

Future Workforce for America: Exploring the Impact of Ecological Factors on Youth Motivations to Pursue Careers in Agriculture

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Abstract

Technological advancements in the United States' agricultural sector have created a demand for young and innovative workforce to replace the aging working population. While existing research shows that most of the youth are not attracted to the agricultural related jobs due to their low economic benefits, the motivations for those entering the sector are not yet documented. This study, therefore, employs the Ecological Systems Theory to explore the motivations for youth pursuing agricultural careers in the University. A qualitative content analysis approach was adopted by analyzing 45 video presentations by undergraduate students. The results showed that family influence through practical agriculture engagement, value for sustainability, and connections with educational institutions coupled with school activities and emerging opportunities in the agricultural sectors were the main motivating factors for youth engagement in agriculture studies. Our findings suggest the need to involve the microsystem elements such as family values and school activities in policies and youth agricultural program development to increase youth involvement in the sector.

Introduction

Youth's role in the development and sustainability of the global agriculture and food industry cannot be underestimated. Youth possess valuable talents and energy to handle complex systems, drive innovations, revitalize the production systems to promote environmental stewardship and sustainable production (FAO, 2021; Huambachano et al., 2022). They also have the potential to utilize new technologies such as drones, artificial intelligence, ICTs and clouds more effectively than the older generations. Such abilities enable them to identify and find solutions to the numerous challenges such as climate change, increasing pests and diseases outbreaks, biodiversity loss, soil erosion among others facing the agricultural industry (Bhattacharjee & Saravanan, 2013; Lohento & Ajilore, 2015).

Agriculture plays a major role in the United State economy. The sector provides employment to a significant number of the rural population and ensure sustainable livelihoods in rural areas (United States Department of Agriculture, 2024). It also serves as the primary source of raw materials to the allied industries to support their continuous operations and supply of secondary products for domestic use. Over

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the years, the American agricultural industry has experienced an increasing digital technology revolution, which is increasing work efficiency and productivity. In recent years, agriculture producers have had access to a wide range of sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS (Baur & Iles, 2023; Chávez et al., 2020; NIFA, n.d). These advanced technologies have created a need for skillful and innovative workforce to champion their use. In this context, youth involvement in the sector has become a need more than a want (USDA, 2022) due to their technology savviness, innovativeness and ability to take high risks and use complex technologies to drive labor diversification and competitiveness in the agricultural industry (Girdziute et al., 2022; Islam et al., 2023).

Existing studies, however, show that the U.S. agricultural industry faces challenges in attracting youth into the sector (Dempsey, 2019; ILO, 2022; USDA, 2023). For example, the number of youths working in the sector has been reported to decline while new ones are failing to join, causing shortage of labor, an aging labor force, a lack of succession, potential loss of intergenerational knowledge transfer, less innovation adoption and competitiveness of the sector (ILO, 2022; USDA, 2023). Some of the salient factors found in existing studies precluding youth from joining careers in the agricultural industry were poor outlook of agriculture the societies, high cost of production with low return, inadequate social protection, lack of startup capital, and farming being backbreaking with less economic rewards (Boerngen & Rickard, 2020; Dumas, 2014; Jean-Philippe et al., 2017; Holz-Clause & Jost, 1995; Smith, 2017).

While it is important to gain holistic understanding of the factors impacting youth engagement in agriculture, the existing studies have focused on the rate of youth exiting from the agriculture sector, its causes, and consequences with little to no attention to the motivations of those entering or willing to pursue careers in the sector (Boerngen & Rickard, 2020; Holz-Clause & Jost, 1995; Smith, 2017). This creates a knowledge gap in understanding the actual factors to consider when designing and implementing intentional youth-centered programs (Baker et al., 2013; Daynard, 2010). Moreover, youths' decisions to engage in careers in agriculture are influenced by the interactions and interrelations among the systems present in their environments (Bronfenbrenner, 2000; Espelage, 2014). It is therefore important to explore the motivations of youth engaged in the various agricultural programs. This will help guide policy makers, curriculum developers and youth programmers to introduce or implement agricultural programs that meet the interest of the youth to attract and retain them in the field.

