

# **Review and Outlook of Food Security and Nutrition in China**

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By Prof. CHEN Mengshan, Chair of State Food and Nutrition Consultant  
Committee (SFNCC), former Secretary of the  
Leading Party Group of Chinese Academy of  
Agricultural Sciences (CAAS)

Ms. ZHAI Lin, Department of International Cooperation, CAAS

Mr. QIN Lang, Strategic Planning Office, CAAS

The Chinese government attaches great importance to agricultural development and food security. It has always taken the provision of enough food for its over one billion people as a top priority for governance and national stability and adhered to the principle of basic self-sufficiency in agricultural products such as grain. The fundamental position of agriculture has been constantly strengthened. Agricultural and rural development has scored remarkable achievements since the 1980s, with significantly enhanced comprehensive productivity, increasingly sufficient food supply and prominent improvement in people's health. Socialism with Chinese characteristics has entered into a new era, with the principal contradiction facing the Chinese society evolved to one between unbalanced and inadequate development and the people's ever-growing needs for a better life. At this new point of time, it is both crucial and relevant to comprehend the features of food and nutrition development, address the contradiction between unbalanced and inadequate development and people's ever-growing needs for nutrition and health, and carry out international exchanges and cooperation in a deep-going and wide-ranging manner.

## I . Achievements of food security and nutrition in China

**Millennium Development Goals (MDGs) on poverty and hunger reduction met ahead of schedule.** Poverty and hunger are common challenges for the international community. Over the past 40 years, the Chinese government launched massive poverty alleviation and development campaigns with focus on feeding and cladding the rural poor. From 1978 to 2017, the number of rural

poor people fell by 740 million nationwide, with close to 19 million people lifted out of poverty on average per annum; the rural head count ratio (HCR) declined by 94.4 percentage points, 2.4 percentage points on average per annum. China's current HCR is far lower than the world's average. China made tremendous contributions to global poverty and hunger reduction and met relevant MDGs ahead of schedule. In the world, 70% of people lifted out of poverty and 2/3 of people got rid of hunger came from China. China scored equally prominent achievements in hunger reduction. From 1990 to 2017, the number of undernourished people dropped by 15.2 percentage points in China; the decline of the share and number of hungry people in China was 50% higher than the MDGs and the goals set by the World Food Summit. In fact, since 1990, the number of people recovered from malnutrition in China accounted for 75% of that of the world.

**Agricultural product supply capability constantly strengthened.** The substantial reduction in the number of hungry people cannot be realized without China's ever-strengthening grain supply capability. Since the founding of the People's Republic of China, in particular the reform and opening-up, China has made great progress in food production, which has not only ensured enough food for 1.3 billion people, but also made huge contributions to building a moderately prosperous society in all respects and guaranteeing national modernization. China managed to feed nearly 20% of the world's population with less than 10% of the world's farmland. In 1983-2017, the growth of China's grain output was faster than that of population, in particular, after 2004, China

managed to grow its grain output for 13 consecutive years. China's grain output was only 113.15 million tons in 1949, and grew to 304.765 million tons in 1978 and rose further to a historic high of 617.9 million tons in 2017.

In the meantime, agricultural production underwent restructuring. With grain output increasing, the production of high value crops and livestock products also grew rapidly. For example, meat production increased from 9.43 million tons in 1978 to 86.54 million tons in 2017, with an average annual growth of 5.8%; the output of fruits, vegetables, poultry eggs and aquatic products grew by 11.3%, 6.0%, 7.4% and 8.4% respectively. The output of agricultural products, particularly fruits, vegetables and aquatic products, grew thanks to the input of modern means of production.

**Residents' food consumption upgraded and nutrition improved.** Thanks to rapid economic development, the income of urban and rural residents in China surged. The Engel coefficient of urban and rural residents fell from 57.7% and 67.7% in 1978 to 28.6% and 31.2% in 2017; people are demanding for not only enough but also better, more nutritious and more tailor-made food.

The dietary pattern of Chinese residents is gradually evolving from being cereal dominant to a more protein-rich and diversified one. The consumption of rice, flour and other refined grains is declining and the consumption of animal products is rising. Per capita grain consumption dropped from 235 kg in 1983 to 130.1 kg in 2017. Meanwhile, the consumption of fruits, vegetable oil, meat, poultry and aquatic products increased dramatically.

