Created China

Feeding a Nation

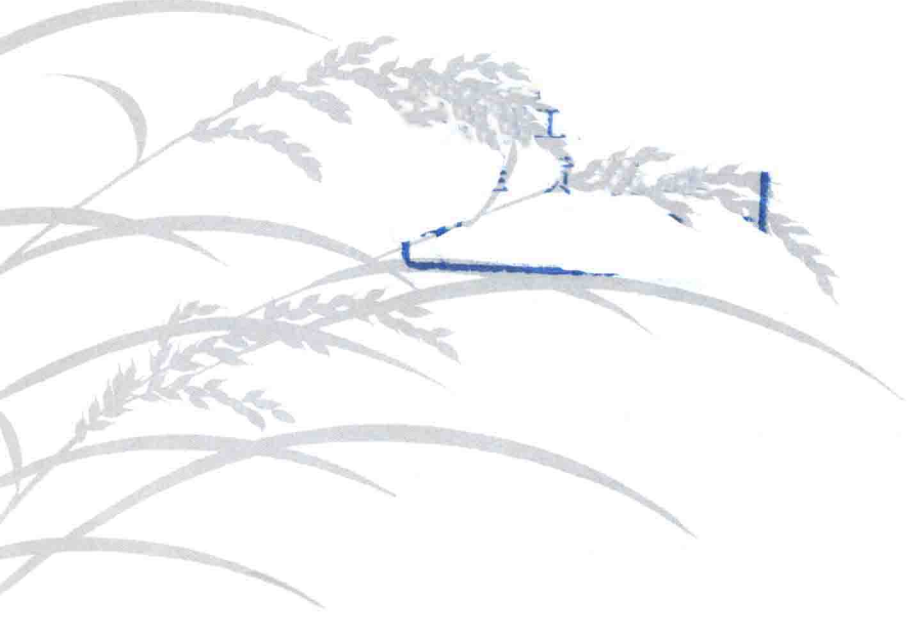
China's Innovative Agriculture

Zhao Lingling

China Intercontinental Press

Feeding a Nation: China's Innovative Agriculture

By: Zhao Lingling



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Contents

Foreword

An old Chinese saying of "food is the overriding necessity for human beings" tells that food is the most basic guarantee for survival. Chinese characters are the world's oldest, yet most vibrant text. The structures of many Chinese characters are closely linked to agriculture. They are the crystallization of human wisdom, which took many years of work to form and preserve. We can see the awareness of the significance of agriculture in administrating state affairs and ensuring the national security of Chinese people through reading Chinese characters. For instance, if " 饭 "(which means meal in English) has no" 食 "(the left half of " 饭 ", meaning food), it will become" 反 " (the right half of " 饭 ", meaning rebel), indicating that people will rebel if they don't have enough food; if no " 禾 " (which means crops) is beside " 口 " (which means mouth), then there will be no" 和 "(which means peace); if " 欠 " (which means lacking) is beside" 谷 "(which means food), there will be" 欲 "(which means appetite). It is a signal from the stomach. While reading between the lines of characters, it is not hard for us to understand the social philosophy of "food is the overriding necessity for human beings" in China.

Only when the granary is full can we know about manners. Only when the food is guaranteed can the world have peace. Three decades after the reform and opening up and six decades after the foundation of People's Republic of China, China has experienced earth-shaking changes and its achievements in society and economy have drawn the attention of the world. China led and solved the biggest problem for livelihood , enabling 1.3 billion people to get rid of hunger.