Theoretical Framework

The current study adopted the Ecological Systems Theory (EST) proposed by Bronfenbrenner (2000) as an overarching theoretical framework to explore the contextual factors within the youth environment that influence their decisions to study agricultural programs at college. The EST posits that individuals are surrounded by a series of interrelated systems that influence their choices, decisions, and behavior (Bronfenbrenner, 2000; Neal & Neal, 2013). EST conceptualizes development as a valid process that encompasses interactions and interdependence within and across contexts (Duerden & Witt, 2010). Bronfenbrenner (2000) outlined five levels of interrelated systems known as microsystem, mesosystem, exosystem, macrosystem and chronosystem.

The microsystem represents the primary social environment inhabited by youth and their direct interactions within these contexts (Bolton et al., 2021; Ortega et al., 2012). This system includes social institutions like family, school, peers and other identifiable social institutions. The mesosystem, on the other hand, represents the relationships that exist between two or more social elements within the microsystems that influence youth behavior. An example could be the relationship between parents and teachers at school at youth's school. The exosystem represents external elements that the youth does not have direct contact with but is influenced by them. This could be the parents' job. There are also social-cultural elements such as norms, values, and policies that affect how youth socialize or the opportunities available to them. These

contexts are classified as macrosystems. The chronosystem also represents significant life events and societal changes, such as cultural shifts that affect youth development and decision-making.

The EST has been applied to past studies to study the influence of the various systems on youth development. For instance, parents' direct relationships with their children were found to influence youth's ability to resist peer pressure (Duerden & Witt, 2010). Similarly, another study found teachers' positive relationship with students' academic and social activities decreased insecurity and enhanced learning among youth in schools (Espelage, 2014). While the EST has been widely applied to social work and youth development to explain positive youth development, its application in youth agricultural career decision-making has not been fully explored. The current study, therefore, adapts the EST to explore the systems within the youth environment that inform their decisions to pursue various programs in agriculture.

Youth in various agricultural programs live in communities (environment) and within these communities are their parents, peers, community members, schools, churches and youth clubs or associations (microsystem) that interact with them directly. These interactions or interdependence potentially influence their career decision-making (Bolton et al., 2021; Ortega et al., 2012). Additionally, the interactions between family members and teachers (mesosystem) or between schools and youth clubs such as Future Farmers for America (FFA) could reinforce youth interest in specific programs or careers in agriculture (Bolton et al., 2021). Furthermore, parents or close family members' occupations (exosystem) may not directly involve the youth, however, the benefits they derive from them or the love and emotional attachment to the jobs could inspire youth to study agriculture and work in similar industries (Marx et al., 2017). Additionally, the structures in societies, such as norms, beliefs, values, and government policies on agriculture, play important roles in youth decisions to engage in the sector. For instance, if society places high value on agriculture and individuals who engage in the sector are valued and respected in society, youth may be motivated by the value society places on agriculture and pursue careers in the area. (Bronfenbrenner, 2000). If government policy supports agriculture innovations, ready market, credit availability for startups, and professional development through grants and scholarships, youth may be attracted to the sector to explore opportunities in the area. Finally, historical events such as relocation of youths' families from the city to rural areas or growing up on a farm and helping parents on their agriculture operation for a longtime could be a source of motivation for youth to study agriculture to gain professional experience to work in the sector.

Youths do not live in isolation. They are surrounded by systems that interact and interrelate to influence their agriculture career decisions. Therefore, the EST provides a useful theoretical framework to model youth motivations to pursue agricultural programs at the University (Bolton et al., 2021). This can help identify the appropriate resources that can be used to support youth career decisions. In this study, students and youth are used interchangeably.

Purpose and Research Question

The purpose of this qualitative content analysis is to explore the motivating factors for youth decisions to pursue agricultural programs at the college level. The study answers the following research questions:

1. How do family background and agricultural practices motivate youth to pursue agricultural programs in college?
2. How does participation in school activities inform youth decisions to pursue agricultural programs in college?
3. How do experience and present opportunities inform youths' decisions to pursue agricultural studies?

