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RESEARCH ARTICLE

Mindset shift of agriculture college students on the importance of agriculture: Initial impression and actual learning

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ABSTRACT

A mindset shift is a profound transformation in an individual's beliefs, attitudes, and cognitive frameworks. It involves a reevaluation of one's assumptions, leading to a new way of interpreting and interacting with the world. This shift is not merely a change in perspective but a deeper restructuring of how a person understands a particular concept or situation. This exploratory paper analyzed the phenomenon of mindset shift among agriculture-oriented course in ZAMBASULTA. College students (n=30) were purposively sampled to be interviewed in this study. Themes were extracted from the interview narratives. This study observed a significant shift in the mindsets of agricultural and biosystems engineering students after enrolling in the program. Initially, many students viewed agriculture as a fallback profession for those without higher education, expressing skepticism about the field's value. However, after exposure to the program, their perspectives shifted towards a more positive and informed outlook. They began to appreciate the complexity of agriculture, its critical role in the economy, and the importance of technology, quality, and innovation in advancing the sector. Students' language also reflected this change, as they began to use terms that showed greater respect for farmers and the agricultural industry, highlighting how the program developed a deeper understanding and appreciation of the field. The findings might have direct application on educational strategies aimed at promoting agriculture-related programs, helping to reshape students' perceptions and attract more young people into the field. By understanding how mindset shifts occur through exposure and hands-on learning, educators and policymakers can design curricula that emphasize the importance of agriculture in national development and global sustainability.

Keywords: agriculture, learning, mindset shift, perception

1. Introduction

Mindset shifts are pivotal in shaping societal attitudes towards critical issues, influencing decisions and behaviors. According to the FrameWorks Institute[1], while mindset changes are achievable, their success often hinges on external factors beyond immediate control, making them context-dependent. This underscores the complexity involved in altering perceptions, particularly in domains like agriculture, where

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entrenched beliefs and societal attitudes play a significant role.

Agriculture holds immense importance in the Philippine economy, contributing significantly to its gross domestic product (GDP) and utilizing a substantial portion of the nation's land area. In 2016, agriculture accounted for 9% of the GDP, with approximately one-third of the total land dedicated to agricultural purposes[2]. This sector is dominated by key crops such as palay, coconut, corn, and banana, highlighting its crucial role in food production and economic stability.

The history of agriculture In the Philippines reflects periods of growth and stagnation influenced by global economic trends and technological advancements. The introduction of technologies like Green Revolution seeds in the 1960s and 1970s propelled agricultural growth, particularly in export crops such as bananas and pineapples[3]. However, subsequent decades saw fluctuating growth rates, influenced by international commodity prices and domestic policy changes, underscoring the sector's susceptibility to external forces.

The sustainable development of agriculture is a paramount goal globally, emphasizing modernization and efficiency to ensure long-term viability[4]. This approach is critical not only for economic growth but also for environmental stewardship and food security. In the Philippines, however, challenges such as an aging farming population and high poverty rates among farmers pose significant barriers to achieving sustainable agricultural practices[5].

The demographic profile of Filipino farmers underscores a critical Issue facing the agricultural sector: an aging workforce with an average age between 59 years[6]. Economic hardships and perceived limited opportunities in agriculture have led many farming families to encourage their children to pursue alternative careers in urban areas or abroad. This generational shift highlights a pressing need to revitalize interest in agriculture among the youth to ensure future sustainability[7].

The youth demographic, aged 15-24 years, represents a pivotal group for the future of agriculture globally[8, 9]. Despite their potential to innovate and address agricultural challenges, young people often perceive agriculture as unattractive due to prevailing negative stereotypes and limited educational opportunities[10]. Addressing these perceptions and fostering a positive mindset towards agriculture among youth are crucial steps in securing the sector's future and harnessing their potential contributions to sustainable agricultural development. Understanding and reshaping mindsets regarding agriculture among college students is essential for fostering a sustainable and vibrant agricultural sector in the Philippines. By addressing historical trends, economic realities, and demographic challenges, this research aims to explore initial impressions and actual learning experiences of agriculture college students, with the goal of promoting a positive shift in mindset towards the importance and opportunities within agriculture.

