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Efforts to improve the quality of agricultural education graduates as preparation for entering the workforce

Dwi Haryanta[1], Reza Syehma Bahtiar[2], Yudha Popiyanto[3]
Faculty of Teacher Training and Education, Wijaya Kusuma University Surabaya, Indonesia

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ABSTRACT

Food self-sufficiency, food security, and food sovereignty are terms that have recently become very popular as they are all related to the sustainability of human life. To ensure food availability, agriculture must continue to be developed and managed by skilled and professional workers. Agricultural education institutions are obliged to prepare graduates who possess the necessary competencies required by the agricultural business and industry sectors. This manuscript aims to provide an overview of the issues surrounding the provision of professional personnel in agricultural development (food production) and the efforts needed to address these challenges. The analysis and conclusions are based on previously published journal articles. Efforts to improve the quality of agricultural education graduates as preparation for entering the agricultural workforce must begin with fostering interest and motivating students in agricultural faculties to develop careers in agriculture. Educational institutions can take the following steps: (1) Enhancing the curriculum with learning activities related to technical skills in agriculture, (2) Increasing the competence and professionalism of lecturers in agriculture, and (3) Developing partnership networks between educational institutions and the agricultural business or industrial sectors, especially for student internships.

Corresponding Author:

Dwi Haryanta,
Faculty of Teacher Training and Education,
Wijaya Kusuma University Surabaya, Indonesia,
Jl. Dukuh Kupang XXV No.54, Dukuh Kupang, Surabaya, Jawa Timur, 60225, Indonesia.
Email: dwi_haryanta@uwks.ac.id

1. INTRODUCTION

Agriculture has the potential to provide vast employment opportunities; however, young people are increasingly disinterested in agriculture and often view it as a last resort due to the lack of alternative job opportunities. Agriculture is the backbone of a nation, ensuring food availability for its population. There are many challenges in ensuring a sustainable food supply to match population growth. The lack of youth participation in the agricultural industry is one of the sustainability challenges, prompting governments to ensure greater youth involvement in the sector (Saili et al., 2020). The declining number of young farmers and the increasing number of elderly farmers have led to reduced agricultural yields and productivity in rural areas, posing a threat to national food security (Obayelu and Fadele, 2019).

The lack of youth involvement in agriculture threatens future food security and social balance. Young people are seen as the driving force for change in the agricultural industry, given the increasing number of aging farmers (Saili et al., 2020). The decreasing number of young farmers raises concerns

about food production declines. Rarely do children of farming families continue their parents' work. Many young people tend to avoid farming as a profession, and this phenomenon needs to be addressed comprehensively. Three alternative approaches to increasing youth interest in agriculture are (1) early education, (2) creating a conducive agribusiness environment, and (3) using social media community approaches (Yodfiatfinda, 2019).

The issue is that agricultural education graduates are generally not interested in agricultural professions. There is concern about the declining interest of young people in agricultural careers, while at the same time, the agricultural industry struggles to find the skilled labor it needs. Students face challenges related to their perception and motivation toward agriculture, including a lack of skills acquired from the agricultural education process (Jjuuko et al., 2019). Students perceive that (1) agriculture has low status, (2) farming is a family matter, (3) agribusiness is difficult to achieve, and (4) agriculture is risky (Consentino et al., 2023). There is a significant gap between the number of available jobs in agriculture and the number of qualified applicants (Robotham and Windon, 2023).

Agricultural education must produce millennial farmers-farmers who master advanced agricultural technology to ensure global food availability. Agricultural education is expected to produce graduates who are career-ready and capable of developing the agricultural sector. Changes in generational attitudes and student backgrounds encourage educational institutions to maintain curricular programs that create attractive career paths for students (Feldpausch et al., 2019). Positive perceptions of agriculture, participation in internships and extracurricular activities, and career counseling from educational institutions influence student engagement in agricultural education and interest in agricultural careers post-graduation. Strategies to attract students to the agricultural sector include enhancing career counseling, providing more hands-on experience, and addressing stereotypes to attract and retain young people in agriculture, ensuring the sector's future sustainability (Troka et al., 2024). Integrating practical agricultural activities into the educational system can increase student interest in agriculture as a profession. Skills in technology use and incentives for students serve as motivation to become "agripreneurs" or own agribusinesses to eliminate food insecurity (Omotosho et al., 2020).

