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Existing Problems of Agricultural Development in China and Recommendations

Guoqin HUANG*

Research Center on Ecological Sciences, Jiangxi Agricultural University, Nanchang 330045, China; Key Laboratory of Crop Physiology, Ecology and Genetic Breeding, Ministry of Education, Nanchang 330045, China

Abstract In 2012, China's total grain yield reached 590 million tons and realized nine consecutive years of growth. This is huge historic achievement of China and also rare in development history of world agriculture. However, at the same time of making great achievements, China's agriculture is still confronted with many problems. On the basis of extensive survey, it pointed out 10 outstanding problems: farmland, labor, livestock power, water conservancy, input, agricultural disaster, ecological and environmental problem, waste of resources, economic scale and economic benefits. These problems have brought great adverse influence on China's agricultural development. In view of these problems, to realize sustainable, stable and healthy development of agriculture in the new period, it came up with following recommendations: (i) deepening the understanding; (ii) enforcing laws strictly; (iii) enhancing training; (iv) increasing benefits; (v) saving resources; (vi) protecting environment; (vii) developing science and technology; (viii) consolidating foundation.

Key words Agriculture, Development, Problems, Recommendations, China

1 Existing problems of agricultural development in China

In 2012, China's total grain yield reached 590 million tons, 18.36 million tons more than 2011 (having a growth of 3.2%) and 158.87 million tons more than 2003 (having a growth of 36.9%), realizing nine consecutive years of growth for the first time^[1]. At the same time, however, it must be clearly realized that China's agriculture is still confronted with many problems and it is urgent to study measures to solve these problems.

1.1 Farmland problem

1.1.1 Loss of farmland. In recent years, due to rapid economic and social development and fast advance in urbanization and industrialization, the demand for land is still increasing. As a result, the situation of loss of farmland is serious and outstanding. From 1998 to 2010, China's farmland area shrank from 1.945 billion mu (129.67 million hm²) to 1.826 billion mu (121.73 million hm²), decreasing about 119 million mu (7.94 million hm²)^[2]. In future, if no practical and feasible measures are taken, such situation will become increasingly intense.

1.1.2 Using farmland for other purposes. In many areas, to increase economic benefits, farmland originally used for planting field crops is used for planting flowers, forest and wood, edible fungus, greenhouse vegetable, or fruit or breeding industries. Thus, the farmland is no longer farmland in traditional sense. In

the long run, such change is not favorable for developing agricultural production and safeguarding grain security.

1.1.3 Some farmland becomes desolate. Due to pulling of secondary and tertiary industries, fewer and fewer people are willing to do farm work. According to our survey in Yujiang County, Yungan County, and Dongxiang County of Jiangxi Province in winter of 2011 to spring of 2013, desolate farmland in the whole year accounted for 5–10% of paddy field area; seasonal autumn fallow ground accounted for 40–50% of paddy field area; seasonal winter fallow ground accounted for 75–80% of paddy field area. Idle farmland is a huge waste of farmland resource.

1.1.4 Degradation of farmland. According to survey, the farmland degradation situation is extremely prominent in all areas of China. According to relevant reports, farmland contractors Zhang Fusen et al from Dongyang Town of Anyi County contracted 100 mu paddy field; due to blowdown of enterprises in the industrial park, it resulted in no harvest of 5.33 hm² rice^[3]. Key Laboratory of Soil Environment and Pollution Remediation of Chinese Academy of Sciences measured pH value of farmland soil in Nanning of Guangxi in recent 30 years (1981–2011). The results indicate that the soil pH value was 5.71 in 1981 and it dropped to 5.06 in 2011, dropping about 11.38%^[4]. At present, the average soil organic matter (SOM) of farmland in China has dropped to 1.3%, which is lower than the world average value (2.4%) and only 1/4 of the average value of the United States (5%)^[5]. Besides, our field survey in southern areas of China found that long time of idle farmland turns fertile paddy field to grassland. In northern area, due to shortage of water, idle farmland changes to wasteland.