In 2012, the per capita daily calorie intake of Chinese residents was 2,172 kcal, protein intake was 65 grams, fat intake was 80 grams, and carbohydrate intake is 301 grams. The supply of the three macronutrients was sufficient and energy needs were met. Total protein intake has increased steadily and the intake of quality protein grew.

The wasting rate of children under age 5 in China dropped from 19.1% in 1990 to 3.6% in 2010; the stunting rate of children under age 5 decreased from 33.4% in 1990 to 9.9% in 2010, down by 15.5 and 23.5 percentage points respectively. The prevalence of micronutrient deficiencies in children also fell. The prevalence of anemia in children under age 5 continued to drop from 19.3% in 2005 to 12.6% in 2010.

## II . Experience of food security and nutrition development in China

**China formulated the food security strategy and identified food security as the top priority for governance and stability.** Food security has always held a strategic position in China. The government has always regarded the issue of food as overarching and strategic that bears on the national economy and people's livelihood. A range of important documents were issued to emphasize the importance of food as both an economic and a political issue. Food security is the anchor of national development and the ballast stone of social stability. In November 2008, the Medium- and Long-Term Plan for National Food Security 2008-2020 was released, which identified the foremost goal of

guaranteeing national food security. Since 2014, important documents were formulated every year to stress advancing agricultural modernization and keeping national food security as the primary task. In 2012, President Xi Jinping made a profound interpretation of the road to food security with Chinese characteristics based on the situations of the world, China and Chinese agriculture. He proposed the new strategy for national food security, i.e. China's food security shall be ensured by relying on domestic production, moderate import and the support of science and technology. China's food security has laid an important foundation for the country's long-term stability and made crucial contributions to world food security.

**Effective supply of agricultural products guaranteed through breakthroughs in agricultural science and technology.** China has achieved great progress and innovations in science and technology related to agriculture and the rural sector, and the overall strength of science and technology has been constantly improved. In 2017, the progress of science and technology contributed to 57.5% of China's agricultural development, and China's main crop varieties have basically realized full coverage. Independently selected and bred varieties cover 95% of the total agricultural area; the production capability of core germplasm of livestock, poultry and aquatic products kept improving; and breakthroughs were made in super rice, GM BT cotton, vaccines for avian influenza, etc. The comprehensive mechanization level of crops, involving ploughing, sowing and harvesting reached 67%. Breakthroughs in agricultural science and

technology are instrumental in guaranteeing national food security, effective supply of important agricultural products and farmers' income growth.

Under constraints of farmland and fresh water, science and technology are making bigger contributions to the improvement of grain yield. In terms of **varieties**, China's protoplast culture technology for rice, wheat and corn is internationally advanced, and China is leading the world in super rice research and new variety breeding. The breeding and extension of a large number of high-yield, super high-yield, highly resistant and widely applicable new grain varieties such as super rice, hybrid wheat and hybrid corn has made great contributions to the improvement of grain yield in China. In terms of **technologies**, China launched and extended a series of advanced and applicable technologies for stabilizing and increasing grain output, preventing and reducing agricultural disasters, integrating agricultural machinery and agronomy and the storage, transportation and fresh-keeping of agricultural products; These technologies have effectively transformed traditional ways of production, storage and transportation of agricultural products and enhanced resource use efficiency. In terms of **models of technology transfer**, programs for high-yield grain, cotton, oil and sugar were launched; a number of agricultural science and technology parks, science and technology innovation and integrated demonstration bases were established; new circular rice-fish, rice-crab and rice-shrimp farming models were developed and new progress was made in science and technology development along the whole industrial chain.

**All-round and deepened rural reform is a source of inexhaustible power for agricultural and rural development.** China has always taken proper solutions to issues related to agriculture as the top priority. Historic achievements and transformations have been realized through all-round and deepened rural reform, the establishment and improvement of the fundamental management system in rural areas, land right identification, registration and certification, the separation of rights of ownership, contract and management of rural land, the reform of rural management system and agricultural products distribution system, the supply-side structural reform in agriculture, and the implementation of the rural vitalization strategy.