2. Literature review

Shifting mindsets involves replacing outdated beliefs with more productive perspectives that can alter not only individual choices but also identities[11]. This transformation is crucial as it shapes how students perceive agricultural professions. Lavadia et al.[12] argue that many students view agriculture through a lens of traditional labor-intensive roles with limited economic opportunities, often dismissing it as a viable career path. Addressing these perceptions is essential for fostering a renewed appreciation for the multifaceted opportunities within agriculture.

Education and training in agriculture help in fostering international collaboration and knowledge exchange, crucial for addressing global challenges[13]. The importance of agricultural education cannot be overstated in an era marked by the urgent need for food security and sustainable rural development. By

engaging students in collaborative activities, higher education encourages innovative thinking and equips future professionals with the skills needed to tackle complex agricultural issues[14].

Furthermore, universities play a pivotal role in agricultural innovation and technological advancements[15]. Research originating from higher education institutions drives innovation across the agricultural sector, enhancing productivity and sustainability. This research contributes significantly to the development of new technologies and practices that benefit agricultural production and environmental conservation. Many agricultural education programs have expanded beyond traditional farm skills to include critical thinking, problem-solving, leadership, and team-building. This shift acknowledges the importance of both practical and soft skills among agriculture graduates[16].

In the Philippines, agriculture is not merely an economic sector but a cultural cornerstone, deeply embedded in the nation's identity and economy[17]. The country's diverse agricultural sub-sectors, including fisheries, farming, livestock, and forestry, underscore the breadth of opportunities and challenges within the field[17]. Agriculture's integral role in national development necessitates a reevaluation of its perceived importance among youth to ensure sustainable growth and food security[18].

Youth's positive economic perceptions of the agricultural sector were strengthened by their exposure to agricultural education in secondary schools and significant financial support, which positively influenced their intentions to engage in agripreneurship[19]. Agriculture, like other scientific disciplines, requires rigorous and refined methodologies to sustainably achieve enduring results such as food security and sovereignty[20,21].

To sum it up, the mindset shift among college students regarding agriculture is pivotal for the future of the sector and the nation's overall development. By dispelling misconceptions about agricultural careers and emphasizing their critical role in economic stability and environmental sustainability, educational institutions can cultivate a new generation of professionals equipped to address the challenges of tomorrow[22, 23]. This paradigm shift is not only essential for individual career choices but also for securing the nation's food security and advancing global agricultural practices in a sustainable manner**.**

3. Methods

3.1. Research design

This paper was an exploratory study that discussed the phenomenon of mindset shift among the agriculture major students from WMSU. Narratives from college students were used to understand how mindset shift takes place after enrolling in agriculture course. Exploratory studies aim to address a specific question or gain knowledge about a particular phenomenon[24]—like the context of mindset shift—that is, to elucidate the occurrence of a specific phenomenon and to offer an in-depth look into an event that lacks thorough understanding[25]. Particularly, qualitative exploratory design, according to Chavez[26], also facilitating active participation from the participants in the development of new knowledge within that research domain. Although some argues that exploratory studies are *"not of very high scientific quality,"* Swedberg[27] stressed that this design still holds significant value as they enable researchers to understand the problem and collect preliminary data efficiently. This paper, through its exploratory nature, has the potential to unveil novel opportunities for investigation and provide preliminary insights that could inform subsequent research endeavors, especially in improving the enrolment possibilities for agriculture-based courses. This paper answered the question: *how do agriculture students perceive the course after years of enrollment prior to graduation?*

3.2. Population and sampling

In most exploratory studies, the number of participants is not a concern. It does not strictly require the investigators to have large data sources[28] because its main goal is to narrow down the contexts into details and perspectives[29]. As a cardinal rule, for single-case studies like this paper on mindset shift, Marshall et al.[30] recommends having only 15 to 20 participants. In this study, 30 participants were selected from the pool of ZAMBASULTA students enrolled in school year 2024-2025. This number, although slightly higher than what Marshall et al.[30] suggested, was particularly useful because of the accessibility to as many participants. They were purposively sampled[31, 32] to be interviewed. Purposive sampling is frequently used in exploratory studies as its *flexibility* allows for a concentrated examination of specific subgroups or individuals who hold relevant ideas, expertise, experiences, or characteristics essential for understanding the research issue or phenomenon[33, 34], *i.e.,* understanding the mindset shift in agriculture will be most effective when directly involving agriculture students.

