# Study on the policy of land tenure separation

## 1. A brief description of the findings

### 1. Data Collection

We conducted a social practice survey in Zhenshu Village, Ziyang City, with the theme of "Separation of Research and Three Powers, Helping Rural Revitalization", designed a questionnaire in advance before the start of the survey, and completed the questionnaire through face-to-face interviews during the research process.

We collected basic family information from the respondents, including their education level, household residents, how many children and elderly people need to be cared for, and whether there are people with serious illnesses or physical disabilities in the family. Subsequently, we continued to inquire about their annual income and expenditure before and after the implementation of the "separation of powers" policy (the relevant policies were implemented in 2017, here the policy refers to 2016 before the implementation of the policy, and the average level since 2018 after the implementation of the policy, the same below), including the family operating income in the basic income structure (family members personally farming and family-based farming, etc.), transfer income (government pension, housing provident fund, child support for migrant workers, subsistence allowance, disability security fund, etc.), Salary income (work wages or part-time job income), property income (interest on bank deposits, rent collection of houses and vehicles, etc.) and other sources of income that may exist, as well as expenses on medical care, education, food, clothing, entertainment (including tobacco and alcohol, etc.), shop rent, agricultural procurement, etc.

Subsequently, in order to understand the subjective feelings of the respondents before and after the policy reform, we set five levels of expenditure changes: "always zero", "not zero, but almost unchanged", "small increase", "large increase", "slight decline", "large decline", "large decline", and "large decline", and we also designed questions related to happiness, yearning for urban life, and support for the education of future generations. At the same time, in order to understand the agricultural production of the surveyed households before and after the policy reform, so as to screen out the targets with sample value and worthy of further in-depth interviews, we designed subjective questions about land planting input, agricultural production efficiency, agricultural production competition, and agricultural production enthusiasm.

### 2. Data Processing

A total of 127 questionnaires were collected, each with dozens of questions. They were manually sorted and entered into a spreadsheet, resulting in tens of thousands of cells. Faced with the massive amount of data that is difficult for the human brain to process, the practice team chose to use the professional knowledge of big data science and technology to overcome the difficulties.

(1) Eliminate noisy data

Ditch noisy data. In the process of investigation, although the practice team patiently explained to the villagers, it was inevitable that some of the investigators would not be able to remember clearly or have enough patience to cooperate with the survey, so some of the data obtained by the questionnaire were unreliable, which required a certain method to identify the data that interfered with the research conclusions. Verification by humans is not only hard but also extremely inefficient, and the solution of the practice team is to design an algorithm to verify the data according to the actual situation. It is not a simple mathematical equation, but a flowchart based on multiple judgments and discussions, with the effect of removing the false and preserving the true.

(2) Look for feature data

After removing part of the noise data, it is necessary to analyze the structure of the remaining data, and the data structure is determined by some feature item values, which highlight the connection and difference between the data, which is an important basis for drawing conclusions. Through the distribution columns of computer-generated data, the practice team quickly identified some data items with obvious characteristics, such as wage income and health care expenditure, and accordingly divided the working families and sick families.

(3) Comparative analysis of data

In the previous step, we got the superficial connection, and if we want to discover more in-depth patterns, we must compare and process the data. Since the impact of this policy is to be explored, it is necessary to use a comparative analysis, that is, to compare the difference between pre- and post-policy data. The practice team used the formulas in the Excel sheet to obtain various economic indicators, such as per capita net income and Engel's coefficient, and then performed attribution analysis on the changes of various indicators. When analyzing, it is necessary to consider not only the impact of the separation of powers, but also other circumstances that may affect these indicators, such as the impact of inflation on prices.

(4) Charts and graphs show data

After some conclusions have been drawn from the data analysis, the conclusions can be more visually corroborated using computer-generated graphs. Making charts is also a technical task. To highlight the different correlations between the data, you need to choose different types of charts, such as pie charts and column charts.

