculture's most hazardous environments, while the other gives farmers more time during the weeks that matter most. Both reflect what the Davidson Prize has always sought to honor: engineers who, like J.B. Davidson himself, aspire to find a better way.

Grain Weevil Robotics Platform

Doing Work That No Human Should

Grain Weevil Corporation has developed a robotic system that delivers precise movement and predictable results for grain storage and industrial material applications—improving safety, efficiency, and material quality while doing work that no human should.

The robot also implements best practices that humans can't match at scale. Grain Weevil improves

The Grain Weevil Robotics Platform removes the need for anyone to physically enter a grain bin.

grain extraction efficiency with up to 50% more throughput in cleanouts, reduces grain spoilage losses, lowers operating expenses, and can move more material than a human with a shovel. "The robot saved us 180 hours of confined space entry in just four hours of operations," reported a commercial grain operator.

Customers continue to find uses for the robot. The original concept was to build a machine that could break up crusts and bridges, but Grain Weevil has progressed beyond those tasks. For example, grain leveling reduces drying and cooling times and sets up the bin for long-term storage success, and running maintenance routines throughout the storage process can mitigate issues before they lead to grain loss.

Grain Weevil works in most granular materials. Validated materials include corn, soybeans, popcorn, rice, wheat, milo, edible dry beans, barley, canola, feed pellets, pistachios, dry fertilizer, and alumina. Using its auger-based propulsion, Grain Weevil maneuvers on the material surface while manipulating the surface and moving material. These capabilities allow the robot to perform a wide range of tasks throughout the storage process on farms, in commercial facilities, and in industrial settings.

While keeping humans out of hazardous locations is a win for everyone, building a product that achieves this goal involved a new set of challenges posed by combustible dust. That's why the robot was designed with safety in mind. For example, the robot's electronics are enclosed in a rugged polycarbonate shell that meets IP65 ingress protection requirements, keeping dust out.

The robot has a rated power capacity of 22 amp-hours at 24 VDC, supplied by a Toshiba SCiB battery, one of the safest lithium batteries currently available. A power distribution unit between the battery and the electronics cuts power to the offending component if a current or voltage fault is detected. Communication with the robot is maintained with a 915 MHz LoRa signal that passes through metal bins and buildings without degradation.

The robot was built to fit through most modern hatch doors. It weighs 52 pounds and measures 24 × 22 × 14 inches. Typical operations yield a battery life of 60 to 90 minutes, with a recharge time of 20 minutes. The remote control can be comfortably used outside the bin. Currently, the robot is human-controlled with autonomous capabilities (requires supervision), and new features are being developed.

For more information, visit grainweevil.com.

OutRun | Tillage

Autonomy When It Counts Most

OutRun | Tillage from PTx Trimble is a retrofit kit that allows farmers to convert certain tractor models into autonomous machines. Part of the OutRun product family, along with the OutRun grain cart system,

OutRun | Tillage from PTx Trimble is a retrofit kit that converts select tractor models into autonomous machines.

OutRun | Tillage provides farmers with both time and agronomic benefits.

The time benefit comes from allowing the autonomous tractor to complete tillage while farm employees can work on other tasks, getting two jobs done at once. This time benefit spills over into family life, potentially allowing operators to get home earlier during the busiest times of the year, or attend a child's sporting event that they might otherwise miss.

The agronomic benefit comes from the timing of tillage. In the fall, farms that deploy an autonomous tractor soon after harvest can reap the benefits of tillage in warmer temperatures, including more microbial activity and residue breakdown, and ultimately more nutrient availability. In the spring, an OutRun-equipped tractor can perform tillage ahead of the planter, allowing the planter to continue running and get seeds into the ground under ideal conditions.

"Timeliness matters for every field operation," said Mike Schlitt, region manager lead for PTx Trimble, "Performing tillage immediately after harvest, when the weather is warmer, leads to more residue breakdown in the fall, and more nutrient availability in the spring."

