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Leading agricultural sustainability through generations and ever-changing technology

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Abstract

This research paper provides a foundation for future research on the importance of generational farming in correlation with ever-changing technology. This project traces the realism of generations leading one another to success. The literature highlights the way technology has altered traditional farming practices and how farmers over the last ten decades have had to adjust in order to meet productivity and sustainability indefinites. For some, technology has run farmers out of their work and forced them to sell the operation; this includes not having access to resources because of bulk technology production integrated into farming practices. For others, technology has helped shaped a future for farming sustainability.

This technology includes drones, smart phones, artificial intelligence censors, and crop sprayers. Depending on what generation is operating any given farm, the ideals of classic farming remain in existence but include adaptation to the technological world. To better understand this research, I will be exploring the main question of "What is necessary for sustained success in the future of farming" by working through these focuses: generational farming, technology, sustainability, productivity, and best practices for an ever-changing natural environment.

The main question of "what is necessary for sustained success in the future of farming" is answered by four pillars working together: sustainability, social, economic and environmental. By working through these focuses: generational farming, technology, productivity, and best practices for an ever-changing natural environment present themselves as supporting concepts. Moreover, generations working with each other and leading each other make for a more educated path forward in the industry.

Keywords: generations, farming, technology, agrobiodiversity, future

Leading Agricultural Sustainability through Generations and Ever-Changing Technology

Introduction

Agriculture can be classified into several different areas of focus. While some argue that farming and agriculture differ, the truth is that farming, and agriculture, are the science and art of cultivating plants and\or livestock. For the purpose of this research, the term 'agriculture' will push the direction of discussion on generational farming and how technology has evolved overtime in the agricultural industry. The focus question is: "What does the future of farming look like?" This research will show trends in numbers and other research from the last decade and how those trends either went in a positive direction or impeded productivity in the agricultural world. The future of farming is still in the genius of people; whether it be hands-on or machines, people are still the driving force behind farming practices. Farmers are those who cultivate, grow, raise, manage, and produce consumables for humans. Their practices were always hands-on and created an environment of education and labor. Farmers raise and slaughter beef, swine, sheep, poultry, waterfowl, and utilize dairy for milk production alongside those who raise a variety of crops and wool\silk fibers from certain animals.

This brings up the focus of generational farming, which is defined by multi-generational farms and first-generation farms. The trend in technology has changed in terms of how older

generations tended their animal farm practices compared to a hundred years ago. With that, technology differs every decade and from generation to generation. The USDA (United States Department of Agriculture) does a census every five years; this means the most updated numbers are from 2017. The census provides a variety of number usage from farmer of all ages, land use, and trends in specifics farming focuses. Farming niches include dairy, swine, poultry, beef, and plant agriculture. Farmers are providing a service and trying to live off the profit from that service. Their service is about cultivating the land and raising livestock for human consumption while also fueling the world.

Whether using new technology or continuing the same practices from a decade ago, there is always a reason that farmers work the way they do. This can be reflected in generational farming because those generations that are taking over are learning one way but have to adapt to a constantly changing environment as they move forward. As the literature shows, specific leadership behaviors in the agricultural world increase leadership effectiveness by engagement, adapting, sustainability, and productivity. Farmers are looking to learn from previous generations in order to help the next. Farmers are also battling the changing environment, to include the economic environment and the physical environment. At the end of the day, farmers focus on creating success for the future, sustainability, and productivity. This paper expresses what is currently being researched and predicted, along with a foundation for further research deeper into how leaders in today's agricultural world can look to the future for successful farming practices and leave behind that same sustainability.

Literature Review

Generational Farming

The foundation for farming started thousands of years ago with the simple practice of humans growing their own food source. In order to do this, farmers have to cultivate the land in a way that produces substantial elements of nutrition for survival. The purpose of this literature review and research is to provide a critical written account of the current state of research on the topic of generational farming with ever-changing technology. To narrow the focus of research, this literature will be from United States based farms and technologies. It is easy to think the food that humans consume comes only from the grocery store, but what people are not seeing is the vast amount of work and the process it takes to get food into those grocery stores. The number of U.S. farms has declined from a 6.5 million in the 1930 census to approximately 2.8 million by the U.S. Department of Agriculture in 1975. Between the years of 1950 to 1975 farm numbers declined by approximately one half (Stockdale, 1977). U.S. Agriculture and farming is a high energy, high resource, and high labor-intensive field. Increases in productivity have come from machinery, electricity, fuel, and herbicides. While these have, in total, reduced costs, they have also had a significant impact on total numbers of food output (Steinhart, 1974). Food output means the substance resulting from farming that is human grade. Generation X farmers in the1970's were calculating their cost and efficiency based on food output numbers in correlation

with labor costs. This generation saw early technology in terms of tractors, milking systems, slaughter systems, fuel efficiency, and segmented development.