Educational institutions need to develop strategies to attract graduates to agricultural professions. Strategies to change the negative perceptions of youth towards agriculture and attract young people to work in the agricultural sector can be achieved by (1) providing training for young people interested in agricultural entrepreneurship, (2) introducing agricultural education from elementary to higher education, (3) reforming the education system at all levels to ensure holistic student development, including technical and soft skills, (4) marketing strategies in collaboration with media, and (5) strengthening the role of agricultural associations to bridge the gap between the agricultural sector and secondary and higher education institutions (Merwe, 2024).

Competent graduates are those who are innovative and successfully enter the industrial and business world while securing jobs. The agribusiness industry and organizations demand competent graduates—young graduates with experience in agricultural production. Collaboration is the only way to produce competent graduates (Magumba, 2022). Higher education graduates are expected to be job-ready and prepared to enter the workforce, meaning they have the capacity to participate effectively in their jobs. Higher education institutions respond by equipping students with industry experience (e.g., through practice, internships, and job placements) (Tan et al., 2023).

2. RESEARCH METHOD

This study employs a literature review method to identify, analyze, and synthesize various research studies relevant to the topic under investigation. The purpose of this method is to understand previous research developments, identify research gaps, and recognize patterns or trends in the existing literature.

The data sources for this study include academic journals, books, research reports, and articles published in scientific databases such as Google Scholar, Scopus, IEEE Xplore, and ScienceDirect.

Inclusion and exclusion criteria are applied to ensure that only relevant and high-quality literature is included in the analysis.

Inclusion Criteria: Articles published in reputable journals, Research that discusses key relevant topics, Studies that use clear and valid methodologies. Exclusion Criteria: Articles that are not available in full text, Publications without a clear methodology, Literature that is not directly related to the research topic.

The data analysis method used in this literature review is thematic analysis, where the collected studies are categorized based on themes or aspects related to the research topic. The analysis steps include: Identifying Themes: Analyzing and grouping studies based on similar variables or topics. Data Synthesis: Connecting various studies to identify patterns, differences, and gaps in the literature. Critical Evaluation: Assessing the strengths and weaknesses of each reviewed study to gain a more comprehensive understanding.

To enhance the validity and reliability of this review, source triangulation is applied by comparing multiple literature sources to ensure consistency in findings. Additionally, a systematic approach is followed in the selection and analysis of data to minimize bias.

This literature review adheres to research ethics by ensuring that all sources used are properly cited in accordance with academic guidelines. There is no data manipulation or misrepresentation in the interpretation of findings.

3. RESULTS AND DISCUSSIONS

Agricultural Workforce

Agriculture offers vast employment opportunities; however, the knowledge and skills required in the agricultural industry remain insufficient. A career in agriculture requires a combination of technical production knowledge, comprehensive sociological understanding, and psychological insights that enable production management units to work effectively. To enhance the effectiveness of education, students must: understand learning objectives, including knowledge, skills, and final competencies to be achieved; identify assessment methods to evaluate goal achievement; comprehend the criteria for organizing educational and cognitive activities; develop programs for organizing cognitive activities to master planned knowledge, skills, and competencies; and foster motivation, interest, and confidence in students regarding the importance of acquiring specific knowledge and skills to encourage active participation (Oliinyk and Zolotarova, 2020).

Most agricultural faculty students consider agriculture a stepping stone to other professions, perceiving it as a low-income and labor-intensive job. Barriers to promoting agriculture as a profession include limited access to financial resources and land, fear of crop failure, unpredictable commodity prices, an uncertain future, and psychological challenges. There is a significant relationship between prior education, work experience, social contacts, and economic factors in choosing agriculture as a study program and profession among young people (Adebo and Sekumade, 2013).

Enhancing Lecturer Competence

Competence is defined and associated with scientific knowledge and practical skills required for technical activities, communication skills, and learning attitudes (Bodescu et al., 2024). Research by Raof et al. (2020) concluded that lecturers face competency challenges, with agricultural skills at a moderate level while teaching competence remains high.

Aligning graduate quality with the demands of the Fourth Industrial Revolution requires improving infrastructure quality based on industry needs (link and match) and enhancing lecturer competence (Maryanti et al., 2020). The ability of agricultural graduates to start new businesses is crucial in ensuring food security. Lecturers play a vital role in fostering entrepreneurial motivation by shaping positive attitudes, creating a supportive environment, boosting confidence, and integrating practical training (Ajo et al., 2025). Efforts to improve education include enhancing educator competence and curriculum reform (Aritonang, 2018). Students have limited opportunities to practice

career skills through classroom learning. Strengthening career counseling services at universities is a strategic policy to increase graduates' chances of securing meaningful employment in their field (Ghimire et al., 2021).