To use the OutRun | Tillage system, a farmer first drives or draws the field boundary so that the system knows the extent of the field. The farmer then identifies areas where the implement needs to be lifted, such as waterways or washouts, and areas with different speed zones, such as low spots in the field. The tractor is then turned loose to work the field.

Using the smart phone app, the farmer can monitor the entire operation, including tractor speed, location, planned path, as well as rearview video of the implement. The farmer may need to visit the field if the system detects an obstruction or to wrap up the end rows, but for the most part, the system can run with only brief check-ins.

OutRun | Tillage is part of the OutRun product family, which includes tillage and grain cart tasks using the same core features. The base system can be used for both autonomous tillage and autonomous grain cart operation, with some peripheral sensors required for each task. OutRun will continue to evolve and include more tasks across the crop cycle and more tractor models.

For more information, visit ptxag.com.

Who Will Farm Tomorrow?

Roselle Barretto and Elmar Schutte

We came to this question from different places, but with a shared concern: how do young people come to see agriculture as a future worth choosing? Roselle brings lived experience from the Philippines, where farming is often discussed as hard work and limited opportunity. Elmar brings a perspective shaped by research in education and self-efficacy, along with a South African context where agriculture can be both promising and constrained. Together, we see a common challenge across both countries: agriculture must become not only economically viable, but socially and psychologically imaginable for young people.

We did not set out to compare one country as a failure and the other as a success. Instead, our conversation led us toward a more complicated picture. The Philippines and South Africa both depend on agriculture. Both need younger generations to enter food systems not only as laborers, but as problem-solvers, business builders, and stewards of rural futures. Both also face barriers that make agriculture difficult to embrace. The difference is not that one country has a crisis and the other has a solution. The difference is that the crisis takes a different form in each place.

> “Agriculture must become not only economically viable, but socially and psychologically imaginable for young people.

Why young Filipinos are stepping away

In the Philippines, the numbers tell part of the story. A report by the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), citing The Manila Times, notes that the average age of Filipino farmers is now 55 to 59 years and increasing. Experts predict a critical shortage of farmers within 10 to 12 years if that trend continues.

The same report says that agriculture-related enrollment had been declining by about 1.5% annually before the pandemic, while farmers account for 31.6% of the poverty incidence, and fisherfolk account for 26.2% of the poor. It also notes that agriculture, forestry, and fisheries contributed only 8.9% of GDP in 2022, down from 9.6% in 2021. These figures describe a sector under pressure, and indicate the need for a generational transition that the country will have to address.

However, the problem is about more than just numbers. The more painful truth is cultural. Too many young Filipinos grow up absorbing the message that farming is backbreaking, underpaid, and somehow beneath aspiration. That message begins before college, and it comes from many sources beyond the labor market. It’s repeated in casual conversations, in family advice, in media portrayals, and in the way career success is depicted: as a departure from farming, not a renewal of farming.

This is why it’s too simple to say that Filipino youth are not interested in agriculture. Interest can’t grow in a vacuum. Young people respond to what their society honors. Too often, Philippine agriculture has been treated as necessary but not admirable. As older farmers remain in the sector while younger people search for work elsewhere, the result is not just a labor gap. It’s a social verdict on the kind of future that is worth pursuing.

How South Africa creates different pressures

Talking across our experiences reminded us that South Africa is far from a simple success story. The country also faces severe youth unemployment and an aging farming population. A scoping review of youth employment in agriculture and rural development in South Africa noted that, as of the third quarter of 2021, the overall unemployment rate reached 34.9%, youth unemployment stood at 66.5%, and agriculture accounted for about 5% of total employment.

At the same time, the average age of South African farmers has been reported as 62, even though young

Traditional rice planting in the Philippines, highlighting the labor-intensive realities that can shape youth perceptions of farming.

people ages 18 to 34 make up roughly a third of the national population. Research on youth participation in South African agriculture points to familiar barriers. Financing, agricultural education, mentorship, family influence, and climate-related risk all shape whether young people can enter and remain in the sector. In that sense, South Africa and the Philippines share more than they differ.

