Is the Farmland of China Sufficient? ——Analysis Based on the Second National Land Survey

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Abstract According to the data of the second national land survey, the farmland area of China at the end of 2009 was 200 million mu more than the original statistical data. This raises widespread concern. Analysis is carried out from the perspective of task, technique, necessities and effect on China's grain security of the second national land survey. Through analysis, it can be deemed that data of the second national land survey are reliable. It overcomes defects of traditional survey projects and will be of profound significance for grasping current situations of farmland resources in China. Farmers are grain production entities, while the grain yield survey of farmers is calculated through sampling survey of per unit area yield and the sown area. Therefore, the increase in farmland area may indicate underestimation of the grain yield, and the grain security risk of China will decline accordingly.

Key words Grain security, Land survey, Per unit area yield

1 Introduction

China's land area ranks third in the world, but the farmland is not sufficient in China. For example, the per capita farmland of China is lower than that of India, which is also a country with large population (more than one billion). To value land highly, use land rationally and protect farmland effectively is a national basic policy of China. However, the farmland area still keeps shrinking, because rapidly advancing industrialization and urbanization occupy large area of farmland. At an essential meeting in March 2006, China launched an ambitious plan to take the 120 million ha farmland as restrictive target with legal effect, and included it into performance assessment of local government. Former Premier of China, Wen Jiabao, said we cannot cross the line and reduce the total amount of farmland in China to less than 120 million ha (or 1800 million mu), and we must resolutely adhere to the strictest possible land management system. However, people are not confident of this target. According to statistical data issued officially, the farmland area declined gradually, from 1951 million mu in 1994 to 1820 million mu in 2013, only 20 million to the target. Will the farmland area continue to decline?

As is known to all, with advance in urbanization and modernization, numerous farmers flow to cities, and urban residents also keep improving housing conditions at the same time. For building highways, railways, and airports, large area of land will be occupied. No matter what the superior government orders, all local areas are still busy at putting up installations, building factories and airports, countless tall buildings rise. All of these will occupy farmland. Urbanization is an inevitable trend, occupation of farmland will be of frequent occurrence, it is impossible to completely forbid farmland occupation. In this situation, as long as we continue to promote urbanization, the 1800 million mu farmland red line will be broken sooner or later.

No doubt, no country is able to feed 1.3 billion people independently, so China must produce sufficient grain. Sticking to the 1800 million mu farmland red line means if capital farmland continues to be occupied, it may lead to grain crisis. Thus, the issue of 1800 million mu farmland red line is in fact the issue of grain security.

2 General information of the second national land survey

To find out actual situation, China launched the unprecedented second national land survey in July 2007. After three years, with expenses more than 10 billion yuan, it completed a survey report at the end of 2009 (specifically October 31, 2009). This land survey report was submitted to the State Council in March 2010, but it was not announced until December 30, 2013. Before the announcement, many scholars had in-depth discussions. According to practice, departments of land and natural resources announce farmland area data in annual *Communiqué of Land and Natural Resources*. Nevertheless, in 2009 - 2012, there were no data of farmland area in the Communiqué for consecutive 4 years. Obviously, there is considerable dispute about the data of second national land survey. At least, the national department of land and natural resources is not confident at the data of this time survey.

On December 30, 2013, major data of the second national land survey were announced. According to the survey, by the end of 2009, the national farmland area was 2030.77 million mu, which was 203.8 million mu more than the data in 2009.

As a tossed stone raises a thousand ripples, various circles showed different attitudes. Numerous people felt doubtful. According to original statistical data, national farmland area dropped from 1940 million mu in 1998 to 1826 million mu in 2009, reducing about 114 million mu within 10 years. According to the data announced by national department of land and natural resources at

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the end of 2012, the farmland area at the end of 2011 was 1824.76 million mu. Decline rate of farmland area showed slight slower, but it was still decline. However, the information reflected in the second national land survey was opposite.

Some scholars explained that before 2006, farmers had to pay agricultural taxes, so they may report less farmland area, to reduce pressure of public grain. After the agricultural taxes were canceled, the state granted farmland subsidies. To obtain more grain subsidies, farmers would report more farmland area. If this idea is correct, farmland area will be like rubber band. In other words, the farmland area is not convincing.

By contrast, some people, especially real estate developers, are elated at such fact of the 200 million mu farmland beyond the 1800 million mu red line, because only 2 million mu is needed for house construction. They hope government to loosen land policy and grant more land, they will build more houses.

