

Perception and Use of Sustainability Practices in Farm Markets: A Case Study Exploring a Central New Jersey Market

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ABSTRACT

Farm markets have become popular in response to consumer demands to access local, fresh, and high-quality food. In addition, greater emphasis has been placed on sustainable practices to manage food security and employment in this sector. This case study explored the perception and use of sustainable practices in small farm market operations in Monmouth County, New Jersey. The research was guided by three questions: 1) What is the perception of sustainability practices by farm market operators, 2) What specific sustainability practices does the farm market use, and 3) What are the barriers to implementing sustainability practices? Data was collected from interviews conducted with the farm manager and farmer owner of the market. Data confirmed a variety of sustainable agriculture practices are being used, such as limiting tilling, water conservation, local product usage, organic fertilization, limitations of pesticides, and invasive species management. However, there is a lack of knowledge surrounding how and what sustainable agriculture practices offer the most value to the consumer and the farm market operator. This study revealed three major themes, including a lack of knowledge and resources of sustainable practices, small farm business strategy, and importance of social/local connection to customers.

KEYWORDS

Sustainability, agritourism, farm market, case study, no-till, fertilizer

INTRODUCTION

Agriculture is an integral part of managing the world's food security and employment. In agricultural production, small farms, operations with gross cash farm income under \$250,000, have taken a role in increasing biodiversity and a sense of community in suburbs and rural areas. Many of these small farms sell their goods to a specific community rather than exporting or selling to larger markets, classified as farm markets. The implementation of sustainable production practices is increasingly important as consumer awareness continues to focus on the health benefits of consuming fruits and vegetables (Morgan and Alipoe, 2001). Farm markets have become more popular to meet this growing consumer demand for locally sourced produce

and equally benefit from this potential to obtain high profits on a small acreage (Morgan and Alipoe, 2001).

Sustainable practices implemented by small farms include the implementation of organic farming, manure-based fertilizers, water conservation, and soil conservation (Serebrennikov, et al., 2020). No-till agriculture, diversification, rotation of crops, and sustainable pest management are included in sustainable agriculture techniques as well (Maxwell, et al., 2008). Sustainable practices are predominant in the world of agriculture; they are implemented to maintain efficient production of food and security while sustaining the environment used to produce the commodities. Without sustainable practices, land, water, and other resources may become inefficient for agricultural use through degradation.

The aim of this qualitative case study was to explore the perception and use of sustainability practices in a small farm market in New Jersey. This study investigated farm market practices including the history of the farm, practices implemented based on sustainability factors, barriers to sustainable practices, and future considerations for the farm to increase sustainability. Accordingly, this research was guided by three questions: 1) What is the perception of sustainability practices by farm market operators, 2) What specific sustainability practices does the farm market use, and 3) What are the barriers to implementing sustainability practices? This study has implications for research, policy, and practice as the agritourism industry continues to grow in New Jersey.

LITERATURE REVIEW

The United States reports more than 2 million farms with gross revenues that range from \$1,000 to more than \$5 million (Whitt, 2021). In the last release of the U.S. Department of Agriculture's Economic Research Service report, it classified farms based on ownership, revenue, and primary occupation of the principal operator. Whitt (2021) reported that family farms are a significant part of U.S. agriculture, "making up 98% of all farms and providing 88% of production. Most farms are small family farms, and they operate almost half of U.S. farmland while generating 21% of production. Midsize and large-scale family farms account for about 66% of production, and non-family farms represent the remaining 2.1% of farms and 12% of production."

Accordingly, in agricultural production, small farms have taken a role in increasing biodiversity and a sense of community in suburbs and rural areas. Many of these small farms sell their goods to a specific community, rather than exporting or selling to larger markets; classified as farmers markets. The USDA defines a small, commercial farm as an operation with sales of \$10,000 to \$250,000 (USDA, 2022).

Agricultural production has put significant pressure on natural resources and the environment over the years. With greater emphasis on preserving natural resources, many sustainable agricultural practices have emerged to promote environmental stewardship (National Institute of Food and Agriculture, 2022). The U.S. Department of Agriculture has committed to the implementation of sustainable production practices as well as meeting the increasing demands of consumers. Sustainability in agriculture is measured by its success in advancing objectives related to the social, economic, and environmental dimensions of sustainability. Sustainability objectives include providing safe and nutritious food, livable incomes, and wages for farmers and those working across the system and conserving natural resources for the benefit of current

and future populations, such as the maintenance and improvement of soil fertility (USDA, 2022). The implementation of these practices is increasingly important as consumer awareness continues to focus on the health benefits of consuming fruits and vegetables (Morgan and Alipoe, 2001). Additionally, farm markets have become more popular to meet this growing consumer demand for locally sourced produce and equally benefit from this potential (Morgan & Alipoe, 2001).