Yet South Africa also reveals something important. Agriculture can sometimes be more visible to youth, not only as farming in the traditional sense but also as agribusiness, enterprise, innovation, and value-chain work. Recent reporting has profiled young farmers and entrepreneurs who are building viable agricultural careers, even in a highly difficult system. This doesn't mean that South Africa has solved the problem of youth participation in agriculture. However, for at least some young people, agriculture still appears connected to economic movement, strategy, and growth.

This distinction matters. If the Philippine challenge often feels like one of stigma and withdrawal, the South African challenge can look more like a lack of opportunity or access to it. In one context, youth may be pushed away because agriculture appears old and socially diminished. In the other, youth may be interested in agriculture but blocked by structural barriers that determine who gets to convert their interest into a livelihood.

What education adds

One of the most valuable parts of our discussion was the way educational language helped sharpen the agricultural question. Elmar's research on mastery-oriented instruction and self-efficacy has shown a statistically significant positive association between perceived mastery support and self-efficacy in academic performance. In simple terms, people who receive support until they master an educational topic have greater confidence in their ability to succeed, and they are ultimately more likely to succeed academically.

That may sound like a classroom insight, but it helps explain the crisis of youth in agriculture. A young person does not enter agriculture because the government says the sector matters. A young person enters agriculture when it becomes imaginable as a place where competence can be built, dignity can be maintained, and effort can lead somewhere. In that sense, self-efficacy belongs in agricultural conversations more than we might assume.

What if part of the crisis of youth in agriculture is that too many young people have never been given mastery experiences in the field? What if they have been shown agriculture mainly as hardship, obligation, and inherited struggle, rather than as a domain in which they can learn, innovate, and lead?

Our conversation did not make us see South Africa as better than the Philippines. Rather, it made us see both countries as places where youth participation depends not only on policy and economics, but also on whether institutions help young people believe they can thrive in agriculture.

What we kept returning to

If we are honest, one reason this comparison felt difficult to write is that we didn't want the Philippines to become a case study in decline, while South Africa became a model of progress. That would be unfair to both countries. The Philippines is not defined by failure, and South Africa is not defined by triumph. Both countries are navigating the same challenge: how to bring a younger generation into agriculture under conditions of uncertainty, migration, limited opportunities, and changing aspirations.

The more balanced truth is this: the Philippines may be facing a sharper generational break, while South Africa may have somewhat more visible entry points through agribusiness and entrepreneurship. But neither country can afford complacency. A visible pathway is not the same thing as an incorporative one, and a struggling sector is not beyond repair. In both countries, youth participation will depend on whether agriculture is presented not merely as work that must be done, but as work that can be respected, learned, and rewarded.

Lessons for the future

The Philippines teaches a hard lesson about what happens when agriculture becomes essential in rhetoric but marginal in aspiration. A country can say it values farmers and still allow farming to become socially invisible to the young. When that happens, the sector does not collapse all at once. It ages, thins out, and waits for successors who no longer see themselves in it.

Hydroponics workshop in South Africa, showing one of the emerging innovation pathways that can attract youth to agriculture.

South Africa teaches a different lesson. Even where agriculture remains hard to enter and opportunities are limited, youth may still approach the sector when there are visible examples of entrepreneurship, mentorship, and skill development. The lesson is not that branding alone will fix participation; the possibility has to be real. Young people need space, financing, training, support networks, and a reason to believe that effort will produce more than survival.

For both countries, then, the challenge is larger than recruitment. The challenge is whether agriculture can offer young people a credible future. That future must be material, through real work and institutional support, and it must also be psychological, through dignity, confidence, and the feeling that one belongs in the sector.

When we reflect on this together, that is the point that stays with us. Youth do not enter agriculture simply because agriculture needs them. They enter when families, schools, communities, and industries make it possible for them to imagine themselves in there. In the Philippines and in South Africa, the task ahead is not only about inviting young people into agriculture. It is to build a version of agriculture that young people can believe in.