3.3. Research instrument

In a qualitative study, the key determinants influencing the quality and reliability are the carefully constructed processes utilized for data collection[35]. A well-structured protocol significantly affects the later phases of the interview process[36], which could contribute to the study findings[37]. In interviews that are semi-structured, the questions are pre-formulated, utilizing existing knowledge to create an interview guide prior to the actual interview occurring[38, 36]. The interview guide covers the central themes of the research study. The template facilitates a systematic approach to addressing the subject matter throughout the interview process, yet it is important to remain flexible and not follow it too strictly[39]. **Table 1** presents the interview guide questions asked during the interview.

Table 1. Interview guide questions.

Objectives	Interview questions
Determine their impressions before taking the agriculture program	a. What were your initial thoughts about studying agriculture before you decided to enroll in the program? b. How did you foresee the relevance of agriculture in the Philippines?
Determine their perspectives during the time they are taking the program	c. What is the importance of the agriculture program now that you are studying it? d. What aspects of your agriculture program do you appreciate the most?
Compare the mindset shift in their initial and actual learning experiences in the agriculture program	e. How does your current experience in the agriculture program differ from your initial impression? f. How has your perspective changed from your initial impressions to your current stint in the agriculture program? g. Has there been a perspective shift towards agriculture now? Enumerate and explain why.

3.4. Data gathering procedure

Interviews serve as a systematic approach to engaging with and analyzing the narratives presented by individuals. Narratives have functioned as a method for individuals to extract meaning from their experiences since the emergence of written documentation, providing a structure for knowing their behaviors and actions[40]. Interviews serve as a prevalent method in phenomenological research to explore the real-life experiences of the individual subjects[41], distinguishing this approach from grounded theory, which focuses on group processes, and ethnography, which examines the culture of specific groups. In conducting an interview, Creswell and Creswell[42] outlined six stages: develop research objectives, identify participants, introduction (e.g., discussion of objectives, ethical considerations, confidentiality, and data distribution), asking thematic questions, have follow up questions, and summary/conclusions. Benlahcene and Ramdani[43] added processes like simplifying complex topics during interviews, make the participants feel comfortable,

and encourage them to reflect on themselves. It was apparent in this study that language had significant barrier in communicating with the participants. To address this, they were asked to speak using the language they are accustomed to, like Bisaya, Chavacano, Filipino.

3.5. Data analysis

Narrative data from the interview was the primary data collected in this study. Reflexive thematic analysis was used to analyze the responses from the participants. Basically, thematic analysis serves as a strategy for the structured documentation, organization, and analysis of recurring patterns of meaning, which are commonly known as themes, within a specified data set[44]. In doing the analysis, researchers generally start their coding process at a basic descriptive level, then systematically advance toward a more analytical level of analysis[45]. A similar procedure was used in this study, employing an inductive approach. This approach starts with specific narratives and develops broader ideas or patterns from them. It relies on the inherent information in the data, allowing codes and themes to emerge directly, ensuring the analysis stays aligned with the data's core substance[44]. Particularly in reflexive thematic analysis, the themes emerge from the researcher's interaction with the data, influenced by their values, experiences, and preconceptions[46]. The coding process in reflexive thematic analysis exhibits a degree of flexibility and evolution, permitting codes to adjust as the investigator's understanding of the data becomes more profound. The subjective nature of coding is highlighted, necessitating that researchers remain *reflexive* regarding the potential impact of their perspectives on the analysis. Reflexivity makes up an essential component in qualitative research, as it enables researchers to examine the ways in which their presence may influence the processes of data collection and analysis[47, 48]. Braun and Clarke[46] developed the six phases of reflexive thematic analysis, shown in **Figure 1**.

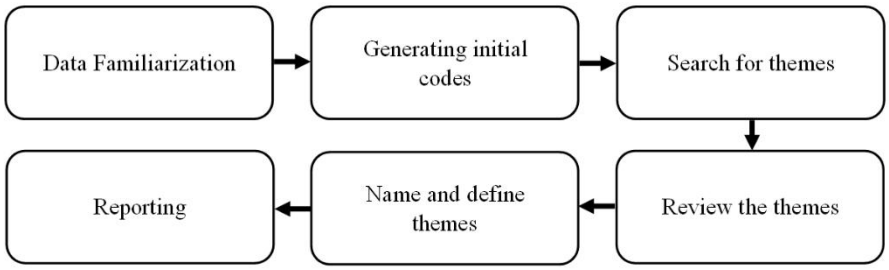

Figure 1. Six phases of reflexive thematic analysis.