The Farmers Market Coalition (2002) defines a farm market as “a public and recurring assembly of farmers or their representatives selling the food that they produced directly to consumers. Farmer’s markets facilitate personal connections and bonds of mutual benefits between farmers, shoppers, and communities.” Farmers markets, also referred to as community farmers markets, have become more popular as consumers seek to buy fresh produce directly from the farmer. In fact, the number of farmers markets in the U.S. has grown rapidly with more than 8,600 currently registered with the USDA, compared with 2,000 in 1994 (Agriculture Marketing Service, 2022). In New Jersey, many farmers who participate in community farmers markets are Certified Farmer Vendors in the Women, Infants & Children and Seniors Farmers’ Market Nutrition Programs (FMNP), according to the NJ Department of Agriculture (2022). These programs allow the state’s farmers to direct-market their locally grown produce to nutritionally at-risk pregnant, breastfeeding, postpartum women, children 2-5 years old as well as eligible seniors 60 and older. Several seasonal markets pop up in nearly every county in New Jersey to meet consumers’ desires to improve their diets through the purchase of fresh produce as well as “providing economic viability and enhancing the quality of life in each community that creates this farm fresh experience” (NJ Department of Agriculture, 2022).

Sustainable Farming Practices

To promote environmental stewardship in agriculture, farms have implemented several sustainable practices, including organic farming, manure-based fertilizers, water conservation, and soil conservation (Serebrennikov, et al., 2020). No-till agriculture, diversification, rotation of crops, and sustainable pest management are included in sustainable agriculture techniques as well (Maxwell, et al., 2008). No-till agriculture is incorporated into many sustainable farming practices as a result of its benefits in reducing soil erosion, saving time and reducing fuel inputs (Maxwell, et al., 2008). The diversification of crops is important in implementing biodiversity, and crop rotation is increasingly as important as it disrupts insect and pathogen reproduction, aiding in resistance to diseases and restoring nutrients to the soil and therefore its overall quality (Shah, et. Al., 2021). By rotating crop fields annually, biannually, or seasonally, soil health and quality are kept at a higher level. By adopting sustainable pest and weed management, farming systems can reduce pesticide use for crop protection. Sustainable pest management can be achieved through rotating crops and devoting time to manually removing invasive species without the use of pesticides (Maxwell, et. Al, 2008). Sustainable practices are predominant in the world of agriculture; they are implemented to maintain efficient production of food and security while sustaining the environment used to produce the commodities. Without sustainable practices, land, water, and other resources may become inefficient for agricultural use through degradation.

The National Institute of Food and Agriculture (2022) seeks to promote innovation in sustainable agriculture and offers several programs to engage farmers in the development and adoption of a

variety of practices. These practices not only help preserve natural resources but help farmers adopt profitable and environmentally sound practices that contribute to improved efficiency, productivity, and profitability. However, in a study conducted at the Basiq International Conference, more than 80% of the 50 small farms studied lacked an understanding of sustainable agriculture practices and how these practices apply to their farm (Cristea, et al., 2019). For example, farmers practiced sustainable agriculture through crop rotation, natural fertilizers, polycultures, heirloom growth, animal welfare, and natural grazing without knowing that they were practicing sustainable methods. Furthermore, this study separated its participants into two categories. The first category is represented by farmers who are not interested in sustainable agriculture or did not know that it was a practice. This category feels that their productivity may be affected and like to stick with traditional agricultural practices. They were unconvinced about the efficacy of sustainable practices and were not willing to spend money on green operations. The second category includes farmers who are interested in using new technologies and practices for a more sustainable future in agriculture if it did not affect their profits immensely. They felt more concern about the long-term health of the environment and generational farming. The study concluded that the differences in perception of sustainability between the participants may be due to their differing educational, cultural, and economic backgrounds.

A similar study focusing on farms in West Virginia (Zickefoose, 2017) identified four categories of farmers studied: sustainable, conventional, working toward sustainability, and leaning toward conventional. The sustainable and working toward sustainability farmers face challenges with resources, leaving them to use less sustainable practices when they do not want to. This study helped recognize that sustainability is not a black-and-white entity wherein farmers are either completely sustainable or unsustainable (Zickefoose, 2017). The most common practices Zickefoose saw on farms in all categories included mulching, planting cover crops, rotating crops, using manure fertilizers, and minimizing chemical applications. These practices were also seen on the farms studied in Romania (Cristea, et al., 2019).

