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# Understanding Latinx Farmers in Pennsylvania to Meet Their Needs for Non-Formal Education

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**Abstract:** Latinx/Hispanic farmers are an underrepresented group with the largest number of farm operators in the US. However, agricultural educators have encountered challenges in identifying Latinx farmers in Pennsylvania and consequently, in meeting their needs. This study aims to contribute to improved agricultural programming by offering an exploratory overview of Latinx farmers in the Commonwealth, and to bring to light the experiences of Extension educators when working with Latinxs in the agricultural context. Qualitative research interviews were conducted with seventeen Latinxs at different stages of their farming journey, and with twelve educators with experience in agriculture programming and outreach to Latinxs. Latinx farmers discussed the characteristics, goals, challenges, and solutions of their farming operations. Educators discussed their motivations to serve Latinx farmers, the challenges they face in meeting their needs, and the implementation of targeted strategies for successful programming. Both groups discussed challenges they believe Latinx farmers face due to their ethnicity and provided recommendations to better serve the Latinx farming population. Based on the findings, agricultural educators could support Latinx farmers by developing statewide programming, including programming in Spanish, having employers allocate a percentage of educators' responsibilities to connecting with this audience, creating a Latinx farmers' network, partnering with organizations connected with Latinx farmers, participating in cultural competency training, and promoting stories of success. Our methodology and findings can be adapted to educators in other locations working with minority populations.

**Keywords:** Latinx; Hispanic; farmer; producer; agricultural educators; non-formal education; Extension; Pennsylvania



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## 1. Introduction

In the United States of America (US), agricultural training and information are offered in every state through the Extension system enacted by the Smith–Lever Act of 1914 [1]. The Extension system is housed in land-grant universities established through the Morrill Act of 1862 [2]. Federal monies support the Extension system. The Civil Rights Restoration Act of 1987 required all entities receiving federal funding to comply with specific civil rights requirements that prohibit discrimination based on race, color, national origin, sex, age, and disability [3]. Equal opportunity is also just. This project focuses on Hispanic and Latinx (a gender-neutral term for people whose origins are in Latin America) farmers. The United States Department of Agriculture (USDA) considers Hispanic and Latinx farmers to be minority farmers who have been historically underserved [4].

According to the USDA's Census of Agriculture, the number of Hispanic or Latinx farmers in the US increased by 21 percent between 2007–2012 [5]. This makes them the largest underrepresented racial/ethnic minority group of farm operators in the US. [6,7]. This trend not only represents an increase in the involvement of this population in farming, but also reveals a demographic shift in agricultural economic activity. Pennsylvania, located

in the northeastern US (bordering New York to the south) and the fifth most populated state, represents a state with a relatively low population of Hispanic farmers. However, in Pennsylvania, there is an increasing trend similar to that of the nation, with a 24% increase in Hispanic/Latinx operators occurring between 2007 (526 operators) and 2012 (652 operators) [8,9]. Currently, 759 Hispanic producers farm in Pennsylvania, of which 590 are principal producers [9].

Despite recent efforts, beyond the number of producers reported by the Census of Agriculture, little is known about Latinx farmers in Pennsylvania [10]. The lack of information about this population has stalled efforts to serve this community. Latinx farmers have different needs and preferences from non-Hispanic White farmers, who have traditionally been the focus of educational efforts. Understanding of Hispanic farmers' demographics and specific needs is necessary for fair funding allocation and developing educational programs that benefit all farmers.

In Pennsylvania, the Extension system is housed in Pennsylvania State University, which was designated as the state's land-grant university in 1863. Pennsylvania State University's Extension Horticulture Team has been consciously concentrating on assisting Spanish-speaking farmers (a subset of Latinx farmers) since 2009 by making resources available in Spanish. Extension educators have also developed training events and programs targeting agricultural educators and focusing on creating welcoming environments to support Latinx farmers in Pennsylvania [10]. These efforts have prompted conversations about better connecting and serving this farming population, and a large number of educators want to connect with Hispanic farmers. At the same time, Extension educators have articulated concerns that are mainly related to their lack of knowledge about Latinx farmers, prompting questions such as (1) Who are they? (2) Where are they? (3) What do they need? (4) How can Penn State Extension support them? These questions were the main motivation for conducting the present study.

This exploratory research aimed to begin capturing the demographics and needs of Pennsylvania's Latinx farming community and to learn about the perceptions and needs of Extension and other agricultural educators serving this community. The goal was to identify and address barriers historically limiting the connection between the Latinx farming community and Extension. The study is exploratory because the literature offers little information about Latinx farmers in Pennsylvania and in the US. At the national level, there are few studies on Latinx farmers [11–15], and at the state level, all the available information is from census demographic data. Prior to this study, research-based information regarding the non-formal agricultural educational needs of Latinx farmers, aspiring farmers, and operators in Pennsylvania, and their relationship with Extension did not exist. The methods used here can be applied to other US states or areas with low populations of Latinx or other minority farmers, wherein little is known about the demographics or needs of this community. Our findings may serve as the foundation of the topic of Latinx farmers in Pennsylvania, and consequently may offer opportunities for further investigations with more refined research questions.

## 2. Materials and Methods

A purposeful and referral sampling method was utilized to recruit participants from two groups: Latinx farmers and agricultural educators. This is a well-established strategy for exploratory studies in which not much is known about the target population [16]. The criteria for selecting Latinx farmers for the study included three elements: (1) the participant self-identifies as Hispanic or Latinx; (2) the participant owns or operates a farm (of any size), and at least one farm product is commercialized (sold); and (3) the participant's farm is in Pennsylvania. Since a list of Pennsylvania's Latinx farmers does not exist, it was challenging to identify and recruit potential participants. Recruitment strategies relied on (a) referrals from Penn State Extension educators and faculty; (b) attending Extension events offered in Spanish and USDA events targeting Latinx farmers; (c) posting flyers at events and grocery stores in locations with a high Latinx population, and the email lists of a regional

farming organization (Pasa Sustainable Agriculture, www.pasafarming.org (accessed on 1 April 2023); and (d) reaching out to organizations such as the American Mushroom Industry (AMI), the USDA's National Agricultural Statistics Service and Natural Resources Conservation Services offices in Pennsylvania, and the GrowNYC program in New York. Some organizations offered some leads, but no specific names or contact information were provided. Through these strategies, 22 potential participants were identified and sent invitations by e-mail and phone, which led to 17 final interviews. The point of saturation in sampling was determined when there were no more opportunities to identify and connect with participants during the data collection period (Summer and Fall of 2018).

Extension educators were selected based on their known interactions with the Latinx agricultural community, and through an email invitation sent to the Extension Director. In Spring 2019, 13 personal invitations were sent to agricultural educators asking them to participate in the study. This resulted in 12 interviews conducted via phone calls or face-to-face. The saturation point was achieved as the same themes arose in each of the different interviews [17,18].

Table 1 presents definitions for each group used to identify potential participants. In total, 17 Latinx farmers in Pennsylvania and 12 educators participated in the study.