4. Results

Objective 1: Determine students' impressions about agriculture before taking the program.

Theme 1: Agriculture as a fallback option

Before taking the program, many students initially viewed agriculture as a career for individuals who lacked higher education opportunities or were less fortunate. Students saw agriculture as a fallback option rather than a desirable profession. Some look at the agricultural industry as not a promising career path.

> "I have always thought of agriculture as a lifeline for the less fortunate and the end point of individuals who cannot or did not pursue higher education."
> "Maybe because I thought one doesn't need to have a degree to be in agriculture field."
> "My initial thoughts were influenced by these opinions that maybe I wouldn't have a future when I take this course, maybe this course is 'useless' just so I could graduate with a 4-year course."

Theme 2: Agriculture as a backbone of economy

In contrast, some students, prior to entering the program, had a positive outlook about the agriculture sector. Some believed that there is deep connection between agriculture and Filipino traditions, where farming has been a vital practice passed down through generations. Students also recognized the role of agriculture in addressing the needs of a growing population.

> "Agriculture has been embedded in our culture since many Filipinos work as farmers, with a significant number of our elders traditionally cultivating lands and producing their own food. This highlights the importance of agriculture in our country."

> "I also consistently encountered references to agriculture as the 'backbone of the Philippine economy.' It is where my realization on the vital role of agriculture not only in providing food and resources but also in shaping societies and economies started."

> "Since we live in an agricultural country, managing our lands and planting crops should be the priority. This is because our population is getting higher every day, and almost everything we eat comes from agriculture."

> "I saw agricultural engineering as highly relevant in the Philippines because our agriculture sector needs modernization. Efficient machinery, better irrigation, and innovative solutions could significantly enhance productivity and address many challenges faced by Filipino farmers."

Objective 2: Determine students' perspectives during the time they are taking the program.

Theme 1: Technology acceptance

Technology acceptance revolved around students recognizing its essential role in transforming agriculture. For agriculture and biosystems engineering students, technology is key to enhancing efficiency and solving challenges in the agricultural sector. Students perceive technology not solely as a tool for enhancing machinery but as a comprehensive mechanism for developing sustainable systems, augmenting food production efficiency, and tackling tangible agricultural challenges. The primary emphasis is on embracing technology as an essential component in the modernization and advancement of agriculture to satisfy current and potential demands.

> "Studying agricultural engineering has shown me how essential it is for advancing agricultural practices. It's not just about improving machinery but also about developing sustainable systems, enhancing food production efficiency, and solving real-world problems in agriculture."

Theme 2: Quality focus

Quality focus highlights the importance of improving agricultural outputs to benefit both farmers and the broader economy. In order to help farmers fulfill market needs and improve their livelihoods, it is fundamental to invest in qualified professionals in agricultural engineering as this will support them in creating high-quality products. For students, there is the need for a quality-oriented approach not only for the immediate benefits of food production but also for ensuring that agricultural products serve other industries. Through a focus on quality, students express a commitment to enhancing agricultural practices and contributing to a sustainable and productive agricultural ecosystem.

> "It is important to put people in this field to help our farmers produce better quality products and higher yield. Agriculture isn't just for food production; other industries rely on agricultural products as its input/raw material."

Theme 3: Practicality

Practicality emphasizes the value students place on hands-on, applied learning within agricultural engineering. This suggests that students believe practical experience is essential for fully understanding and addressing the challenges faced in agriculture. By engaging with GIS technology, students can visualize and analyze spatial data, which enhances their ability to make informed decisions regarding resource management, land use, and environmental conservation.

> "Studying irrigation and drainage engineering, soil conservation engineering, and getting them into the field is what I appreciate the most. Especially when we explore Geographic Information Systems (GIS) like QGIS or ArcGIS, where we create maps and analyze them."

> "I prefer agricultural sciences since it focuses more on science and its application in the field of agriculture. Learning the science behind crop and livestock management is fascinating to me because we always delve deeper to what we see every day."