Sustainable agriculture methods are used to sustain the environment and land used to produce and harvest, but to also preserve agritourism. If sustainable agriculture continues to be lesser known by established farms, resources may become degraded and insufficient for agricultural use in the future. Preservation and conservation of agricultural lands may only be achieved through the protection of the land both via sustainable agriculture and eco-friendly practices. As the National Institute of Food and Agriculture (2022) seeks to engage farmers in the adoption of sustainable practices for the protection and advancement of their physical land, it must also be known that these practices can assist them in improving their productivity. In the mentioned studies, farmers showed a lack of understanding of sustainable agriculture practices and how these practices can support their farms for generations to come without uncertainty. Many of the farms were practicing sustainable methods without knowing it or were on their way to becoming sustainable without knowing the next steps. Farmers who were unconvinced about the efficacy of sustainable practices and were not willing to spend money on practicing sustainable methods were less knowledgeable and understanding of how these methods can supplement their farms and aid them in becoming more profitable in the long run. This perception of sustainable farming methods may be due to different educational, cultural, and economic backgrounds. Access to resources like the National Institute of Food and Agriculture can benefit and encourage them to shift to more sustainable methods depending on their needs. With different educational, cultural,

and economic needs, farmers can reach out to these resources to understand how they may be able to implement sustainable practices on their farms with less daunting shifts in their traditional methods.

METHOD

The purpose of this qualitative case study was to explore the perception and use of sustainability practices in one farm market in New Jersey. This research involved collecting and analyzing data from a small farm market to understand their perception and sustainable and traditional farming practices. It is appropriate to this study because the data collected was observational and focused on the individual's actions and decisions. By using an interview in qualitative research, it was possible to obtain information from the farm owner and previous farm manager on specific topics but also allowed the conversation to be open-ended where new information was revealed that was not specifically asked in the interview (George, 2022). This farm market was selected as the researchers had direct access to the farm owners and one researcher had previously worked for the farm market.

The research method employed a case study design to investigate one specific farm. This type of study was chosen to efficiently describe and evaluate the farm as its own entity in the category of sustainable agriculture. In a case study, the researcher describes the actions and behavior of the subject through observation and the subject reports these actions to the researcher from their point of view (McLeod, 2019). It is appropriate to use in this study because it allows the specific farm to be researched in depth and provide insights on the farm on its own, but also to allow insight into sustainable agricultural practices in small farms as a whole. Limitations of a case study involve the analysis of descriptive data by the researcher, whereas interpretation may not be generalized, and they can be difficult to replicate due to their specificity (McLeod, 2019).

Site Selection

New Jersey agriculture is made up of more than 9,000 farms covering over 715,000 acres of farmland. The state produces blueberries, cranberries, spinach, and peaches in abundance but also produces tomatoes, corn, apples, hay, soybeans and nursery plants (<https://www.state.nj.us/>). This study focuses on a singular farm market, NJA Market; a synonym was used to protect the identity of the market. The market is in central New Jersey in Monmouth County and has been farmed for over 40 years, with two separate owners and operators. Agriculture serves an estimated 645,354 people living in Monmouth County with a median household income of \$102,523 (<https://www.census.gov/>, 2020). Central New Jersey is included in the tri-state area of New Jersey, New York, and Connecticut, a massive metropolitan center. It houses many working-class citizens who commute to New York and Philadelphia, with the luxury of living close to the northern half of the Jersey Shore. Monmouth County sits on flat, sea-level land for the most part, with many rural areas with open fields alongside suburban neighborhoods.

Central New Jersey also includes [Middlesex County](#), the center of the population of New Jersey, and includes much of nearby [Monmouth](#), [Mercer](#), [Somerset](#), and [Hunterdon](#) counties. NJA Market is a stakeholder in southern Monmouth County's summer produce market and is a town staple in fall and winter holiday needs and activities. According to the market's website, it engages in a variety of activities in addition to agriculture that falls under agritourism. Agritourism has become the basis of income for the farm, where the months of September

through December are the busiest and most productive. Agritourism involves any activity including recreational, educational, and entertainment on farmland. For NJA Market, agritourism means driving the general public to the farm for fall activities, Christmas necessities, and the annual usage of the petting zoo.