## 3. Ways to cooperate

There are 4 members of our practice team, and the division of labor is as follows:

Team Leader: Qin Qi, the founder of the project, the writer of the project proposal, and the data processor, are fully responsible for the actions of the practice team, and arrange and assign various tasks to ensure the smooth development of the research.

Team Member: Zhou Peidong, the main interviewer, is responsible for the local accommodation, travel, and schedule of the practice team.

Team Member: Wu Wenbin, the main designer of the questionnaire, was mainly responsible for the collection of relevant data in the early stage, which provided the theoretical basis and knowledge background for the action of the practice team.

Team Members: Ling Fengyang, data processor, tweet writer, actively participate in the work of various activities.

On the basis of this division of labor, our team generally adopts the method of online document co-editing to deal with and collaborate on various issues.

## 4. Research Methodology

1. Data collection research methods

(1) Qualitative: interviews

(2) Quantitative: questionnaire data

2. Research methods for data processing

(1) Longitudinal comparison method: compare the different situations of the same family at different times to analyze the importance of the separation of powers policy

(2) Horizontal comparison method: compare the different situations of different families at the same time and analyze the importance of the separation of powers policy

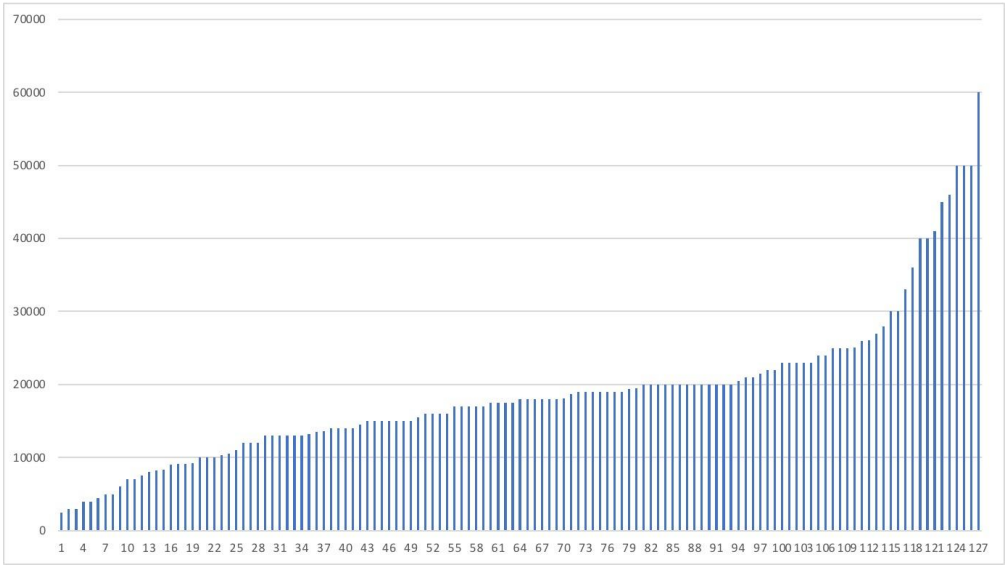
# Second, the key research content

## 1. The impact of policy reform on the real life of farmers

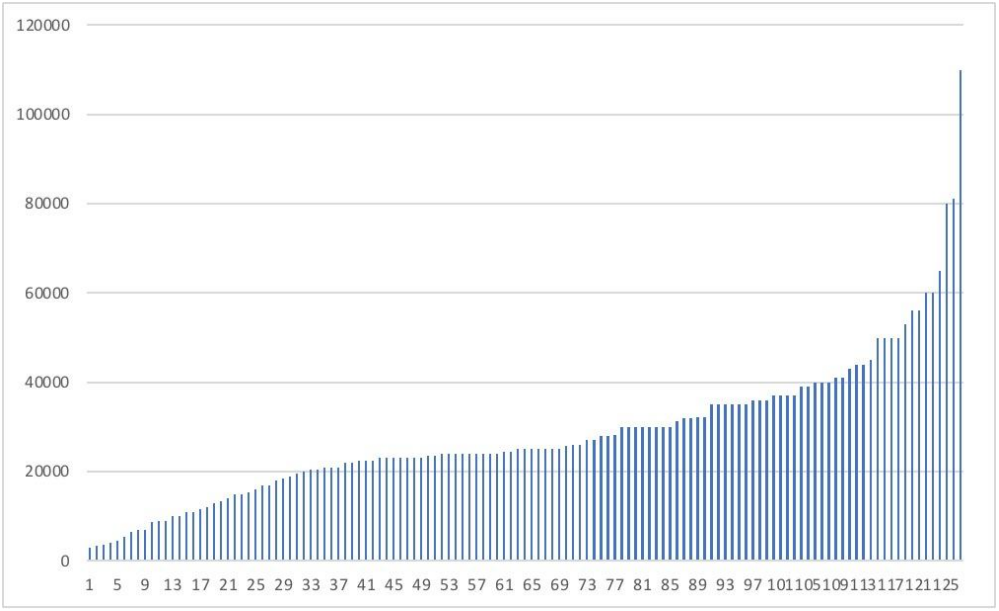
In recent years, a large number of the agricultural population has shifted to secondary and tertiary industries, and great changes have taken place in the situation in which every household has contracted land and every household farms. The phenomenon of separating the main body of land contracting rights from the main body of management rights is becoming more and more common, and the composition of agricultural producers has undergone profound changes. The new main body is family farms, peasant cooperatives, and agricultural enterprises, which do not necessarily have the right to contract land, but they have flowed into the land on a relatively large scale to engage in agriculture, have the right to operate the land, and are real agricultural producers and operators.

After the implementation of the "separation of powers" policy, the relationship between farmers and the land has changed, and what kind of changes will occur in their income level, expenditure, education level, marriage and family, occupation, happiness, etc.?

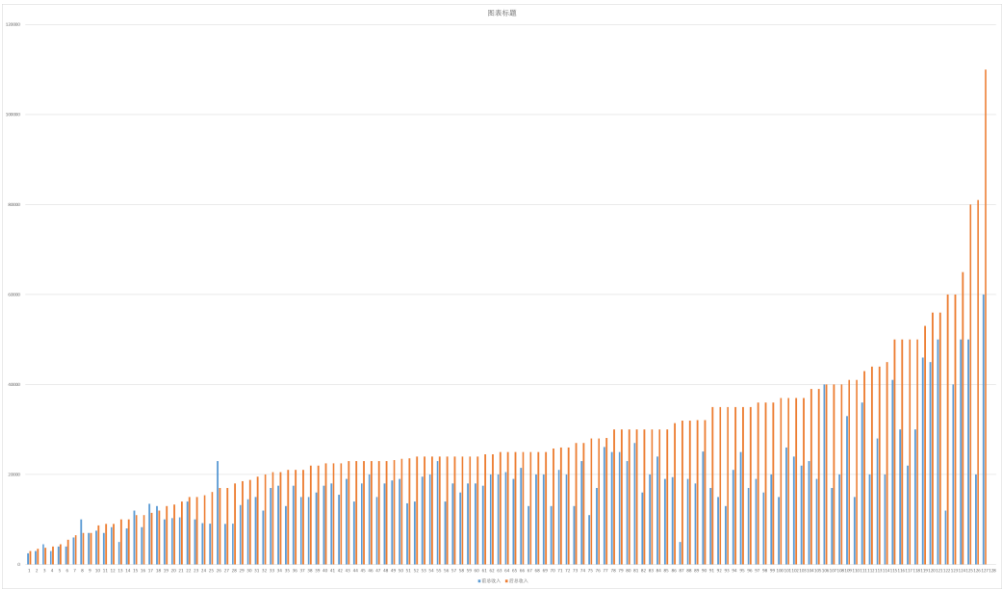
### (1) Income level




The total income of each peasant household before the "separation of powers".




The total income of each peasant household after the policy of "separation of powers".