Methods

In this study, we employed qualitative content analysis techniques in a storytelling format. Content analysis is a research technique for analyzing and interpreting contents of written documents, interview scripts, pictures, and recorded communications (Erlingsson & Brysiewicz, 2017). Content analysis provides a structured method for identifying and classifying keywords into patterns (themes) and concepts to create the conceptual meaning of data and draw realistic conclusions (Wilson et al., 2016). In content analysis, phrases and words are mostly tallied or quantified to establish the frequency of concepts (Busch et al., 2005; Elo et al., 2014). In this study, we wanted to understand the contextual factors that motivate students to study agricultural programs at the college level, therefore we adopted content analysis with storytelling strategy. Storytelling is an emerging field in science communication that is used to show people's unique experiences (Mei et al., 2020; Sundin, 2018). It is an emotional and symbolic charged narrative that comes in verbal or visual metaphor to show people's lived experiences with the aim of communicating learning, concepts, and causalities (Yueh & Zheng, 2019; Mei et al., 2020). Storytelling helps in capturing diverse experiences as such serves as a useful tool to better understand and appreciate factors influencing people's behaviors.

Data Collection Procedure

Participants in the study were undergraduate students pursuing agricultural programs at [University A]. As part of the core subject requirements, students were asked to prepare and deliver a five-minute presentation. A checklist that contains guidelines for the presentation was provided to the students through Canvas (an online student learning platform). The checklist required that students give a brief background about themselves, their educational journey, their reasons for choosing Iowa State University, and the agriculture programs they are pursuing. The presentations were video recorded and uploaded to Canvas. Altogether, 45 individual presentations were recorded, which lasted for 107 minutes (about 2 hours) and 23 seconds.

Data Analysis

The current study followed the eight category coding steps for qualitative research outlined by Kathleen Carley (Carley, 1993). Based on Carley's guidelines, we defined the level of coding. We agreed to single-word and phrase coding techniques to help capture all the relevant information. We also established to code only keywords and phrases relevant to the study context (manifest coding). We used deductive coding approach for the data analysis. This approach was adopted because the study was guided by the EST framework (Miles et al., 2013).

First, the videos were downloaded from Canvas and saved on a desktop computer. Each member of the team watched the full video to have a fair idea of the emerging keywords. Next, the first author transcribed the video recordings verbatim and shared them with the researchers. The team developed a codebook based on the research questions and contextual factors established through the EST (see Table 1). Pseudonyms were assigned to the presenters to conceal their identity.

We used a line-by-line coding strategy. Line-by-line coding is the application of codes to each line of qualitative data to identify themes and concepts (Willam & Moser, 2019). Each team member did independent coding by highlighting and writing down the emerging codes. After the first stage of coding, the research team had a debrief session to discuss the codes and themes generated. We compared notes (memos) during the debriefing session to ensure the codes generated reflected the exact meaning from the videos and the constructs of the EST. This process helped reduce biases (Blair, 2015). Memoing is the technique where thoughts, insights, and meanings of the data are written down throughout the coding process (Charmaz, 2014).

A second stage coding process followed the team's first meeting, the authors reread the transcripts and coded based on the agreed categories by the team. We met again to discuss the categories and develop the final themes. Throughout the coding process, we used constant comparison and member checking as a way of ensuring trustworthiness. Trustworthiness is the appropriate criterion to ensure credibility, transferability, confirmability, and dependability of qualitative data (Elo et al., 2014; Williams & Moser, 2019).

Reflexivity Statement

The researcher's objectivity in qualitative research is important (Creswell, 2014; Elo et al., 2014) as they form the main instrument of the research process. The researchers' beliefs, knowledge, background, culture, and experience shape the interpretations of the data. Therefore, the ability to recognize these is known as reflexivity (Creswell, 2014; Elo et al., 2014). The first author is an agricultural extension educator with many years of experience working with youths and farmers. As such they acknowledge their bias in the choice of the research topic, data collection, analysis and interpretation. The second author is a science communication expert and has never conducted research exploring youth's motivations for engaging in agriculture. As such they provided a critical view on the data collection, analysis and interpretation. The third, an agricultural educator with several years of experience, was an FFA member and is now an advisor. They acknowledge their potential bias on the topic. However, the third author was not involved in the data collection to avoid bias. To ensure transferability of the results the three authors worked together to check and address any biases during data analysis and interpretation.