From September to the week before Thanksgiving, the farm provides pick-your-own pumpkins, hayrides, a corn maze, a hay maze for the younger kids, face painting, a bounce house, and barrel rides every weekend from 10 a.m. to 5 p.m. Admission to the farm involves a \$15 wristband that allows access to all of the activities. Children under 2 are free, and pumpkins are priced at 0.79 cents per pound. The day after Thanksgiving, the farm springs into winter with Christmas trees including Fraser firs and an abundance of spruces. Employees load the trees onto customers' vehicles at no cost, and customers can pay for trimming the trunk, wrapping the tree for transport, and drilling the tree for the stand. The market sells homemade décor from locals, holiday candles, wreathes, grave blankets, and more.

Throughout spring, summer, and fall, there are seasonal plants, fruits, and vegetables that are 100% farm grown and locally sourced that are available for purchase in the market. Produce and seasonal plants sold in the market are purchased from Twin Pond Farm in Howell, New Jersey, which is also in Monmouth County. NJA also hosts private events throughout its open seasons, with fall being the most popular. It hosts birthday parties, which are two hours long with admission of up to 20 kids and 20 adults — additional attendees include an added fee. Birthday parties include access to the petting zoo, one bag of feed per child, a private picnic area, and for additional costs, a bounce house, wagon rides, egg gathering from the henhouse, and barrel rides. Field trips from local schools are also common and are one hour long. They include the petting zoo, one bag of feed per child, and the option to add on a wagon ride for an additional fee. The petting zoo is open to the general public 10 a.m. to 4 p.m. Monday through Friday and 10 a.m. to 5 p.m. weekends April through September and costs \$5 per person and \$3 per feed bag. On weekends in September through Thanksgiving, the fall activities wristband must be purchased for admission to the petting zoo.

Data Collection

Interviews were conducted with a farm manager and the current farm owner of NJA Market, independently. An interview protocol was developed to help the researcher answer the three research questions guiding this study. The first iteration of the protocol developed was unstructured; meaning the researcher was going to use a few interview questions and allow the conversation to progress in the manner of a normal conversation related to the research topic (Statistics Solutions, 2022). Table 1 displays the interview protocol and how the interview questions align with the research questions.

Table 1: Interview Protocol

Research Questions	First-Round Interview Questions
What is the perception of sustainability practices by the farm market operators?	<ul style="list-style-type: none"> • What sustainable practices are you aware of? • What is your perception of sustainability? • Do you use herbicides or pesticides? <ul style="list-style-type: none"> ○ If not, how do you control weeds and pests?
What specific sustainability practices does the farm market utilize?	<ul style="list-style-type: none"> • What sustainable farming practices do you utilize? • What are the largest inputs that go into your farm (water, electricity, feed, fertilizer, fuel etc.)? • What are your largest sources of waste and how do you try to reduce them? • How do you try to limit these inputs to run your business economically?
What are the barriers to implementing sustainability practices?	<ul style="list-style-type: none"> • Are there any barriers that you experience in customers purchasing from your business as compared to traditional grocery stores? • Why do you think buying local is important? • How long have you and your family been farming? <ul style="list-style-type: none"> ○ How did you get into farming?

After the first interview, based on findings and gaps in understanding, the researcher modified the protocol to be semi-structured with more specific questions to elicit appropriate details from the participants. Additional questions were also used to confirm the information shared by either the farm manager or farm owner as a reliability check. Interview responses were transcribed to allow easy review, comparison, and analysis. Table 2 displays the revised interview protocol and how the interview questions align with the research questions.

Table 2: Interview Protocol, Revised

Research Questions	Second-Round Interview Questions
What is the perception of sustainability practices by farm market operators?	<ul style="list-style-type: none"> • If herbicide and pesticide are used, what is the brand? Is it organic? Why/Why Not? • What are your resources for learning sustainable practices?
What specific sustainability practices does the farm market utilize?	<ul style="list-style-type: none"> • What is the amount of pesticide/herbicide used? • What is the specific process of crop rotation? <ul style="list-style-type: none"> ○ How many fields/acres are rotated? • Where are you getting your local produce? • Where are you getting your trees and pumpkins? • How do you measure your farm’s success economically and production-wise?

What are the barriers to implementing sustainability practices?	<ul style="list-style-type: none"> • Are there any barriers to not using as much pesticide? • Is cost an issue for implementing sustainable methods?
Generalized data collection	<ul style="list-style-type: none"> • What changed between ANJ and NJA? • Do you have quantitative data on production of straw, hay, corn, produce etc.? <ul style="list-style-type: none"> ○ How much do you deem unsellable after harvest? • How many acres do you have on the farm? • How many acres do you use off of the farm property? • How many annual visitors do you have by season? • Where are the holiday décor, bakery items and merchandise in the market coming from?

