AGRISCIENCE AND TECHNOLOGY
Armenian National Agrarian University
ԱԳՐՈԳԻՏՈՒԹՅՈՒՆ ԵՎ ՏԵԽՆՈԼՈԳԻԱ АГРОНАУКА И ТЕХНОЛОГИЯ
International Scientific Journal
ISSN 2579-2822

UDC 378.6(479.25)
doi: 10.52276/25792822-2025.sp-123

Innovative Approaches to Knowledge Transfer and Experience Sharing in Armenian Agriculture

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ARTICLE INFO

Keywords:
agricultural education, experiential learning, five-step training model, knowledge transfer, sustainable agriculture

ABSTRACT

As Armenia seeks to transition toward more sustainable and climate-resilient agricultural practices, the success of this transformation depends significantly on how knowledge is generated, shared, and applied among agricultural stakeholders. This paper explores critical gaps in the current educational system for agricultural professionals in Armenia, contrasts these with international best practices, and proposes a two-part strategy that integrates curriculum reform, experiential learning, and digital tools. A five-step model for training veterinarians and farmers is presented, along with practical innovations such as mobile applications, video tutorials, and a national online platform for agricultural education. By emphasizing participatory learning, localized content, and lifelong education, this framework seeks to empower individuals and communities, enabling Armenia's agricultural sector to thrive in the face of future challenge.

Introduction

Agriculture remains a vital component of Armenia's economy and national identity. However, achieving sustainable development in this sector requires more than advanced technology or foreign investment. It requires a strategic transformation in how agricultural knowledge is produced, transferred, and embedded in practice. The importance of knowledge transfer in agriculture cannot be overstated; it serves as a bridge between traditional practices and scientific innovation, enabling communities to adapt to climate variability, improve productivity, and strengthen resilience.

This article argues that while Armenia has a foundational education system in agriculture, it falls short in delivering practice-oriented, continuously updated knowledge to students and professionals alike. We propose a forward-looking model that centers on human capacity—students, educators, veterinarians, and farmers—as the key to transforming Armenian agriculture from the ground up. Contemporary models of knowledge transfer emphasize experiential learning, Trainer of Trainers (ToT), peer-to-peer dissemination, and technology-enabled platforms that make knowledge more accessible and actionable.

Materials and methods

1. Limitations of the Formal System

Conventional agricultural education in Armenia often prioritizes theory over practice. For instance, veterinary training programs at Armenian universities lag behind their European counterparts in both structure and content. While graduates may possess theoretical knowledge, they frequently lack the hands-on experience required in real-world farm settings. A diploma or certificate alone is not a guarantee of professional competence—a reality underscored by the observed disparity between Armenian and Bavarian veterinary education models.

Armenia's agricultural universities and colleges produce numerous graduates each year. However, the effectiveness of this education in preparing professionals for modern agricultural challenges is debatable. A diploma or certificate often does not equate to practical knowledge or skill. The curricula are heavily loaded with non-specialized subjects, while practical training hours are minimal. For example, veterinary students at the Armenian National Agrarian University receive only one semester of practical training (120 hours), in contrast to approximately 1,200 hours in German programs like that of LMU Munich.

Moreover, core subjects such as language, political science, and philosophy dominate the early semesters in Armenia, leaving students underprepared for real-world veterinary and agricultural challenges.

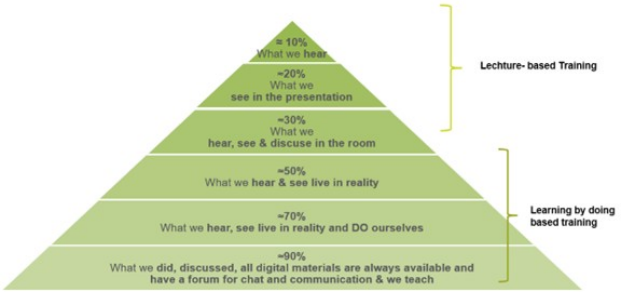
2. Learning versus Memorizing

The "Learning Pyramid" model demonstrates that traditional lecture-based instruction results in low knowledge retention (~10%), while participatory methods such as practical application and peer teaching result in retention rates of up to 90%. Armenian education still favors passive learning, thereby failing to prepare professionals for on-farm problem-solving and innovation.

In the context of modern agricultural education and capacity-building, traditional pedagogical models often fall short in equipping learners with the practical, experience-based knowledge required for fieldwork and technical problem-solving. To address this gap, a modified and contextually adapted version of the Learning Pyramid has been proposed as a guiding framework for both initial and continuous education of agricultural specialists. This model emphasizes a progressive shift from passive to active learning methods—starting with foundational theoretical instruction (e.g., reading and lectures) and moving toward higher-retention activities such as observation, demonstration, simulation, and ultimately, "learning by doing" trough ToT and peer-teaching.

In its adapted form for agricultural use, the learning pyramid prioritizes practical application in real-world settings—such as internships on working farms, guided fieldwork with livestock or crops, and problem-solving workshops with real case studies. Crucially, the model also integrates digital learning platforms, including video tutorials, AI-enhanced translation tools, and mobile applications, to ensure accessibility across Armenia's diverse and often rural agricultural communities. When learners engage not only in practice but also in teaching peers and contributing to forums or discussion groups, retention rates approach 90%, according to educational research.