Theme 4: Change-driven

Change-driven reflects a strong desire among students for transformative approaches within the agricultural sector. Students emphasized the need for new ways of thinking and innovative solutions to address the challenges faced by the industry. By enhancing the quality and scope of agricultural programs, students envision a future where upcoming professionals are equipped with the latest knowledge, skills, and innovative approaches needed to revitalize the sector.

> "Our agriculture deserves a fresh perspective, ideas, innovations, and enthusiasm. And to achieve those, I believe that it is crucially important to strengthen agri-related programs offered in all universities and colleges around the country."

Objective 3: Compare the mindset shift in their initial and actual learning experiences in the agriculture program.

Theme 1: Hands-on learning

In terms of learning experiences, hands-on activities greatly impacted the growth of students in learning the agricultural sciences. This indicates that experiential learning opportunities have contributed to students' understanding of the convoluted characteristics of agriculture and the associated challenges. The practical application of learning has expanded their knowledge of the field, exposing them to contemporary technologies and innovative approaches that improve agricultural efficiency and effectiveness.

> "Hands-on experiences have taught me that agriculture is interesting, but not easy. It is complex. Agriculture is heavily reliant on natural factors like weather patterns, soil quality, and water availability. It also needs technological and scientific knowledge."

> "I came to experience some hands-on technology-related activities, unlike what I initially thought where it only involves the traditional farming principles. I experienced its complexity, unlike what I initially thought."
>
> "My program isn't just about learning established methods; it's about developing critical thinking and problem-solving skills. We're constantly analyzing agricultural challenges and exploring innovative solutions using engineering principles."
>
> "My current experience is far more comprehensive and impactful than I initially thought. I expected to focus mainly on machinery, but I've also learned about renewable energy, environmental protection, and how to design systems that enhance agricultural productivity sustainably."

Theme 2: Growing appreciation

Growing appreciation reflects the transformative experiences students undergo as they engage with the field of agriculture. Initially, many students have a narrow view, focusing primarily on traditional farming practices and basic crop production. As they progress through their programs, they begin to realize the complexity and multifaceted nature of modern agriculture, which extends far beyond simple planting. Students recognize the broader significance of agricultural engineering in addressing global challenges, such as food security, climate change, and resource management. This evolution in perspective demonstrates a shift from a simplistic understanding of agriculture to a profound recognition of its complexity, relevance, and the critical role it plays in shaping sustainable solutions for future generations.

> "Before pursuing this field, I had a narrow view of agriculture, focusing on traditional farming practices and basic crop production. However, my experiences in the program had broadened my perspective significantly."
>
> "My initial impression was quite simple. At first, I underestimated the complexity of modern agriculture. It requires a deep understanding of various sciences and engineering disciplines to optimize production and address environmental concerns."
>
> "Agriculture isn't really full of 'simply planting' because if I were to compare the times, we were exposed on field than the time we spent in a formal classroom setting, the latter would have had the longest time."
>
> "My perspective has evolved significantly. Initially, I saw agricultural engineering as a niche field within agriculture, but now I understand its broader role in addressing global challenges such as food security, climate change, and resource management."

5. Discussion

This paper observed prominent mindset shift among agricultural and biosystems engineering students after enrolling in the program. A mindset refers to a set of beliefs that influence how individuals perceive and interpret both the world around them and their own identity[49]. A mindset shift, in its core, is a significant transformation in a person's cognitive frameworks, belief systems, and attitudes. The process involves a transformation in viewpoint, necessitating a reassessment of existing assumptions and building an innovative

cognitive framework that empowers individuals to deal with circumstances in an unusual way and attain their objectives[50].

Initially, college students believed that agriculture sector is *"[only] a lifeline for the less fortunate…[an] end point of individuals who cannot or did not pursue higher education."* Students believed that they *"… [will not] have a future…maybe this course is 'useless.'"* It seems that students have an innate level of discouragement in pursuing any career related to the agriculture sector. This phenomenon is not surprising at all. In a study of Roy[51] in Bangladesh, it stressed that agriculture is often perceived as a profession of last resort, particularly in countries where there is a prevailing belief that the future profitability of this sector is limited. Similarly, youth engagement in agricultural activities in Bangladesh is notably low, primarily attributed to the disinterest among university students and recent graduates in pursuing careers within the agricultural sector[52, 53]. In the Philippines, an existing trend manifests that younger demographic exhibits diminished interest in agriculture, particularly in the context of an aging cohort of farmers[54, 55].