While generation X (1965-1979) started to reel in technology specifics and manage their farm with new science, the age focus became a factor in farming overall. The U.S. Agricultural Census of 2012 reports that the average age of the U.S. farmer was 58.3 years of age compared to an average age of 50.5 years reported in the 1982 Agricultural Census (Tauer, 2019). The productiveness of farmers by age group for each of the previous eight U.S. agricultural census years recognizes that productivity increases with age, peaks at mid-life and then decreases by age for each census year. By 2050 the world's population is projected to grow by one-third, reaching between nine and ten billion people. With globalization and expected growth in global affluence, a substantial increase in per capita meat, dairy, and fish consumption is also anticipated (NRC, 2015). Generations in the late 1800's built their farms and operated them as a lifestyle, and this became the case through the 1940's. The great depression era (1929-1939) struggled due to lack of resources and the fact that the fifty-year war took the men and laborers away, leaving women to tend the crops, make their living, and support a family. One of the most profound changes in the United States in the past century is the national abandonment of farming as a livelihood strategy. This change is evident both in the exodus of Americans from farming and in the conditions faced by the farmers remaining, most of whom are marginal producers in an increasingly concentrated industry where technology is booming (Lobao, Meyer, 2001).

In terms of generational farming, the focus on multi-generational farmers and first-generational farmers starts with knowing the difference between the two. Multi-generational farmers are those who have multiple generations working on the farm and started with a generation before them. First generational farmers are those who begin a farm on their own

without have inheriting the land or practice from their family. With different generations, the values and goals differ because of the time period. Farmers in the early 1900's would not have the same goal as those in 2020. The leaders in the farming world are cultivating the means to be successful, productive, sustainable, and ensure the future of the next farmer has the tools they need. The slow nature of change is partially a reflection in relation to farmer age. Change is also slow due to the biological nature of farming and long growth periods required for some crops: "If you're a 50- or 60-year-old farmer you can't transition overnight. We have trees that are on a three-year pipeline depending on the variety and size. And since you've never done things before, you have to allow for trial and error, new and different equipment" (Alexander, 2010). While farming looked different in the late 1800's, the ideals are still there in a different manner because the farmers are still in existence to produce, but on different levels of production. The focus, for this research, is to find the pattern of how efficient farmers were in each generation and what specifics they are passing onto the next. Human life expectancy is longer than it was each decade, therefore, farmers are able to continually work into older age, but their peak performance was at an earlier age according to the 2017 Agricultural Census.

Sustainability and Productivity

Sustainability and productivity meant something different decades ago, and now the world of agriculture is faced with varying interpretations of the definition. As defined by congress, sustainable agriculture (or farming) is: "an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

1. animals supply human food and fiber needs;
2. enhance environmental quality and the natural resource base upon which the agricultural economy depends;

3. make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
4. sustain the economic viability of farm operations; and
5. enhance the quality of life for farmers and society as a whole." (USDA, 2019)

Despite the decline of the farm population, farming remains essential for charting national social change and societal change. Farming is a direct production of food and fiber which is the cornerstone of agriculture. This cornerstone includes inputs, processing, distribution and employs nearly 20% of Americans (Bean, Clark, Inwood, 2013). The no farms, no food, mentality relate directly back to: How can farmers be sustainable and productive? In order to make money, the farms need to be sustainable and produce more than their cost output. In today's farming era, farmers look back to a federal farm policy that has been in effect since the great depression, with little wiggle room. This states that the focus should be on three things in any farm act: (1) providing nutritious and affordable food; (2) producing food sustainably and in a way that regenerates the environment; and (3) providing a decent living for those that raise food and ensuring equity in the opportunities to engage and succeed in farming (Cadieux, Carpenter, 2017).