Professional competence has a strong and significant positive impact on campus services provided to students and indirectly influences academic performance. Meanwhile, professional competence and personality significantly impact student achievement. This study highlights that lecturers must equip themselves with competencies to provide the best possible service to students (Azis et al., 2020).

Motivating Students

Strategies to increase agricultural faculty students' interest in agricultural careers include motivation and practical experience throughout the learning process. Personal and environmental factors influencing students' career choices in agriculture include lecturer, parental, and peer support, internships or work experience in agriculture, and job trends in the agricultural sector (Prasetyaningrum et al., 2022). Learning motivation, job information, career expectations, industry practice, family support, self-competence, and spiritual intelligence significantly impact agricultural students' readiness to work in the agricultural sector (Isyanto et al., 2024). Direct experiences with agricultural activities enhance knowledge and perception among both lecturers and students regarding agriculture as a viable career, particularly when lecturers and students have urban backgrounds. Formative learning experiences, exposure, and education shape perceptions of agriculture, ultimately linking lecturer support to students' career choices in agriculture (Cosby et al., 2024).

Lecturer support, defined as the interaction between lecturers and students, influences learning outcomes and contributes to effective and high-quality teaching. Lecturers are not only educators but also seen as "natural mentors." They play a crucial role in shaping students' mindsets to adapt to careers in agriculture (Lazarova et al., 2019). Research in Bangladesh found that only a small percentage of agricultural faculty students (29.6%) aspire to start agricultural businesses after graduation, with most preferring government jobs due to perceived stability. Students consider agriculture too risky. If they engage in agriculture, they tend to focus on fruit and vegetable commodities, feed factories, beef production, floriculture, and fisheries (Pervez et al., 2024). Agricultural vocational students are more interested in science-related careers, higher education for academic achievement, personal benefits, and acquiring life skills. Intrinsic factors play a primary role in career selection. Therefore, lecturers, counselors, and parents must consider students' interests and abilities when guiding career choices. Lecturers should provide meaningful learning experiences to help students explore their interests and career potential (Mukembo et al., 2014).

Refining the Curriculum

Weaknesses in vocational education, particularly in the agricultural sector in Indonesia, include limited development of innovative learning through project-based learning approaches. However, industry and business involvement, as well as competency certification recognition, remain inadequate. The agricultural education curriculum, which is approaching international standards, needs to be accompanied by strengthened industrial partnerships, modern technology, and global certification recognition to enhance graduate competitiveness in the global market (Astuti et al., 2024). Most agricultural graduates work in government agencies, financial institutions, or private sector industries that offer lower risks and moderate financial returns. Few graduates pursue agriculture as a profession. Efforts are needed to shift aspirations toward greater engagement in agricultural careers for the benefit of society (Anandaraja et al., 2020).

The skills gap between agricultural graduates and the needs of industry and businesses is widening. This is largely due to rapid global changes, with ICT as the main driver, requiring a new set of skills from graduates, as well as the latest teaching and evaluation methodologies in higher education institutions. Skills should be integrated into the agricultural higher education curriculum,

and lecturers need training on how to teach and assess competencies. Agricultural education lecturers and students do not fully understand the technical and non-technical skills required in the agricultural industry (Lundry et al., 2015).

Efforts to enhance the relevance and practical skills of agricultural graduates required by the workforce include communication, learning, and social skills. Additionally, it is necessary to strengthen partnerships and establish new collaborations between universities and economic environments by engaging public entities and research institutions (Bodescu et al., 2024). Educational institutions need to incorporate skills into the curriculum that will effectively build job readiness among prospective graduates (Gule et al., 2023).

Efforts to improve the job skills of agricultural education graduates for social and economic transformation involve refining the curriculum to ensure it remains relevant and up-to-date. Educators should transition to case-based and project-based teaching methods and actively promote extracurricular programs (Ademu et al., 2018). Preparing agricultural students for professionalism involves fostering a strong desire to deeply understand the profession, developing interest in it, completing independent and structured educational tasks, actively participating in public responsibilities, and seeking innovative solutions to technical problems.

To enhance educational effectiveness, students need to: understand learning objectives, including knowledge, skills, and final competencies to be achieved; identify assessment methods to evaluate goal achievement; build motivation, interest, and confidence in acquiring the necessary knowledge and skills to encourage active participation (Oliinyk and Zolotarova, 2020). The primary goal of agricultural education is to develop students' sustainable agricultural competencies, enabling behavioral changes that prepare them as motivated agents of sustainable agricultural transformation (Nyamweru et al., 2024).