Table 1

Coding Guide

Category	Theme	EST construct	Situation
Work on the farm with parents, assist grandparents on the farm, and work with siblings.	Family influence a. <i>Practical agriculture engagement</i> b. Sustainable practices	Microsystem Mesosystem	I grew up on the farm raising cattle with my parents. My parents taught me a lot about the environment, like respecting it. Half of my family attended ABC university; agriculture is a great field
Protect environment, organic farming, Family alma mater Parents know mentors	c. Connection with educational institutions		
Worked in agriculture, Showed animals, raised animals, Volunteer in agriculture organization, internship	Agriculture industry experience	Microsystem	I started working for John Deere when I was sixteen years and I developed love for agriculture through that I was involved in FFA and 4-H in high school, I showed cattle and pigs at State and county fairs.
Teachers guidance, Mentors advice, high school programs. Teacher raised cattle. Agricultural association	Influence from school a. <i>Mentor</i> b. <i>Participation in agricultural clubs and associations</i>	Microsystem Chronosystem	My ag teacher raised sheep, so I got so involved in sheep showmanship. I visited Iowa state; the advisors helped me, He said

School club			graduates from Iowa have about 90% of job placement
Animal showmanship			
Job in the agricultural industry, ag. Professional, Inherit family business	Future aspirations a. <i>Family business opportunities</i> b. <i>Job opportunities in agricultural companies</i>	Chronosystem microsystem, mesosystem, exosystem	I want to go back to the family farm. I want to keep the family business going.
Family enterprise			
Scholarship, tuition support, financial aids	Availability of support systems Financial support.	Microsystem, Exosystem, Macrosystem	I had a scholarship to finance my college

Findings

Research question one: *How do family background and agricultural practices motivate youth to pursue agricultural programs at college?*

When asked about the role of family on the participant’s motivation to embark on agricultural studies at the University, *family influence* emerged as the major theme. Most of the participants (n = 44) reported that family influence played a significant role in youth decisions to choose agriculture programs at the University. Further discussions regarding the impact of family revealed three sub-themes namely; *engagement in practical, value for sustainability, and connection with educational institutions.*

Engagement in Practical Agriculture: The analysis showed that more than half (25) of the participants indicated that they were motivated to study agriculture based on their practical engagement in family agricultural activities. Many of them explained that they grew up on their parent's family farms, and they were actively engaged in their daily farming activities, such as plowing fields, harvesting crops, feeding animals, selling harvested produce, and taking stock of inputs. Their engagement in these practical activities helped them develop love for agriculture as evidenced in the following quotes. Rock stated,

"I grew up on a farm, growing up, I helped my father on the field hauling bales and scooping cattle litter. We grow soybeans and corn; it is the work I like doing that is why I decided to get a college degree in agronomy."

Baci supported Rock’s point when they stated the following:

"I lived with my stepfamily on a large corn farm; we have goats, sheep, and ducks. I helped feed and clean the duck pen with my cousins. It was something I loved doing every morning. I think that got me into choosing animal science major."

These sentiments were echoed by Wright who also stated,

"I grew up on a corn roll farm, and it slowly became part of me. Growing up, I spent all 21 years of my life on the farm, helping my father stack and drive tractors, shape waterways, and keep machines running. I think that was the time my agriculture journey started."

It was not only family farming activities that motivated the participants to pursue agricultural programs, but their involvement in national and state activities as well. Some of the youth explained that their parents and grandparents were heavily involved in animal shows at the county, state, and national levels and through those activities, they developed strong attachment to agriculture. Brown had this to say:

"I grew up raising cattle, mainly focusing on raising show cows. I have shown cattle across the country with my parents all my life. Showing cattle inspired me to study animal science. I met a lot of professionals in the agricultural industry, that is why I ended up in University ABC."

Another participant, Martha, said, "I grew up on beef and crop growth operations. I started showing cattle at five years, I showed rabbits, and as I grew older, I started showing pigs and cattle; I got attracted to veterinary medicines through the animal show." The results showed that parents' engagement of the youth in practical farming activities gave them firsthand experience, which ignited their passion for agriculture.

Value for sustainability: A notable number of participants (11) indicated that their decisions to pursue agriculture at school were inspired by their family members' values for environmental sustainability. The participants explained that growing up, their parents taught them how to dispose of plastic waste and keep the environment clean from metals and harmful chemicals. Through these activities, they became environmentally conscious and ended up studying various programs in environmental sciences. Andy stated that,

"...my parents taught me a lot about the environment, like respecting it. My mother always talks about the importance of protecting the environment, so I went into environmental science in middle school; I did a project in the Amazon rain forest during high school."