**Table 1.** Definition of the population of study: Latinx farmers and agricultural educators.

| Population of Interest | Definition |
|---|---|
| Latinx farmers in Pennsylvania | People with origins in Spanish-speaking countries or Latin America who are currently farming in Pennsylvania or aspire to; also in addition, people that own or have management responsibilities for any size farming operation. |
| Pennsylvania agricultural educators that work or have worked with Latinx people in agriculture, especially farmers | Professionals that work at The Pennsylvania State University with an Extension appointment (including Extension educators/agents or faculty) or in government agricultural agencies and have been involved in non-formal education, programming, or outreach for Latinx agricultural audiences. |

Three research questions guided this study. The function of research questions is to explain the intention of the study, and they tend to evolve as the study progresses [19]. Table 2 shows the research design matrix.

**Table 2.** Research design matrix. Adapted from Maxwell [19] (p. 117).

| **Research Questions** | | **Population and Sample** | **Study Procedures** | | |
|---|---|---|---|---|---|
| | | | **Recruitment** | **Data Collection** | **Data Analysis** |
| *What Do I Need to Know?* | *Why Do I Need to Know This?* | *Where Will I Find This Data?* | *Whom Do I Contact for Access?* | *What Kind of Data Will Answer These Questions?* | |
| Who are the Latinx farmers in Pennsylvania and what are their agricultural educational needs? | To understand the needs of the population and develop appropriate Extension programs | Latinx farmers, aspiring farmers and operators in Pennsylvania | Educators that have worked with Latinx farmers<br>Institutions that could know the Latinx community<br>Target locations in PA with large Latinx populations | Questionnaire<br>Interviews | Frequency analysis<br>Recording<br>Transcription<br>Coding/categories |

**Table 2.** *Cont.*

| Research Questions | | Population and Sample | Study Procedures | | |
|---|---|---|---|---|---|
| | | | Recruitment | Data Collection | Data Analysis |
| What are the engagement barriers and opportunities between agricultural educators and Latinx farmers in Pennsylvania? | To create successful engagement strategies with Latinx farmers in Pennsylvania based on educators' experiences, including challenges and implemented solutions | Penn State Extension educators<br>Ag educators working for Mid-Atlantic land-grant universities<br>Employees of government agricultural agencies | Penn State Extension Director<br>Agricultural educators | Interviews | Recording<br>Transcription<br>Coding/categories |
| How can Penn State Extension facilitate successful and strategic programming for Latinx farmers in Pennsylvania? | To contribute to Penn State Extension's goals of providing service to all the members of the community | All of the above | Same as the above | Above information<br>Field notes<br>Literature review | Recording<br>Transcription<br>Coding/categories |

This study collected qualitative data through in-person and online semi-structured interviews with Latinx farmers, and telephone and in-person semi-structured interviews with agricultural educators. Interviews are one of the most common methods of collecting qualitative research data [17,19,20]. In addition, to address the first research question (Table 2), a questionnaire was used to examine farming characteristics of Latinx farmers and to refine the interview phase of this study. Three different instruments were used for data collection. For Latinx farmers, the instruments consisted of one questionnaire and one interview protocol. For educators, the instrument was an interview protocol. All instruments were adapted from a national-level study with Hispanic farmers and ranchers [14] and reviewed by a committee of panel reviewers.

All interviews lasted between 30 and 60 min, were conducted in either English or Spanish based on the participants' preference and occurred between Summer/Fall 2018 and Spring 2019. Immediately after each interview, the researcher wrote a memo to capture the freshest reflections, interpretations, sentiments, and perceptions. Interviews were audio-recorded with participants' permission and transcribed into their original language by a professional transcriptionist who signed a confidentiality agreement. The participants' confidentiality was ensured by using pseudonyms, concealing any potentially identifiable information, and saving all data in a locked office and a password-protected computer.

Transcribed qualitative data collected from the interviews were gathered, organized, coded, and analyzed using MAXQDA 2018. The questionnaire administered to farmers was organized and analyzed using descriptive statistics with SPSS. A bivariate correlation analysis was also conducted for demographic variables (gender, education level, English proficiency, number of generations in the US, and agricultural family background) and the primary role in farming (farmer, aspiring farmer, operator) at the 0.05 and 0.001 confidence level. This correlation analysis was conducted to explore aspects that could be further investigated, rather than to demonstrate significant relationships among the variables.

The Institutional Review Board (IRB) of The Pennsylvania State University approved the study methodologies in the Exempt category in Spring 2018 (STUDY00009387).

## 3. Results

The study findings are divided into three subsections. The first and second subsections correspond to the information collected from Latinx farmers and agricultural educators, respectively. In each subsection, demographic characteristics are described, followed by selected topics resulting from data analysis of each group's interviews. The third subsection is a comparison of the topics that were discussed with both groups.

### *3.1. Latinx Farmers in Pennsylvania*

A total of 17 Latinx farmers (N = 17) were interviewed. They resided in 8 of Pennsylvania's 67 counties: Washington (n = 1), Butler (n = 1), Centre (n = 3), Cameron (n = 1), Adams (n = 7), Chester (n = 2), Lehigh (n = 1), and Philadelphia (n = 1). Figure 1 shows the distribution of Hispanic producers in the state, as well as the location of Latinx farmers participating in this study.

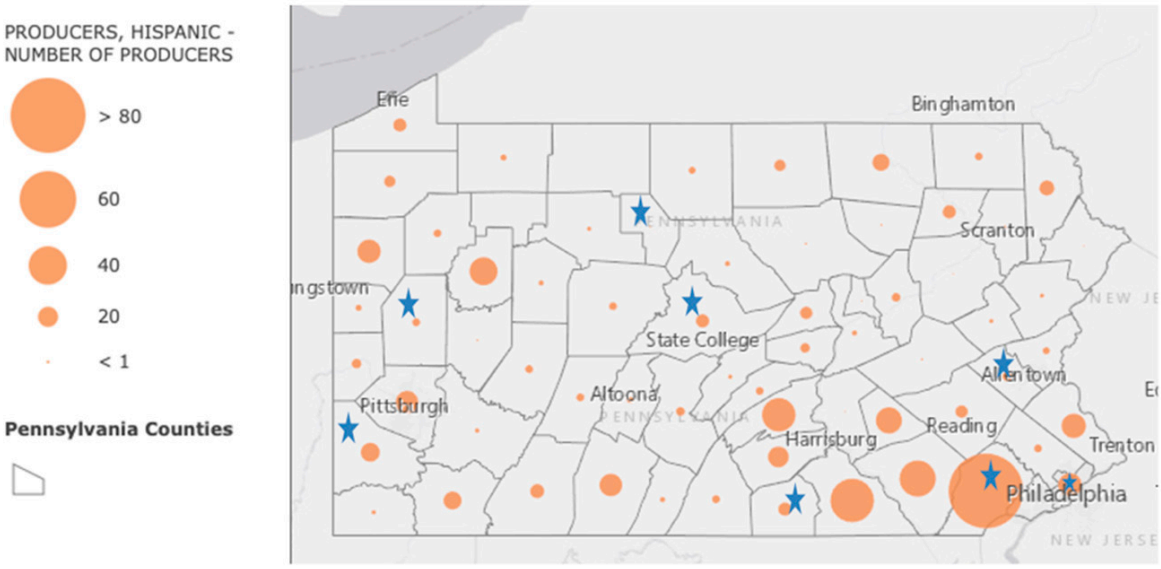


**Figure 1.** Distribution of Hispanic producers in Pennsylvania by county. Elaborated by Benjamin Bartley with data from the Census of Agriculture [21]. Stars indicate the counties of the Latinx farmers that participated in the study.