The use of advanced technology in education includes artificial intelligence (AI) to automate teaching, learning, and assessment procedures by implementing backpropagation neural networks for more accurate evaluations (Kumar et al., 2023). Educators design learning with career-oriented outcomes in mind, identifying essential student skills and ways to reinforce them. Group work, presentations, debates, and public speaking are crucial in developing career behavior skills. Educators can expand ideas by designing learning activities that enhance understanding and require students to think in an industry-based environment (Hendrix and Morrison, 2018).

Agricultural education in the United States emphasizes integrating modern technology and research-based teaching methods. This approach enhances student engagement through digital tools while ensuring alignment with industry needs. In Australia, sustainability and interdisciplinary collaboration are prioritized, utilizing advanced technologies such as GIS and drones for environmental management and conservation. These innovations equip lecturers and students with the skills to tackle complex field challenges.

Japan excels in integrating cutting-edge research and industry practices into aquaculture education. Hands-on training and interactive teaching methods play a crucial role in preparing graduates to meet the dynamic demands of the aquaculture sector, ensuring practical relevance and industry readiness. The Netherlands stands out for its cross-disciplinary collaborations and partnerships with research institutions and industries in agriculture, forestry, and aquaculture. These collaborations enrich educational content and research outcomes, fostering innovation and preparing graduates to address diverse field challenges.

Recommendations for Vietnam include adopting innovative teaching methods and technologies, advocating for international collaboration, and addressing local challenges such as resource limitations and technological constraints (Thoa et al., 2024).

Building Partnerships

The implementation of a competency-based curriculum, refined through the Merdeka Belajar Kampus Merdeka policy, requires higher education institutions to establish partnership networks with businesses, industries, and the workforce. These partners become key stakeholders in higher education

institutions, providing input on institutional vision and mission, curriculum evaluation, student exchange collaborations, internship placements, and more. Higher education institutions must provide facilities such as business incubators, collaborations with enterprises, and curriculum restructuring that supports entrepreneurial practices to increase the likelihood of graduates successfully establishing new agribusinesses, along with government policy support to create a conducive learning environment (Ajo et al., 2025).

The majority of students state that the most important factor in preparing for a future career in agriculture is relevant work experience, compared to other activities offered by lecturers, such as additional courses, student organizations, relevant jobs, international experiences, mentoring, campus life, and building professional networks (Feldpausch et al., 2019). Work experience and technical skills can be obtained through internships. Internships enable students to integrate practical experience with theoretical learning, allowing them to graduate with comprehensive skills. The implication for companies is to design and implement impactful internship programs that help reduce recruitment and training costs. Internships benefit students by providing practical experience, teamwork skills, enhanced resumes, professional and personal relationships, and income opportunities. Companies benefit from internship programs by gaining valuable employees and competent job candidates. The importance of internships lies in providing short-term practical experience for students, thereby facilitating their entry into the labor market (Hassouna and Zaazou, 2024).

Internship participants gain hands-on experience in business skills, farm management, and routine agricultural practices. Some participants emphasize the need for agricultural internships to focus on acquiring professional experience and skills. Internship programs should be tailored to the specific needs of participants, ensuring a greater and more relevant impact on agricultural skill development programs from higher education institutions (Ndashe and Omotosho, 2024).

Internships impact professional and skill growth, influencing students' personal development, abilities, and competencies (Anjum, 2020). Internships serve as an effective hands-on learning tool, exposing students to a range of skills and job expectations, creating individuals who are prepared to enter the workforce. Students gain a better understanding of life experiences, which can help build a deeper appreciation of internship experiences (Henderson et al., 2023). Internships help students become job-ready by developing work-related attitudes, values, knowledge, and skills while familiarizing them with real-world work environments (Azizah et al., 2023).

4. CONCLUSION

A review of extensive literature and scientific publications reveals a unique issue: while the agricultural sector is crucial for sustaining human life, young people, especially students from agricultural education institutions, show little interest in pursuing careers in agriculture. In large cities, agricultural education lecturers primarily come from urban backgrounds, which does not guarantee their technical competence in agriculture. Efforts to improve the quality of agricultural education graduates as preparation for entering the agricultural workforce must begin with fostering interest and motivating students in agricultural faculties to develop careers in agriculture. Educational institutions can take the following measures: (1) Enhancing the curriculum with learning activities related to technical skills in agriculture, (2) Increasing the competence and professionalism of lecturers in agriculture, and (3) Developing partnership networks between educational institutions and the agricultural business or industrial sectors, particularly for student internships.

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