The Relationship Between Western Agricultural Science and Technology Reform and Economy

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Abstract. With the growth of the world population, the problem of agricultural food is becoming more and more serious. However, with the change and development of the times, agricultural science and technology plays a more and more important role in grain planting, cultivation and detection. Taking the agricultural science and technology development of western agriculture since the 17th century as the representative of research and popular science, this paper forecasts and prospects the progress of agricultural science and technology around 2030, and discusses and finds the important impact of agricultural automation, integration and refinement on agricultural planting and production. At the same time, it is found that agriculture plays an important role in promoting the growth and stability of the world economy. The article also discusses the different influence of agriculture in different economies.

Keywords: Agriculture · Technology · Economic

1 Introduction

Agriculture, as an essential sector of the national economy, is also one of the economic sectors most closely related to daily life. From the 17th century British Industrial Revolution to today's automated agriculture and fine agriculture, the development of Western science and technology has brought earth shaking changes and progress to agriculture. In addition, agriculture and economy are closely related as two major factors in life, and the relationship between agriculture and economy is also different under different economic systems. At the same time, agriculture can help solve the problem of poor economy, that is, poverty, and promote economic development. Because of its stability, agriculture is more suitable as a stabilizing factor and buffer in the economic crisis. With the continuous development of various technologies such as GIS, agricultural output and food quality will become better and better, so that fewer countries in the world have the problem of hunger and get rid of poverty.

Agriculture is an industry that uses the growth and development law of animals and plants to obtain products through artificial cultivation. It is also an important department in the economy. Up to now, about 40% of the world's population cannot get a healthy diet, which reflects that after nearly 300 years of scientific and technological progress, agricultural science and technology is still not enough to support the huge population

F. Balli et al. (Eds.): ESFCT 2022, AEBMR 226, pp. 1540–1547, 2022.
https://doi.org/10.2991/978-94-6463-052-7_170

base to obtain enough food. Therefore, the research and development and progress of agricultural science and technology is very necessary. Economy, as another important factor of national and social development, is closely related to agriculture. The progress of agriculture will drive the development of national economy in different ways and degrees. The import and export of food and the provision of labor force can help the economy of developing countries and reduce hunger. This makes agriculture, agricultural science and technology and economy interact and become an important closed loop affecting people's living standards.

Org gives the impact of agricultural science and technology on non-agricultural growth under the conditions of different institutions, population density and different spatial living patterns, and how agricultural science and technology promotes or keeps the flow of rural population to cities [1]. Meena et al. developed A Likert-type-scale to evaluate the work help of video conference for Agricultural Students and the attitude of Agricultural Students towards video conference. And studied his role in the national agricultural research system and the added value in the field of evaluation and theoretical construction [2].

The development direction of rural agricultural economy and some ideas and models of agricultural extension under today's social values are given by Waithaka. With the development of science and technology, these communication and planting models will also progress and develop. This paper puts forward some suggestions for practitioners or organizations in the field of agriculture, especially in rural agriculture [3]. Steven and Peter proposed that improving agricultural technology is the key to increasing grain production. They also discussed the impact of agricultural technology on different aspects of developing and developed countries, such as employment, economy and agricultural output. Time axis and time series are also given to analyze relevant parameters and laws [4].

From the perspective of agricultural biology and MAS, this paper written by Wang et al. discusses the traditional and emerging cultivation methods of American soybean, soybean breeding, seedling raising and antibody and other professional knowledge, from point to area, and then to the importance of soybean to the agricultural development of North America. At the same time, it also discusses the prospect of agricultural breeding and development in the East and the West [5]. Pechlaner compares the agricultural biotechnology of developed countries such as Canada and the United States with that of developing countries such as China and Mexico and puts forward the changes in the relationship between new agricultural technology and food regulation. At the same time, the view that these agricultural biotechnologies make the gap between developing and developed countries larger is also put forward in this paper, which means that these technologies make developing and developed countries more unequal in agricultural society [6].

Pan describes the relationship between agricultural nutrition and agricultural extension. Using the data from seven villages in China as an example, it is proved that participating in agricultural extension has a positive impact on the rationalization of farmers' nutrition management behavior. It further shows that China has great obstacles and difficulties in promoting these agricultural technologies [7]. Rotz describes the relationship between agricultural development, technology and labor force in North America, so as to infer and summarize the advantages and disadvantages of agricultural digitization on grain production efficiency and agricultural workers. Using the method of social mirror image, this paper considers the relationship between agricultural technology and labor productivity, even racial exploitation. Finally, it is concluded that in addition to some, digital agriculture also has problems such as increasing exploitation and labor and spatial marginalization [8].