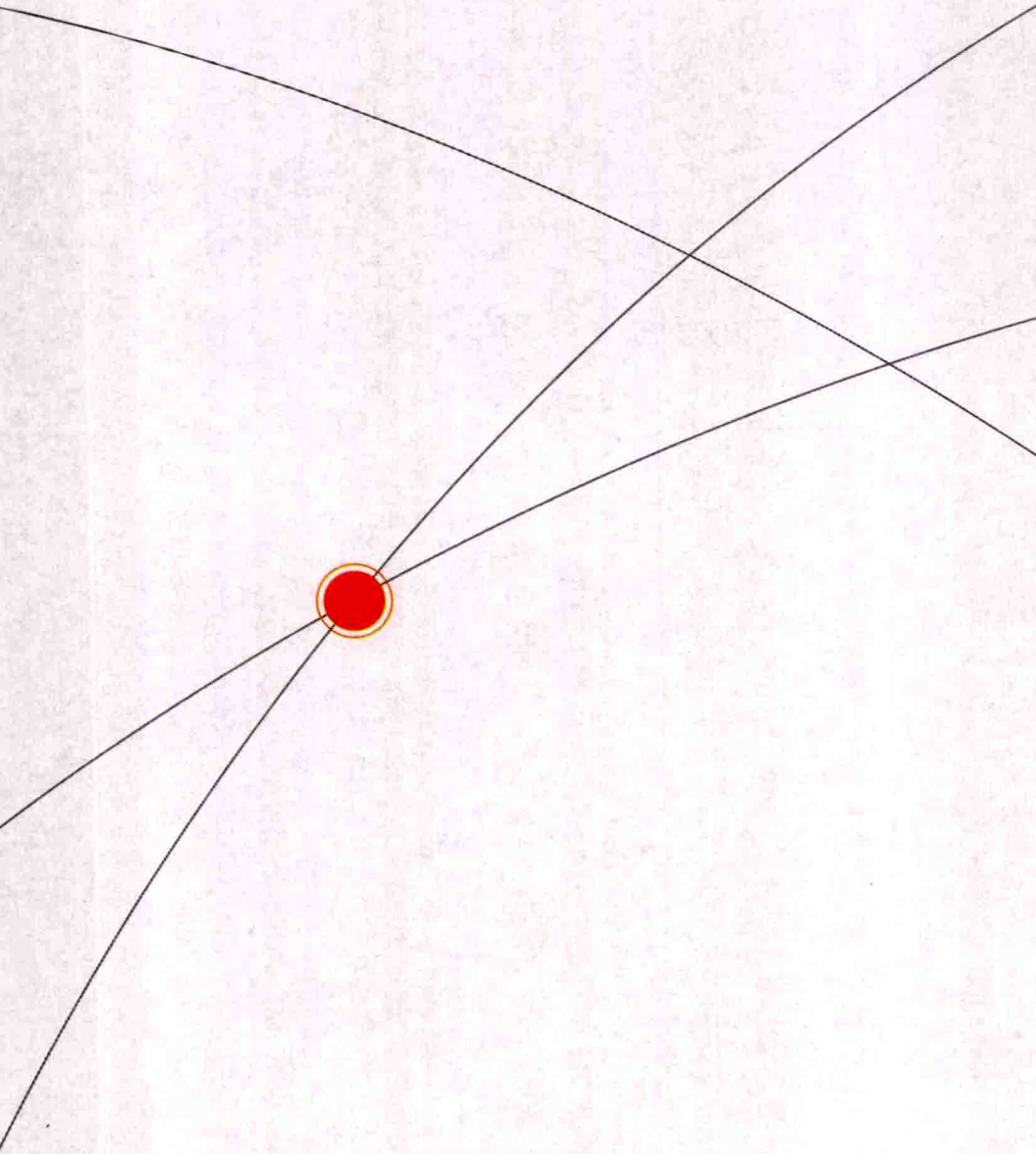
China's hybrid rice is known as China's fifth greatest invention, a great pioneering achievement in the world's agriculture at the 20th century, a big leap forward in the science of breeding and in human heritage and

a significant contribution to the global "Food Engineering" and "Seed Engineering".

As the "propeller" of new scientific and technical revolution in agriculture, biotechnology is quietly expanding and innovating new functions of agriculture, so as to provide enduring and driving motivation for the sustainable and healthy development of China's economy.