Such an approach is particularly relevant for the Armenian agricultural sector, where educational reforms are urgently needed to replace outdated, theory-heavy curricula with skills-based training. Therefore, an adapted learning pyramid serves not only as a pedagogical tool but as a strategic framework for building a resilient, competent, and future-ready agricultural workforce.



Chapter. Modified Learning Pyramid for agricultural education in Armenia. *Source: National Training Laboratories. (n.d.). Learning Pyramid. Bethel, ME.*

3. Two-Part Strategic Framework for Reform

- Part 1: Reforming Student Education

To modernize agricultural education, the following reforms are proposed:

Curriculum Update: Prioritize profession-specific subjects from the first semester onward.

Practical Internships: Partner with farms and agribusinesses to embed hands-on learning.

Modern Teaching Materials: Replace outdated textbooks with current, relevant content.

Educational Videos: Use visual learning tools to improve retention and accessibility.

- Part 2: Lifelong Learning for Professionals

The rapid evolution of agricultural practices means knowledge becomes outdated quickly. Agricultural universities must evolve into centers for continuous learning, offering:

- Short courses and seminars.
- Modular content delivery.
- Remote access to training materials.

4. Five-Step Model for Veterinary Training and Dissemination

To address the deficiencies in the current system, a five-step phased strategy was developed for knowledge transfer and professional development in veterinary science:

Step 1: Selection of Regional Trainers (Multipliers, ToT)

Veterinarians from across Armenia are selected based on their motivation and capacity to train others.

Step 2: International Training in Germany

Selected participants undergo intensive, hands-on training at the Triesdorf Agricultural Training Center in Bavaria, focusing on cattle husbandry, disease detection, nutrition, and treatment techniques.

- *Step 3:* Localization of Learning Content

Materials are adapted to the Armenian agricultural context, translated, and integrated into training formats suited for adult learners and farmers.

Step 4: Digital Dissemination

Content is made accessible via the Armenian Agricultural Education (AAE or similar) Platform, a digital hub designed for open access learning and international collaboration.

Step 5: Regional Capacity Building

Trained veterinarians conduct workshops, seminars, and field trainings across Armenian regions, creating a multiplier effect and fostering local ownership.

5. Technological Tools Supporting Knowledge Transfer

5.1 The “Cow & Calf” Handbook

This Armenian-translated manual provides visual guides and practical advice for recognizing and treating cattle diseases. It is an essential reference for both veterinarians and livestock farmers and a comprehensive guide covering disease symptoms, causes, emergency response, and preventive measures, translated for Armenian audiences.

5.2 “Fit for Cows” Smartphone Application

This mobile application, developed in Germany and currently being translated into Armenian, enables farmers to identify behavioral signals and symptoms in cattle for early disease detection.

5.3 Educational Veterinary Video Tutorials

A series of short, practical video guides (e.g., on hoof care and disease prevention) address specific Armenian veterinary challenges. These videos serve as supplementary learning tools, especially in rural areas.

Results and discussions

Although still in early phases of implementation, pilot training sessions have demonstrated:

- Enhanced practical knowledge among trainees.
- Increased confidence in disease detection and treatment.
- High demand for region-specific training sessions across provinces.
- Strengthened networks between local veterinarians and international experts.

The scalable and adaptable nature of the five-step model positions it as a replicable framework for other sectors within Armenian agriculture (e.g., horticulture, agribusiness, water management).

To ensure long-term impact, the following actions are recommended to create an Armenian Agricultural Education (AAE) platform serves as a central pillar in the dissemination ecosystem. Its functionalities include:

- Access to manuals, video content, and translated German educational resources.
- AI-based translation to facilitate cross-border dialogue and knowledge flow.
- Discussion forums for peer engagement and expert consultation.
- Integration of mobile-responsive learning tools.

This platform not only democratizes access to knowledge but also fosters long-term partnerships between Armenian professionals and European institutions.

Conclusion

The path toward sustainable, green agriculture in Armenia lies not only in policy or investment but in people—how they learn, apply, and share agricultural knowledge. The transformation of Armenia's agricultural sector begins with educational reform and extends through lifelong learning, digital access, and participatory practice. By implementing the proposed strategies and tools, Armenia has the potential to become a regional leader in knowledge-driven, sustainable agriculture.

This initiative highlights the importance of:

- *Local empowerment:* Giving Armenian professionals the tools and autonomy to lead training efforts ensures sustainability.
- *International cooperation:* Germany's contribution through infrastructure, expertise, and digital tools exemplifies the benefits of global partnerships.
- *Hybrid learning:* Combining digital platforms with in-person training strikes a balance between scalability and depth of knowledge.

However, challenges remain, including ensuring consistent internet access in rural areas, maintaining updated content, and securing long-term institutional funding.

To foster sustainable growth in Armenian agriculture, a shift from static education to dynamic, practice-based learning is essential. The five-step model, enhanced by digital platforms and international collaboration, provides a resilient framework for transforming veterinary and agricultural education. By investing in human capital—students, farmers, and veterinarians alike—Armenia can cultivate a knowledgeable, skilled, and adaptive agricultural workforce capable of meeting the demands of the 21st century.

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Declarations of interest

The author declares no conflict of interest concerning the research, authorship, and/or publication of this article.

Received on 20.05.2025
Revised on 16.07.2025
Accepted on 12.09.2025