1.2 Labor problem

1.2.1 Shortage in quantity. Gaoling Village in Chuntao Township, Yujiang County of Jiangxi Province is an agricultural natural village with 60 households. Due to shortage of labor, rice planting

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* Corresponding author. E-mail: hgqjxnc@sina.com

area shrinks gradually. Triple-cropping system has changed to double-cropping system or single cropping system; double-harvest rice becomes single-harvest rice, and large area of farmland becomes idle.

1.2.2 Low quality. Due to influence of industrialization and urbanization and pull of high economic benefit of secondary and tertiary industries, young farmers with higher scientific and cultural quality become migrant workers, and those left behind are women, children, old people, disabled people and patients.

1.2.3 Aging problem. Relevant survey has shown that in rural areas of Shaanxi Province, 60 – 70% of agricultural work is undertaken by old people; in some areas, this figure is as high as 90%^[6].

1.2.4 Weak physical strength. In rural areas, most agricultural production activities are undertaken by women, children, old people, disabled people and patients, but their physical strength is weak and difficult to suit for heavy duty work of agricultural production. Thus, it is not beneficial to human health, and not favorable for energetically developing modern high efficient agriculture.

1.3 Livestock power problem At present, in agricultural production of southern areas, the serious shortage of farm cattle greatly influences development of agricultural production. After entry to the new century, thanks to development of agricultural mechanization and subsidy policy of purchase of agricultural machinery and tools, fewer farmers are unwilling to breed farm cattle and the situation of reduction of farm cattle is deteriorating. This increases agricultural productivity, is favorable for realization of agricultural modernization, but it also brings certain problem to southern agricultural production. In the north, the mechanization level is high, but it also has large area of mountains and the terrain is complex and it is difficult to conduct mechanized farming. Therefore, the north area should keep certain quantity of cattle, horses, and mules in accordance with actual local situation.

1.4 Water conservancy In February, 2011, central government issued No. 1 Document about strengthening farmland and water conservancy construction. The document states that building water conservancy and eliminating water damage are major projects of administering state affairs well and ensuring national security^[7]. Since the foundation of new China, especially since the reform and opening-up, China has made outstanding achievement in reform and development of water conservancy. However, compared with requirements of economic and social development, the input in water conservancy is not sufficient, the construction progress lags far behind, and the security level is significantly low. Our field survey also shows that the water conservancy construction at grass-roots level develops slowly and the actual effect is not prominent.

1.5 Input problem

1.5.1 Reduction in labor input. To develop agricultural production, it is required to attach great importance to input problem. Shortage of labor for agricultural production is extremely detrimental to China's agricultural development.

1.5.2 Reduction in input of organic fertilizer. At present, increasing reduction of livestock and poultry breeding in rural areas objectively results in drop of source of organic fertilizer.

1.5.3 High input "intensive and meticulous farming" becomes rare. In the past, south areas adopt triple-cropping system. Now, it has changed to double-cropping system or single cropping system, or even no crop planting. It is difficult to find large area of high intensity material input, labor input and livestock (cattle) input in traditional sense. In other words, small and low input has become one of greatest obstacles of China's agricultural development in the new century. This should arouse high attention of relevant authorities.

1.6 Agricultural disasters In China, agricultural disasters happen every year. The difference lies in place and degree. According to statistics, diseases, pests, weeds and mice affected 484.13 million $\text{hm}^2 \cdot \text{times}$ in 2012, 2.07% more than 2011^[8]. Reports show that since the exposure of human infection with H7N9 in March, 2013, the domestic poultry industry incurred economic loss more than 40 billion yuan; the price of poultry products declines continuously and sales volume falls sharply; poultry enterprises suffered huge losses, and fewer and fewer people are unwilling to engage in relevant work^[9]. In recent years, rapid development of economic construction and accelerated advance of industrialization and urbanization also bring prominent ecological and environmental problems to agriculture.

1.7 Ecological and environmental problem

1.7.1 Ecological damage. In 2008 – 2010, we carried out several times of survey in Gaoling Village, Chuntao Township in Yujiang County of Jiangxi Province. Due to expressway building (Jing – Ying Expressway), large area of mountain and farmland was occupied, original water conservancy projects were damaged, water pipeline was destroyed, water route was blocked, and farmland water conservancy facilities were destroyed. All of these brought serious adverse influence on agricultural sustainable development of this village.