A note on scope

This commentary does not claim to capture every reason young people enter or leave agriculture in either country. Youth participation is shaped by many factors, including family expectations, geography, policy, labor markets, education, gender, infrastructure, and local opportunity. Parts of this commentary are also grounded in personal experience and conversation, especially the reflections drawn from lived experience in the Philippines and from dialogue about South Africa. For that reason, the commentary should be read as an informed reflection rather than a total account of either country.

ASABE member and YPC Publications Council Representative Roselle Barretto, USDA Forest Products Laboratory, Madison, Wisconsin, USA, rosellebarretto@ksu.edu; and **Elmar Schutte,** PhD Candidate, Curriculum and Instruction, Kansas State University, Manhattan, USA.

Further Reading

Asis, M. (2020). Sowing hope: Agriculture as an alternative to migration for young Filipinos. Quezon City, Philippines: Scalabrini Migration Center: Quezon City. https://smc.org.ph/wp-content/uploads/2020/03/SOWING-HOPE.pdf

Bilyonaryo News Channel. (2026). Aging farmers, fewer youth threaten PH food security, says ex-DA chief. https://bnc.bilyonaryo.com/aging-farmers-fewer-youth-threaten-ph-food-security-says-ex-da-chief/news/

Bonthuys, J. (2022). Young and agriculture: Understanding the challenges first: The rural youth and rainfed smallholder farming. *The Water Wheel, 21*(1), 23-25.

D'Angelo, G. (2026). Youth policy recommendations for agrifood systems transformation in Asia and the Pacific. https://youth.world-food-forum.org/docs/devworldfoodforumlibraries/track-youth-assembly/youth-recommendations_for-agrifood-systems-transformation-in-asia-and-the-pacific.pdf?sfvrsn=952655ee_1&Status=Master

FAO. (2025). Strengthening the youth's participation in agriculture toward achieving food and nutrition. https://openknowledge.fao.org/server/api/core/bitstreams/cc128138-652f-4dc5-9682-39904c59b2a4/content

Geza, W., Ngidi, M. S. C., Slotow, R., & Mabhaudhi, T. (2022). The dynamics of youth employment and empowerment in agriculture and rural development in South Africa: A scoping review. *Sustainability, 14*(9), 5041.

Giwu, O., Mdoda, L., Ntlanga, S. S., & Loki, O. (2024). Evaluating factors influencing youth participation in agricultural enterprises: Implications for food security and agribusiness. *Southern African Journal of Entrepreneurship and Small Business Management, 16*(1), 903.

