

Implications of the Third Agricultural for the Fourth

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INTRODUCTION

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The Green Revolution since following its conception during the mid 20th century has demonstrated a significant ability to transform how humanity conducts agriculture in contemporary times. Despite revolving around agriculture, the Green Revolution became ingrained into various aspects of societies from economics to environment to technology, whether positive or negative. While everchanging, agriculture (similar to other fields) is designated revolutions based on dense periods of transformation. The Green Revolution was able to manifest through various changes to farming techniques and technological innovations that formed modern agriculture. Today however, a new wave of innovations exists to redefine agriculture once more in what is being coined the “Fourth Agricultural Revolution”. This revolution promises to bring about a new wave of digitization to agriculture and efficiency meant to continue increasing humanity’s agricultural capabilities while mitigating the egregious effects modern agriculture has had.

PURPOSE

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Given the context of a theoretical Fourth Agricultural Revolution on the horizon despite the transformations of the Green Revolution only existing for a little over half a century, there is a precedent set for the Fourth Agricultural Revolution. While the Fourth Agricultural Revolution is poised to make various distinct changes to our current agricultural systems, it also relies on the basis the Green Revolution set forth, one that is defined by several challenges and ramifications. As a result, the goal is to outline the vestiges of the Green Revolution, whether it be retaining desirable aspects or not allowing negative ones to manifest during the Fourth Agricultural Revolution. By doing this, the door for potential strategies, mitigation efforts and anticipated challenges/outcomes can be made to create a truly innovative revolution.



Source: Pixabay tarasyasinki

Analyzing the Green Revolution

Analysis of the Green Revolution primarily serves as a point of discussion for exploring the potential changes and continuities during the Fourth Agricultural Revolution. Specifically, trends were explored across four primary categories that embody societal aspects agriculture often affects: technology, commerce, environment and health. With the Green Revolution, the primary stimulus was the desire create more productive farms, causing the revolution to prioritize technology that fed the commercial ambitions of the revolution. Whether it be the utilization of chemical fertilizers/pesticides and herbicides, the mechanization of farms or the shift to large scale farms, the nature of the Green Revolution was commercial. In reality, agriculture is representative of more than commerce; it is society, culture, environment, health and the foundation for all components of society. As a result, a lot of shortcomings of the Green Revolution stem from a lack of consideration for these other aspects such as pollution, environmental damage and health degradation. This is the framework that the Fourth Revolution will build upon, whether it continues or dismantles Green Revolution ideas.

Precedents & Implications for the Fourth Revolution

While attempting to predict the outcomes of the Fourth Revolution is unlikely to create a perfect vision of the future, the precedents of the Green Revolution provides significant changes and continuities that provides a solid foundation. Looking at the aforementioned categories of technology, commerce, environment and health, the pressing idea with the Fourth Revolution is will it continue the trends of the Green Revolution or modify them. Technology serves as the primary foundation, with the primary focus being the introduction of technology to either build off of Green Revolution successes or revert issues. Additionally, the Fourth Revolution increasing production with higher costs (especially from technology) could increase commercialization of agriculture. Conversely, ethical, health and environmental concerns have resulted in criticism of Green Revolution mass commercial farming. Whether technology or sociocultural changes addresses this, creating sustainable agriculture will be a key player in influencing the Fourth Agricultural Revolution.

RESULTS AND DISCUSSION

Smart Farms

Among the most significant anticipated transformations is the integration of smart technology in agriculture. While increasing the efficiency of farms through innovations isn’t exclusive to any revolution, the kinds of innovations do vary. Among the most significant is the implementation of smart farms, which involves the use of software and hardware (Internet of Things) for purposes such as tracking data, automating processes and optimizing growing conditions. Smart farms have already emerged in developed countries and are anticipated to grow significantly within the decade (Fig 1). Smart farms take a myriad of forms from integration with current commercial farms to controlled vertical farms and smart greenhouses.

Environmental Crisis

Above all else, revolutions emerge as a result from a need to address a dire issue. With the Green Revolution, it was the need to address concerns of overpopulation outstripping food production. While productivity is still a stimulus for the Fourth Agricultural Revolution, the current environmental crisis is an arguably greater issue. As the Green Revolution emerged during a time when environmental considerations were not nearly as prominent, the Fourth Revolution embodies high priority environmental concerns. Regardless of how the revolution unfolds, the underlying context of environmental preservation will dictate the practices and innovations implemented.

