Research on China's Subsidy for Crop Rotation and Fallow Land

Research Summary[1], February 2022

1. Research Background

Crop rotation and fallow land is a vital path to address the ecological problems of land use. It is also a major strategic element of innovative land protection and food security. It is conducive to soil health recovery and sustainable development of agriculture and is also conducive to balance the contradiction between food supply and demand, stabilize farmers' income and reduce financial pressure. In *the Proposals of the Central Committee of the Communist Party of China on Formulating the 13th Five-Year Plan for National Economic and Social Development* adopted in 2015, it was proposed to explore the implementation of a pilot farmland rotation and fallow system. In 2016, to implement the decision and deployment of the Party Central Committee and the State Council, the former Ministry of Agriculture, together with the Central Agricultural Office, the Development and Reform Commission, the Ministry of Finance, and other ten central ministries and commissions, jointly issued *the Notice on Issuing the Pilot Program for Exploring the Implementation of the Cultivated Land Rotation and Fallow System*. The pilot work of the rotation and fallow system has been fully deployed, and specific provisions have been made on the pilot area, including technical path, subsidy standards, and methodology. Therefore, timely summarization of China's farmland rotation and fallow system is of great significance to further improve and scientifically promote farmland rotation and fallow, accelerate the transformation of agricultural development, promote ecological restoration and governance, and promote agricultural sustainable development.

2. China's Farmland Rotation and Fallow System Framework

2.1 China's Farmland Rotation and Fallow System Framework

Through years of exploration and practice, the pilot area of the farmland rotation and fallow system has expanded from 6.16 million mu in 2016 to 40 million mu in 2021. The direction and path have been

[1] This project was conducted in collaboration with a research partner.

increasingly clear over the years, and good results have been achieved. These are summarized below.

First, since the launch of the pilot farmland rotation and fallow system in 2016, 10 departments and units, including the Ministry of Agriculture and Rural Affairs, the Development and Reform Commission, and the Ministry of Finance, as well as the governments at all levels in the pilot regions, have strengthened cooperation and implemented measures under the deployment and requirements of the central government. A set of effective organizational methods and working mechanisms were formed.

Second, for the “Regional Selection and Technical Model of Farmland Rotation and Fallow”, the government not only focuses on the pilot objectives to highlight critical areas and long-term development to strengthen the measures for polluted farmland, but also adopted specific technical measures suitable to local conditions.

Third, the *Pilot Plan for Exploring the Implementation of the Farmland Rotation and Fallow System* issued every year has specific provisions regarding the subsidy standards and subsidy methods for land rotation and fallow.

Fourth, the local counterparts explored two more effective monitoring tools in the pilot practice. The first is the “sky eye” observation of changes in the planting area. The second is the “ground net" measurement of the quality improvement of cultivated land. It is mainly to carry out soil quality inspection and evaluation — monitoring and evaluation. In practice, the current quality monitoring and evaluation work mainly relies on third-party purchase service and the farmland quality monitoring and protection agencies of the agricultural and rural authorities in the pilot areas.

2.2 Main Difficulties in China's Farmland Rotation and Fallow System

Since the launch of the pilot farmland rotation and fallow in 2016, various localities have actively explored and established the technical model and organization and management methods of crop rotation and fallow. The progress has been smooth, and the results have been remarkable, however there is still room for improvement.

First, from a design perspective, currently a mid-to-long-term development plan needs to be developed and the top-level design needs to be adjusted. Leading groups and expert committees have been established in various places, and fallow implementation plans have been issued, but the overall plans and blueprints are still lacking and need to be developed. Second, from a subsidy standards perspective, it can be challenging to achieve consistent policy for all regions. The rotational fallow areas cover a large range of climate conditions and involve many types of cropping systems, and the standards cannot be one-size-fits-all and should match local situations. Third, from a management mechanism perspective, the knowledge accessibility and training of farmers are not enough, and the supporting system should be improved. Fourth, from a technological perspective, technological support could be stronger, and the regulatory mechanism needs to be modified to consider new innovations.

3. Investigation and Analysis of Farmland Rotation and Fallow

3.1 Analysis of the Pilot Fallow Farm in Nanpi County, Hebei Province

3.1.1 The Situation of Nanpi County and the Survey

Nanpi County participated in the fallow pilot project with an area of 30,000 mu, involving 13 villages. The first batch of pilot villages began in 2016. The research team conducted a survey and visited five pilot villages and one non-pilot village. A total of 127 questionnaires for farmers were completed. Interviews were also conducted with the county, township, and village officials. One of the villages was on the first batch of pilot villages, which started with fallow in 2016 and ended in 2020. Two villages started fallow in 2019 and another two villages started fallow in 2020.