To understand the information of the second national land survey, it is necessary to find out tasks and technical methods of the second national land survey. The second national land survey includes rural land survey and urban land survey. Rural land survey takes county as basic unit, mainly according to 1:10000 scale ortho-photo map, field survey of parcels of farmland, garden, grassland, forest land, land type, location, area, and current use situation of rural residential area beyond urban areas. Capital farmland protection land (parcel) was implemented in current land use maps. Registration was made, land use database and cadastral information system were established, to realize interconnection and sharing of survey information. On the basis of land survey, it established statistical, monitoring and rapid update mechanism for information of land resource changes. Urban land survey was mainly to determine boundary, scope, and uses of parcel of land in urban areas, to grasp land use and land use right of industrial land and infrastructure land.

The second national land survey applied many advanced technologies, such as aero-space remote sensing, geographical information system, global positioning system, database, and network communication, *etc*. These advanced technologies greatly improve technical level of the second national land survey and turn over a new page for land survey, so they have great theoretical and practical significance.

Using advanced technologies can get rid of untrue information of land survey. If we ask farmers to declare their farmland area truthfully, it is difficult to get rid of influence of state fiscal and taxation policies. In the past, when land tax and agricultural tax were exempted, some farmers would report less farmland area; when there are subsidies of farmland, they will report more farmland. However, taking aerial photos as basis of land survey and decoupling fiscal and taxation burdens and farmers, the data obtained will be highly credible.

According to statistical report issued officially, improvement of survey standards and technical methods and adjustment of rural fiscal and taxation policies bring about more comprehensive, objective and accurate data to the second national land survey. However, from the perspective of farmland area and location, about 9.963 million ha farmland is situated in forests, grasslands and control lines of highest flood levels of rivers and lakes in Northeast and Northwest regions, and slopes of more than 25 degrees. A large amount which suffers middle-level and heavy pollution is mostly not suitable for plantation, and a certain amount has encountered problems in normal plantation as surface soil has been damaged by roof fall in mines and overexploitation of underground water. In sum, China is still characterized by low per capita farmland, poor quality of farmland, insufficient farmland reserves. China is still facing a daunting challenge in protecting its farmland in light of its total amount and quality of farmland, population growth and demand for land use in development.

3 Necessities for new national land survey

At the early period of the founding of new China, farmers obtained land property right, so their enthusiasm for opening up wasteland and expanding farmland became enormous. In 1956, China launched land survey in the whole country, and farmers and grass-roots cadres actively cooperated. People carefully measured every parcel of land and made truthful registration of farmland boundary and location, as well as name of farmland owner. Farmers obtained land certificate, gladly buried boundary stone, and took the farmland as their precious. The national farmland area soared from 1.468 billion mu in 1949 to 1.677 billion mu in 1957. No doubt, the statistical data of farmland at this time was credible. The grain yield of China rose from 113.18 million tons in 1949 to 192.75 million tons in 1956, with annual growth rate near 10%.

In 1956, China launched the movement of rural socialist transformation, advanced cooperatives were gradually changing to people's communes. The land property right obtained by farmers disappeared again, which greatly dampened farmers' production enthusiasm. Later, the Great Leap Forward completely disrupted agricultural production order. All areas boasted the per unit grain yield. For example, the grain yield in central plain area was 300 – 400 kg, but it was boasted to 500 kg, 5000 kg or even 15000 kg. Those boasters did not realize the delivery of public grain is closely coupled with the yield and farmland area, finally, they had to deliver all grain harvested but it still failed to complete the delivery task. As a result, a lot of farmers had no grain left for survival. This led to the great famine in 1959 – 1961.

Farmers get two bitter lessons from this experience. First, not boasting the grain yield any more. Second, resolutely refusing to measure the farmland again. Simply, much farmland means more exemption. Even they increased some farmland through opening up wasteland, they would conceal and do not report. From 1958, farmers in most areas started not telling truth about farmland area. The property right ownership and vital interests changed attitudes of farmers towards farmland area completely. In addition, rural grass-roots cadres united together with farmers in common benefits. If some leaders wanted to measure the farm-

land, they would not lead the way, and may create obstacles by every possible means, or even drove surveyors away.