A mindset shift takes place after enrolling in an agriculture-based college program. One student believed that "…my experiences in the program had broadened my perspective significantly." One said that "My program isn't just about learning established methods; it's about developing critical thinking and problem-solving skills." As straightforward as it seems, admission to the program caused students to expand their understanding about agricultural sciences and thus shifting their mindset into positive one. For some cases wherein students initially thought "backbone of the Philippine economy," similar reaction was observed—but in much profound manner. For example, these students were much more open in communicating how agriculture is essential in the economy highlighting critical aspects like showing a character reflecting technology acceptance, quality focus, practicality, and change driven. A similar pattern can be observed in how a person's perception of something changes after frequent exposure to it. For example, a classroom culture that provides growth mindset-supportive practices expressing a belief that anyone could be a top student in the class, discussing ways for students to improve their grades over the course of the semester, and encouraging students to ask questions to improve their understanding were all categorized as indicating a growth mindset by ≥99% of students[56]. In the same vein, the prudent adoption and utilization of digital and technological tools have the potential to drive cultural and mindset transformations, enhance workplace safety and health, and yield favorable outcomes in a systematic fashion—causing the workplace to further adopt sustainable technology[57].

In theoretical nuance, the concept of mindset is described as the intrinsic beliefs or perspectives that individuals or groups hold regarding reality[58], say the value of agriculture sector in the economy. In practice, the persistence and performance of lower-performing students exhibited improvement following instruction on the malleable nature of intelligence within an educational context[59, 60]. A similar phenomenon was observed in this study as enrolling in an agriculture-based program helped reshape the perspectives of college students without them realizing it at first. It is important to note that early studies stressed out how mindset can be dynamic and can take shape based on its environment[61, 62]. Specifically, they focus on mindsets—fundamental beliefs that guide an individual's expectations, attributions, and objectives—which influence not only the interpretation of experiences but also the resulting psychological and behavioral reactions[63,64]. In perspective, college students in this study used more *sensitive* code words that manifest their sympathy for farmers and agriculturists, words like "appreciate," "hardwork," "deserves," "fascinating," "essential," among others. This is remarkable as language directly delivers the thoughts one wants to express. Their exposure to the program led to subtle changes on how they talk and communicate their ideas to how they perceive the agriculture sector in general.

6. Conclusion

This study observed a significant shift in the mindset of agricultural and biosystems engineering students after enrolling in an agriculture-based program. Initially, many students held negative views of the agricultural sector, perceiving it as a fallback career or a profession for the less fortunate. However, through their exposure to the academic program, students developed a deeper appreciation for the complexity and importance of agriculture, recognizing its critical role in food security, environmental sustainability, and technological advancement. This shift underscores the transformative power of education in reshaping perceptions and highlights the importance of experiential learning in fostering a positive outlook toward the agricultural industry.

These findings have significant implications for educational institutions, governments, and the agriculture economy. First, agricultural programs can have a significant impact on changing students' views toward agriculture, potentially encouraging youth participation in the sector. This holds significant relevance in nations such as the Philippines, where there is a notable trend of an aging agricultural workforce. Secondly, to encourage appreciation for agriculture among students, those responsible for designing the curriculum ought to place an emphasis on the incorporation of technology, problem-solving, and real-world applications. Finally, the shift in students' language and perceptions demonstrates that education can alter how people speak about and advocate for agriculture, which could have far-reaching consequences for how the public perceives and supports the sector.

Despite its contributions, this study had several limitations. First, the sample was limited to students enrolled in a specific agricultural program, which may not represent the views of all students or individuals outside the academic environment. Second, the study did not account for other factors, such as prior family or community involvement in agriculture, that might have influenced students' initial perceptions. Future research could expand the sample size, include students from different regions or academic backgrounds, and explore how other demographic factors contribute to mindset shifts in agricultural education. There was a need for robust statistical tests *i.e.,* a quantitative analysis, to analyze the perceptions of the college students and relate it to how they communicate their thoughts and ideas about the agriculture sector.

Conflict of interests

The authors declare no conflict of interest.

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