The United States Department of Agriculture (USDA) has been long standing their focus on current farm abstracts and recognizes the inherent pressures on farm families and farmland. The USDA has been developing policies and programs that simultaneously attempt to retain existing farm families on the landscape, recruit new farmers, and create lasting economic opportunities rooted in agriculture (Bean, USDA, 2013). While federal agencies are helping to support farmers as best they can, the concern is that some farming practices are more crucial than others. For example, bovine (cows) have a higher chance of being sustainable into the next era

versus swine simply because humans can utilize bovine products to a better efficiency and sustainability (NRC, 2012). Close proximity to dense population centers creates tremendous market potential, particularly for producers interested in participating in local and regional food systems (Bean, 2013). The farms in rural areas tended to supply for themselves and locals. Now, with urban and city development spanning across rural areas to house the population, farmers must adapt to the matter of shipping or hauling their products. This means farmers must adapt to shipping regulations, as shipping consumables has strict policies. This is an extra investment that farmers must dive into because now, in order to be productive and sustainable, they must meet the demands across a further circumference. Sustainability and productivity are the reality for farmers, and now, technology comes head to head with their operation.

Technology

Technology since 1970 was a phenomenon that people only thought was going to make things better. 1970 was the year that Norman Borlaug won the Nobel Peace Prize for starting the Green Revolution. The Green Revolution occurred during the 1960's and 1970's. It involved the introduction of High Yielding Varieties (HYV's) of rice and wheat. The aim of the Green Revolution was to increase food production and encourage self-sufficiency in less developed countries. Borlaug and proactiveness quickly tripled food yields from most of the world's good cropland. Borlaug was credited with saving one billion people from starvation. Today, even in 2020, high-yield agriculture is keeping five billion people from starvation. Borlaug's work radically increased per capita food supplies despite a rapidly expanding human population, buffered us against inevitable crop losses due to bad weather, and gave us confidence in our future food production (Avery, 2011). Today, however, food prices have soared, and computer models are predicting lower crop yields during a hotter future. Computers can be very helpful,

but they need good data to produce stable results. This is where the matter of technology is questioned by farmers, especially for the farmers that lived by the farmer's almanac. Computer models are seemingly producing more fears on the global warming crisis, of which farmers deal with directly in their environment.

Science and technology designers in the environmental field claim that computers can tell the population just when and how the Earth will crumble. Denying that climate is not changing would be radical, as farmers have already accepted this. The climate record is chaotic; it has never moved in a straight line or simple curve and is not doing so today. Global temperatures rose quickly from 1976 to 1998, touching off urgent public concern. Yet, during the past ten years, the thermometers stopped rising. Temperatures also rose rapidly from 1915 to 1940, after which they declined from 1940 to 1975 (Tauer, 2012). Farmers understand this from a different perspective because they are forced to adapt their practices to the environment. Technology in relation to global warming is actually supporting farmers and their motives in practice because it gives them an idea on what is happening now and potentially in the future.

The real reason that food prices have shot up in recent years is simple. The United States, the European Union, Canada, and Indonesia decided to divert a major portion of their grain and oilseed crops to making auto fuel (Avery, 2011). The United States has been so focused on using food crops for fuel that people are forgetting that farmers are multi-skilled professionals in their field. Farmers are responsible for a lot of categories that, from the outside, do not function from technology. Farmers use the land they have and adapt where needed. In microeconomic theory, the primal transformation function, describes the maximum output that may be obtained given inputs and technology (Alexander, Balgatas, Mayen, 2010). This means farmers must learn how to utilize their technology with balanced input to ensure sustainable and productive output. The

technology is supporting their production even though they must still manually input work specifics. Some inputs may be varied at the discretion of the decision maker, while other inputs are exogenously fixed, acting as constraints to the production process. Keep in mind, technology differentiates from different types of farming practices. All farmers will use different specific technologies to either make their job more efficient, adapt to the rise in production needs, or it was the only way they could remain living of their farm enterprise, to include the use of drones.

Commented [KN1]: This whole section describing farmers might be best in the introduction to this whole project. Who is a farmer? What is farming? What is agriculture? And then you could move into how these people and things have changed over time. Think about your organizational strategy. What is the point you are ultimately trying to make, and how can you best provide that argument? Build a case.