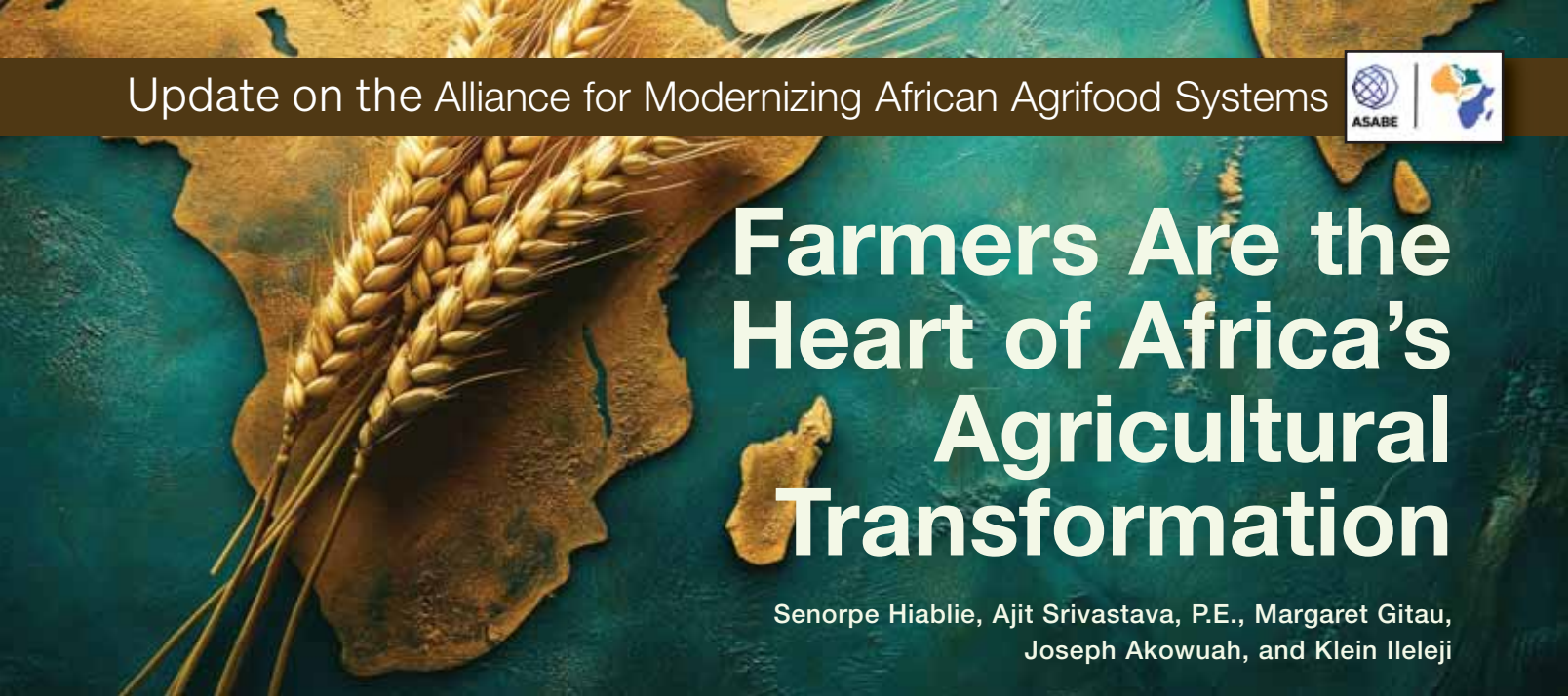
Manila Times. (2023). Aging farmers could add to food insecurity. Southeast Asian Regional Center for Graduate Study and Research in Agriculture. https://www.searca.org/press/aging-farmers-could-add-food-insecurity

Mercado, K. M. P., & Osbahr, H. (2023). Feeding the future: Knowledge and perceptions of the Filipino youth toward agriculture. *Asian Journal of Agriculture and Development, 20*(2), 31-50.

Nemanzemba, E. N., Maziya, M., & Mathaulula, M. A. (2025). Factors influencing youth participation in agriculture in Thulamela local municipality, Limpopo province, South Africa. *Journal of Agribusiness and Rural Development, 2*(76), 187-196.

Nthoesane, M. C., & Teele, T. (2024). The role of African youth attitude in agriculture: A comprehensive overview. *South African Journal of Agricultural Extension, 52*(5), 18-35.

Schutte, E. (2026). Mastery-oriented instruction and self-efficacy in academic performance. *Journal of Education and Learning, 15*(6), in press.



Farmers Are the Heart of Africa's Agricultural Transformation

Senorpe Hiablie, Ajit Srivastava, P.E., Margaret Gitau, Joseph Akowuah, and Klein Ileleji

Throughout the Proceedings of the 7th Conference of the Pan-African Society for Agricultural Engineering (PASAE) and the Moroccan National Committee on Irrigation and Drainage (ANAFIDE), one message comes through strongly: Africa's agricultural transformation will depend not only on infrastructure, technology, and investment, but also on how meaningfully farmers are involved in shaping the systems that are designed to support them.

ASABE's Alliance for Modernizing African Agrifood Systems (AMAA) places farmers, especially smallholders, women, youth, cooperatives, and rural households, at the heart of resilient food systems and water-smart agriculture.

Giving farmers a voice in water decisions

A recurring theme of the PASAE-ANAFIDE conference was the importance of participatory governance in agricultural water management. As climate variability, drought, and groundwater depletion intensify, farmers need more than technical solutions. They need a seat at the table where water rules, irrigation priorities, infrastructure maintenance, and investment decisions are made.