These sentiments were echoed by Sherilyn who also said:

"I grew up around nature; my parents grow organic vegetables; they always talk about environmental safety. So, growing up on the farm and learning sustainability from my parents really cemented my love for nature; that is why I chose soil science."

Apart from having family that valued sustainability, random encounters with wildlife also served as a source of motivation for participants like Theresa and Mars as indicated in the following quotes:

"...my parents, my little brother and I went on a trip to visit a national park, on our way, I saw a bear in the park, it wouldn't move until I screamed. It then moved into the bush, so I realized that we had invaded the bear's natural ecosystem. That experience solidified my love for nature."
(Theresa shared)

These sentiments were echoed by Mars who stated, "I have a huge passion for sustainability and environmental issues. I learned that from my late grandparents."

Connections with educational institutions: The connections family members had with educational institutions motivated some of the students to pursue agricultural careers in the same institutions. The analysis revealed that the parents' relationship with teachers, mentors, and administrators at high schools and Colleges opened doors for students to get advanced information about school programs, admissions process, and departmental information, which facilitated their selection of specific agricultural programs. Others also explained that their decision to study agriculture was inspired by their family legacy; their parents, siblings, and grandparents studied agriculture science at Iowa State University therefore they wanted to maintain the tradition. Presenter Kate said this "half of my family attended Iowa State University, some study agronomy, animal science, and horticulture. I did not want to go to any other university, so I chose Agribusiness; later changed it to Agcom." Frank also explained that

"both my dad and Mummy are alumni of this College; they know most of the faculty at agronomy. I had a campus tour with my mother when I was at high school, we spoke to some of the mentors about my interest in ag education, so before coming here, I knew what I was going to study" .

Ruth stated that "my stepfamily work at university ABC, I never thought of going to another school, I frequently watch the cyclones soccer with my dad, I knew I was going to come here." Beatrice said,

"we live very close to university ABC, it has been part of me from childhood, my brother and sister work here, we have 150 acres of corn and soybean farm, there was no way I was going to attend a different college for my undergrad degree."

Family influence is pivotal in youth career decisions due to the direct interaction the family has with youth and other primary institutions. The present findings are evidence of the influential role of the microsystem and mesosystem in shaping youth behavior and decisions.

Research question two: *How does participation in school activities inform youth decisions to pursue agricultural programs at college?*

When participants were asked to share their opinions on how education policies and participation in school activities informed their decisions to pursue agricultural programs in college, two themes emerged namely: *school activities/interactions and financial support*.

Influence from school

A significant number of the participants (n = 18) reported that school influence played a significant role in youth decisions to choose agriculture programs at the University. Two sub-themes emerged under this theme which were *mentor influence* and *agricultural clubs and associations membership*.

Mentor influence: The analysis showed that six presenters pursued agricultural programs based on the influence teachers and advisors had on them. It was revealed that mentors' advice, teachers' practical involvement in agriculture, and touring students on university campuses informed youths' decisions to pursue certain programs in agriculture. Helen stated that

“my agriculture teacher at middle school raises sheep and is heavily involved in animal showmanship at State and national level. She mentored me in sheep production and showmanship. I got so involved in sheep showmanship at State Fairs; she inspired me to study animal science.” Kate explained how her high school teacher’s teaching skills impacted her decision to become an agriculture teacher

“I took an education class at high school, the teacher was so skillful, I remember how he used to narrate how she used to go to farm with her parents, her involvement in FFA and always shared how she loved teaching Ag. Science. I got so attached and wanted to become a teacher. Since then, I have loved to educate people, especially youth, about agriculture and its value.”

Paul also expressed his motivation for agriculture this way; “during high school, I was heavily engaged in agriculture fairs, I met experts in the industry who inspired me. I spoke to people who knew so much about pig production, it fascinated me that is why I ended up being in the industry.” Kobe stated,

"I visited ABC University when I was in high school; the advisors were friendly, and they explained all the Ag. programs in college to me. They said graduates from ABC university have about 90% job placement after graduation.