1.7.2 Water loss and soil erosion. Industrial mining and exploiting not only damage mountains which are ecological barriers of agriculture, but also result in serious water loss and soil erosion. At low level, it may block rivers, lakes, reservoirs and farmland; at high level, it will lead to landslide, mud-rock flow and threaten people's life and property safety.

1.7.3 Environmental pollution. (i) Air pollution. In February and March, 2013, nearly all areas of China were shrouded in thick fog and haze mainly due to PM_{2.5}. Factors bringing about PM_{2.5} are various. One of the essential factors is long time of idleness and exposure of farmland. With blow of wind, it will generate PM_{2.5}. (ii) Pollution of water for agricultural irrigation. From the perspective of environment of agricultural production area, the area influenced from water pollution is about 20%, the area under serious impact accounts for 5%, and the area threatened by pollution is about 6.5 million hectare. (iii) Pollution of farmland soil. At present, the overall trend of soil pollution is serious in agricul-

tural production area. According to incomplete survey, the polluted farmland in the whole country is about 10 million hectare, about 2.167 million hectare farmland is irrigated by polluted water, solid waste occupies and destroys 0.133 million hectare farmland. In total, these account for 1/10 of total farmland area, and most are situated in economically developed areas^[10]. According to estimation of Ministry of Land and Natural Resources, farmland area polluted by heavy metals is about 10 million hectare; as calculated by state environmental protection department, the grain polluted by heavy metals is up to 12 million tons annually, leading to direct economic loss more than 20 billion yuan^[11]. (iv) Pollution of agricultural products. Due to heavy metal pollution, mercury-polluted rice, cadmium-polluted rice, and lead-polluted rice appeared in some areas. Eating such rice, people will have high risk of getting cancer. Thus, it will threaten health. On May 16, 2013, Guangzhou Food and Drug Administration issued the sampling inspection results of the catering trade in the first quarter of 2013, the qualification rate of rice and rice products is the lowest and the over-limit rate of cadmium is up to 44.4%^[12].

1.8 Resource waste

1.8.1 Waste of land resource. As stated above, due to acceleration of industrialization and urbanization, the pull and "phagocytosis" of secondary and tertiary industries to agricultural resources is increasing. Numerous agricultural labors give up farming and become migrant workers. As a result, large area of farmland lies fallow or becomes idle all the year round. This is huge waste of land resource.

1.8.2 Waste of chemicals. Since the reform and opening-up, farmers really engaged in forefront of agricultural production and farming become fewer and fewer. To save labor and realize high yield and high efficiency, farmers have to use various and excessive chemicals, such as chemical fertilizer, pesticide, herbicide, and growth regulator. This not only wastes resources, but also pollutes farmland environment.

1.8.3 Waste of crop straw resources. At present, straw resources in south area are not fully developed and utilized, the waste situation is serious. According to our survey, waste of rice straw resources is mainly manifested in following approaches. (i) Direct burn. After harvest of rice, rice straws are directly burnt in field, it not only wastes resource, but also damages soil structure. (ii) Throwing out without care. After harvest of rice, rice straws are thrown out without care. As a result, straws are scattered in farmland, roads, fields, and villages. (iii) No management. After rice is harvested, straws are left without management despite wind and rain. In consequence, all over the mountains and fields are scattered with rice straws, which will pollute environment, block ditches, channels, water routes, and influence farmland irrigation.

1.9 Problem of operation scale China is one of the countries with smallest agricultural operation scale. The United States dominates the leading position in agriculture for many reasons, one of which is its moderate and large scale operation scale. In the United

States, most farms are family farms and most farmers are multiple occupation farmers. On average, each farm has farmland area about 200 hectare, breeders generally breed more than 100 milk cows, and more than 2 000 pigs are available for slaughter annually. In Minnesota State, there are more than 80 000 farms, but only 20 000 (25%) farms solely operate agriculture^[13]. Although a good many typical scale operation entities appears in China, such as large grain farmers and state-owned farms. In 2011, the number of state-owned farms reached 1785 in China, and the farmland area reached 6.1163 million hectare^[14]. However, compared with developed countries, there is still a large gap.