Data Analysis

The sustainable practices on the farm were analyzed after a series of interviews with the farm manager and the farm owner. The qualitative data gathered from the interviews were transcribed and entered into a document for further organization under the three categories of research questions pertinent to the study: What is the perception of sustainability practices by the farm market operators? What specific sustainability practices does the farm market use? What are the barriers to implementing sustainability practices? The data collected between the manager and owner was examined, and repeated claims were combined into one answer. The following themes within the data were discovered: sustainability of land and environment, economic profitability, and social connection.

FINDINGS

The interview with the previous farm manager compiled knowledge and use of farm practices over 20 years of experience. The manager supervised all staff, monitored the crops and animals, planned the farm's seasonal activities and their placements on the farm, and handled all customer concerns. Two families came together in 1988 and bought the land to begin the market referred to as ANJ Market, where the manager and her family were sole operators. After many years, the third generation began working at the farm and it became a close-knit community between the farm and surrounding towns. The farm was sold in 2020 and was renamed, referred to in this study as NJA Market, and was rebranded and downsized. The previous farm, ANJ Market, used over 100 acres of land throughout Wall Township, New Jersey, to harvest hay, straw, and corn. The new owners are only using 63 leased acres. The new owners are first-generation farmers and have employed some of the first family members who continue to teach and inspire them about farm operations. The current owner commented that without the help of the previous family, he would have been farming “blind” and their input was necessary for all farm operation decisions. He uses their input but continues to educate himself by researching sources such as the Nature Conservancy to input modern, more sustainable methods of farming. The farm owner noted that he only researched things that came to mind, and it is not too often — subjects he has researched minimally include no-till agriculture, water conservation methods, and seed saving. He does not typically research new practices, but rather how he can make his current, traditional practices better.

In the first interview, the farm manager stated that buying local and being involved in local agriculture is important because:

“It is a farm-to-farm connection. We buy from local small farms and orchards, which is cheaper for us since we don’t need as much [produce and goods] as a regular grocery store would; it’s more efficient. Supporting local markets is important to the customers; they want to support us so the farm and its land can last instead of dying out and being developed. Wall Township and Manasquan [New Jersey] are ever-changing, and development is taking over; people come to us to try to change that ... but also to take part in a community.”

Upon asking the owner about his input on buying local, he said supporting local farms saves farmland from development and that customers “trust” the produce more than the grocers, because grocery stores obtain their produce from mass-production farms where consumers are unsure if their methods of growing and harvesting are relatively safe and “clean.” He also said that a large portion of customers purchase local honey that is sold in the market to help combat allergies (Asha’ari, 2013), and therefore buying local is also “connecting to your local land.” The owner has a modern view on sustainable agriculture, claiming that taking care of the land efficiently is most important in farming.

NJA Market uses compost from discarded produce and manure, as well as leaves, dropped off by local landscapers, as nutrient supplements to be plowed and spread into their fields. The ANJ Market manager said they did not limit tilling in her time as farm manager under the previous owners. Upon speaking with the new owner, he said they do try to limit tilling as much as possible now. After researching and educating himself on this modern practice, he realized they should not be tilling so often as to destroy soil layers and must rebuild sufficient soil layers each year. Sowing new seeds over old crops saves time and is more economically sound when it comes to fueling machinery. After starting fresh when purchasing the farm, fields were tilled 12-24 inches in the beginning, but they have since continued to sow new seeds into the fields each year without plowing and tilling the soil below.

The farm experiences an overgrowth of the invasive plant jimsonweed, which is toxic to humans as well as many of the livestock animals that are kept on the farm. NJA Market must be diligent in keeping up with the removal of the plant, especially because they try to limit herbicides and pesticides wherever possible. Their main source of action against the plant is patrolling the grounds and cutting it down and removing it manually using a hoe or a machete. In addition to the previous manager's input on their control of jimsonweed, the current owner said they must keep it mowed and take extra care not to let it contaminate their hayfields, otherwise the result is poor-quality hay. During their first year of hay production, they had to dispose of most of the hay due to jimsonweed contamination and have since become more punctual in their jimsonweed prevention efforts. The owner said they also deal with an invasion of potato beetles that destroy their produce. The current family that owns NJA Market has four young children whom they are raising to help out on the farm. With the potato beetles, instead of using pesticides, they had their kids go around and collect all of the beetles they could find in their vegetable garden, put them in cups and feed them to the chickens. In addition, they use bug netting over their produce to limit

pests. In limiting pesticides, the owner said they only “spot spray” their produce as a jumpstart in the beginning stages of growth. They do not use commercial fertilizer but local green material and manure. He said the product may not be the prettiest looking because of this, but it is better tasting. In the third interview, it was revealed that they try not to use any pesticides, but when absolutely necessary will use the brand Sevin by GardenTech, which is not organic or natural. The owner said that, at most, they would use 2 to 3 quarts a year mainly due to the invasion of potato beetles. They limit their pesticide usage by making sure to thin their crops and keep them clean by removing dead or rotting parts of the plant before pests could arrive.