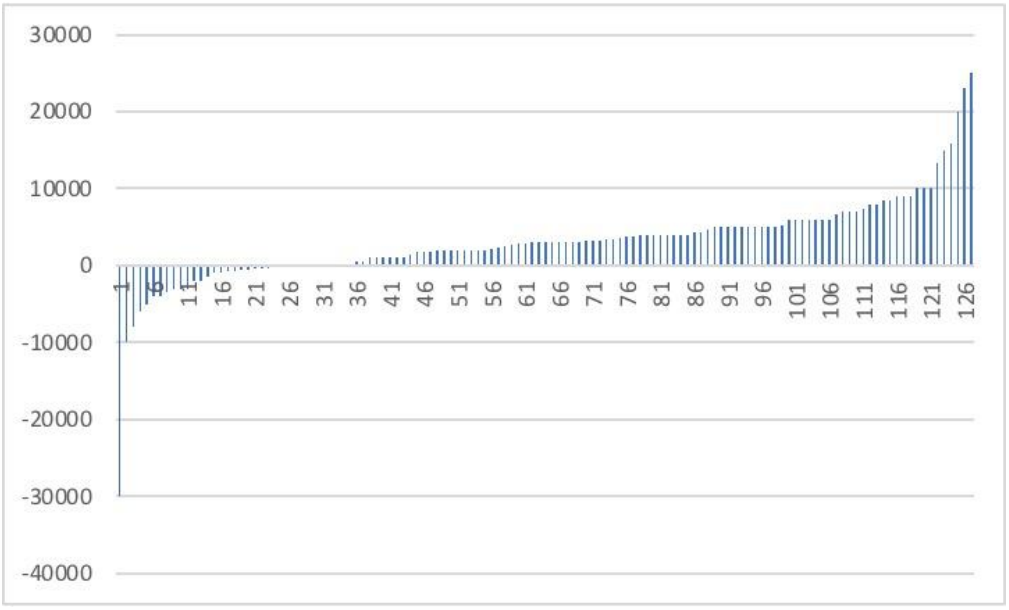
Comparison chart of the total income of farmers per household

The total income of farmers before and after the implementation of the "separation of powers" policy is ranked from lowest to highest, and the resulting bar chart is as follows. As can be seen from all the entered data and the above charts:

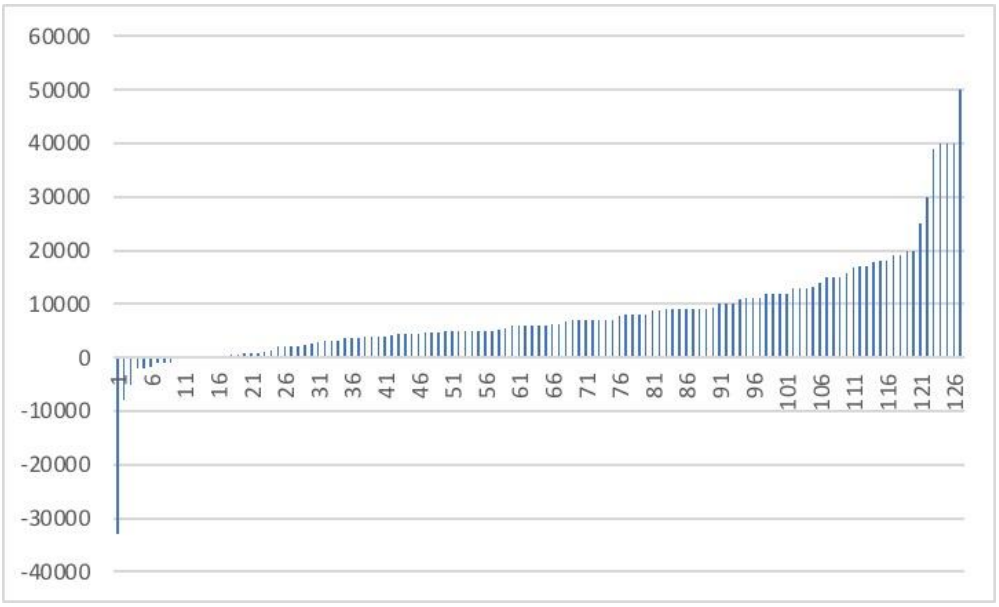
1. From a numerical point of view: before the implementation of the "separation of powers" policy, the average average income of farmers per household was 18,673.07 yuan. Most farmers have lower incomes. The lowest value is 2,500 yuan, and the highest value is 60,000 yuan; After the implementation of the "separation of powers" policy, the average total income of farmers per household was 28,266.14 yuan, and the income level increased significantly, an increase of 51.3 percent. The minimum value is 3,000 yuan and the maximum value is 110,000 yuan.