#### 3.1.1. Demographic Characteristics

Fifteen Latinx farmer participants were men (n = 15), and two were women (n = 2). Their ages ranged from between 27 and 65 years old, with an average age of 43. The majority were first-generation immigrants (88.23%, n = 15) from Mexico (n = 11), Colombia (n = 2), Brazil (n = 1), and Honduras (n = 1). The two remaining participants were born in the US, with origins in Argentina and Spain. Of these, one participant belonged to the second generation living in the US, and the other had been in the US for at least three generations.

The highest educational level achieved varied from 'less than high school' (n = 6) to 'high school completed' (n = 4), 'some college' (n = 2), and 'completed a four-year university degree' (n = 5).

English proficiency was self-reported in three areas: speaking, reading, and writing. Three categories (poor, average, and well) were provided as options within these areas. 'Average' was the highest reported category for speaking (n = 9, 52.94%) and reading (n = 8, 47.06%). More than half of the participants reported 'poor' English writing proficiency (n = 9, 52.94%). In all three areas, the second most common category selected was 'well' (speaking = 29.41%, reading= 35.29%, writing= 29.41%). This reflects that most participants felt more confident speaking and reading than writing in English.

#### 3.1.2. Agricultural Background

Twelve participants (70.6%) indicated that their parents were farmers or involved in agricultural businesses, and five (29.4%) said that their parents were not involved in agriculture. In addition, most participants (n = 15, 88.2%) had more than 7 years of experience in farming, one person had 3–7 years of experience, and one person had less than 3 years of experience.

During the interviews, those from farming families indicated that they had helped their parents with farm activities since they were children or young adults living in their home

countries. Three Latinx farmers had agriculture-related college degrees (e.g., agronomy and veterinary science). Additionally, two participants worked as Extension educators in their home countries. While in the US, others had worked in non-agricultural industries (e.g., construction, factories, or independently) but eventually returned to agriculture. Some were farm employees promoted to management positions or had started their own agricultural businesses.

#### 3.1.3. Farming Roles

Not all Latinx interviewees who identified as farmers owned a farm. Some were aspiring farmers, meaning that they initiated efforts to start a farm, and others were operators, meaning that they had management responsibilities for a farm (except for financial aspects) but did not own the business. In this section, we explore these three different roles. These roles were not mutually exclusive and could overlap because individuals participated in two or all three of these roles.

Six participants (35%) were classified as 'farmers' because farming was their primary occupation. Three had horticultural operations, one was a dairy farmer, one was a mushroom grower, and one was a forester. The horticulture farmers sold their products directly to consumers.

Three participants (18%) were classified as 'aspiring farmers' because their primary occupation was not farming or operating a farm. Two of these were farm employees at commercial orchards, and one worked in a company related to food importation. They were actively searching for opportunities to start farming operations in Pennsylvania.

None of the interviewees were solely operators. All participants who managed a farm without being owners were either farming independently or aspired to farm independently. This means that they were grouped in a combined role. One participant (6%) was an aspiring farmer and farmer, because they were a farm employee and also maintained a large garden and a few animals at their home, mainly for self-consumption. In the past, they sold their produce and livestock and aspired to become a full-time farmer.

Another participant (6%) was characterized as a farmer and operator, because they were the production manager of a large operation that they did not own. They also grew and sold crops in Pennsylvania and their home country outside of the operation for which they worked.

Four participants (24%) were classified as aspiring farmers and operators because they managed farms in Pennsylvania but also actively desired starting their own farms. Two were fully responsible for managing an orchard and vegetable farm, respectively, and two worked at the same commercial orchard, each having specific management responsibilities.

Finally, two participants (12%) fit into all three roles: farmer, aspiring farmer, and operator. This was because they were primary managers of agricultural operations, but they also had their own agricultural businesses (usually a small-scale operation) that they wished to expand and therein become full-time farmers. One worked at a dairy farm as an operator, maintained their own beef cattle that were sold occasionally, and wanted to expand this business. The other person also worked at a dairy farm, had a large garden in which they grew different agricultural crops, and raised different livestock species, some of which were raised and sold by their children.

#### 3.1.4. Products and Farm Characteristics

In the questionnaire, Latinx participants selected their first and second agricultural products of interest. Most participants (n = 14) were growing or interested in growing horticultural crops, such as vegetables, herbs, and mushrooms (Table 3). One was involved in dairy, one in livestock, and one in timber products. The second most mentioned products were field crops (n = 5), livestock (n = 4), ornamental plants (n = 3), and dairy (n = 1).

**Table 3.** Agricultural products of interest to Latinx farmers interviewed in Pennsylvania in 2018–2019. Farmers completed a questionnaire and selected their first and second most important products.

| **First Most Important Product (n = 17)** | **n** |
|---|---|
| Horticultural crops | 14 |
| Dairy | 1 |
| Livestock | 1 |
| Timber products | 1 |
| **Second Most Important Product (n = 13)** | |
| Field crops | 5 |
| Livestock | 4 |
| Ornamental crops | 3 |
| Dairy | 1 |

Regarding farm characteristics, most participants (n = 10) were involved or interested in individual operations (sole or family) and in family-held corporations (n = 5). At the same time, one person had a legal partnership (with a family member). Those whose primary role was farmer (n = 6) were growing their products on between half and 162 hectares. A question about specific farming practices (conventional, organic, etc.) was not included; however, participants talked about this during an open interview question. Participants were involved or interested in a wide range of farm characteristics and agricultural practices, from large-acreage commercial operations to small-scale self-sufficient farms. None of the farms were certified organic. Additionally, labor needs were mostly met by the participants or their family members. They grew diverse products, including some traditional ones from their home countries for those born outside of the US, and these products were usually hand-harvested.

#### 3.1.5. Correlation of Demographic Characteristics and Farming Role

A bivariate Pearson correlation test at significant levels of 0.05 and 0.001 was conducted using SPSS to determine if the participants' demographic characteristics correlated to their farming role: farmer, aspiring farmer, or operator. Profiles were analyzed independently, not considering a combination of roles. Individuals were independently counted for each of their combined roles.