Rural reform with the family contract responsibility system as the hallmark unveiled China's reform. The establishment of the dual management structure featured by the combination of unified and independent management on the basis of family contract has greatly mobilized millions of farmers to engage in production and emancipated rural productivity, providing solid institutional guarantee for agriculture and rural development. Vigorous efforts were made to advance market-oriented reform: centralized and mandated purchase schemes were abolished so as to invigorate agricultural distribution and strengthen farmers' autonomy in decision-making. Main functional zones for agricultural production were delineated to further optimize the layout of agricultural production and enable growing advantages enjoyed by the main producing areas. While greatly emancipating agricultural productivity, the family contract responsibility system is challenged

by the small-scale operation of individual households, low returns of agriculture and limited access to big markets. In this respect, the government deepened the land reform to separate three rights, namely stabilizing the rights of ownership and contract and invigorating the right of management. With the rapid development of moderately scaled agricultural production, the massive emergence of various kinds of new players of agricultural production, operation and service, and the integration of the primary, secondary and tertiary industries, the ways of agricultural production have undergone profound changes, and agricultural production has been restructured to meet people's changing food demand, and agriculture is increasingly shouldering multiple functions.

Together with rural reform, various pro-agriculture policies were issued to further mobilize farmers. In addition to rescinding agricultural tax, the government has strengthened support for agriculture by issuing a range of pro-agriculture policies, such as the minimum purchase price for grains, the temporary collection and storage scheme for grains, and grain production subsidies, such as direct subsidies for grain growers, subsidies for the use of improved varieties, subsidies for the purchase of farm machineries and comprehensive subsidies for agricultural inputs. These policies have greatly boosted grain production.

**Science-based and effective food and nutrition policies are strong guarantee for a robust food sector and people's health.** The Outline for the Reform and Development of China's Food Structure for the 1990s issued by the government in 1993

provided good guidance for the development of food related sectors in China, building enabling macro environment for food development, strengthening comprehensive food production capacity and improving residents' food consumption and nutrition. Subsequently, the government issued the China Food and Nutrition Development Outline 2001-2010 and 2014-2020 given the new developments and features in food and nutrition in China. These important plans aim at guaranteeing effective food supply, optimizing food structure and improving residents' nutrition, and serve as new blueprints and visions for food and nutrition development. In recent years, the government also released the Outline of the Healthy China 2030 Plan, the National Nutrition Plan (2017-2030) and other documents to promote the improvement of national nutritional status. In preparing these important documents, the National Food and Nutrition Advisory Committee played a major role. The Committee is a consultative and advisory body established in 1993 composed of experts in the fields of agriculture, food, nutrition, health, economy, trade, etc. It provides advice and guidance for decision-making by the central government and relevant ministries on major issues of national food and nutrition. In addition, the Dietary Guidelines for Chinese Residents was revised in 1997, 2007 and 2016 respectively and put forward food and nutrient intake reference indicators suitable for different genders and age groups in China, providing effective guidance for residents' healthy diet.

China developed plans for the development of specific food sectors in an effort to optimize residents' dietary structure and improve

people' health. The most representative plans are the Soybean Action Plan, Dairy Sector Rejuvenation Plan and the Potatoes as Staple Food Plan. These action plans involve all links in the food value chain, ranging from production, processing to sales. The development of competitive food sector helps to meet and guide people's demand for nutritious diets.

**Poverty alleviation policy and social security focus on improving food security and nutrition of the most vulnerable people.** There is an urban-rural nutritional gap in China. People suffering from malnutrition are mainly concentrated in poor rural areas. Nutritional improvement for focus areas and groups and poverty alleviation policies and social security measures integrate and mutually reinforce. Targeted poverty alleviation policies implemented in recent years could effectively identify poor people and the causes for being poor. Investment in poverty alleviation for those households documented and recorded as poor could help remove two concerns and ensure three guarantees. One concern is over food insecurity. Another important policy is to advance the Nutrition Improvement Program for Students Receiving Compulsory Education in Rural Areas (Nutrition Improvement Program for short). Launched in 2011, the Program received 159.1 billion yuan of central budget for implementation. Altogether 1,590 counties in 29 provinces of China implemented the Nutrition Improvement Program. To be specific, 699 counties launched national pilots and 891 counties rolled out local pilots, covering 134,000 schools and benefiting over 36 million students. Thanks to the scientific planning and overall arrangement, the

Nutrition Improvement Program enables rural poor students to have access to enough and nutritious food. Thanks to the concerted efforts of governments at all levels, this major program for public wellbeing has generated significant outcomes.