2. From the overall distribution: before the implementation of the "separation of powers" policy, about 85% of the total income of peasant families was 0 yuan to 25,000 yuan, of which about 63% of the families had an annual income of less than 20,000 yuan. After the implementation of the "separation of powers" policy, about 85% of peasant households have a total income of 0-40,000 yuan, and only about 23% of households have an income of less than 20,000 yuan.

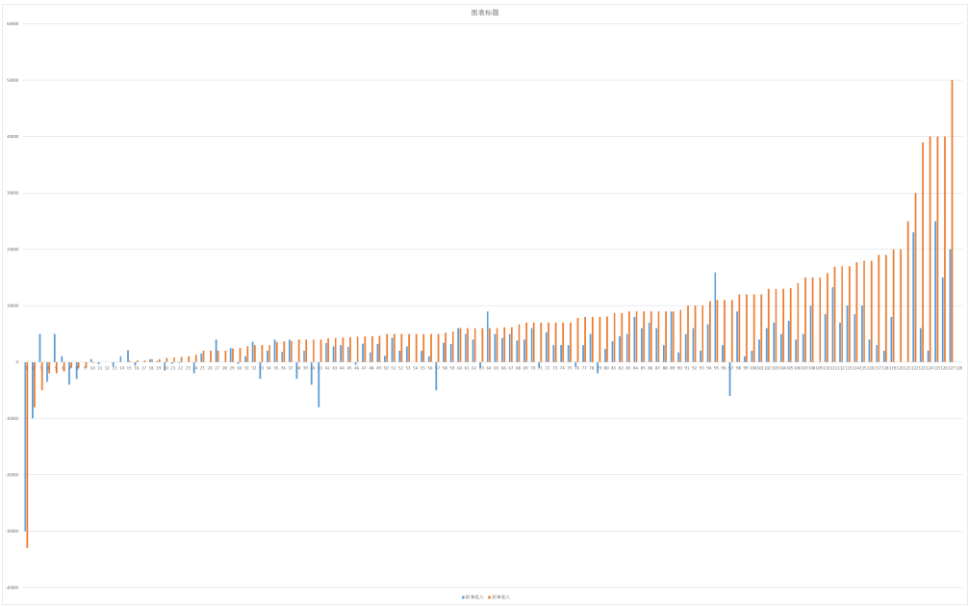
3. From the comparison before and after: the total income of the vast majority of households showed an upward trend, and only about 5 households saw a decline in the total income.




The net income of farmers per household before the "separation of powers" policy




The net income of each peasant household after the "separation of powers" policy



The bar chart generated by the net income of farmers before and after the implementation of the "separation of powers" policy is as follows above. As can be seen from all the entered data and the above charts:

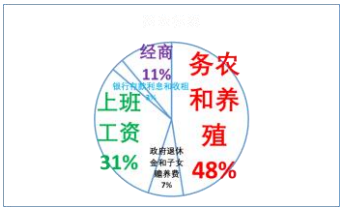
1. From a numerical point of view: before the implementation of the "separation of powers" policy, the average net income of farmers per household was about 3106.20 yuan. Most farmers have a lower net income. The lowest value is -30,000 yuan, and the highest value is 25,000 yuan; After the implementation of the "separation of powers" policy, the average net income of farmers per household was about 7,962.48 yuan, and the income level increased by about 156%. The lowest value is -33,000 yuan, and the highest value is 50,000 yuan.