Being a farmer was positively and significantly correlated with self-reported English proficiency in speaking ($r = 0.499$, $p = 0.041$), reading ($r = 0.548$, $p = 0.023$), and writing ($r = 0.594$, $p = 0.012$). Education level and role as a farmer, although positively correlated ($r = 0.239$), were not significant ($p = 0.355$). Being an aspiring farmer was significantly negatively correlated with education level ($r = -0.632$, $p = 0.006$) and self-reported English proficiency in speaking ($r = -0.562$, $p = 0.019$), reading ($r = -0.637$, $p = 0.006$) and writing ($r = -0.906$, $p < 0.0001$). Similar to the aspiring farmer role, being an operator had a significant negative correlation with education level ($r = -0.627$, $p = 0.007$).

These findings generally indicate that those who were already farming in some capacity had a good self-reported English proficiency level. Aspiring farmers and operators were more likely to have low levels of education. In addition, the lower the self-reported English proficiency level, the more likely the respondents were to be aspiring farmers.

#### 3.1.6. Motivations to Farm

In the questionnaire, all 17 participants indicated the main reason they farm is that they 'enjoy farming,' followed by 'way to earn money' (n = 13), 'want to own my own business' (n = 12), 'tradition in my family' (n = 10), and 'other' (n = 4) (Figure 2). Two of the participants that selected 'other' explained that they mainly farm to help their people, referring to other Hispanics or Latinxs. One person mentioned that many newcomers to the area have very low income and are at risk of food insecurity, so they provide produce either for free or at a very low cost. The other person said that one of the main reasons they farm is to help other Latinxs by generating work by offering employment opportunities.

Another participant saw farming as an activity connecting them with their home country, which is the main reason they farm in Pennsylvania.

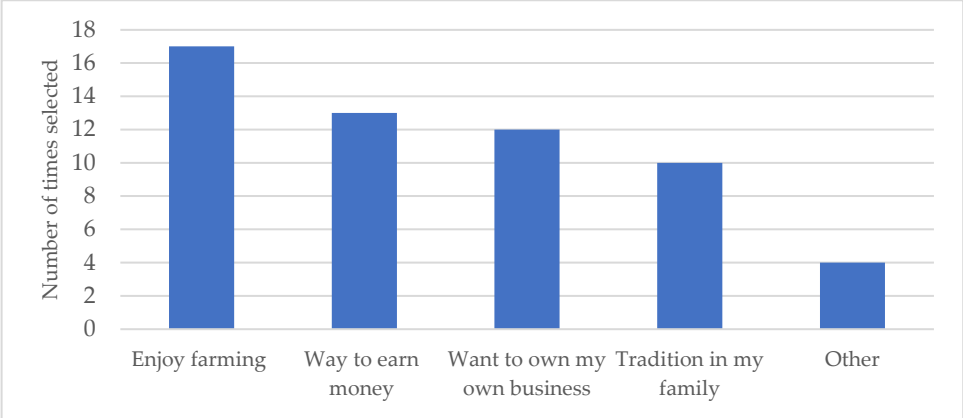


**Figure 2.** Motivations to farm, as reported by 17 Latinx farmers in Pennsylvania participating in a questionnaire administered in 2018–2019.

The participants' answers fell into the thematic categories of simplicity and experience when discussing the reasons for raising certain products. 'Easy to raise or sell' was the most common answer. One farmer said that vegetables are easier to grow than livestock because vegetables require fewer facilities and thus are also less expensive to produce. Others mentioned that they grow whatever sells fast, and what consumers demand. 'Knowledge or experience' of a particular product was another common reason for raising certain products.

During the interviews, Latinx farmers were asked about their goals for their agricultural businesses. Their responses were coded into themes (Table 4). Overall, the most common goal was to 'expand their business' by gaining more land for production or increasing their markets by selling more or for a longer timeframe. 'Diversification' was the second most mentioned theme, which indicates an interest in growing new products. Three indicated they would prefer to 'farm somewhere else', either back in their home countries for those born outside the US, or in another US state. A couple of the participants shared their goals to make their farms a 'destination or an education farm', where they would grow food and involve the community in tours or learning at the farm. 'Buying one's own land' was a goal mentioned twice. Other goals mentioned once included 'to be known', 'to export', 'to be successful', 'operating without debt', 'implement production technology', 'having an internship program', 'selling land' because there is no one in their family to transition their farm to, 'to start farming', 'to continue gaining experience', 'to work and save money', and 'to satisfy clients'.

**Table 4.** Themes and sample quotes that the 17 Latinx farmers shared in the interviews regarding their goals for their agricultural business.

| Theme | Number of Mentions | Sample Quotes |
|---|---|---|
| Expansion | 5 | *Expand my business . . . [s]ell more, expand my plantation.*<br>*I think it is more about growing . . . [i]f it was on me, I would like to have more animals.*<br>*I would like to expand the business. In the future I plan to have a formal store . . . [w]here I could sell salsas.* |
| Diversify | 3 | *We do not have our mind just on dairy. We'd like to have, maybe, some chickens, poultry and we actually raise some of our bulls for beef.*<br>*Another goal is short-term, I would like to bring one or two additional products, new ones, that people ask for. For example, I'm curious about mushrooms, I've never grown them. I would like to bring them one day.* |

**Table 4.** *Cont.*

| Theme | Number of Mentions | Sample Quotes |
| --- | --- | --- |
| Farm somewhere else | 3 | *In five years, I'm leaving to work on my own. We are going south and work there.*<br>*With the experience that we're gaining here, well we always have dreams, right? I always dream with going back to my country . . . [I] would like to go back and farm in Mexico.* |
| Maintain production | 2 | *[t]he goals are to continue generating (growing)* |
| Destination/education farm | 2 | *I think that education is the big part of my goals; teaching people about growing these plants, about using these plants, which is information that we've just kind of lost through our family lineage.* |
| Buy own land | 2 | *[t]o be able to buy our own farm because we're renting this place right now.* |

In several cases, the goal of expansion was related to diversification. One of the participants said, "we would like to be able to have a bigger place to have a more versatile business, not just the (product)". Similarly, expansion meant increasing market possibilities and introducing value-added products, such as dehydrated food and salsas, as shared by one farmer.

#### 3.1.7. Main Challenges

Challenges were overall factors that kept participants from meeting their goals, problems related to raising their products, barriers to starting their farming operations, and other issues mentioned during the interviews.

In the questionnaire, participants were given options to select the two most important factors that kept them from meeting their goals. Overall, 'access to operational resources' was the most cited factor (n = 12), followed by 'financial aspects' (n = 10), 'marketing' (n = 5), 'knowing about programs and information' (n = 2), and 'others' (n = 2), which included transportation for moving livestock, and uncertainty about when financial support from government programs will arrive. 'Government regulations' and 'time' each received one mention. In six cases, 'access to resources' and 'financial aspects' were mentioned together.

During the interview, participants were asked about their main production problems. Their responses were coded into seven themes (the number of mentions is indicated in parenthesis): 'pests and diseases' (n = 5), 'marketing' (n = 4), 'weather' (n = 3), 'labor' (n = 1), 'adaptation practices' (n = 1), 'finding professional advice' (n = 1), and 'profits' (n = 1). Farmers talked about crop damage caused by pests and diseases, and the need to know how to identify and manage them. Similarly, the weather was considered a challenge because of its effect on production. Regarding marketing, farmers discussed the need to know where and how to sell, especially as they increased their production. One farmer indicated that initially, marketing their products was not easy, and the profit of their first-year farming was only USD 300. This resonated with the concern of an aspiring farmer, who is actively searching for opportunities to start farming but is worried about risking their family's current source of income.