Several contributions to the conference show that farmer participation improves the legitimacy and durability of water management systems. For example, in the Fès-Meknès aquifer in Morocco, participatory groundwater management was defined by a contract, signed in April 2025, to regulate groundwater use and support the substitution of overused groundwater with surface water. For farmers, this type of agreement can provide clearer rules, reduce conflict, and protect long-term access to irrigation water.

The conference also highlighted the role of local institutions in managing irrigation. In Moroccan oasis systems, collective structures such as the Jemaa and Agricultural Water User Associations help organize water sharing, maintain irrigation networks, and coordinate local adaptation to scarcity. These systems show that governance is not just a policy issue but also a community practice built on trust, shared responsibility, and practical knowledge of local water conditions.

A farmer-led perspective is also evident in the work of Moline Chauruka, who examined smallholder irrigation development along sand rivers in southern Zimbabwe. The study shows that farmers are already making incremental investments in irrigation using accessible technologies such as solar-powered and gas-driven pumps. Rather than relying on large, centralized irrigation projects, these farmers are adapting progressively based on income, risk, knowledge, and market opportunity.

This investment by farmers has important policy implications. If farmers are already innovating, then governance systems should recognize and support their agency. Flexible regulation, public-private partnerships, revolving irrigation funds, and co-investment models can help scale the practical solutions that farmers are already testing on the ground.

The Programme d'Appui au Développement Inclusif et Durable des Zones Agricoles et Rurales (PADIDZAR), presented by Latifa Barkat, offers another example of inclusive agricultural development. This program focuses on smallholder agriculture, rural livelihoods, farmer field schools, cooperatives, and the inclusion of women and youth. Its emphasis on infrastructure rehabilitation, advisory support, and farmer organization shows that resilient agriculture requires both physical investment and strong rural institutions.

Local practices are resilience assets

The conference also made clear that traditional knowledge remains a powerful resource for climate adaptation. In many African farming systems, farmers have long managed water scarcity through locally adapted practices that are practical, low-cost, and socially embedded.

In the Middle Drâa oasis systems, traditional irrigation practices include the use of khettaras, which are ancestral underground water-harvesting channels that move groundwater by gravity toward agricultural land. This approach reduces dependence on energy-intensive pumping and reflects generations of adaptation to arid environments.

Farmers in oasis systems also use floodwater capture and spreading to turn occasional flood flows into productive irrigation and groundwater recharge opportunities. These practices show how local communities work with the rhythms of their landscapes, making use of scarce and seasonal water resources when they become available.

In Tunisian oases, farmers apply indigenous responses such as sandy amendments, organic soil amendments such as compost, and improved gravity irrigation to cope with salinity, soil degradation, and poor water quality. While the conference proceedings note that outdated systems and institutional inefficiencies remain a challenge, they also show that local knowledge provides a strong foundation for modern improvements.

A particularly direct farmer perspective came from Yerima Bako Djibo Aboubacar's work on irrigation in Niger. Farmers facing severe water stress have developed their own adaptation strategies, including deepening wells, digging small holes near wells to reduce pumping lift, irrigating at night, interrupting watering schedules, sowing early, harvesting early, and reducing the number of cropping cycles. These are practical, field-tested responses to climate pressure.

The clear message is that traditional knowledge should not be treated as outdated but instead combined with policy support and complementary tools to create solutions that are both modern and locally grounded.

Helping farmers make better decisions

Digital technologies are another major pathway for improving farmer resilience. The conference highlighted tools such as soil moisture sensors, AI-enabled irrigation platforms, mobile applications, remote sensing, satellite imagery, and digital storage monitoring. These technologies can help farmers reduce water waste, improve irrigation timing, protect harvest quality, and increase productivity.

In work presented by Younsuk Dong of Michigan State University, artificial intelligence and internet of things (IoT)-based precision irrigation uses sensors, web platforms, and mobile applications to support real-time irrigation decisions. Field demonstrations showed that recommended irrigation strategies can reduce water use while maintaining crop performance. In a tomato crop demonstration, irrigation was reduced by 30% without compromising yield or quality.

