

**From Data to Action: An Innovative Professional Development Model to Empower
Agricultural Educators in Puerto Rico**

Janitza Saavedra-Lugo, Ed.D.
Associate Professor
Department of Agricultural Education
University of Puerto Rico
Mayagüez Campus
P.O. Box 9000
Mayagüez, PR 00681-9000
janitza.saavedra@upr.edu

Bryan Hernandez-Aquino, M.Sc.
Agriculture Extension Agent
University of Puerto Rico
Mayagüez Campus
P.O. Box 9000
Mayaguez, PR 00681-9000
janitza.saavedra@upr.edu

Salvador Acuna-Guzman, Ph.D.
Associate Professor
Department of Agricultural Engineering and Biosystems
University of Puerto Rico
Mayagüez Campus
P.O. Box 9000
Mayaguez, PR 00681-9000
salvador.acuna@upr.edu

From Data to Action: An Innovative Professional Development Model to Empower Agricultural Educators in Puerto Rico

Introduction/Need for Innovation or Idea

Agricultural education in Puerto Rico faces ongoing challenges related to teacher certification, technical preparation, and access to sustained professional development. A recent needs assessment conducted by the University of Puerto Rico at Mayagüez revealed that 45% of agricultural education teachers lacked full teaching certification, and 92% had never participated in a structured mentoring or professional development program. These gaps are compounded by limited preparation in key technical and instructional areas essential to effective school-based agricultural education. Teachers identified the greatest needs in irrigation system design and water management, followed by hydroponics, controlled environments, agricultural biotechnology, technology integration, curriculum development, and supervised agricultural experiences. Collectively, these findings point to a systemic need for a cohesive, evidence-based professional development approach that strengthens both technical expertise and instructional practice. In response, the *Jornada Educativa para Maestros de Educación Agrícola* was developed as an innovative, data-driven model that translates teachers' identified needs into actionable, collaborative professional learning experiences aimed at improving teacher effectiveness and retention.

How It Works/Methodology/Program Phases/Steps

The *Jornada Educativa* is an experiential professional development model designed in direct response to teachers identified technical and pedagogical needs. The initiative consists of a series of specialized training sessions led by subject-matter experts in three priority areas identified through a needs assessment: technology integration, emerging agricultural technologies, and innovative instructional strategies. Workshop topics included the use of GIS tools in agriculture, applications of artificial intelligence in agricultural education, and student-centered classroom strategies centered on cacao cultivation. Workshop activities were intentionally aligned with high-priority instructional needs and designed to support immediate classroom application. For example, participants engaged in hands-on GIS exercises to analyze land-use scenarios relevant to school-based agricultural education programs. In another session, educators explored practical applications of artificial intelligence by developing lesson activities that integrated AI-supported decision-making into agricultural instruction. Inquiry-based learning modules focused on cacao cultivation were used to model student-centered teaching strategies, allowing teachers to actively participate in instructional activities that could be directly transferred to their own programs. The program incorporated hands-on learning, digital tools, collaborative problem-solving, and guided reflection to promote meaningful, experiential learning that bridges emerging agricultural technologies with effective teaching practice. Collectively, these activities were structured to enhance teachers' technical competence, instructional confidence, and capacity to translate innovative agricultural concepts into authentic learning experiences for students, while fostering peer learning and sustained professional collaboration. The *Jornada Educativa* is grounded in a theoretical framework informed by Self-Determination Theory (Ryan & Deci, 2000) and Lewin's Change Theory (1947), which guide the program's design, implementation, and evaluation. The framework progresses through five interrelated phases: (1) Data-Driven Planning, (2) Curriculum Design, (3) Implementation through Educational Workshops, (4)

Mentorship and Collaboration, and (5) Evaluation and Reflection. Each phase intentionally promotes autonomy, competence, and collaboration, positioning teachers as both learners and co-creators of knowledge. Collaborative agreements among the Puerto Rico Department of Education, the Faculty of Agricultural Sciences, and the Agricultural Extension Service at the University of Puerto Rico at Mayagüez ensure that professional development offerings remain high-quality, contextually relevant, and aligned with the needs of SBAE programs across the island.

Results to Date/Implications

This Initial pilot workshop was conducted during 2024 and engaged over 60 agricultural educators from six educational regions across Puerto Rico. Post-workshop evaluations indicated that a majority of participants reported increased confidence in applying new technical content and instructional strategies within their classrooms. Specifically, participants highlighted improved capacity to integrate digital tools, design inquiry-based lessons, and adapt technical content to student learning contexts. In addition, structured reflection activities and follow-up discussions revealed the development of informal mentorship relationships among participants, with educators reporting increased communication and collaboration beyond the workshop sessions. These preliminary outcomes provide evidence that the model not only strengthens technical and pedagogical skills, but also fosters professional networks that support ongoing teacher effectiveness and retention.

Future Plans/Advice to Others

The activity will be offered again on an annual basis, expanding through strategic collaborations with additional faculty members to incorporate new topics aligned with the professional development needs previously identified among agricultural educators. Furthermore, the initiative seeks to broaden its reach and impact by engaging a larger number of teachers across Puerto Rico's agricultural education programs, thereby strengthening the overall capacity and effectiveness of the agricultural education teaching workforce.

Costs/Resources Needed

Implementation of the model requires collaborative planning between the University of Puerto Rico at Mayagüez and the Puerto Rico Department of Education. Estimated cost per participant is approximately \$250, which includes instructional materials, technical supplies, and logistical support. Resources include faculty facilitators, agricultural extension agents, and specialists in irrigation, biotechnology, and digital learning. Funding opportunities may include USDA-NIFA programs, local education grants, and institutional contributions.

References

- Lewin, K. (1947). *Field theory in social science*. Harper & Row.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Saavedra-Lugo, J., & Hernandez-Aquino, B. (2025). Determination of the Profile of the Agricultural Education Teachers of Puerto Rico Aimed at Identifying Needs to Establish a Professional Development Plan. *Journal of Agricultural Education*, *66*(1), Article 25. <https://doi.org/10.5032/jae.v66i1.2896>
- Smalley, S. W., Hainline, M. S., & Sands, K. (2019). School-based Agricultural Education Teachers' Perceived Professional Development Needs Associated with Teaching, Classroom Management, and Technical Agriculture. *Journal of Agricultural Education*, *60*(2), 85–98. <https://doi.org/10.5032/jae.2019.02085>
- Touchstone, A. J. L. (2015). Professional Development Needs of Beginning Agricultural Education Teachers in Idaho. *Journal of Agricultural Education*, *56*(2), 170–187. <https://doi.org/10.5032/jae.2015.02170>