### **III. Challenges for food and nutrition development**

The development of China's agriculture and food production is evolving towards meeting nutritional and health demands of urban and rural residents. This transformation is faced with many challenges and contradictions which are mainly reflected as **three imbalances and two mismatches**.

**The three imbalances are as follows:**

**First, the imbalance between food production and supply and consumption demand.**

The supply of agricultural products in China has realized the historic transition from chronic shortage to basically balanced aggregate, however the imbalance between food production structure and residents' consumption is getting more prominent. Grain output has been growing for 13 consecutive years. The internal structure is unbalanced with high output, import and stock. Wheat production is slightly greater than demand, but quality wheat supply is insufficient, import pressure continues to increase; rice production is greater than demand, but quality rice is still being imported; corn production is greater than demand, there is periodical surplus; soybean demand continues to expand, supply and demand gap is widening; the consumption demand for miscellaneous grains and beans is growing rapidly, but there is no effective supply of products

of high quality and famous brand and with good markets.

**Second, the imbalance in the structure of food consumption and nutrient intake.**

China's caloric supply is excessive if judged from nutrients provided by food consumption and nutritional needs of residents, however, quality protein, especially vitamins and minerals, is obviously in short supply. Monitoring data of residents' nutrition and health status shows that the per capita availability of carbohydrates, protein and fat for Chinese residents is sufficient, but the gap between the actual intake and recommended level for micronutrients such as vitamins and minerals (iron, zinc, calcium, etc.) remains big. The dietary calcium intake of over 90% of the population is below the recommended level; the dietary zinc intake of over 50% of the population is below the recommended level; and the dietary vitamin C intake of over 70% of the population is below the recommend level.

**Third, urban-rural imbalance in the development of nutritional status.**

Malnutrition is prevalent in poor regions, in particular, those remote areas, given the lack of nutritious food and the inadequacy of protein, minerals and vitamins. Urban residents are suffering from chronic diseases such as obesity, high blood pressure, high blood sugar, high blood fat, diabetes and gout caused by dietary imbalance or excessive nutrition. The number of patients of various kinds of chronic illnesses has exceeded 400 million. At present, the prevalence of hypertension, diabetes and hypercholesterolemia

among Chinese adults is 25.2%,9.7% and 4.9% respectively. Chronic nutritional illnesses represented by the three are not only posing serious threats to the health of urban residents, but also adding tens of billions of RMB of medical expenses. It is therefore a daunting task to adjust and optimize dietary structure to cope with the high prevalence of chronic illnesses.

**The two mismatches are as follows:**

**First, the mismatch between growing demand for food and ecological and environment constraints.**

Due to the long-term pursuit of extensive agriculture focusing on output growth, China's agriculture and food production is facing increasingly intensified resource constraints and environmental challenges.

**Second, the mismatch between the technology system for production and processing and nutrition and health goals.**

There is an obvious mismatch between nutritional agricultural product varieties, farming techniques of nutrition fortification and processing and cooking techniques for nutrition maintenance, and the increasingly robust consumption demand for more tailor-made and functional products.

#### **IV. New visions for food security and nutrition development in China**

The development of food security and nutrition in China will feature new concept, choices and visions, thus meeting people's new and growing demand for food nutrition and health.

## **1. New concept of food, nutrition and health**

We need to approach food in a broader sense and guarantee food supply with both domestic and foreign resources and markets in mind. We should on the one hand develop rich domestic food varieties, germplasm resources of animals, plants and microorganisms, as well as marine and forest foods and on the other hand open wider to the outside world and import more quality and diversified food products from other countries, driving agricultural development of the exporting countries. We need to approach nutrition in a broader sense. Efforts should be made to conduct scientific assessment that emphasizes food's nutritional function, effectively remove factors leading to chronic illnesses, develop nutritional and functional food and realize the balance and coordination among people's pursuit for health, nutritious food production and appropriate dietary consumption. We need to follow the broad concept of health and advocate green agricultural production, residents' nutritious food consumption, healthy food production and consumption, and residents' physical and mental wellbeing. We will vigorously promote the concept of healthy diet and appropriate and balanced food intake. The scope of nutrition education should be expanded from students, women and the elderly to all people. It is easier to develop a habit among students, and a convergence and demonstration effects could be easily generated. Incorporating food and nutrition knowledge into curriculum of primary and middle schools and launching Small Hands and Big Hands nutrition education campaigns could help to influence and lead the whole society to healthy diet. It is necessary