This paper studies a new agricultural technology: soil carbon sequestration and makes a targeted study on its mitigation potential. Compare the databases of NRI and IPCC in the United States and find the version that can be improved. The information of increasing no tillage, reducing fallow, changing highly erodible land into grassland and increasing the potential soil carbon storage produced by utilization are analyzed, and the specific conclusions of data are drawn [9].The main research direction is agricultural diversification and development methods. Taking developing countries such as Bangladesh and China as examples, this paper criticizes, analyzes and discusses their agricultural system (small-scale peasant economy) from the perspectives of economy and science and technology. For example, MCC, a government organization from North America, provides economic assistance, and expounds the purpose and role of doing so from several points [8].

Therefore, this paper plans to explore the relationship between agriculture and economy, including the development history and motivation.

2 Motivation Analysis Pest

2.1 Technology

There are many aspects of new agricultural science and technology. There are probably two reasons for using robots and automation. One is to invent robots to improve efficiency, such as automatic harvesters or sowing robots, and automatic irrigation. The other is the robot invented to reduce the cost of agricultural planting, such as agricultural and forestry rooting robot, which is used to improve economic benefits. Automatic irrigation and mechanized irrigation are also one of the ways to save water and reduce costs. The United States, Canada, Australia and other developed countries adopt fine agriculture, but the details of each country are different. GIS, GPS, RS also plays important role in new agriculture in western world.

2.2 Society

75% of the land in the United States is concentrated in the hands of a few large farmers. The operation scale of large farms is generally more than 600 hectares, with a per capita of 144 hectares. In the 1950s, Australia began high-tech agricultural planting such as pesticide spraying and aircraft seeding. Canada's per capita labor force has 147kw of power, 1120 hectares of labor and 368 livestock. The socialized service system of agriculture and animal husbandry in the west is more perfect, such as professional consultation and guidance planting institutions.

2.3 Policy and Economy Policy

In 1954, Germany promulgated the land law to connect scattered farmland into pieces, which is conducive to the application of modern agricultural technology and new technology. The United States connects the planting fields of the same crop in the plain area, which is similar to the German policy, but the effect is different. The effect is to improve the planting efficiency. Europe issued the common agricultural policy (CAP) in 1962 to ensure that Europe provides food for its growing population. The policy of combining agriculture and animal husbandry has also been put forward, which is similar to the construction of pig farms and dairy farms in the field, so as to reduce transportation and production costs and improve net profits.

Optimize according to economic benefits and promote intensification, specialization and centralization. For example, if the amount of biofuels increases, the price of fuel will fall, thus reducing costs. GATT (general agreement on Tariff) was proposed to cover agriculture in 1944. It was approved in March 1955, and U.S. agricultural export subsidies surged. The customs union was formed from 1955 to 1956. The US agricultural economic policy changes every five years.

Norway adopts the policy idea of multi-functional agriculture, and Canada pays more attention to the supply management of agricultural crops and agricultural production. As a group organization, the EU pays more attention to the common interests in agriculture. The United States and Japan are more open to agriculture and enlarge the import restrictions on those agricultural products.

3 The Development of Agriculture Technology in Different Periods

3.1 By the 17th Century

Before the 21st century, western agricultural science and technology were constantly promoted and developed. Windmills were popular in the 13th century and were used to drain water and grind grain in lowland countries. By the 17th century, agricultural land use planning began to change and was no longer as rigid as before. At the same time, more kinds of plows have also been invented to improve planting and production efficiency. With the occurrence of the industrial revolution, the invention and research of fuel and mechanical production are more in-depth, and mechanical technology is gradually applied to agricultural planting and production.