For aspiring farmers, most of the challenges in starting farming are related to financial constraints. An aspiring farmer said that it is difficult to adventure into an agricultural project without financial security for a few months, because they have family commitments, rent to pay, etc., but at the same time, they want to try it before they lose enthusiasm. Concerning momentum, an operator and aspiring farmer said they feel youth is exploited in the US. Once people reach a certain age, jobs are unavailable, so they must find other work, inferring the need to start a business. Another operator/aspiring farmer sees their immigration status as a huge barrier restricting them from obtaining loans and becoming independent. Finally, a farmer was looking to buy more land to expand their farm but was

struggling to invest because they were paying for their children's college education, and obtaining a loan was not part of their plan.

Other challenges were mentioned at various stages of the interview. For example, two people talked about their lack of knowledge about renting or buying land. With respect to buying, one shared the following:

> *I think it's hard because, at least my land, I have six more years on my lease. And so, after that, I'll be 40 and maybe have nothing or something. I think it's a little scary to think about that. I don't know how to buy land. I've never bought anything like that before, so that feels really intimidating and scary to me. So, I feel there's a lot of question marks I guess about further in the future.*

Reliable transportation was another challenge for one vegetable farmer since they must travel about 2.5 h to transport their crops to the market weekly. Growing new crops was also a challenge in meeting consumer demand. Adapting practices to the production season in Pennsylvania and using season-extending technologies was also a concern for an aspiring farmer, alongside finding reliable labor.

#### 3.1.8. Implementing Solutions and Learning about Problems

Participants in the Latinx farmers group shared what they do to solve their issues or challenges, including where they go to attain help.

Eight people said they search for information through different channels. The most common channels were Penn State Extension (n = 5) and other farmers (n = 4). Participants often did not refer directly to Penn State Extension, but to people or programs within it. When discussing reaching out to other farmers, participants referred to Latinx farmers in other US states that they see as their mentors, or they were confident that farmers of different ethnicities and races in Pennsylvania would support them with advice (even their current employers for those aspiring to farm). Most participants did not know other Latinx farmers in Pennsylvania. Other sources of information included particular people within agricultural organizations such as Pasa Sustainable Agriculture and the USDA's Natural Resources Conservation Service, and independent consultants. Internet searches (Google; https://www.google.com (accessed on 1 April 2023) were another source of information mentioned.

Five people explained that they solve issues by implementing recommended agricultural practices. They mentioned using pesticides, sanitation practices, and crop rotation. Even when using pesticides, one farmer emphasized using cultural management strategies and organic pesticides when possible. However, they struggled to control some pests, and use conventional pesticides minimally.

Two people indicated that they solve the issues as they occur and know what to do or where to go for support.

One aspiring farmer said they would like to focus on their professional development because they see that their bosses have specialized knowledge in agriculture, and therefore, know about the problems that can occur, including how to counteract and mitigate issues. They also mentioned that their father, who is in their home country, was having an issue with a crop; the aspiring farmer knew how to manage the issue in Pennsylvania, but their father had to hire a local consultant for advice specific to his area. Therefore, the aspiring farmer would like to invest in their own education instead of paying someone else for agricultural information.

### *3.2. Agricultural Educators*

Twelve agricultural educators were interviewed via phone. They were all professionals who were employed by land-grant universities or government agencies that support farmers by providing non-formal agriculture education.

#### 3.2.1. Characteristics and Nature of Work

Except for gender, demographic characteristics were not collected to avoid displaying potentially identifiable information. By gender, participants equally represented women (n = 6) and men (n = 6). Most participants (n = 7) spoke, wrote, read, and listened well in Spanish. The five remaining had various levels of Spanish proficiency for each ability area. Overall, speaking was the most deficient area, with four out of five reporting their ability as poor. Listening was only offered as an option after a participant asked about it, so not everyone reported their ability in this area. Three out of four educators reported that their listening skills were average or above average. One person indicated theirs was poor.

Some participants had just started working with Latinx farmers, while others had over ten years of experience. They shared that their work was concentrated in one geographic area of Pennsylvania (n = 5) or statewide (n = 7). For those that work in one geographic area, this was either the eastern or southeastern part of the state, because that is where most of the Latinx population is concentrated (Figure 1). Those that indicated their work was statewide either had statewide appointments or collaborated in other parts of the state to serve Latinx audiences. However, even those with statewide appointments acknowledged that they focus more on the southeastern part of the state when creating programming for Latinx or Spanish-speaking audiences.

The topics of their programs fell into one or more of four content areas: business and entrepreneurship, horticultural production practices, dairy, and conservation. Topics included marketing and business practices (starting a business, developing a business plan, agricultural liability, insurance, etc.), commercial horticulture, specialty crops, pesticides in fruit crops, vegetables, and mushrooms, integrated pest management (IPM), soil management, orchard establishment, worker protection standards, communication and cultural differences among Latinx and other communities, dairy livestock, labor and conflict management, and awareness of funding available through government programs for implementing conservation practices. Some indicated that they focused on all topics because they were trying to make all topics available to the Latinx community.

The activities used to disseminate these topics were developing educational outreach, writing and/or translating publications (from English to Spanish, primarily), developing and providing educational materials, offering workshops, offering classes for pesticide credits, visiting farms, teaching technical aspects on conservation and about the institutions they represent, offering training videos and webinars, and coordinating efforts to attend to the needs of Latinx farmers, or serving as an interpreter or translator when needed. At least three participants mentioned that through their work with new and beginning farmers, they were able to focus on serving Latinx growers and providing entrepreneurship workshops on marketing and business practices.

#### 3.2.2. Motivations

Educators were asked what they were trying to accomplish with programs that serve the Latinx farming population to understand the reasons or motivations for their efforts. Responses were coded and categorized into themes. Some responses offered multiple motivations, so themes do not add up exactly to the number of participants (N = 12).

- 'Inclusiveness' (n = 6) was the most cited theme; people shared a desire to offer programming that is accessible to this diverse population.
- 'Professional advancement' (n = 4) refers to educators' interest in supporting the professional growth of Latinxs, moving from farm employees to supervisors, starting their own businesses, or just succeeding overall.
- 'Fulfill the mission of Extension' (n = 2). The educators are working to ensure that agricultural programming is available to all Pennsylvanian farmers and farm employees and want to ensure the Latinx community is aware of this service.
- 'Support agricultural industries' (n = 2) refers to educators' views on farm owners having a well-trained labor force.
- 'Fulfill a need' (n = 2) to serve a growing population.

- 'Educators' personal motivations' (n = 2) include enjoying learning Spanish or the satisfaction of being able to help.
- 'Community building' (n = 1) explained an interest in creating relationships and offering opportunities to amplify individuals' voices about their needs.
- The need to 'prepare the next generation of farmers' (n = 1) of which Latinxs are a part.