1.10 Problem of economic benefit Low economic benefit is a prominent, specific and actual problem of agricultural development in China. Low economic benefit of agriculture is mainly resulted from following reasons. (i) High risk: Agricultural production often suffers great losses due to natural disasters, accordingly influencing harvest of agricultural production. Apart from natural risk, agricultural development is also faced with "market risk", including international and domestic market risks. (ii) Long time: The process of agricultural production, *i. e.* the growth and development of agricultural organisms, is long, for example, one growth season, or even longer, one year or several years. Therefore, the effect is slow, and the time for obtaining economic benefits is longer compared with secondary and tertiary industries. (iii) Low price: With rise of price, agricultural products have high price, but the price of means of agricultural production rises faster. Rise of agricultural production cost objectively gives rise to "farming at a loss". Engaging in agriculture has no high economic benefit or even will lose money. Consequently, agricultural "land, people, and capitals" will flow to the secondary and tertiary industries. What's worse, only a small portion of the money earned by farmers will be invested to agricultural production, while a larger portion is invested in secondary and tertiary industries (such as purchasing houses, speculating in shares, and establishing enterprises, *etc.*).

2 Recommendations

2.1 Deepening the understanding In the new century and new stage, to ensure rapid, sustainable and healthy agricultural development, we must deeply understand importance of agriculture and special characteristics of China's agriculture. All countries in the world attach great importance to agriculture. Since food is the primary issue, even in such economically powerful country as the United States, agriculture is still put in a strategic position. China is a large agricultural country with 1.3 billion people, so the food issue is always the top priority. From 2004–2013, Central Committee of the Communist Party of China issued No. 1 Document with "three issues concerning rural areas" as the subject for consecutive 10 years, manifesting high attention of Central Committee to agriculture, rural areas and farmers. However, due to rapid economic and social development, the portion of agriculture in the entire national economy is declining. Some local leaders take the

GDP growth as the sole target. In actual work, they neglect agriculture intentionally or unintentionally. This must arouse close attention of local government. In future, examination of local cadres and local economy should include agricultural development situation (quantity, quality and proportion, *etc*) into the performance indicators, and it is recommended to implement "one vote veto system".

2.2 Strictly enforcing laws Firstly, it is required to legislate. Market economy is rule of law economy. In future, with constant socio-economic development and advance of agricultural modernization, it is required to legislate, and promulgate new laws and regulations, to realize having laws to abide by. Secondly, it is required to enforce laws. After promulgation of a series of agricultural laws and regulations, it is required to strictly enforce laws and bring into play functions of these laws. Practice shows that only strict enforcement of laws may ensure agricultural development, rural prosperity, and farmers' richness, and effectively solve three issues concerning agriculture, rural areas and farmers. Thirdly, solving realistic problems. In our survey, we found many areas receive agricultural subsidy of the state but lay the farmland idle and desolate. Such situation is not favorable for agricultural development. It is required to strictly enforce laws, to correct agricultural malpractice and promote agricultural development. Besides, we found some grass-roots units make a false report of statistical data for political achievement or catering to the superior government, it is required to put an end to this problem through relevant laws, regulations and systems.

2.3 Strengthening training To comprehensively improve scientific, technological and cultural quality of farmers, raise scientific farming level, and adapt to requirement of modern agricultural development, relevant organizations must attach importance to and practically strengthen training of farmers. It is recommended to launch comprehensive modern agricultural knowledge training for all farmers and those directly engaged in agricultural production. Training should focus on modern scientific and technological knowledge, modern agricultural knowledge, as well as agricultural laws and regulations. Through training, it is expected to make trainees become new farmers, new agricultural production operators and managers having agricultural sci-tech knowledge, knowing agricultural laws and regulations, and being good at agricultural operation and management. Training can be carried out in various ways, such as off-the-job training, on-the-job training, special training class, and tutorial class, in many forms, including radio, television, newspaper, movie, network, and wall newspaper, or telephone, mobile phone message, We-Chat message, and QQ, *etc*. Training should focus on practical effect and vary with each individual. Training time may be weekend, holidays or farm slack season. Training may be carried out in the form of "night school for farmers" or "holiday training class".