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Increasing adoption of drones for crop spraying can be viewed as an emerging trend observed in the agricultural market. Drones are being developed for crop spraying, monitoring, reaching far locations of land, and taking photos so farmers can study their land in one look rather than ground survey. Drones allow farmers, for food crops or animals, to get a view of their land from a different, but efficient, perspective. Surveying land is a difficult task while using manual methods; drones offer a way for farmers to 'see' the work they have and gather intel on their own property to raise better yields, or outputs. The growing demand for agricultural products, including fruits and vegetables, is one of the major factors driving the growth of the agricultural drone markets. According to the United Nations, in 2018, the global population was recorded at 7.7 billion and is expected to rise to 9.7 billion by 2050 (AgTech, 2020). With the growing population, the demand for food products is bound to increase and thus, global food production must increase to cater to this growing demand. To address this, drones are being developed for agricultural purposes. Once again, their benefits include real-time crop monitoring, crop spraying, soil analysis, and images of the land. Drones can enhance crop production (Gautam, Sarkar, 2019). With growing agricultural consumption across the globe, adoption of drones among the farmers is expected to grow significantly in the future.

Changing Environment

A changing environment means temperature, weather patterns, new managers, new location, and everything in between. A farmer's environment relies on several factors, to include economic specifics. The changing environment, weather related, can affect soils, grazing land, water source, and a multitude of other problematic factors that farmers fight against. Different generations have fought against a variety of factors and will continue to lead and tech the next generation to come. Farmers who embrace technology are adapting their practices to better suit their need (NRC, 2015). A major player in their consideration is animal health and disease. Each generation has their way of treating and preventing animal diseases, but with stricter USDA laws and inspection teams, the demand for a step-by-step process line is something the farmers must be able to prove, especially because they are cultivating for human consumption.

The continued success of the food-animal sector is due to unparalleled advances in research that have resulted in remarkable gains in agricultural productivity, and to progress in eliminating many livestock and poultry diseases that still impact animal production and trade in other countries. Studies done by the National Research Council have assessed disease threats to animal and public health and the broad array of disease agents that can affect animal agriculture. (Deloffre, Myrick, 2017). Animal diseases that have high priority with the USDA also appear on the World Organization for Animal Health (OIE) list of animal diseases; although many of these diseases are considered threats to livestock, many are also important due to be zoonotic (can transfer between humans and animals). The ever-changing environment leaves farmers vulnerable and in the position to adapt and act fast. Farmers do not have the luxury of waiting until the next day for work, or waiting out the weather, or even stopping production to make changes. Their world changes daily and our food course is in their hands from start to finish.

Framework for Analysis

This framework introduces readers and future researchers to the subject of technology over the last few generations and what farming is projected to look like in the future. The literature review examines what has been researched in the past all the way through trending current topics. Research and developments in relevant fields provides the context and driving force to the purpose behind agriculture practices in today's society. The framework instigates questions of concern while examining how it used to be.

The primary audience for this research are those looking to a sustainable future where farming still produces items for survival without depleting necessary resources. What people fail to realize is that farmers expand a vast area across the United States doing a different business than their neighbor. Corn is not grown for the soul purpose of consumption, which means farming does produce non-consumable items that are essential for the world we live in today.

Next, we have the research of which will be passed on and available to those currently in farming positions who are looking at the old facts and comparing them to current scenarios. Generational farming and building a sustainable future means mentoring relationships with other farmers and consumers, cultivating an environment where a farmer can make a living of the farm, and developing the necessary skills to continuing the forward mobility on agriculture.

Lastly, as a state animal inspector, I come in contact with a variety of farmers daily that are concerned about being bought out or simply having to close down. This does not come as a surprise to me as large corporations and industries in the agricultural world are buying out these small farms or making it impossible for them to be sustainable. Everything has a price tag and this goes for every farmer's situation. I want this research to help push farmers to help each other in ways that technology lacks and be able to learn from research and practices done a decade

ago. On that note, I aim to show readers that technology can support even the small-scale farmers in their efficiency practices to better suit the needs of their farms.