The farm does not reuse or harvest seeds from the previous year’s crops and produce. The owner communicated that it is illegal for them to reuse or save privatized varieties of seeds that they purchased. Therefore, the seed company will accept leftover seed and provide a credit for new seed provided each year. He prefers to use the new seed for everything each year as he worries about insect and disease resistance in using seeds harvested from previous crops and produce. They did allow tomatillos to grow wherever they sprung up again from the previous season’s seeds with the previous owners, but the current family prefers not to. The farm has always practiced crop rotation annually for every species planted. Upon asking the farm owner about his methods on crop rotation and if it is planned out, he explained that since they have only been there for three years, he is still trying to figure out their best methods. Currently, they are rotating on an annual basis where no same crop or produce plant is seeded in the same area the next year.

In their sustainable practices, they have some neutralizing inputs on the farm which do send them a few steps backward in sustainability. They have an on-site diesel tank used for farm vehicles and machinery only. The manager said it was their largest input and cost on the farm. For the month of October 2022, the new owner paid \$5,000 for fuel, and the owner agreed with the previous manager that the largest input is still, and will continue to be, fuel. Water is not a large input for their farm due to the organic material used in the growing season; the organic material holds moisture from rain, so watering has only become a larger source when rain is minimal during the season. Watering is mainly reserved for the animals and seasonal plants that are sold in the market. They use city water but are in the process of implementing a private water well system. The owner described a large source of waste as cardboard; this is picked up and recycled by a local company. All wood pallets obtained by the farm are resold for \$2 each to local people and companies, and metals are sent to the scrapyard.

ANJ Market, before being sold, used more than 100 acres of open fields around Wall Township and Manasquan as hay and straw fields. They saved some costs on the farm by producing all of their animal feed with hay, feed corn, and silage from processing the corn stalks from these production fields. The farm property is 17 acres, and about 80% of it is planted with hay, straw, corn, and a small portion of the produce. They use 3 acres behind a local restaurant, [Scarborough Fair](#) in Sea Girt, New Jersey, and an additional 60 acres are leased in Wall Township at the “Silo Fields,” which is a part of the [Open Space Acquisition](#) alongside the [Wall Township Bike Path](#). From their previous harvest, they got about 25,000 pounds each of feed corn, hay, rye, and straw from 60 acres planted. They allocate a majority of their harvest to feeding their livestock, so there is no need to purchase feed. They sell their feed corn in 1,500-pound bins and 40-pound bags; this year they sold six bins and 10 bags of corn totaling 9,400 pounds. The rest is allocated to their livestock for the year. This year, they sold about 3,000 bales of hay at \$9.99 each and

3,000 bales of straw at \$12.99 per bale. This left them with 1,500 bales each of hay and straw for their livestock. If they run short of hay and straw, they purchase from another local farm to supplement. The owner admitted they have had a hard time growing produce this year, and almost all of it has gone to feeding their livestock as it was deemed unsellable; he did not have a specific production quantity to discuss. Therefore, they have been supplementing any produce and animal feed needs from another local farm.

The market carries seasonal décor, bakery items, goods, and perishables from local crafters and vendors. The seasonal bakery items come from a local bakery that is featured on the farm's roadside entrance sign. Many of the goods and perishables come from a local supplier that features premade gourmet soup and dip packages. Perishables such as sweet potato, strawberry, and pumpkin butter, blackberry preserves, and grape jelly are made by a private vendor and are specifically made and labeled for the NJA Market. Seasonal décor includes home décor made by local crafters and small businesses, hay and straw bales, and feed corn for decoration. All year round, the market sells candles and room sprays from a local supplier, and many of their scents are locally themed.

DISCUSSION

The literature presented represents sustainable practices in small farm agriculture markets and agritourism, as well as the perception of sustainability of small farm owners and operators globally and nationally. It is essential to understand where the owners and operators stand in their knowledge and actions of sustainable practices in agriculture as farm markets become increasingly popular and essential to our growing population. Throughout the research, common themes were found in the findings. The NJA Market showed a lack of awareness of sustainable practices because of a lack of understanding of available resources and connections with experts. The market also lacked a business strategy and an understanding of how they can measure the farms' economic success. It was common that the owner held a heavy focus on personal connection with customers as his largest concern with any challenges the farm faced.