#### 3.2.3. Personal Challenges in Meeting Latinx Farmers' Needs

To identify what, if anything, is a barrier to meeting the needs of Latinx farmers in Pennsylvania, participants shared their personal experiences as educators. Agricultural educators' obstacles were clustered into seven themes, presented in Figure 3, indicating the number of times each theme or category was mentioned.

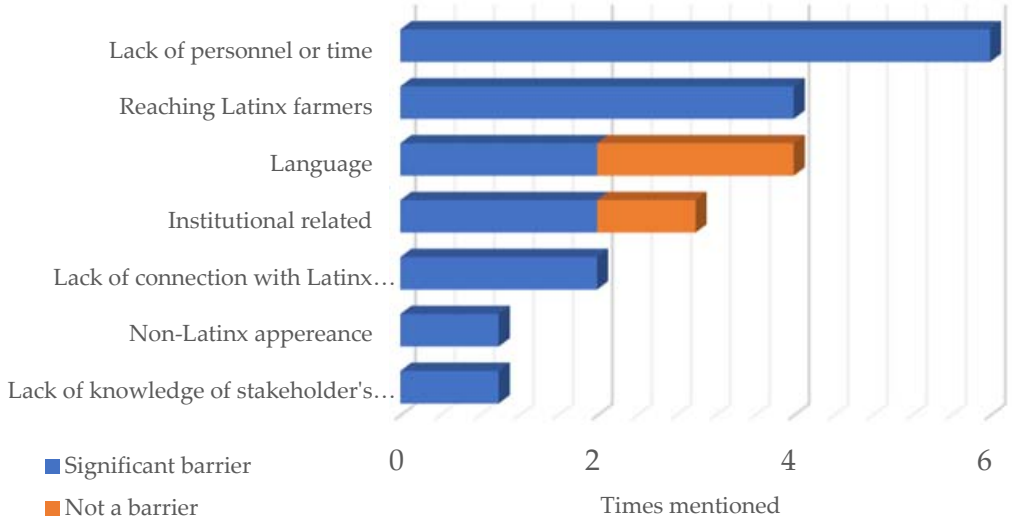


**Figure 3.** Personal challenges of agricultural educators in meeting Latinx farmers' needs. Seven themes were coded from interviews, showing five are significant barriers and two are not a barrier for some educators.

'Lack of personnel/time' (n = 6) was the most common obstacle cited by educators, especially by those with good Spanish language skills. Currently, a lot of programming targeting Latinx audiences focuses on reaching people who are not fluent in English or prefer to learn in Spanish. Agricultural educators indicated they need more people to help with Spanish programming because it significantly adds to their duties. Most had responsibilities that did not include outreach in Spanish and creating programming in Spanish added to their already full workloads.

Educators (n = 4) indicated that one of the main challenges was 'reaching Latinx farmers' due to difficulties locating them and identifying them as farmers.

The theme of 'language' was mentioned on four occasions. However, half of these educators (n = 2) discussed language as a significant barrier. The other half (n = 2) indicated that it is not always an issue because many Latinx people speak English. They said that language as a barrier can be overcome with empathy and cultural understanding, which are more important than accurate interpretations.

The 'institutional related' theme resonated with three educators and had two connotations. In two cases, educators mentioned that there was an institutional barrier to meeting Latinx farmers' needs because their employment structure did not encourage or reward working with Latinx farmers the way it does with other audiences. They focused on programming for Latinxs who are not fluent in English or prefer to learn in Spanish. They said that by working in Spanish programming, they could be at risk of neglecting their central nucleus of responsibility, which could affect their professional advancement, since the promotion process is rigorous. Another educator echoed this by saying the "importance of working with them (Latinxs) is not always recognized or is poorly understood by some

of the decision-makers". However, another educator shared that their supervisors had never pushed back on their work with Latinxs. This person said,

> *I'll say that the two places that I never found obstacles were, one, within my supervisor, people within Extension telling me what to do, no one ever said, 'Don't work with these people'. I was always encouraged to follow that line. And I also never had any push back from farmers themselves . . . [I] never had anything but support from farmers on this work, which was kind of nice.*

'Lack of connection with Latinx community' (n = 2) was a recurring theme in portions of several interviews, but only two educators presented it as an obstacle for this specific question. It refers to an inability to connect with Latinxs because they do not know that Extension exists or have trouble accessing Extension programs. One participant indicated that the biggest problem is distributing and promoting materials; the other mentioned that they have a problem marketing Extension services to the Latinx community.

One non-Latinx bilingual educator mentioned that their 'non-Latinx appearance' could potentially make Latinx farmers uncomfortable because when they first approach, Latinx farmers often assume that this educator only speaks English.

Concerning meeting the needs of Latinx farmers, one educator said that one obstacle is that there is not a good understanding of Latinx farmer's needs (i.e., lack of knowledge of stakeholders' needs).

#### 3.2.4. Institutional Challenges in Meeting Latinx Farmers' Needs

Agricultural educators shared their opinions regarding institutional challenges to serving Latinx farmers. Several comments revolved around funding to reach people who are not fluent in English or prefer to learn in Spanish, because programming for Spanish-speaking audiences requires a different approach than traditionally used, which means a demand for additional resources and justification of greater effort. Responses were classified into seven themes, and at least three are related to funding.

- 'Bilingual Personnel' (n = 7). Participants mentioned that there are only a few bilingual educators, so even when their institutions try to advance their efforts for Spanish-speaking communities, the number of bilingual educators is insufficient.
- 'Investment/cost' (n = 4). Educators recognized that these efforts require investment in resources for reaching this population, including creating awareness of educational opportunities, creating welcoming spaces, improving cultural competency, conducting a needs assessment, translating materials for those who prefer Spanish, and making these efforts sustainable (i.e., not depending solely on short-term external funding).
- 'Justify efforts' (n = 2) because most resources are used to target other audiences, resource allocation for this minority population may be complicated.
- 'Partnership establishment' (n = 2) is a common strategy educators use to overcome the barriers of connecting with different populations and limited resources. However, partnerships are complicated because there is a risk of excluding social groups, and competition among agencies can interfere with successful collaboration.
- 'Knowledge of stakeholders' (n = 2) was mentioned as an institutional obstacle, because educators do not know who the Latinx farmers are and where to find them.
- 'Administration support' (n = 1) reflects a comment about a lack of support at the administrative level in providing services in Spanish and in addressing other barriers.
- 'Extension logistics/format' (n = 1) refers to the incompatibility between the current Extension approaches and the preferred approaches of the Latinx population. For example, a push for online Extension programs and exclusively using online registrations exists, when many in this community prefer face-to-face interactions.

#### 3.2.5. Educators' Strategies for Working with Latinx Farmers

Some agricultural educators had over a decade of experience working with Latinxs in Pennsylvania, and they shared their strategies for programming and how they overcame challenges.