For 39 years from 1957 to 1995, no measurement was made for farmland area. The farmland area issued in Statistical Yearbook was obtained through the farmland area in 1957 deducting annual capital construction land and destroyed farmland. In fact, if possible, farmers have not stopped opening up wasteland all the time. In this period, the capital construction land scale is limited. According to logic, the total farmland area should take on a rising trend, but the statistical data showed a decline trend. Some agricultural policies further distort the farmland area objectively. For example, to encourage opening up wasteland, government allowed farmers not to include the wasteland they opened into their farmland area, and thus they could be exempted from respective agricultural tax of the corresponding period. Even the specified period had expired, farmers and rural organizations still made effort to delay. Newly reclaimed farmland was not included into the farmland area and became a coffer of farmers for evading taxes. However, once there were natural disasters, farmers and rural grass-roots organizations would report more destroyed farmland, to obtain more relief funds. In some period, superior government asked to increase the per unit area grain yield, and took the increase of the per unit area grain yield as a target for performance assessment of local officials. If the concealed farmland was exposed, the per unit area grain yield would drop. Thus, the superior government usually looked the other way.

In farmland area, benefit drives farmers, local grass-roots organizations and statistical department have conflict. Due to information asymmetry, farmers tended to report less farmland area, while statistical department found no way out. If they encouraged farmers to conduct land survey, they worried about the new farmland area will increase public grain delivery, worried about reallocation of farmland. Also, if they cooperated with government to measure farmland, they would shoot themselves in the foot. Without support of farmers, traditional mode land survey will not be carried out successfully. In this situation, it has to draw support from advanced technologies. However, it is easier said than done. From 2007 to 2009, it mobilized several hundred thousand people and invested more than 10 billion yuan to complete the land survey. The second national land survey is meritorious. The data of the second national land survey will provide fundamental basis for China formulating various agricultural policies, land policies, and environmental protection policies.

4 Effect of the second national land survey

As to the effect of the second national land survey on China's grain security, different people have different opinions. An official of the Ministry of Agriculture believed that although the farmland area showed slight increase in figures, the productivity is still the same with originally announced data, and there were no any substantial change. Another agricultural expert from Chinese government said the slight increase of farmland area may indicate the per capita unit area grain yield is not as high as the estimated. However, with reference to relevant statistical survey regulations, there may be different conclusion. The statistics of grain crop sown area and yield are surveyed as per agricultural production and operation households and entities by different statistical methods.

Statistics of grain crop sown area and yield of agricultural production and operation households are carried out by sampling survey method, and data are mainly grain crop sown area and yield of rice, wheat and maize. Firstly, it is required to work out the overall sampling framework of a province according to agricultural census data, and collect sample households in allowed sampling error range. Secondly, it is required to obtain the sown area of sample households through household survey or field survey, then to obtain the per unit area yield through real-time harvesting and weighing of planting samples. Then, it is possible to calculate sown area and per unit area grain yield of each province and the whole country according to the above sampling survey data. Finally, it is possible to calculate total yield of main grain crops of each province and the whole country according to the above sown area and per unit area yield data. For agricultural production and operation entities, the sown area and yield data are obtained through comprehensive survey.

At last, the grain yield of each province and the whole country is equal to the sum of the yield of agricultural production and operation households and entities. In the grain yield of the whole country, agricultural production and operation households produce more than 95%, and the yield of main crops (rice, wheat and maize) accounts for more than 90% of grain yield of agricultural production and operation households. Therefore, the grain yield in conventional years is mainly calculated through sampling survey. On the basis of the above analysis, we can come up with following conclusion that the farmland area data of the second national land survey will not influence the per unit area yield data, because the latter is obtained through sampling survey. However, the new farmland area data will make the sown area of crops and grain crops slightly increase, and accordingly the actual grain yield of China is higher than the original statistical data. Since the farmland area issued in second national land survey is 11% higher than the original statistical data, it can be deemed that actual annual grain yield of China is 11% higher than the originally announced data, which will further reduce the grain crisis of China.

References

[1] CHEN XW. Food security is faced with three challenges[J]. China Economic Report, 2014(2): 43 - 45. (in Chinese).

[2] National Bureau of Statistics of the People's Republic of China. National health statistical survey system, 2014 [M]. Beijing: China Statistics Press, 2014. (in Chinese).

[3] HAN CF. On the strategies of national food security under the new situation of full implementation[J]. Qiushi, 2014(19): 27 - 30. (in Chinese).

[4] XU DQ, JIA SS. On grain——Analysis 1.8 billion-mu arable land minimum in detail[M]. Beijing: Peking University Press, 2014. (in Chinese).