2. From the overall distribution: before the implementation of the "separation of powers" policy, about 90% of the farmers' families had a net income of 0 yuan to 10,000 yuan, of which about 28.3% of the families had an annual income of less than 0 yuan. After the implementation of the "separation of powers" policy, about 90% of peasant households have a net income of 0-20,000 yuan, and only about 14% of households have an income of less than 0 yuan.

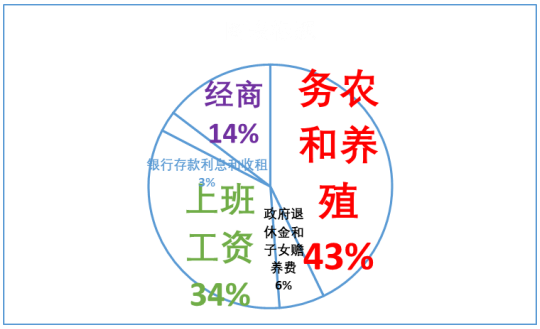
3. From the comparison before and after: the net income of most households showed an upward trend, and only about 14 households saw a decline.

## (2) Income structure

1. The average income structure of each household is shown in the figure below:



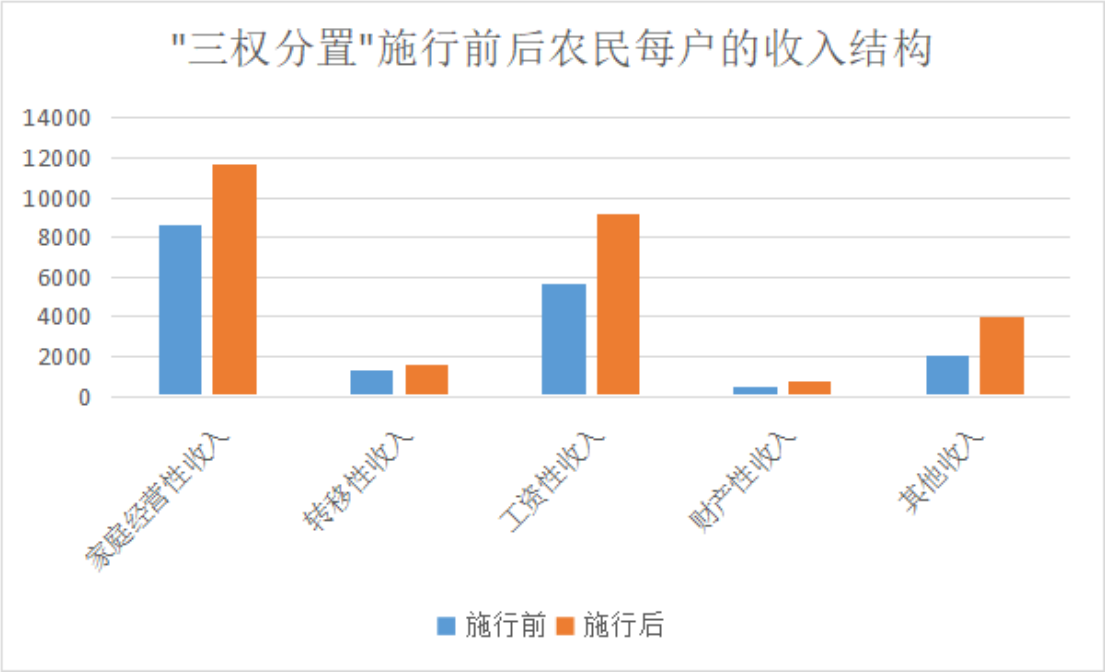

The proportion of income types before the "separation of powers" policy




The proportion of income types after the "separation of powers" policy

It can be seen from the data in the figure that before and after the implementation of the policy of separation of powers, the proportion of household operating income was the highest, the proportion of wage income was the second, and the proportion of property income was the lowest. Compared with before the implementation of the policy of separation of powers, since the implementation of the policy, the proportion of wage income in the income structure of farmers in the area has increased by 3%, household operating income has decreased by 5%, and other income has increased by 3%.