Educators generally establish partnerships for funding, identifying and engaging with individuals, and accessing resources. Additionally, they developed specific programs or events for Latinx audiences. One of the oldest and most important events is the Spanish-speaking session at the annual Mid-Atlantic Fruit and Vegetable Convention (a regional farmer's meeting) in Hershey, Pennsylvania, which has occurred for 11 years (since 2009). Translating publications and programs from English to Spanish is another common strategy, as well as adapting the structure of the events so that they are more attractive to Latinxs. For example, educators hold family-friendly events on weekends, encouraging community-building by having dinners together and making programs more interactive. Finally, they also mentioned how communication/engagement in the community (e.g., going into restaurants or stores and talking to people) has helped increase the knowledge and level of interaction with Latinx farmers in Pennsylvania.

### *3.3. Comparison of Latinx Farmers and Agricultural Educators*

Latinx farmers' and agricultural educators' responses were compared in three sections: access to information, challenges due to Hispanic/Latinx ethnicity, and recommendations for agricultural educators.

#### 3.3.1. Access to Information

Latinx farmers' preferences when accessing information are as follows: (a) family is generally not a source of information for them (almost never, n = 7; rarely, n = 4); (b) Extension and USDA agencies are a more frequent source (continuously, n = 5; almost always, n = 4); (c) other farmers are a more frequent source than not (sometimes, n = 8; continuously, n = 5); (d) feed and seed dealers are a mostly continuous source (n = 8); (e) lenders are absolutely not a source of information (n = 13); and (f) the internet is a very frequent source of information (almost always, n = 11).

Agricultural educators think that Latinx farmers obtain their information mostly through informal education channels, such as word of mouth (n = 5), from employers (n = 4), and through experience (n = 2). Educators also mentioned that organizations (n = 1), both educational and trade, may provide information to more experienced farmers, as well as private companies (n = 1) and the internet (n = 2). Finally, educators indicated that based on personal experience, Latinxs prefer to learn by watching, so posting videos online is a helpful resource.

#### 3.3.2. Challenges Due to Latinx Ethnicity

The question "Are there particular issues that farmers, aspiring farmers, and operators face because they are Hispanics/Latinxs?" was asked to both groups. Latinx farmers and agricultural educators gave different responses.

While all educators (N = 12, 100%) agreed that Latinxs face issues in farming due to their ethnicity, Latinx farmers' responses (n = 16) were divided. Five responded yes (31.25%), six said no (37.5%), and five (31.25%) presented challenges and opportunities for Latinx farmers in the same response.

When prompted to explain their answer, educators mentioned issues related to being newer citizens, which impact their access to land resources and services. Language or communication gaps were another perceived challenge because they limited the ability of Latinx farmers to navigate this new system. Educators also think that immigration status and discrimination are challenges Latinxs face when farming in Pennsylvania. Finally, one educator thought that Latinx farmers might implement cultural agricultural practices (especially with livestock management), which may not be viewed well by US-born farmers or may even have some issues meeting food safety regulations. However, other educators

mentioned that Latinx farmers would not face challenges related to production practices. They also indicated that Latinx producers have a fantastic attitude to work.

Latinx farmers that think that challenges are related to their Hispanic ethnicity (n = 5) agreed that access to land resources, stereotypes, and racism were issues that affected this group, alongside financial issues. Because of racism, some may not want to be very visible in their communities. They also discussed the need to know about government programs in order to access them. Latinx participants that do not see challenges associated with ethnicity (n = 6) indicated that agricultural management is the same regardless of ethnicity, and that any business has issues, especially in its initial stages. They also shared that people treat them well when they sell at their markets, and that they feel supported by non-Latinx farmers. Some even see a window of opportunity for larger profits because it is easier to find labor due to sharing the Latinx culture with the available agricultural labor pool. Those that see both challenges and opportunities think that there may be issues that Latinxs face. These issues include initial fear or insecurity about using English for those who are not fluent in English, and about starting a business, a lack of unity among Latinxs, and prejudgments about them being less educated. Still, the characteristics and skills of Latinxs, such as being hardworking, having initiative, and identifying opportunities, can help to overcome these issues.

#### 3.3.3. Recommendations for Agricultural Educators

Both groups shared ideas that agricultural educators could adopt to improve support for Latinx farmers, aspiring farmers, and operators in Pennsylvania.

Six Latinx farmers and four educators emphasized language. They believe that more Spanish-focused programs and bilingual personnel are essential to improve engagement, and at the same time, they recommend offering English courses for Latinxs in agriculture. Four Latinx farmers suggested having organizational support from Penn State Extension to connect Latinx farmers with each other. Three Latinx farmers requested training on starting operations and acquiring loans and insurance. Four educators discussed the need to permanently engage with the Latinx community. They said this would create a connection and build trust. Additionally, the audience would develop a habit of coming to Extension for information and would know about the services offered. Two Latinx farmers requested help finding land to rent, and two did not know about Extension services. An agricultural educator recommended improving the marketing of events through social media, because "[Latinxs] are good [at] using their cellphones." However, another person acknowledged that Penn State Extension has a social media presence through Facebook and Twitter, but still struggles to reach this population because some do not have access to the internet. Educators also discussed the need for systematic engagement, strategic goals, and a framework or structure to continue outreach efforts in Spanish. They explained that besides educators developing and conducting programs and people translating publications, human resources are needed to provide administrative and organizational support. One educator believed that Latinxs must be more engaged in the needs assessments and programming planning processes, including having community leaders serve in advisory groups. Recruiting students from the Latinx community into agricultural careers (either academic- or industry-related) was also mentioned by an educator. Despite these recommendations, one educator thought the current progress was enough, since Penn State Extension offered good training opportunities to Hispanic producers, and the organization is constantly improving. An educator also mentioned better funding for these programs. Ultimately, all the proposed ideas required economic resources.

## 4. Discussion

This study collected information from Latinxs at different stages of their farming journey. Some have been farming in Pennsylvania for a few years as owners or operators, and others aspire to farm. The unique roles of the participants portrayed the emerging status of Latinx farmers in Pennsylvania. They offered a range of information, such as

motivations to farm, goals, struggles, etc., that helped identify areas in which agricultural educators could concentrate efforts to support this farming group.

Most of the participants were first-generation immigrants; however, whether this is representative of the Latinx population at large is uncertain, because of the small sample size. The average age of participants was 43 years old; this is lower than the national and state average age for farm operators, which is 57.5 years [7] and 56.1 years [22], respectively. This is consistent with national data that indicate that Hispanic farmers are generally younger than their non-Hispanic, White counterparts, with a national average age of 55 [23].

There are few studies on Latinx farmers in the US; however, Minkoff-Zern [12] conducted a recent and complete study with first-generation Latinx farmers. While the current study targeted a different population (smaller, only in Pennsylvania, and including non-immigrant farmers), the population included in this study was still dominated by immigrant farmers. Thus, some comparisons related only to first-generation Latinx farmers are presented next.