3.1.2 The Policy Effect and Existing Difficulties with the Implementation of Fallow Policy

The effect of the policy is recognized, and farmers have a strong willingness to adopt fallow in their farmland. In the interview, many farmers expressed their support for the fallow policy and their willingness to continue participation. The main reasons are: (1) the awareness of water-saving has increased, (2) the enthusiasm for farming is not high, and (3) the income from planting wheat is relatively low. Further investigation shows that if the policy continues, 100% of the farmers interviewed will be willing to adopt fallow. If the existing policies are ended, 66.13% of the farmers will be unwilling to implement fallow land. 33.87% of farmers said that if the existing preferential policies ended, they are still willing to continue implementing the fallow policy, partly because the opportunity cost of planting is still high, so it is better to focus on off-farm work.

The income of farmers is stable and within expectations, and the irrigation method needs to be revisited. The survey found that the primary income of most farmers in the surveyed village was non-agricultural work. However, the survey found that the current agricultural irrigation in Nanpi County still uses the traditional surface flood irrigation method with significant water consumption and low irrigation efficiency, and most of them use deep groundwater as irrigation water. It runs against the water-saving goal of fallow, resulting in a significant reduction in the water-saving effect of fallow pilots.

Ecological effects are beginning to appear, and the pilots suffer from a lack of continuity. Most farmers in pilot villages that previously implemented the fallow technique believe that the quality of crops and soil has improved significantly. Local governments and farmers are most concerned about the stability of the fallow policy and the project's continuity. The villages previously participating in the pilot program are no longer included in the pilot program since after the end of the first phase. The fallow project In Hebei Province is mainly used to protect water resources, especially groundwater. However, the fallow time is short, and the fallow areas are frequently changed, so the impact on groundwater is not significant.

3.1.3 Policy Suggestions

First, it is essential to balance the relationship between food security and resource utilization and avoid expanding the covered area. Although food security is important, there is a need to strike a balance between food security and sustainable use of resources, and further explore a fallow system that adapts to local conditions.

Second, the fallow area should remain stable and can be selectively adjusted if necessary. Stabilizing the fallow pilot areas is conducive to meeting the expectations of local farmers and to the restoration of the local ecological environment.

Third, it is important to have long-term planning and to strengthen the monitoring of the impact from fallow projects. To ensure farmers' income, long-term planning for the fallow system should be strengthened, including enhanced knowledge on land conservation methods, continuous hydrological monitoring, and subsidy refinement, to form longer term and more stable incentives for local government departments and farmers.

3.2 Investigation and Analysis of Farmland Rotation in Inner Mongolia Autonomous Region

Due to the vast area and sparse population in Inner Mongolia, the research team mainly adopted the methods of focus group discussion, interviews with selected farmers, and use of written surveys. The surveyed areas included Tongliao, Ulanqab, and Xing'an League. The analysis focuses largely on Xing'an League.

3.2.1 The Situation of Xing'an League and Implementation of Crop Rotation System

Xing'an League is a prefecture located in the northeast of Inner Mongolia. The implementation period of the crop rotation system is three years, aiming at adjusting and optimizing the crop planting structure. The subsidy for farmers is set to be at the rate of 150 yuan per mu per year, and it will be paid to the farm operators in the form of a cash card.

Table 1 Implementation of Farmland Rotation in Xing'an League

Year	Pilot area (ten thousand mu)	Main rotation pattern	Specific implementation
2016	15	Corn and soybean, complemented by 3 other patterns [a]	50,000 acres in Zalaite Banner 50,000 acres in Keyouqian Banner 20,000 acres in Tuquan County 30,000 acres in League Farm Bureau
2017	10	Corn and soybean, complemented by multiple crops [b]	18,000 mu in Keyouzhong Banner 30,000 mu in Tuquan County 20,000 mu in Keyouqian Banner 12,000 mu in Ulanhot City

			20,000 acres in Zhalaite Banner
2018	60	Corn and soybean, complemented by multiple crops [b]	400,000 acres in Zalaite Banner 200,000 acres in Keyouqian Banner

[a] Three other patterns: corn-soybean-grain (potato)-grain, corn-soybean-potato (grain)-corn, corn-soybean-corn-grain (potato).

[b] The rotation of corn and potatoes, millet, oil sunflower, dry rice, sugar beet, Chinese herbal medicine and other crops.