Low-cost soil moisture sensors and long range, low power wireless (LoRa)-based systems were also highlighted as practical tools for small farmers. In semi-arid settings, these systems can reduce guesswork by helping farmers know when and how much to irrigate. Potential water and energy efficiency gains of 20% to 30%, which can make a major difference where water is scarce and pumping costs are high, were presented.

Satellite and geospatial tools also offer promising benefits for farmers. Hydrosat's smart water and crop management technologies use thermal imagery and crop models to estimate evapotranspiration, soil moisture, crop water demand, and crop growth. The proceedings report possible water savings of up to 50% and yield increases of up to 30%, with the technology framed as affordable and scalable for African agricultural contexts.

Digital tools are equally important after harvest. Low-cost digital grain storage systems can monitor temperature and humidity, helping farmers prevent spoilage and preserve grain quality. Solar-powered portable cold rooms, such as the system presented by Michelle Gathii, combine renewable energy, phase-change materials, and sensor monitoring to reduce post-harvest losses in fresh-produce supply chains. By linking these technologies to farmer groups, cooperatives, or cooling-as-a-service models, smallholders can access cold storage without carrying the full upfront investment burden.

Participation by working farmers

The importance of placing farmers at the center of Africa's agricultural transformation was reinforced by the participation of farmers from Nigeria and Kenya in the AMAA-led panel session on farmer perspectives. These farmers' experiences brought the technical discussions on governance, traditional knowledge, and digital tools back to the realities of farming communities.

Chika Orji, a farmer from Nigeria who is also a 2025 AWARD-GASP Fellow, emphasized the value of the conference in amplifying the voices of smallholder farmers, particularly women farmers. GASP (Gender-Responsive Agrifood Systems and Policies) is a program under AWARD (African Women in Agricultural Research and Development).

Her participation on the panel enabled her to share the challenges, needs, and realities faced by women farmers in Nigeria and across Africa. The conference was especially meaningful for her by creating an opportunity to exchange perspectives with farmers from Kenya and Morocco and to show how shared challenges across countries can inform stronger regional collaboration.

Her reflections also connected the conference to policy action. Through her recent AWARD-GASP fellowship, she developed a fact sheet, titled "Harvest at Risk," that focuses on post-harvest loss policy. Co-created with women farmers, the fact sheet provides practi-

cal indicators and recommendations to help policymakers better understand and respond to the needs of smallholder women farmers.

Richard Munyao Kanui, a farmer from Kenya, described the conference as an educational and deeply interactive experience, emphasizing the value of engaging directly with researchers, engineers, and fellow farmers. For him, the conference was an opportunity to share his experience in a local African context and to connect practical farming realities with scientific and engineering solutions.

His reflections echoed one of the strongest messages of the conference: African agriculture must be approached as a business, with farmers recognized as partners in innovation, investment, and the transformation of food systems.

He was particularly encouraged by interactions with young engineers, especially around irrigation solutions. From his perspective, these are the types of practical innovations that Africa needs to reduce poverty and hunger. His comments also highlighted the importance of AMAA, PASAE, and ANAFIDE in choosing to bring farmers into the conversation—not as observers but as contributors to the future of African food systems.

> “… solutions for Africa’s agricultural future must be built with farmers, not simply designed for farmers.

Together, these farmer voices show why inclusion matters. The conference was a platform for technical exchange as well as a space where farmers could speak directly with engineers, researchers, institutions, and development partners. Their reflections underline a central message: solutions for Africa’s agricultural future must be built with farmers, not simply designed for farmers.

Toward a farmer-centered transformation

Taken together, the conference abstracts, technical contributions, and farmer reflections point toward a practical model for transforming African agriculture: participatory governance gives farmers a voice, traditional knowledge grounds solutions in local realities, and digital tools improve precision and efficiency. When these three elements are combined, farmers are better positioned to manage climate risk, conserve water, reduce losses, improve yields, and participate more fully in agricultural markets.