Agricultural Clubs or Associations Membership: the involvement of agricultural clubs and associations in schools was mentioned as the avenue for several (12) youths' motivation for pursuing Agricultural studies. Youth agricultural clubs such as 4-H, FFA, and other fraternities were mentioned multiple times in the videos by the presenters as areas where they learned more about agriculture through practical activities. Hannah narrated how, being a city girl, she got to love animal science after joining FFA. She wrote

"I grew up in a city, I know nothing about sheep, goats, cows and corn production. My best friend was an FFA member, and she convinced me to join; after a few months, I became so engaged in the association that I participated in fairs, animal shows, and trips. I loved the sheep, that is why I chose Vetmed.” Mettle explained his motivation by stating “In high school, I was so involved in FFA and 4-H. I was an officer, and most of my friends were showing cattle; I learned a lot from them; that is where my agricultural communication journey started.” The motivations of Abigail and MacDan were not different from their colleagues. Abigail wrote, “I was a member of 4-H in my community, I rode horses, I attended 4-H fairs, I met my age mates who were doing so much in the agricultural industry, I got inspired.” MacDan stated that, “I was heavily involved in FFA and 4-H in high school; that was the first time I showed cattle and pigs at State and county fairs. I loved it, that's why I chose animal science at University ABC.”

In the Ecological System Theory (EST), teachers and mentors are part of the microsystem, they engage directly with students through teaching, advising and practical activities. These direct involvements significantly influence youth behaviors and decision-making. Clubs and associations such as FFA and 4-H directly engage youth in practical and theoretical learning activities through competitions. All these experiences create opportunities for the youth to connect with others, learn from peers and build skills in specific fields in the agricultural sectors. The present results confirm the strong influence the microsystem elements such as teachers, mentors, and clubs have on youth behaviors and career decision-making.

Financial support system

The analysis revealed that the availability of financial support from universities, Nongovernmental Organizations (NGOs), and agricultural companies for agricultural education served as a basis for a number (7) of youths to study agriculture. The organizations give financial support in the form of scholarships or tuition aids. Kristine stated "I saw a financial assistantship at the College of Agriculture, who does not want scholarship? I applied to the College, after one semester I received the scholarship." Mercedes stated, "I got a scholarship from the company I worked with to pay my tuition fee." Finally, Kate stated, "I was lucky; I found multiple grants for ag studies at university ABC, it paved the way for my college tuition; I like ag engineering, so that is a great buffer."

Research question three: *How do experience and present opportunities inform youth decision to pursue agriculture studies?*

When participants were asked to share how their previous experiences and present opportunities informed their decision to to pursue a degree in agricultural studies, two themes emerged namely: *agricultural industry experience* and *future aspirations*.

Agricultural industry experience

Direct experience in the agricultural industry through employment, volunteering, internship, and apprenticeship were mentioned as key motivating factors for their decisions to pursue a degree in agriculture-related programs. A few (7) of the participants mentioned that before coming to college, they were working with local and international agriculture organizations; their employment in the sector exposed them to different careers in the agricultural sector. Therefore, they decided to pursue college degrees in those areas. Presenter Ashely said this, "I worked at Hanson farms for five years; it is a small family farm, about seven minutes away from my house." Mole explained this "I developed strong love for agricultural engineering when I started working at John Deere at age sixteen." Moreover, Cain said

"I did an internship at the WHO radio and the United Nations Food and Agricultural Organization. These experiences gave me the opportunity to interact with farmers and the industry experts that made me change my course to international agricultural communication." another presenter called Aaron had this to say, "I did an internship with an agricultural company during my sophomore year, I gained valuable experience in soil sampling, following this I decided to study horticulture." The result demonstrates the importance of experiential learning in shaping knowledge acquisition and career decisions.

Future Aspirations

The analysis revealed that the youths' future aspirations informed their decisions to study agriculture. Under the future aspirations, two main sub-themes emerged: *family business opportunities* and *Job opportunities in agricultural companies*.

Family Business Opportunities: The analysis showed that a considerable number (13) of the youth were influenced by job opportunities in their family farms to pursue agricultural programs at college. Some of the participants mentioned in the video that after their college degree, they will take over their family farm business. Others also indicated that they would establish their own businesses on their families' land. Rex wrote that "I want to go back to my family farm after my degree. I want to keep the family business running." Mark explained the importance of agriculture studies to him by stating this "My father is getting older; I am the only son. I want to have a degree and take over the family farm from him." Bob also wrote "I will be joining my father and my brother Mark's business to manage sports fields in our town." Sam also explained his motivation this way "I started farming last year, we have a large family land, I want to continue with my farming business after college."