Commercialization

The aspect of commercialization involves the large-scale systematic approach to agriculture brought on by the Green Revolution. This system could be amplified by technology, such as with smart farms, in which large farm plots are monitored and controlled. However, the system of modern agriculture created during the Green Revolution has inspired criticism. Specifically, health, ethical and environmental issues associated with practices such as monocropping and chemical applicants (Fig 4). This is further compounded when previous systems are uprooted through diffused technology and practices, especially with developing countries such as India and Bangladesh.

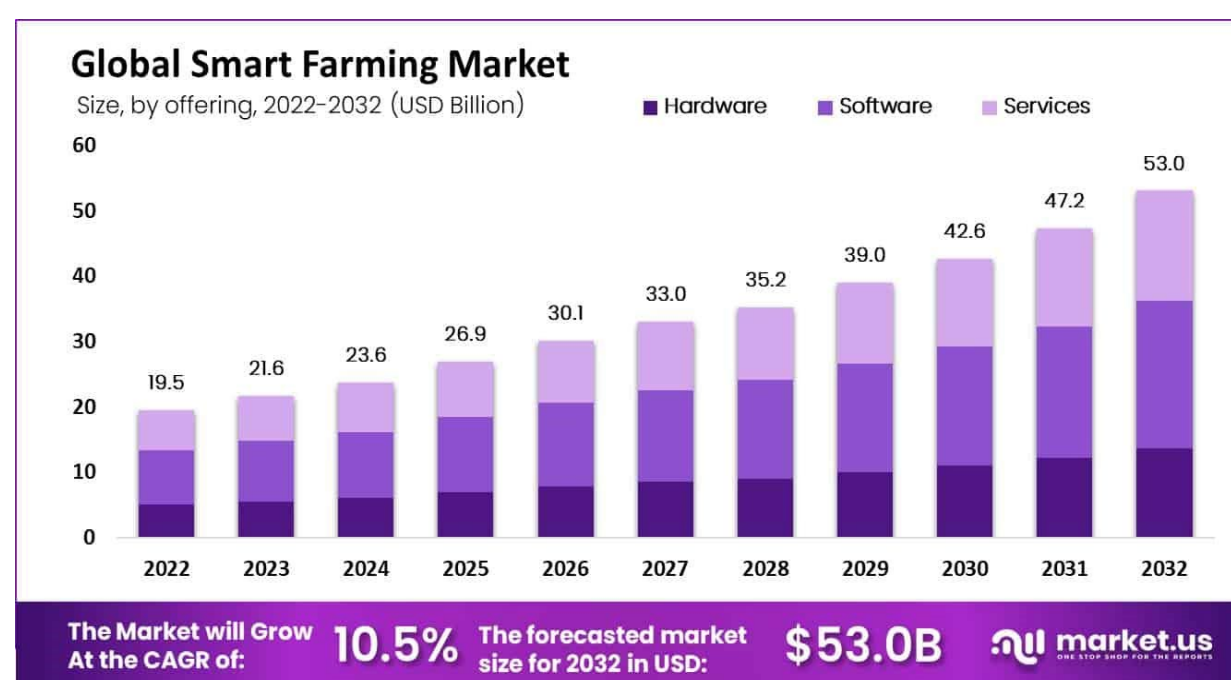


Figure 1: Market.us

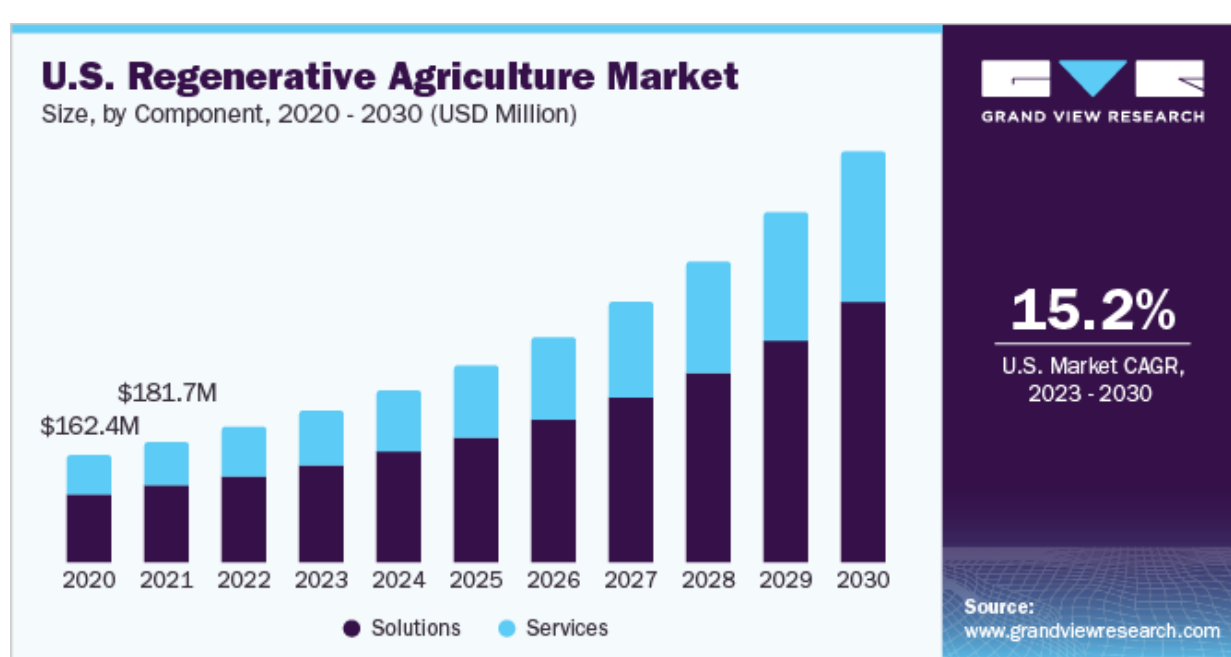
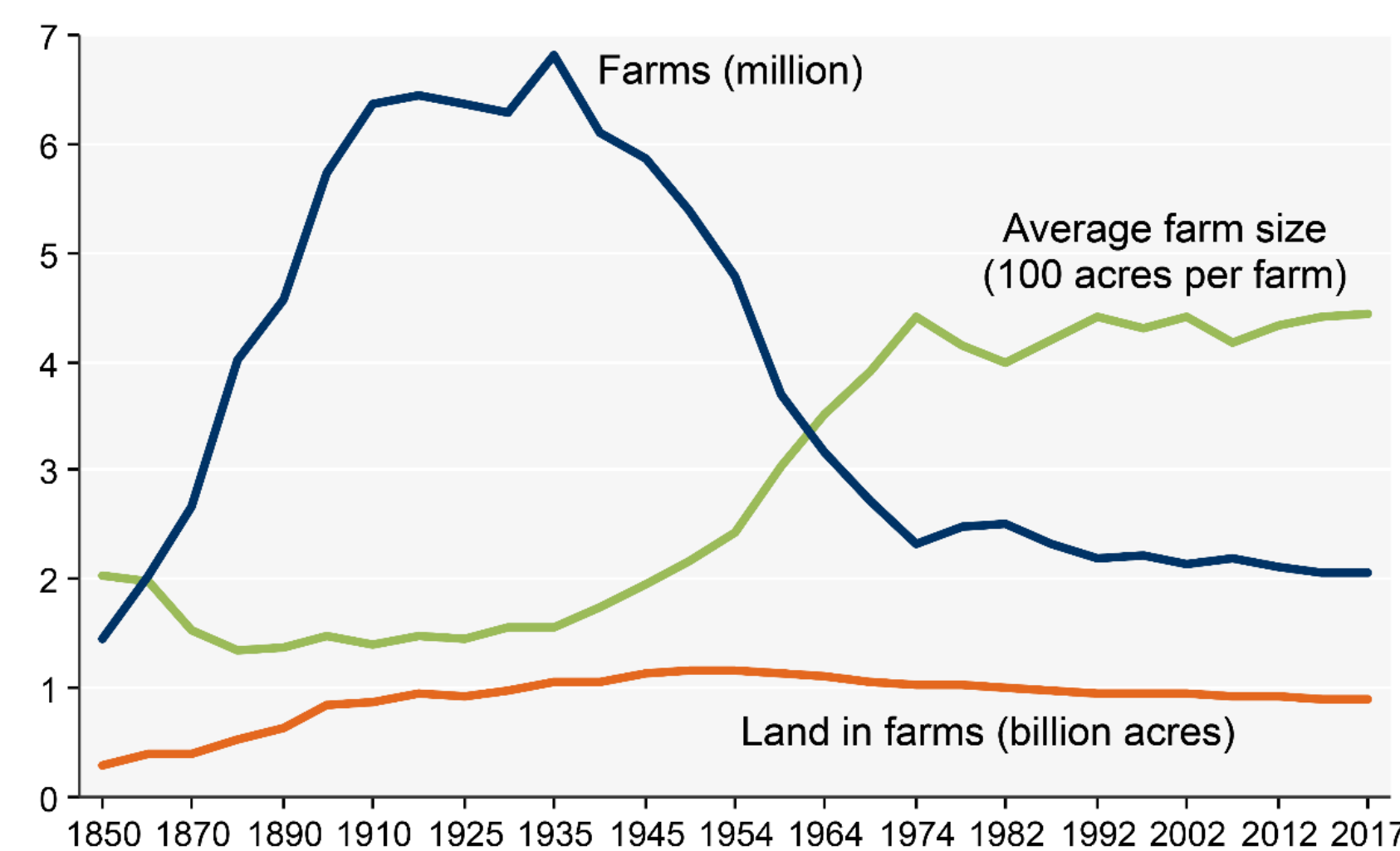