Nowadays, millions of agriculture scientific and technical personnel can be found throughout the rural areas. They've made magnificent contributions to China's food security, maintaining an effective supply of major produce. China's agricultural industrialization has seen the creation of masses of farmers since the reform and opening up. Agriculture industrialization organically combines the production, processing and sales of produce, realizes an integrated operation and brings earth-shaking changes to the development of agriculture.

"Food is life". China's innovation in agriculture science is a blessing for everyone. The development of science, production of food and protection of agriculture productivity has paved the way to successfully guaranteeing agriculture security with Chinese characteristics. China has endeavored towards this for half a century.



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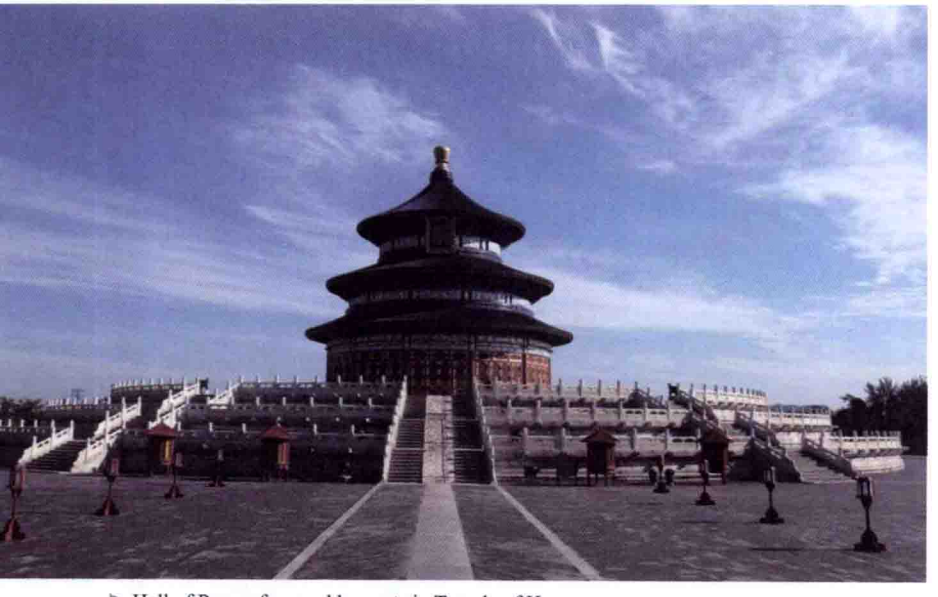
From Ancient Times to the Modern Day: Agriculture Is the Soul of China

Food Is the Overriding Necessity for Human Beings

There is a famous piece of ancient architecture in Beijing, China, named the Temple of Heaven. It is one of the biggest ancient architectural complexes of worship of Heaven in the world, which was included in the World Heritage List in 1998. The formal activities of the worship of Heaven in ancient China date back to 2000 BC. A monarch in ancient times called himself the "Son of Heaven" indicating that the power of being an emperor was given to him by Heaven. The worship of heaven was the core of social political activities at that time. Meanwhile, the Temple of Heaven was also the place where a monarch held the ceremony of praying for good harvests during the first month of spring, where the importance of the Temple of Heaven can be seen.



► Hall of Prayer for good harvests in Temple of Heaven

In traditional Chinese agriculture, people mainly depended on Heaven for survival, so they would worship it. From this we can see the status of agriculture in traditional Chinese politics. As the ancients used to say "food comes before policy" and "agriculture is the soul of state". Nowadays in China, agriculture still is the foundation of the country, which stems from China's particular national characteristics.