Methods and Investigative Research

The means and methods of this research come from previous researched material and predictions to the constant changing agriculture community. The use of material from early years helps provide a background on those who started the research in hopes of seeking a solution for future generations and their farms. This research was conducted in a way that allows future readers and researchers to reproduce my experiment if they want and to assess alternative methods that might produce differing results. If I utilized human participants specifically with their detail, I could have built a larger survey. However, for the privacy of my farmers, I have broken down my research into anonymous participants and only utilized the needs to support generational farming trends (ages) and their support or denial of technology use in their practice. My farmers are set up as such:

Chart 1

Dairy Farmer A Ages 16, 41, 67, Great Grandfather born 1891	Dairy Farmer B Ages 8, 29, 62, 90 Great Grandfather born 1990
Swine Farmer A Ages 23, 67, Great Grandfather born 1886	Swine Farmer B Ages 18, 55
Poultry Farmer A Ages 29, 48, 52, 70	Poultry Farmer B Ages 15, 45
Beef Farmer A Age 48	Beef Farmer B Ages 10, 12, 49

Goat\Sheep Farmer A	Goat\Sheep Farmer B
Ages 26, 28	Age 35

In order to get information from any participant, it is necessary to calculate appropriate questions to help navigate the focus. Each farmer represents its counterpart, and the varying ages amongst them differ entirely. Items that farmers consider include soil type, land usage, location, and then determine their area of focus, at least, that is how today's modern farming works. Most farmers work with the land they have in the specialty of their choosing.

California led the country in both milk cow inventory and sales, with 1.8 million milk cows at the end of 2017 and $6.5 billion in 2017 milk sales. Wisconsin was second, followed by New York, Idaho, and Texas. These five states accounted for 50 percent of milk cow inventory and 51 percent of milk sales (USDA Census, 2017). This is just an example pulled from the USDA census explaining that five out of fifty states are producing half the U.S. mile sales and half the cow population. What this means for the other states and dairy farmers is that their competition of 500 cows versus thousands of cows in a herd cannot compete. Farmers have to focus on their specific environment in their region. The problem is, statistics like this one just mentioned scare farmers out of their practice. Looking at Chart 1, the dairy farmers are of vast age differences, all having a hand in the business. These dairy farmers are competing with large scale corporations and other states with their output numbers. However, each farmer has their niche market that they work with, assuming that market continually makes demands for dairy products.

Chart 1 is an example of mixed multi-generational farms and single-generation farms in various practices. The age expanse is vast and gives the idea that several ages currently have

their hands in the agricultural world. Chart 1 also specifies animal related farmers only, as crop farmers will be discussed further in the project. Farmers in Chart 1 express their vision with similar words: sustainability, social, economic and environmental. No matter the disciplines, famers have the same pillars of focus in mind. The Food and Agriculture Organization (FAO) has developed a common vision for sustainable food and agriculture, based on five principles:

1) Improved efficiency in the use of resources;
2) Conservation, protection and enhancement of natural resources;
3) Improved rural livelihoods and social well-being;
4) Enhance resilience of people, communities and ecosystems to climate change and threats;
5) Responsible and effective governance mechanisms.

These five principles were brought up to each farmer in Chart 1 while I worked alongside them. With each discipline of farmer, their focus regardless of their answer is about production currently and sustainability for the future. Farmers is Chart 1 cared about their decisions now in order to make the future a reality for their practices, especially those leaving their farms with children and grandchildren. The method of research for these five principles would require careful questioning and reasoning between farmer and interviewer. The goal is to share the perspective of the farmer and what their intent for the future looks like. In order to build a more detailed survey of farmer's practices, ideals, and thoughts on technology, an interviewer would need to include cost analysis in their methods. The section below includes supporting charts and\or graphs that include cost, age productivity, technology, and other specifics that support the current literature.

Procedures and Materials

Pairing the act of research, evaluating current trends and movements, and conducting real-life surveys are the reality to building a foundation for new directions in topics. Currently, generational farms are aiming to be sustainability, social, economic and environmentally sound in their practices. The defining factor for success in a farmer's eyes is in the numbers. A farmer who produces successfully sees that in their output of product and number relation.

In the case of conducting further research on "What is necessary for sustained success in the future of farming" by working through the focuses of generational farming, technology, sustainability, productivity, and best practices for an ever-changing natural environment mean gathering evidence, real-world characters, numbers, charts, and examples to exemplify the findings. In the case of this research, exact results or a concrete answer to the question may not yield the expectation. The numbers, discussion, and literature reveal that this particular subject is of constant value for further material, with or without a solid end answer. However, an important factor in the procedure to find support in the agriculture world is to understand agrobiodiversity.