Job Opportunities in Agricultural Companies: The availability of job opportunities in companies was identified as an essential influence in youth agricultural program decisions. In the analysis, it was observed

that the presence of agricultural companies in towns, cities, and states where the youth live influenced them to study various programs in agriculture to gain the needed skills to be employed in the companies. Companies like John Deere, Monsanto, Bayer, Corteva, Cargill, Syngenta, and others were mentioned multiple times in the videos as the desired companies to work with after graduation. Caleb wrote that, "John Deere has established a branch in my hometown, I will be working with them when I graduate from here." Matt stated, "I did an internship with Bayer last summer; I will be working with one of their sales teams immediately after I finish studying agribusiness." Sam wrote "in my career, I plan of working for Corteva, I am majoring in agricultural marketing," Wyte also wrote, "I like working with machine, there are more job opportunities in agricultural engineering, my dad work with Cargill, I will join John Deere" (Wyte).

The results showed that most of the youth have a strong interest in working in their family agricultural enterprises. This passion, together with their desire to maintain or expand these enterprises, along with the attractive job opportunities available in both emerging and established companies, collectively motivated them to pursue a college degree in agricultural sciences. This result shows the important role microsystem such as family businesses and exosystem such as existing and emerging job opportunities influence youth decisions to engage in agriculture activities.

Discussions

The study applied the Ecological Systems Theory (EST) to analyze youth motivations to pursue agriculture at Iowa State university. It was found that family influence, which falls under the microsystem, was the most mentioned motivating factor for youths' decision to engage in agricultural studies at the university. Members of the family influenced youth through practical agriculture engagement, their value for sustainability and connections with educational institutions. Family values reflect on the actions of the family members, and youth keenly observe, internalize, and carry these actions and practices with them. Our analysis revealed that youth who grew up in an environment where their parents or immediate family members placed higher values on environmental sustainability viewed these value as shared values, loving and connecting with them, they adopted them as their own, steering their love for nature and sustainable practices, which transcended into their adoption of agriculture as a means of protecting the cherished values of the family. The present finding is consistent with the study of Ball and Wiley (2005) who found that family values and lifestyle were the most influencing factors in career decisions. Parents' and grandparents' daily engagement of youth in practical agricultural activities such as harvesting, feeding, animal shows, and others heavily motivated youth agricultural careers at the university. The study revealed that most of the youth developed their first love agriculture through these daily activities. Our findings imply that family, specifically parents, can be used as a tool to promote youth engagement in agriculture careers. Like the current findings, Abdullah and Sulaiman (2013) reported that, among other factors, family support was the major factor impacting youth engagement in entrepreneurship. Additionally, Ball and Wiley (2005) found that parents explicitly or implicitly influenced adolescent career decisions in farming by assigning them land to grow flowers and vegetable crops.

Moreover, it was found that family connections with college mentors and faculty paved the way for youths to engage with mentors and advisors on course selections. Additionally, parents touring campus with their kids (youth) served as a way of attracting them to the university and programs in the College. These relationships and engagements link to the chronosystem under the EST in the sense that some of the youth felt specific universities or programs had become part of their family history or traditions that needed to be protected. This reflects the relevance of traditions in shaping youth behavior. Bronfenbrenner (2000) explained that historical events like family traditions influence behavior changes. Our study confirms the important roles of microsystem, mesosystem and chronosystem contexts in shaping youth behavior and career decisions.

Furthermore, it was found that apart from family, school was another microsystem element that had a strong influence on youths' motivations to pursue agriculture study. Schools created an environment that fostered youth and teacher interactions. Just like parents, teachers' daily engagements with youth in classrooms and outside the classrooms influence their social learning, intellectual skills, and career development. Our study revealed that the presence of positive relationships and interactions between students and their teachers and/or mentors created opportunities for youth to engage in hands-on learning activities through participation in agriculture fairs and animal showmanship. These activities connected them to resources that motivated them to pursue agriculture. The current finding is consistent with Meyer (2014), who found a positive relationship between student academic achievement and career success in mentor-student relationships. This implies that a well-established educational system that provides opportunities for students to interact with mentors or teachers on career opportunities in agriculture and related fields has the potential to ignite youth interest and curiosity in the field.