Lack of awareness/education/connection with experts

The lack of understanding of available resources and possible connections with experts' knowledge aligns with a common theme shown in the literature review. The study based on small farms in Romania examined how over 80% of the 50 farmers studied lacked an overall understanding of agriculture practices and how they apply them to their farms (Cristea, et al., 2019). Upon asking the owner of NJA Market what sustainable agriculture practices they used, the answer was not concise. The owner was unsure what sustainable agriculture meant, and if they were practicing sustainable methods. For example, using manure off the farm and local green material dropped off from landscaping companies for fertilization is a practice they use, but he didn't know it was sustainable and only used it as an alternative to purchasing commercial fertilizer. If sustainable practices continue to be lesser known by farmers, resources can become degraded and insufficient for agricultural use in the future. The NJA Market can become more involved in sustainable practices to preserve and conserve their agricultural land through further education. The owner of NJA Market was only educated on specific topics that are relevant to the farm's current practices and was unaware of many practices that can be implemented. Use of resources such as The National Institute of Food and Agriculture (2022) is important for modernizing traditional, unsustainable farming practices. Many modernized practices with

sustainable agriculture in mind not only influence the health of the land but the improvement of a farm's efficiency and productivity. The study on small farms in Romania noted that farmers who knew about sustainable agriculture practices were not willing to spend money to implement them and were often less knowledgeable on how these practices can support their farms for generations to come without uncertainty (Cristea, et al., 2019). The NJA Market can seek enlightenment and guidance on sustainable agricultural practices through resources like the National Institute of Food and Agriculture (2022) for a shift toward a more sustainable, productive future.

Business strategy and economic success

The NJA Market exhibited a lack of understanding of business strategy and economic success alongside agricultural practices that can be implemented. Upon asking the owner how he measures the farm's success, he did not have a concise answer and said his parents took care of the finances. Many of the sustainable practices the NJA Market uses are aimed at saving money, and the future of shifting toward new practices is uncertain. By relying on moisture content from organic material on crops, the farm is able to use less city water; they are also working toward implementing a private well water system to save on the expense. As the major cost for the farm is diesel fuel for equipment, they have worked toward lowering the cost by executing a no-till system that saves hours of machinery use in the fields. This market aligns well with the study in Romania (Cristea, et al., 2019) as they are not willing to invest in new green operations due to a lack of knowledge of how it can benefit efficiency, production, and profitability. Additionally, the NJA Market may be unwilling to invest more in sustainable practices due to current economic challenges. Currently, the market supplements their needs from Twin Pond Farms as produce production was low this year; spending more on supplemental goods from other places may lead them to be less independent and challenged when it comes to affording new practices. Overall, the owner would like to be more sustainable to support the farmland for generations to come, though economic challenges and lack of understanding of the farm's success and resources to enhance operations do not allow more implementation of additional sustainable practices. The National Institute of Food and Agriculture (2022) is an available resource for the NJA Market to understand how investing in additional sustainable practices can influence the efficiency, productivity, and profitability of the farm in the long run.

Heavy focus on social connection with customers

As a response to many of the interview questions, the owner of the NJA Market responded with the importance of the farm's connection to the community. After asking the final question of how the farm measures its success, he immediately responded that he measures success by how relative the farm is to the local community and by making his customers happy. Consumer demand is growing for locally sourced produce and goods (Morgan and Alipoe, 2001), and the NJA Market grows in popularity each year. The market's busiest months, September-December, are aimed toward providing the local community with recreation, education, and entertainment on the farm as an agritourism hotspot. Through fall activities, pumpkin picking, seasonal décor offerings, and Christmas tree sales, the local community returns each year for convenience and connection to their local farm. The New Jersey Department of Agriculture describes these seasonal proclivities as a provider of economic variability and an enhancement of the quality of life in each community that creates a farm fresh experience (2022). The ANJ farm manager said supporting local markets is important to both the customers and the farm itself — supporting the

farm allows the land to stay undeveloped in an ever-changing, modernized world of infrastructure. The owner of the new NJA Market agreed with the previous manager but added that the customers rely on small farms for belief in “safer” produce and for connection to their local lands.

CONCLUSION

Existing literature was explored to understand sustainable agriculture practices by small farms globally, nationally, and most specifically in New Jersey, USA. The specific farm market, NJA Market in central New Jersey, was interviewed and selected as the main contributor to the data collected. Understanding of the specific farm market was developed through the interview process, which included how they grow their produce and crops, what sustainable agriculture practices are used, which are not used, and why. The advantages and limitations of individual sustainable practices vary in agricultural purposes, locations, and affordability, as well as educational and cultural backgrounds. The NJA Market studied may not represent the equivalent of farm market practices in northern and southern New Jersey markets, nor national or global markets, due to diversity in agricultural land and practices, but generalizations can be made as well as encourage a more robust study of New Jersey markets.