to promote nutrition knowledge through various channels or platforms, such as the Internet, WeChat public accounts and traditional TV, newspapers and journals, to enhance residents' awareness of balanced diets and nutrition consumption, thus realizing coordinated development of residents' health, efficient resource use and the protection of ecology and environment.

## **2. New choice of food security and nutrition guarantee**

Being a populous country, China always needs to ensure basic self-sufficiency and keep the rice bowl firmly in our own hands and fill the rice bowl with our own grain. Full implementation of the new strategy of food security requests approaching food from a broad perspective so as to ensure the effective supply of agricultural products and the accelerated integration of the primary, secondary and tertiary industries. Promoting nutrition-oriented sustainable agricultural production requests a two-pronged approach: first, promoting innovation in agricultural science and technology and developing comprehensive nutrition indicators for agricultural products; second, strengthening government supervision and guidance and establishing comprehensive nutrition standards for agricultural products for nutrition-oriented transformation in agriculture and food production in China. Efforts should be made to incorporate nutrition indicators into the system of indicators for agricultural development evaluation and take the bearing capacity of resources and environment into comprehensive consideration. We need to establish a value chain of safer and more nutritious food and accelerate the development of systems to guarantee national food security and the quality and safety of agricultural products.

Basic nutrition supply for undernourished people in rural areas and disadvantaged groups such as women, children and the elderly should be ensured. Policies for regular monitoring of food nutrition should be developed to implement nutrition interventions in key regions and groups of people. For key regions, support and development measures should be combined and introduced for poor areas to raise food consumption by local residents and realize basic guarantee and gradual improvements of food and nutrition of the poor. For regions densely populated by migrants and newly urbanized areas, efforts should be made to improve the diet of migrant workers, provide dietary guidance for people away from home and residents in newly urbanized areas, and advocate healthy way of life and appropriate dietary pattern. For key groups, efforts should be made to monitor nutritional status of the aged, provide science-based guidance on nutrition replenishment and balanced diets for the aged and study and develop food products that meet their demand for health, such as nutrition fortified food and low-salt and low-fat food; efforts should be focused on reducing the wasting rate and the incidence of iron deficiency anemia among rural children and adolescents, guarantee nutrition for rural left-behind children, and curb the trend of overweight and obesity among urban children and adolescents; efforts should be made to promote balanced nutrition of the pregnant and maternal women and strengthen supervision on the quality of breast-milk substitutes and infant and baby food. We should strengthen international cooperation and actively participate in global and regional food security development and governance.

### **3. New vision of a new food and nutrition development outline**

The current China Food and Nutrition Development Outline 2014-2020 is playing a crucial role in guaranteeing effective food supply, optimizing food structure and improving residents' nutrition. The development and implementation of a new food and nutrition outline to guide China's food and nutrition development in the next 15 years will help to address many problems related to food, nutrition and health in a coordinated manner and constitute an important pillar and initiative to implement the Healthy China strategy and an effective means to advance rural vitalization and guarantee safe food supply in China. The new outline will follow the guidance of the Xi Jinping thought on socialism with Chinese characteristics for a new era, coordinate will the goals and tasks of the Outline of the Healthy China Plan and the National Nutrition Plan, promote coordinated development among food consumption, nutrition supply, production and trade, and further enhance people's living standard and health status. Efforts should be made to advance food and nutrition transformation and development in China according to law and study and develop nutritious food guidelines for special groups and nutritional logos for the catering sector. A mechanism for coordinated development of the medical care system and health guarantee system shall be established. We should study and develop a new system of food nutrition and health standards for both nutrition improvement of the general public and tailor-made and targeted services for special groups and shift from focusing on key groups to providing nutrition guidance for all.