2.4 Increasing benefit Firstly, adjusting price of products. To realize stable and sustainable development of agriculture, increase operating benefit of agriculture, and increasing farmers' in-

come, it is required to adjust price of agricultural products, price of means of agricultural production, and price of products of related industries, to make price of agricultural products return to reasonable level, and make producers lucrative, farmers profitable and operators get rich. Then, China's agriculture may be hopeful. Secondly, increasing agricultural subsidy. The price of grain, cotton and oil is generally lower than their due price and fails to reflect due benefit of operators. In this situation, the state should safeguard benefits of operators (producers/farmers) and give subsidy for price difference. Thirdly, developing large-scale production. To increase agricultural production benefit, developing large-scale production is inevitable trend. The 2013 No. 1 document of central government clearly stated developing new large-scale production mode such as family farm. This will greatly increase benefit of agricultural operation. Fourthly, implementing industrialized operation. To increase agricultural benefit and ensure farmers' benefit, industrialized operation is the only way. Industrialized operation, regional distribution, specialized production, integrated operation, socialized service, and enterprise-type management play an important role in sustainable development of China's agriculture.

2.5 Saving resources (i) Cherishing resources. It is required to cherish all resources including land, water, air, *etc*. (ii) Using resources. It is recommended to fully and intensively use idle and waste farmland. For example, it is recommended to collect and use crop straws, poultry and livestock manure resources in many ways and channels, and by many methods, and take the road of "comprehensive use, recycling use, and high efficient use". (iii) Protecting resources. At the same time of using resources, it is recommended to take various measures and methods to protect resources, to realize more resources and higher benefits.

2.6 Protecting environment (i) Protecting ecological environment. To develop agricultural production, especially high-yield, high-quality, high-efficient, ecological and safe agricultural production, the precondition is maintaining first-class ecological environment. (ii) Managing ecological environment. At present, in many areas of China, especially some economically developed areas, the environment pollution is serious and agricultural ecological environment degrades, so it is required to take resolute measures to manage ecological environment. For agricultural diffused pollution resulted from excessive and abusive application of chemical fertilizer, effective measures should be taken. (iii) Building ecological environment. Firstly, it is recommended to plant trees, to increase the forest coverage. This is an essential measure for building ecological environment and protect ecological environment. Secondly, it is recommended to realize green coverage through taking full advantage of existing farmland resource. We should make effort to turn bare farmland to green coverage by every possible means, to effectively improve agricultural ecological environment. Thirdly, it is recommended to build ecological agricultural parks to improve quality and level of construction of agricul-

tural ecological environment.

2.7 Developing science and technology (i) Valuing science and technology. Science and technology constitute the primary productivity. On July 27, 2012, Guangming Daily reported that China's agricultural scientific research and innovation is accelerating, the contribution rate of agricultural science and technology rose from 45.97% in 2003 to 53.5% in 2011. According to Beijing Business Today (March 25, 2013), the contribution rate of agricultural science and technology in Beijing has reached 69%. Therefore, to speed up agricultural production, we must attach great importance to agricultural science and technology, and energetically develop agricultural science and technology. (ii) Innovating science and technology. The vitality of science and technology lies in innovation. We should make active exploration and innovation in agricultural biological technology, agricultural information technology, agricultural maritime technology, and agricultural space technology. (iii) Applying science and technology. It is recommended to apply advanced agricultural science and technology in actual production, convert advanced science and technology into actual productivity, and turn advantage of agricultural science and technology into advantage of agricultural economy.

2.8 Laying solid foundation (i) Increasing input. Laying solid foundation for agriculture needs increasing input in many ways. At the same time of increasing agricultural input, it is recommended to encourage enterprises and farmers to increase input, especially, and adopt preferential policies to attract private input and foreign investment. (ii) Strengthening construction. In particular, it is required to strengthen farmland water conservancy construction, rural road traffic construction, rural water and electric network transformation, and rural information construction, to practically improve hardware facilities and conditions for agricultural and rural production and life. (iii) Enhancing ability. It is recommended to enhance agricultural infrastructure construction through increasing input, to practically increase integrated agricultural productivity and ensure safety of grain and agricultural products, improve ability of resisting disasters and reducing disasters,

and provide solid guarantee for stable and sustainable development of agriculture.

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