As the agritourism industry continues to grow in New Jersey, small farms require more awareness and access to reputable research, implementation of policies, and further practice of sustainable agriculture. Knowledge of sustainable agriculture practices is increasingly important, and many small farms are unaware of how to implement them, nor how they can benefit the farm and the land (Cristea, et al., 2019). Farmers can become more involved and educated about sustainable agriculture practices through respected resources such as the National Institute of Food and Agriculture (2022), which seeks to promote innovation in sustainable agriculture and offers several programs to engage farmers in the development and adoption of a variety of practices.

This study uncovered significant insights into the challenges faced by the small NJA (New Jersey Agriculture) market in central New Jersey, which likely reflect similar constraints experienced by other farms in the region. The findings suggest a pervasive lack of awareness and implementation of sustainable practices among small farms. This lack of awareness is a critical barrier to advancing sustainable agriculture. The study's implications extend beyond its specific findings to highlight broader issues within the agricultural community. For instance, it underscores the need for comprehensive studies on sustainable practices in small farms, drawing on the experiences of farm markets to inform policy and educational initiatives. By understanding the root causes of limited sustainable practices, policymakers can better design interventions that support small farms in adopting environmentally and economically sustainable agricultural methods.

The study's findings also underscore the importance of policy implementation in promoting sustainable agriculture practices. Established farms are legally bound to adhere to existing laws and regulations, but the research identifies gaps in knowledge and understanding that hinder effective implementation of sustainable practices. New policies focused on mandatory sustainable agriculture practices could play a pivotal role in shaping the future of agriculture. By addressing the identified knowledge gaps and providing clear guidelines, policymakers can

facilitate a more sustainable trajectory for farming practices. This study thus serves as a valuable resource for policymakers seeking evidence-based approaches to enhance sustainability in agriculture.

Furthermore, the study reveals significant challenges in accessing reliable information on sustainable agriculture among farm operators. Many farmers may lack awareness of where to find reputable resources or how to interpret and apply sustainable farming techniques effectively. This highlights the need for enhanced outreach efforts and educational programs targeting small farm markets in New Jersey and similar regions. Organizations such as the National Institute of Food and Agriculture (NIFA) and state departments of agriculture can play a crucial role in bridging this information gap. By expanding their outreach initiatives and offering tailored educational resources, these organizations can empower farmers with the knowledge and skills necessary to adopt sustainable practices. Ultimately, leveraging the insights from this study can guide collaborative efforts to cultivate a more sustainable future for agriculture, ensuring that small farms receive the support they need to thrive in a changing agricultural landscape.

The demand for locally sourced produce continues to rise, driven in part by the growth of agritourism facilities (Morgan and Alipoe, 2001). Small farms that integrate farm markets and agritourism activities on site are increasingly popular but face the dual challenge of maintaining environmental sustainability and economic viability to meet this growing demand. Sustainable practices play a pivotal role in modern agriculture, ensuring efficient food production while safeguarding the environment. These practices are essential for maintaining the long-term productivity of agricultural land and preserving natural resources such as water and soil. Without sustainable approaches, the agricultural landscape risks degradation, leading to diminished yields and compromised environmental health.

In the realm of agriculture, sustainability encompasses practices that not only enhance productivity but minimize environmental impact. These include soil conservation techniques, water management strategies, integrated pest management, and renewable energy adoption. By implementing these practices, farmers can mitigate the negative effects of intensive agricultural practices on land and water resources. Moreover, sustainable agriculture contributes to food security by promoting resilient farming systems that can adapt to changing climate conditions and environmental challenges. This holistic approach not only benefits farmers in terms of long-term profitability and stability but also ensures the sustainability of agricultural production for future generations.

The role of farmers in fostering a sustainable future cannot be overstated. Their active participation in adopting and promoting sustainable practices is crucial for maintaining agricultural security and environmental stewardship. Educating farmers about the benefits of sustainable agriculture and providing them with access to resources and support are essential steps in encouraging widespread adoption of these practices. Agricultural extension services, research institutions, and government agencies play a pivotal role in disseminating knowledge and facilitating the adoption of sustainable farming techniques. By empowering farmers with the necessary tools and information, stakeholders can collectively work toward a future where agriculture not only meets present needs but preserves the integrity of natural resources for generations to come.

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