Figure 2: Grandviewresearch

Farms, land in farms, and average acres per farm, 1850-2017

Million farms, billion acres, or 100 acres per farm



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, Census of Agriculture (through 2012) and *Farms and Land in Farms: 2017 Summary*.

Figure 3: United States Department of Agriculture

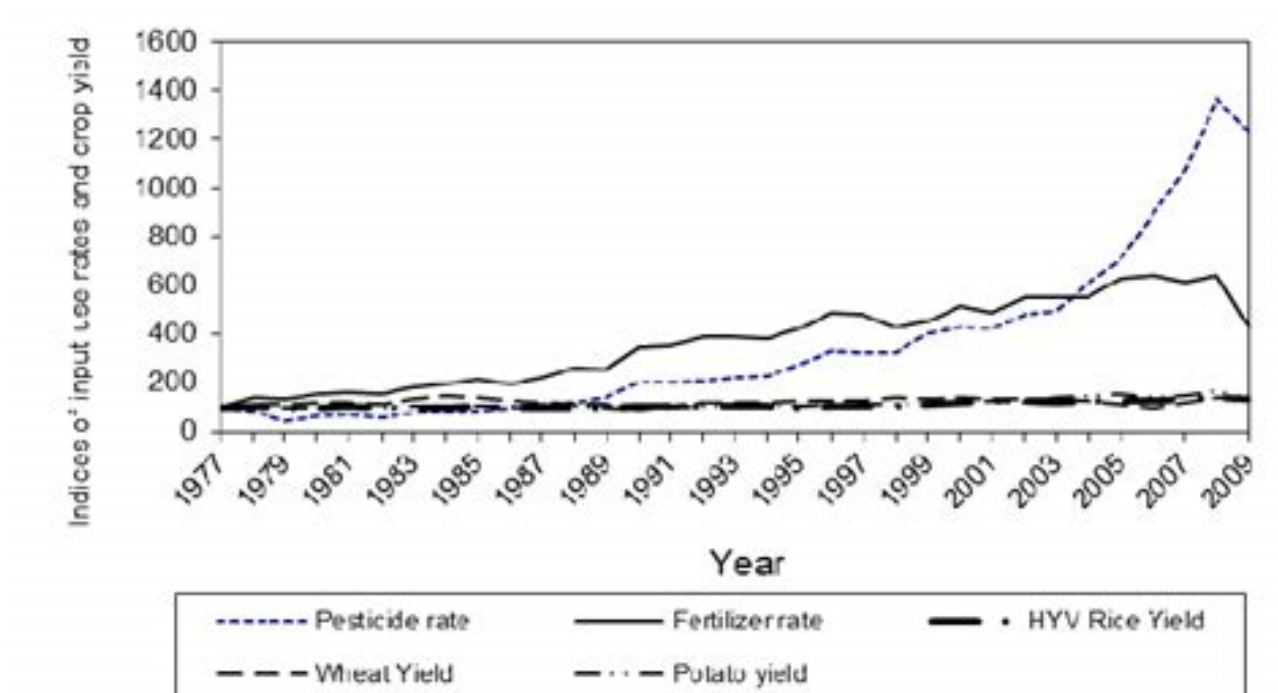


Figure 4: Sanzidur Rahman

CONCLUSIONS

Understanding the speed of the Fourth Agricultural Revolution and the myriad of changes it is expected to have on society, it is crucial that humanity plans for any transformations. Although distinct from the Green Revolution, the Fourth is still partially derived from the Green Revolution, which carried a host of meaningful changes and unintended consequences. As a result, it is important to learn from the prior pitfalls of the Green Revolution to still retain the expected innovations while avoiding potential consequences. Additionally, conversations and further explorations should be made in order to better adapt to changes that could unfold.