The analysis further highlighted the important role of agricultural clubs and associations in community engagement and network building in youth agricultural career decisions. Youth indicated that their participation in clubs or associations such as FFA and 4-H gave them practical experience and connected them to industry experts which reinforced their interest in agriculture studies. Bolton et al. (2021) explained that school clubs offer a place for social interaction, life skills development, and networking among students. Mentors provide guidance that exposes youth to different career paths and opportunities in the agricultural industry. Through these club activities, youth defined their agricultural career journeys. It will be important for basic and high schools to include more agricultural-related extracurricular activities in their programs at school and community level to give students more experiential learning opportunities. This may help connect and deepen their love for agriculture.

Finally, the results showed that financial support offered by schools, companies, and institutions in the form of scholarships and tuition aid also influenced some youth to pursue agricultural studies. These findings exemplify the importance of institutional policies and support systems in youth career decisions.

The study further revealed that previous work experience from agricultural organizations served as motivating factors for youth agriculture career engagements. It was found that some of the youths worked with big agricultural firms such as John Deere, Cortva, Monsanto, Bayer, and others before going to college. This direct experience inspired them to pursue an advanced degree in agriculture to gain technical skills. It also helped them to choose specific areas of focus. In the context of the youth environment, the agricultural companies and enterprises represent microsystems that interact directly with them by providing the platform to gain knowledge and practical skills to explore the agricultural industry. For instance, Patrick stated that he observed from their corn field that some of the corns was growing faster than the others, so he asked his supervisor, "Why are some corns taller than others?" and "why do pests attack the corn?" in the process of finding answers to those questions led him to study plant biotechnology." This implies that industrial experience gives youth skills and career direction. Osher et al. (2021) reviewed that company working environments are dynamic and multilayered contexts where coworkers, supervisors, and company policies shape the behavior of individuals. It is a social environment for skills development, knowledge acquisition, and exploration of potential (Pianta, 2016). Our finding implies that pre-college work experience is an important factor for youth skills development and future career decision-making. It is important for high school programs to incorporate industrial hand-on practice into their curriculum or activities to expose youth to different skills and career options in the agricultural industry.

Finally, it was found that job opportunities in family enterprises and agricultural companies motivated youth to study agriculture. The study revealed that some of the youths were inspired to take over their family farm after graduation from the university. Others also shared that there were emerging opportunities in agricultural firms in their localities; therefore, pursuing a degree in agriculture gives them

more employable opportunities. This means that future job prospects and existing opportunities play important roles in youth career decisions.

Conclusions and Recommendations

The study sought to analyze youth motivations to pursue agriculture programs at the University from the lens of the Ecological Systems Theory. The main motivations for youth to pursue agriculture studies at the university were family influence through practical agriculture engagement, value for sustainability, connections with educational institutions; school influence through mentorship, financial support, and agricultural clubs or associations membership; agricultural industry working experience, job opportunities in family enterprises, and agricultural companies. The study concluded that the ecological systems within the youth environment contribute to their motivations to engage in various agricultural studies and that the microsystem, which consists of family, schools, and other social institutions, was the most influential system in youths' motivation to engage in agricultural careers.

It is recommended that policies that target strategies to increase youth engagement in agricultural careers must use a participatory approach to gather inputs from parents, teachers, community members, and individuals who work directly with youths because these individuals play influential roles in youth decision-making. Furthermore, educational institutions should include more hands-on practical activities such as field work, internships, and visits to agricultural organizations and research institutions in their programs to expose youths to the various career opportunities in the agricultural industry. This will help motivate them to aspire for careers in the agricultural industry.

Finally, since the EST is a developmental theory that can assess cause and effect, we recommend that future studies expand this by collecting quantitative data to examine the effects of each ecological construct on youth agricultural career decisions. This will pave the way for developing integrated programs that support youth careers in agriculture.

Limitations

As is the case with most qualitative research, the current research has limitations in generalizability. First, the study was a content analysis of videos of 43 undergraduate students' assignment presentations, the authors may not have had the opportunity to ask clarifying questions about new concepts as such, the meanings and interpretations as based on the authors' understanding. Secondly, the study is limited to undergraduate students in a specific context. Therefore, the results of this study cannot be generalized to all the youths either in the U.S or globally.

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