Agrobiodiversity is the variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture (Thrupp, 1997). This including crops, livestock, forestry and fisheries. Agrobiodiversity comprises the diversity of genetic resources and species used for food, fodder, fiber, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agroecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agroecosystems See charts below for further support of literature.

Chart 2 (Tauer, 2019)

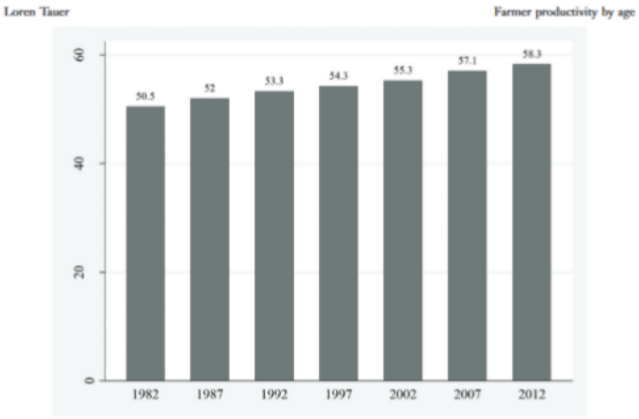


Chart 3 (USDA, 2018)

Table 1. Farm Expenditures, by Category, 2018 ($ billion and percent)

	$ billion	percent[a]
Feed	53.8	15.2
Livestock, poultry, and related expenses	46.3	13.1
Farm services	44.1	12.5
Labor	33.9	9.6
Rent	28.8	8.1
Fertilizer, lime, and soil conditioners	23.2	6.6
Seeds and plants	21.9	6.2
Farm supplies and repairs	17.2	4.9
Agricultural chemicals	15.4	4.4
Taxes	12.8	3.6
Farm improvements and construction	12.7	3.6
Fuel	12.3	3.5
Other expenses	31.6	8.9
Total	**354.0**	**100.0**

[a]May not add to 100% due to rounding.
Source: USDA NASS.

Chart 4 (Tauer, 2019)

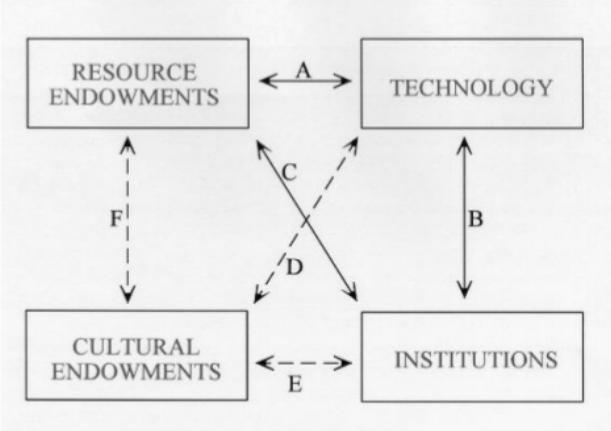


Chart 5 (USDA, 2016)

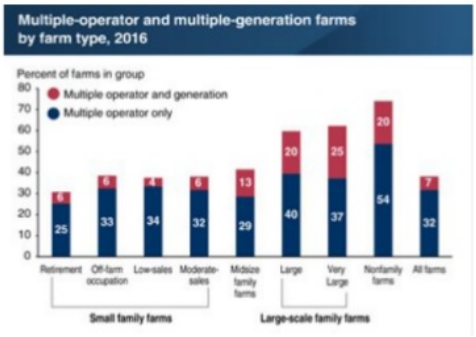


Chart 6 (USDA, 2020)

Network farms include the current technology being used in today's agriculture.