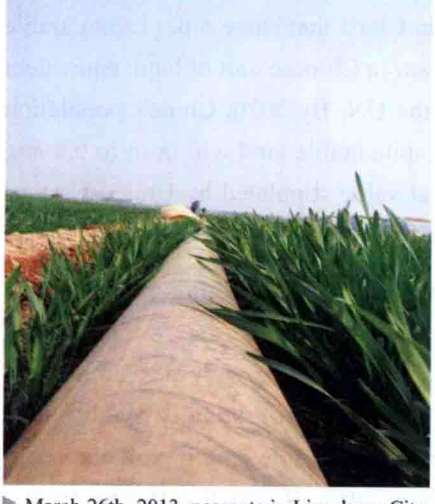
China has a population of 1.354 billion, accounting for 23% that of the world and consuming 800 thousand tons of food a day. Food is indeed a big problem for many people. For a long time, some have believed that China is a threat to the world. In the 1990s, an American named Brown once posed a question to world: "who will support the Chinese in the 21st century?" His point of view was supported by concrete data.

The report of the Food and Agricultural Organization in 2011 confirmed that the world's grain yield in that year achieved a new record of 2.323 billion tons. China needs 0.5 billion tons of grain every year with only 7% arable land of the world. Besides, China's per capita arable land is only one third of the world's average which is still decreasing. There are 666 counties (districts) in China that share a per capita arable land below the warning line of 0.8 *mu* (a Chinese unit of land, equivalent to 666.5 square meters) as set by the UN. By 2030, China's population will reach 1.6 billion and the per capita arable land will drop to 0.8 *mu*, which will be inferior to the critical value stipulated by United Nations Food and Agriculture Organization.

From a domestic perspective, there is not much high-quality arable land and this land is poor in face of natural disasters. Out of the arable land, almost 100 million *mu* is on a slope with over 25 degrees inclination, needing to be returned to forests gradually. Arable land degradation is very serious. There is much arable land in arid and semi-arid areas affected by desertification, 40% of which suffering from a degradation at varying degrees.

Water is a necessity for grain. China is lacking in water resources and those it does have are distributed unevenly. It is statistically shown that the water storage capacity of the Earth is 1.45 billion km^3. However, the fresh water resources of the Earth which can be used in production and people's daily life only accounts for 2.5% of its total water storage capacity. Worse still, among the infinitesimal fresh water resources, more than 70% is frozen in the Antarctic and Arctic Pole areas. The fresh water resources that people can actually use are from rivers and lakes and some of underground water, which accounts for about 0.26% of the total water storage capacity on Earth, and if distributed to everyone, it is 0.24 km^3 per capita.

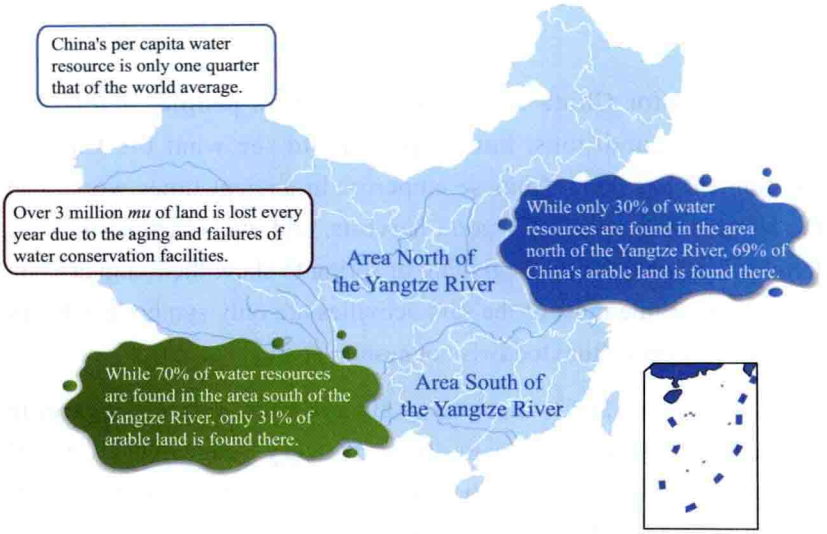
The world needs water while China needs it more. China's water resource per capita is only one quarter that of the world average. 54% of China's arable land basically relies on the gods for good luck. Over 3 million *mu* of land is lost every year due to the aging and failures of water conservation facilities. In those areas with available water, the utilization of water for agricultural irrigation is less than 40%, only half that of developed countries. Moreover, the water resources in China are distributed extremely unevenly. In the one hand, while there is only 30% of water resources in the area north of Yangtze River, there is 69% of arable land there. In the other, while there is 70% of water resources in the area south of the Yangtze River, there is only 31% of arable land there.