3.2 Industrial Revolution to 20th Century

The 20th century was a period of rapid agricultural development, which was promoted by four inventions or improvements. The steam engine invented by the industrial revolution in the 17th century has been more fully used during this period. In the 20th century, the internal combustion engine improved by the steam engine improved the disadvantages of large volume and high fuel consumption of the steam engine. Tractors powered by internal combustion engines have replaced livestock, reducing costs and the level of manpower required by the agricultural sector. The Haber Bosch method in the early 20th century partly overcame the problem of the reduction of nitrogen content in soil due to continuous planting, and indirectly invented nitrogen fertilizer, which greatly increased agricultural output. With the development of genetic biology, the hybridization method of maize was also found in the 1920s, which improved the variety and yield of maize. Finally, with the development of chemistry, pesticides are more and more widely used, and the pertinence of pesticides is stronger and stronger. There are more and more kinds of pesticides, which can better control diseases and pests and reduce the cost of weed control.

3.3 21st Century

Different from traditional agriculture in the 21st century, the definition of the Internet in the 21st century has been invented and popularized, artificial intelligence, link sensors and other emerging technologies have also been improved, and the efficiency of the use of all resources in planting and animal husbandry has been further improved. With the surge of population and the shortage of land demand, a new round of agricultural revolution is beginning. In the 21st century, the connectivity of agriculture has become more and more important. Connectivity means the connection between basic elements such as soil, crops and weather and advanced inventive insights. Technology in the 21st century is the tool to make this connection closer. The Internet helps analyze these data to get the most suitable details for agricultural production and food planting. For example, LPWAN is a new technology for sensing and communication, controlling agricultural watering and sowing. It can even generate images, predict diseases and pests, and detect and prevent losses in time. However, most networks do not support image operations yet. It is expected that these operations will mature and provide value of 130 billion to 175 billion by 2030. Also, the newly invented Smartbow (part of Zoetis) is used to monitor livestock. It can detect the milk yield, health and location of cows, similar to the role of GPS. With the development of such sensors, the value of 70 billion to 90 billion US dollars can be generated after 2030.

4 The Relationships Between Agriculture, Agriculture Technology and Economics

4.1 Different Connections in Different Eras

Traditional agriculture and modern emerging agriculture are affected by the economy in different ways and to different degrees. Before the British Industrial Revolution, when science and technology were relatively backward and developed slowly, the labor force had the greatest impact on traditional agricultural production. When there is enough labor in the market, the output of traditional agriculture will rise. At the same time, with the development of traditional agriculture, the available labor force is also rising. However, in the process of modern agriculture, the interaction between agriculture and market is more obvious, because the market can choose agricultural products and promote agricultural production. At the same time, the market sector needs agriculture to provide labor and food, and agricultural producers also extract profits from it. The economy will change agricultural science and technology, provide R & D productivity for the development of agricultural science and technology, and also provide media for the dissemination of agricultural science and technology, so that these technologies can be more widely used and obtain benefits.

4.2 Reducing Poverty

Poverty, in short, poor economic benefits, can be compensated and adjusted by agriculture and agricultural science and technology to a certain extent. Especially in developing countries, such as China and India. In a study in the 1990s, DATT (1999) and Ravallionc (1948) substituted agriculture into the neoclassical model and gave the improvement of poverty and hunger caused by the growth of primary agricultural sector.[13]Agricultural science and technology and agricultural production are less difficult to produce in developing countries and the labor force is abundant, which can narrow the economic gap between developing and developed countries and improve the hunger and poverty rates. After the per capita agricultural output reaches a certain amount, it can reverse drive other industries, including agricultural science and technology.

4.3 Obtaining More Stability

Compared with the economy, agricultural planting and existing agricultural technology are more stable, which means that in an economic crisis, all currencies and economies may become foam, but agricultural food and agricultural technology cannot be because they are necessities of life. Therefore, agriculture also plays a vital buffer role in economic life. At the same time, because of its buffer, agriculture can continue to play the role of resource supplier to maintain the operation of the economy in the economic crisis and can even be used for the expansion of modern economy.

5 Conclusion

Generally speaking, in the past 30 years, agricultural science and technology are developing at an unprecedented speed. Precision agriculture and automated agriculture are becoming more and more popular all over the world, especially in developed countries. This has greatly reduced the productivity required by agricultural production and secondary production, and increased the output of agriculture and animal husbandry. At the same time, with the development of agriculture, it will play a more important role in the global economy. The inherent stability of transaction value of grain as a necessity of life plays an obvious protective role in the economy. At the same time, it can also be used as an important supporting factor for developing countries to develop economy, science and technology. According to the survey, the automation integration of agriculture will be more perfect and popular in 2030. At that time, it can be predicted that it will play a more important role in the.

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