Most Latinx farmer participants born in other countries had agricultural backgrounds (n = 12, 70.6%). Minkoff-Zern [13] found the same in her study of immigrant Latinx farmers in other parts of the US, indicating that immigrant Latinx farmers bring previous farming knowledge to the US. In this study, the major farming interest was in horticultural crops (n = 14). This could have been influenced by the sampling referral method, which relied on horticulture educators, the type of agriculture in Southeast Pennsylvania (a strong horticulture area), and the available resources of Latinx farmers, such as land size and their farming experience in Pennsylvania. We also observed operations were mainly individually or family-managed and ranged in size from small (less than half ha) to large (162 ha). However, most horticulture farmers and aspiring farmers were interested in small-scale family-run operations to keep the farms manageable without hiring many external laborers. These findings are also similar to those in Minkoff-Zern's study [12], in which farmers aspired to "maintain a smaller-scale, less intensive farming style" [13] (p. 104).

Similarly, Latinxs' answers to the questions related to motivations to farm indicated that all of them enjoy farming, and for most of them, it is also a tradition in their families. A couple of them see an opportunity to help other people in the Latinx community by ensuring access to food or offering job opportunities. These motivations are related to Minkoff-Zern's findings, which highlighted that Latinx farmers are "motivated by their goal to maintain a family-centered, agrarian lifestyle—one that is reminiscent of their daily customs and routines in their countries of origin" [13] (p. 106). In fact, one agricultural educator talked about a Latinx farmer in another state with a weekend market at their farm, where people gather as a community and animals are butchered on-site. Although not in Pennsylvania, this example supports the agrarian lifestyle based on the customs of their countries of origin that Minkoff-Zern discusses in her book [13].

In terms of goals, the individuals currently farming are looking to expand and diversify their operations, both in size and in markets. In contrast to the goals of women farmers in Pennsylvania [24], who are also an emerging farming group, Latinx farmers have more of what are considered traditional goals, such as increasing land size and profits. However, two individuals discussed their goals of having destination and education-type farms. This was an interesting finding that aligns more with the goals of women farmers in Pennsylvania. Additionally, some Latinx farmers appreciated the learning opportunities available in Pennsylvania, such as attending training sessions and gaining experience; however, they are looking to farm in other places. Overall, the participants' goals were so varied and unique that offering a single representative picture is impossible. Latinx farmers in Pennsylvania have a wide range of interests and aspirations. Local needs should direct educational programs.

A recent report with young and beginner farmers in Pennsylvania indicates that they are facing issues with acquiring land, on-farm training opportunities, and access to capital and markets [25], which are similar challenges faced by the Latinx farmers in

this study. While some of these challenges are shared with other farmers, Latinx farmers also face some unique challenges, and may have different learning preferences. However, regardless of Latinx's challenges, the general impression from participants is that it can be difficult for Latinxs to start an agricultural business because of access to resources, finances, immigration status (for some), and language (for some).

One of the most common approaches to serving Latinx farmers is translating educational materials from English to Spanish and developing tailored programs for the Latinx agricultural community. However, some educational needs are unique and require developing new materials. Additionally, as with the farming goals of Latinx farmers, these challenges apply to subsets of individuals and are not representative of the whole group. For example, most participants self-reported high proficiency in speaking and reading English, and some were US citizens. Therefore, it is important to avoid stereotyping when developing programming, and to treat each person as an individual. To achieve this, educators could benefit from cultural competency training and could also search for opportunities to build trust in the community.

The Latinx farmers had a positive attitude, relaying that despite challenges, they believed everything was possible, mainly because they had knowledge of agricultural production and were hard-working. This positive outlook coincides with a study of Latinx farmers in Missouri, in which the researchers found that farmers tend to emphasize opportunities rather than risk [11]. Thus, Latinx farmers appreciate opportunities such as Extension programming tailored to their community. We must remember that even when the audience is not yet as large as other established audiences, the impact of these programs goes a long way, but it takes time to build relationships, trust, and awareness. Performance evaluations of agricultural educators serving new audiences, such as Latinx farmers, should be adjusted to reflect the time needed for relationship-building, and that turnouts will initially be small.

Despite Latinx's interest in connecting with other farmers for mentorship and networking experiences and/or business support, the study findings and the process of referral sampling revealed that Latinx farmers in Pennsylvania have an extensive network gap. Sachs et al. [24] indicated that "networks provide programs and activities that facilitate shared knowledge about business and farming practices and provide space for legitimizing their role as farmers" [24] (p. 146). Therefore, it could benefit Latinxs in Pennsylvania to connect with peers to strengthen their farming identity and access opportunities for success in their farming activities. The building of this network may be facilitated by Extension or other organizations, for example, through the promotion of Latinx farmers' success stories.

Much agricultural programming targeting Latinxs is concentrated in the southeast area of the state. However, according to the 2017 US Census of Agriculture [21] and the current study, Hispanic or Latinx producers are located across the state, and the population continues to rise, demonstrating a need for programming throughout the state. Educators also mentioned a need for more support, including bilingual personnel and permanent engagement through institutional support that promotes and recognizes work with Latinx farmers.

Most educators (n = 7) who participated in this study were bilingual (English and Spanish). However, not all educators in this study spoke Spanish. This demonstrates that speaking Spanish is useful, but educators' interests and attitude toward programming for Latinxs is more valuable.

Overall, the challenges educators faced at an individual level to meet the needs of Latinx farmers mirrored some of the challenges mentioned at the institutional level. For example, a lack of personnel dedicated to programming for Latinx farmers (especially bilingual personnel) was mentioned by both groups, as was limited knowledge about Latinx stakeholders. Educators often develop partnerships within and outside their organizations and the community to overcome some of these challenges.

Both groups emphasized the importance of language. Educators recognized the importance of building relationships with Latinx farmers and respecting their preferred

methods of learning and interacting. More Spanish-focused programs and personnel are essential to fully engage with some members of the Latinx community. At the same time, offering English courses for Latinxs in agriculture who only know Spanish is also important. Findings indicate that some knowledge of the English language was significant for farmers in the US. Education level also had a significant negative correlation with the roles of aspiring farmers and operators, indicating that the lower the level of education, the more likely they performed either of these roles. Improving English proficiency can assist in creating a path to farming.

There are many stereotypes surrounding this community. These results overlap with research on immigrant farmers [11,13–15] and women farmers [24]. For Latinx farmers, stereotypes include assumptions about immigration status, language preferences, and roles as farm employees rather than farmers. Truly inclusive education can be achieved by incorporating more elements of farmers' culture and knowledge. This research focused on Latinx farmers in one state in the US; however, this approach is applicable regardless of social group or geographic location. Relationships are achieved by building and sustaining connections, and through constant communication. A more personalized approach will allow educators to reach new, underserved, and minority farming communities by understanding and addressing their needs through a comprehensive approach that increases awareness, builds relationships, improves cultural competency, and creates inclusive spaces. This study's findings can be used to justify the need for more resources from university administrators to connect with this community and for competitive grants, such as from the USDA's NRCS and Sustainable Agriculture Research and Education programs. Additionally, the methods used here can be adapted to other social groups and locations in which educators wish to understand minority audiences better.

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