2. The approximate average of each income per household is shown in the figure below:

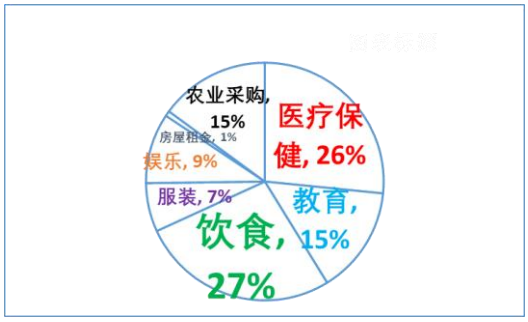



Before and after the implementation of the "separation of powers," the average income structure of peasant households was formed

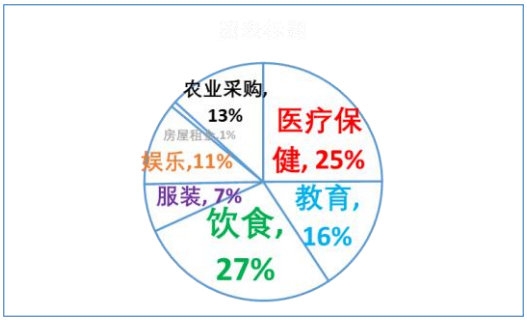
It can be seen from the data in the figure that before and after the implementation of the policy of separation of powers, the average income of farmers in the local income structure increased, among which the increase of wage income was the most significant, followed by household operating income and other income, and the increase of transfer income and property income was not obvious.

To sum up, after the implementation of the "separation of powers" policy, the basic income structure of peasants has remained largely unchanged, but the overall income level has been improved. Combined with the data collected from the questionnaire on occupational changes and the results of in-depth interviews, we found that the "mobility" of land has been further improved after the implementation of the policy, and many families have chosen to contract their land to other collectives or individuals who are willing to plant, or even a "gift" without paying if the other party is their own relative. As a result, the land is concentrated in the hands of some people who are willing to cultivate and are good at farming, and the land recipients rely on the concentration of land to increase their net income per mu, and the land contractors can go to the city more to work for wage income, or participate in business, etc., so that the proportion of "other income" increases.