▶ March 26th, 2013, peasants in Liaocheng City, Shandong Province are irrigating spring wheat

With global climate changes, China has generally been hit

The State of Water Resources in China



by more frequent natural disasters, especially floods and droughts. The problems which occur in the ecological environment, with water and soil losses, deterioration of grasslands and farmland contamination, haven't yet been contained effectively. In addition, China's agriculture has a high production cost, serious waste and low returns. Agricultural production costs include production costs and labor costs. Production costs include chemical fertilizer, pesticide, machinery and water. While the quantity of fertilizer and pesticide in use is very large, the utilization rate is very low. At present, it is less than 40%, whereas in developed countries, it is 60%-80%.

China's No.1 Central Documents

It is hard for China to support 1.3 billion people under such unfavorable conditions, but people should see what the Chinese government has done. Chinese emperors in ancient times worshiped the Heaven and prayed for good harvests, and even stepped into the farmland in person at the beginning of spring to show their emphasis on agriculture. While most of the said activities are only symbolic, China's emphasis on agriculture today is not gesture at all.

From 2004 to 2013, there have always been policies regarding agriculture science and technology in every year's No.1 Central Document (China's first political document of the year outlining its current key aims). For instance, the No.1 Central Document of 2012 titled "Comments on Accelerating the Development of Innovations in Agricultural Science and Technology to Enhance the Ability of Guaranteeing the Supply of Agricultural Produce" was the first time that official documents gave the go ahead to fully deploy the use of agriculture science and technology in agriculture since the foundation of People's Republic of China. Long before that, China's reform and opening up just started with agriculture.

▶ Fine breed of grapes fruit more

Deng Xiaoping,

chief designer of China's reform and opening up, said that the development of China's agriculture should depend on policy at first and then on science and technology. Derek Johnde Solla Price, American Scientist and Socialist, pointed out that the most meaningful inventions and research were not the specific technological secrets behind radar or atomic bomb, but the management system that generated these achievements and corresponding effective policies. With special attention on agriculture, Chinese Government has implemented and developed science and technology policies on agriculture for many years. Since the 1980s, China has successively implemented the Spark Program, the Major Achievements Promotion Plan, the Harvest Project, and the Prairie Fire Program. All these science and technology plans direct to the development of the rural economy.

▶ Logo of China Spark Program

The Spark Program was the first program approved by Chinese Government, which, by means of science and technology, promoted the development of rural economy. In May 1985, China proposed an idea of "science and technology projects to prosper the regional economy", and when they did so they referred to a Chinese proverb: "a single spark can kindle a great fire". They named the project the Spark Program, indicating that the spark of science and technology is bound to burn through China's rural area. In 1986, Spark Program was carried out.

The implementation of the Spark Program involves a four-level management coordination: state, province, district and county. Government administrative departments of science and technology at all levels were to establish and improve the management organization of the Spark Program and there were specially-assigned persons taking charge of the daily work.

The Spark Program introduced advanced and practical science and

▶ Oranges on a tree

technology to rural areas. It was a successful way of combining science and technology with agriculture, and bringing scientific and technical personnel to farmers more close, which infused new vitality into agriculture and the development of rural economy.

In March 1987, the Harvest Project began. The Harvest Project was aimed at enhancing economic performance, applying existing domestic and overseas scientific achievements and advanced technologies comprehensively to a large area and a wide range of production so as to achieve stable and high yields, low consumption and high efficiency.

The Harvest Project emphasized the production of crop seeds with high productivity and quality, and the application of advanced , suitable, efficient and integrated cultivation techniques. Its project scope included the promotion of advanced and practical achievements and technologies in the planting industry, animal husbandry, aquaculture and agricultural machinery.