3.2.2 Results and Challenges in the Implementation of Crop Rotation Scheme

The main results are the following. First, the rotation scheme increased farmers' income. Through crop rotation, not only the yields of grain and oil crops and high-value cash crops increased, but also the higher economic benefits from farming have increased farmers' income. Second, it laid a foundation for improving the quality of cultivated land, effectively improving the soil's physical properties and nutrient structure, significantly improving the soil fertility, and enhancing productivity. Third, it also increased the yield of other crops that are part of the rotation scheme. Fourth, it promoted the adjustment of the crop planting structure, especially reducing corn acreage in non-dominant areas, which is a positive development. Lastly, the scheme promoted the green development of agriculture. The site adheres to the concept of green development and has achieved the goal of reducing the total amount of chemical fertilizers by 10% and increased the utilization rate by 5% through the promotion of organic fertilizers.

There are also a few problems with the implementation. For example, plots are scattered. The scale of the farmland management area in Xing'an League is small, and there are many mountains. Individual farmers want to implement crop rotation, but the area is not large enough to meet the project's requirements. Moreover, some participating farmers are not very enthusiastic. Farmers' business philosophy and planting habits for corn have been deep rooted and it is difficult to change the thinking of farmers. Also, the lack of labor is an essential factor in the low enthusiasm of farmers to implement the crop rotation system. Finally, natural disasters cannot be avoided. Droughts frequently occur in the Xing'an League. Due to the severe drought, some of the rotation plots could not be sown.

3.2.3 Suggestions

A few suggestions for improvement can be drawn from the analysis and field observations.

- Implement land regionalization and standardized management. In terms of the problem of declining arable land area, it is necessary to use the land more scientifically and rationally arrange the layout of crops according to local conditions and the natural conditions such as the climate and soil of various places.
- Increase the public promotion of benefits and practical application of crop rotation.
- Increase financial support for crop rotation to reduce risks.

- Guarantee sufficient level of funds. To implement the pilot crop rotation in detail and ensure the smooth implementation of the project, it is necessary to put aside some funds to support the development of the pilot farmland rotation system, provide training and adequate funding guarantees.
- Strengthen capacity building and scientific and technical support for local agricultural bureaus and farmers

4. Policy Recommendations for Improving China's Farmland Rotation and Fallow System

Establishing and improving the farmland rotation and fallow system is an important part of the implementation of the rural revitalization strategy, and a significant step to consolidate and improve grain production capacity in a sustainable manner. After years of pilot projects, the basic framework of China's farmland rotation and fallow system has been initially established. From the survey results in Hebei Province and Inner Mongolia, it can be seen that the ecological and environmental benefits of crop rotation and fallow are significant, and the enthusiasm of farmers is relatively high for fallow (not crop rotation at the moment). In the short term, the research and development and promotion of relevant farming and irrigation technologies should be accelerated, and monitoring should be strengthened. In the long term, the balance between food self-sufficiency and the use of ecological resources should be fully considered, as well as the scientific planning of areas with crop rotation and fallow.

First and foremost, it is important to strengthen top-level planning. Planning for the crop rotation and fallow system should be formulated as early as possible, and the system should be carefully designed. Relevant state departments should formulate *the Interim Regulations on the Management of Farmland Rotation and Fallow* as soon as possible, formulate *the Measures for the Implementation of Farmland Rotation and Fallow* and other policy documents based on actual local conditions. A pilot coordination mechanism for the land rotation and fallow system should be established. The multi-department coordination should also be strengthened to successfully pilot the system. Following the overall national arrangement, each region must formulate 3–5 year rotation and fallow implementation plans that are suitable for local conditions.

Second, there is a need to improve the compensation mechanism. According to the changes in the incomes of different regions and crops, subsidy standards should be determined scientifically and long-term mechanism for the central finance should be formed to support the rotation and fallow system in critical areas. The local finance can be used to carry out the rotation fallow system independently.

The third suggestion is to strengthen technical support and capacity building. The scaling of existing technologies should be accelerated. It is vital to recruit scientific research units in the form of projects to participate in the research, develop a manual for rotation and fallow technology models, integrate and promote a batch of farming systems that consider production and ecology in different regions and form a

batch of technologies that can be replicated and promoted by combining land use and cultivation models. At the same time, it is necessary to explore the interactive mode of crop rotation and fallow and adjust according to local grain supply and demand.

It is also important to strengthen supervision and monitoring. Improving the management mechanism and realizing standardized management is crucial. The pilot assessment of the farmland rotation and the fallow system needs to be carried out as soon as possible, across regions. Third party acknowledgement and policy evaluation mechanisms should be improved, and quality monitoring data needs to be ensured to be submitted by the third-party inspection unit.