Chika Orji’s emphasis on women smallholders and post-harvest policy and Richard Munyao Kanui’s call to treat agriculture as a business reinforce the same message: Africa’s agricultural future will not be built by technology alone. It will be built through partnerships that respect farmer experience, strengthen local institutions, and deliver tools that are affordable, usable, and relevant to everyday farming realities.

ASABE member Senorpe Hiablie, Bio-feedstock Researcher, Shell International Exploration and Production, Houston, Texas, USA; **ASABE Fellow Ajit Srivastava, P.E.,** Professor, Michigan State University, East Lansing, USA; **ASABE member Margaret Gitau,** Professor, Purdue University, West Lafayette, Indiana, USA; Joseph Akowuah, Associate Professor, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana; **ASABE member Klein Ileleji,** Professor, Purdue University, West Lafayette, Indiana, USA.

Acknowledgments

This article draws on selected contributions to the Proceedings of the 7th PASAE-ANAFIDE Conference. The authors thank ASABE members and conference and session organizers Kumar Mallikarjunan (University of Minnesota), Michael Ngadi (McGill University), El Houssine Bartali (The Hassan II Institute of Agronomy and Veterinary Medicine), and Michael Faborade (Obafemi Awolowo University).

AI-assisted summarization was used to support drafting, after which the content was reviewed, edited, and validated by the authors. The contributions to the conference that are mentioned in this article are:

Smallholder Irrigation by Latifa Barkat, Direction de l’Irrigation et de l’Aménagement de l’Espace Agricole, Rabat, Morocco.

Farmer-Led Irrigation Investment by Moline Chauruka, Department of Irrigation Development, University of Zimbabwe.

Irrigators’ Adaptation Strategies in Niger by Yerima Bako Djibo Aboubacar, University of Djibo Hamani de Tahoua, Niger.

AIoT-Based Irrigation by Younsuk Dong, Michigan State University, USA.

Solar-Powered Cold Storage by Michelle Gathii, University of Nairobi, Kenya.

Other contributions to the conference include:

Senegalese Farmer Resilience and Welfare Studies by Keiron Moller of Michigan State University and co-authors with affiliations at Michigan State University, Wageningen University and Research, North Dakota State University, Purdue University, Kansas State University, and Direction de l’Analyse, de la Prévision et des Statistiques Agricoles (DAPSA), Senegal.

Post-Harvest Technologies, including work by A. Akintola and co-authors from Oyo State College of Agriculture and Technology and University of Ibadan, Nigeria; Michelle Gathii, University of Nairobi, Kenya; and Klein Ileleji, Purdue University, USA, and JUA Technologies International.

Water-Smart Production Systems, with contributions from Kehinde Blessing Temitope, Abiodun O. Iyiola, and Olaitan L. Adeniyi of Obafemi Awolowo University, Nigeria.

Low-Cost Digital Tools, presented by F. Ibn El Mokhtar and co-workers from INRA-Maroc.

Shine a spotlight on innovation. Enter the AE50 Awards!

Do you have a product that is redefining what's possible in agriculture, food, or biological systems? Whether it's a more efficient machine, advanced software, or a practical solution to real-world challenges, the AE50 Awards are your opportunity to be recognized.

Presented annually by the American Society of Agricultural and Biological Engineers (ASABE), the AE50 Awards honor the 50 most innovative products introduced in the past year. These awards recognize engineering excellence that advances productivity, sustainability, safety, and efficiency across the industry.

Winning products receive high-visibility recognition, including featured coverage in Resource magazine and presentation at ASABE's Agricultural Equipment Technology Conference (AETC) in February 2027. From this elite group, the top ten innovations are eligible for the prestigious Davidson Prize—recognizing the best of the best.

If your product represents meaningful engineering advancement and is commercially available in 2026, enter the AE50 Awards.

Learn more and apply: www.asabe.org/AE50
Questions, contact: AE50@asabe.org

Stand out. Get recognized. Nominate your new products.
August 1–September 25 • www.asabe.org/AE50