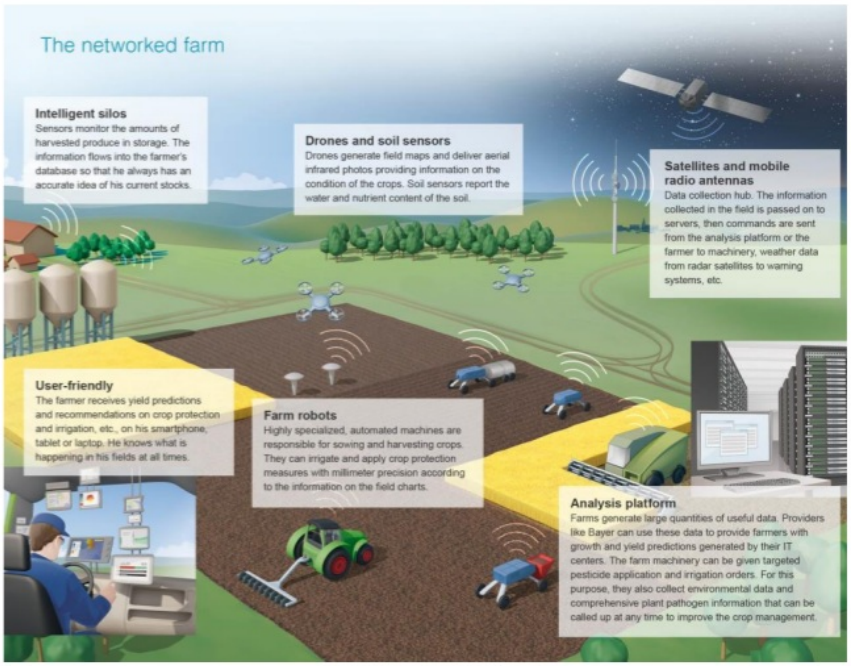
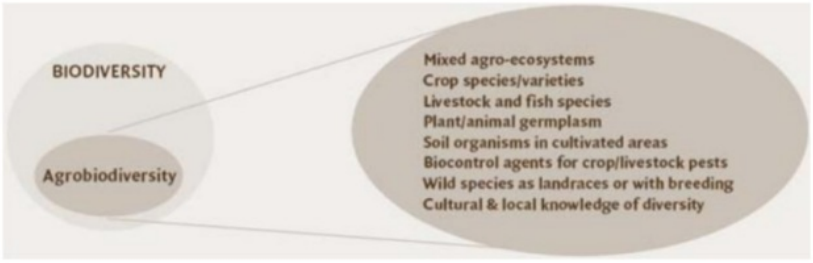


Chart 7 (Thrupp, 1997)



Discussion and Conclusion

In many ways, humans depend on ecosystems and their services for basic needs: agrobiodiversity, food, shelter, clean water, and raw materials. Moreover, ecosystems regulate our environment and production systems: pollination through wild bees, insect-pest and disease control through natural enemies, water purification through trees and forests, and soil fertility maintenance through nutrient cycling and nitrogen-fixing plants. These are just a few agroecosystems in both terrestrial and aquatic environments that surround mankind from all angles (Thrupp, 1997). The relation this has to agriculture is in the very census of ecosystems: agrobiodiversity. Without agrobiodiversity, farmers would have nothing to branch from or cultivate that falls under a natural definition.

This research paper provided a foundation for future research on the importance of generational farming in correlation with ever-changing technology. The reality of generations learning from the previous and future generations is to increase sustainability and productivity in agriculture. Technology has altered traditional farming practices and now farmers have had to adjust in order to meet productivity and sustainability indefinites. The technology in discussion includes drones, smart phones, artificial intelligence censors, and crop sprayers. Depending on what generation is operating any given farm, the ideals of classic farming tactics are evolving to help agricultural efficiency. The main question of "what is necessary for sustained success in the future of farming" is answered by four pillars working together: sustainability, social, economic and environmental. By working through these focuses: generational farming, technology, productivity, and best practices for an ever-changing natural environment present themselves as supporting concepts.

The focus question: "What does the future of farming look like?" has innumerable results that are based off common practices and technology. The future of farming is still in the genius

of people mixed with the natural agrobiodiversity. Whether the work be hands-on or machines, people are still the driving force behind farming and work with the land to cultivate crops or livestock. Farmers are those who cultivate, grow, raise, manage, and produce consumables for humans. Their practices were always hands-on and created an environment of education and labor. Farmers raise and slaughter beef, swine, sheep, poultry, waterfowl, and utilize dairy for milk production alongside those who raise a variety of crops and wool\silk fibers from certain animals.

The encroaching and flattening of urbanization has played a major role in the disappearance of the family farm. Whether using new technology or continuing the same practices from a decade ago, there is always a reason that farmers work the way they do regardless of the encroaching concerns. This can be reflected in generational farming because the generations that are taking over are learning one way but must adapt to a changing environment as they move forward. The result: farmers focus on creating success for the future all through sustainability, social, economic and environmental factors, to include technology. This literature and journalism review explained how farmers are leading their own generation and the next into a deeper era of technology.

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