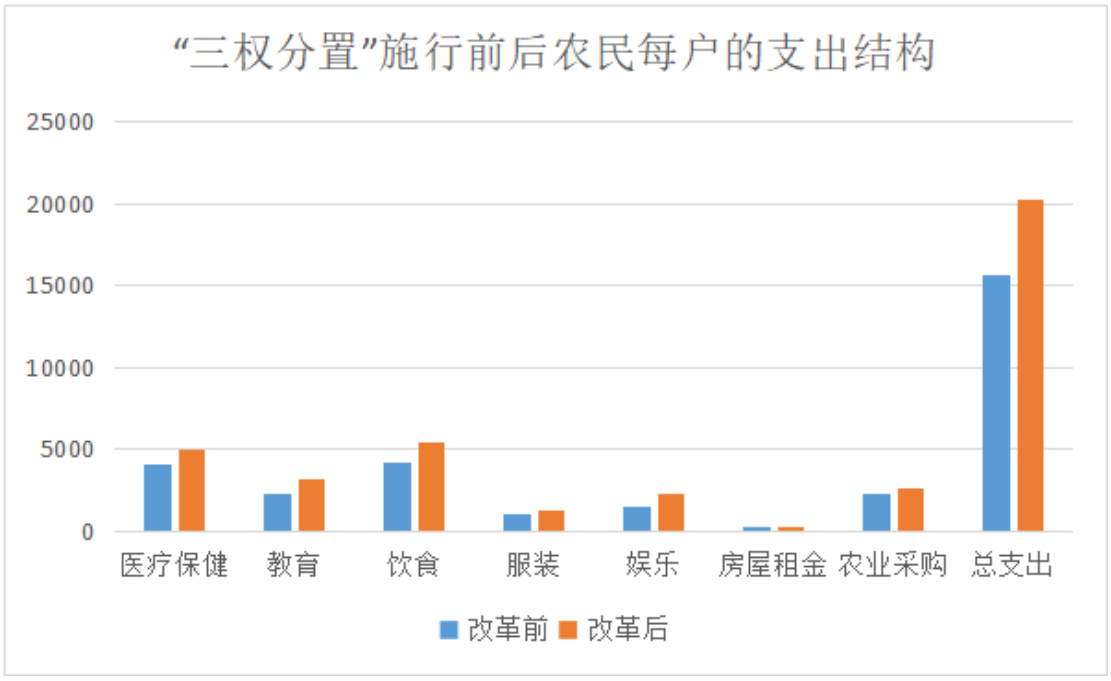
## (3) Expenditure



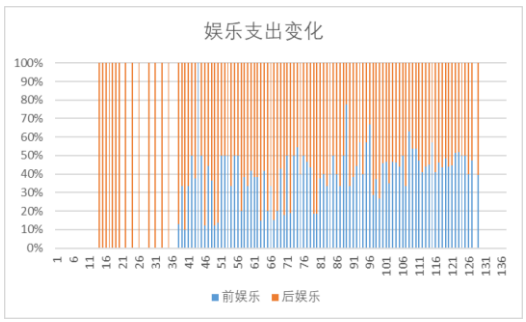

The proportion of the type of expenditure before the "separation of powers" policy



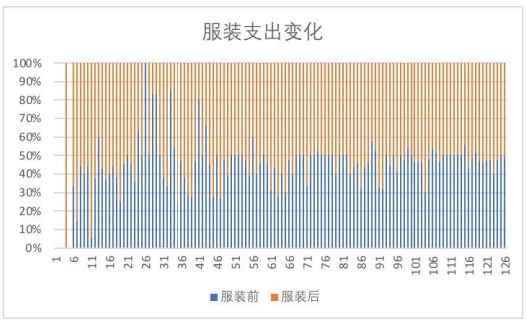

The proportion of the types of expenditure after the "separation of powers" policy




## Entertainment and clothing




A stacked bar chart shows the




A stacked bar chart shows the

comparison of entertainment expenditures before and after the implementation of the "separation of powers" policy, based on the entertainment expenditure after the implementation of the "separation of powers" policy

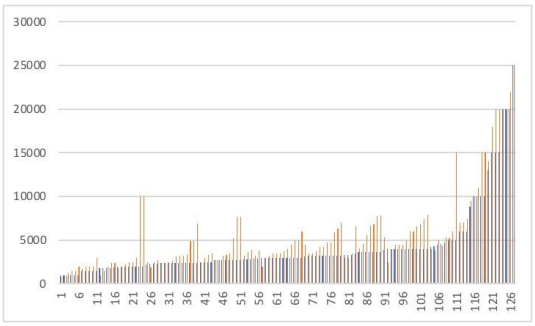
comparison of clothing expenditure before the implementation of the policy based on clothing expenditure after the implementation of the "separation of powers" policy

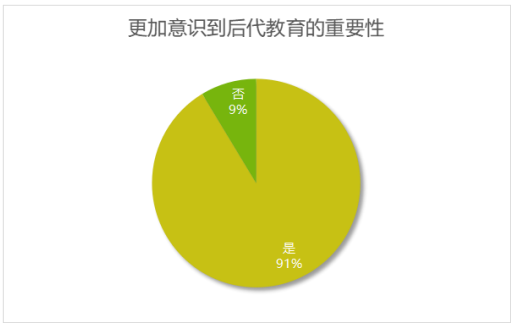
Note: This chart is a stacked bar chart based on entertainment spending after the implementation of the "separation of powers" policy, showing the comparison of entertainment spending before and after the implementation of the policy.

When farmers are no longer direct producers of land, many people's recreational spending rises slightly. This is because villagers have more free time outside of work or more energy for recreational life, and their incomes have increased, in addition to the increase in tobacco and alcohol consumption, the corresponding expenditure has also increased slightly after the policy change.

The same is true for the slight increase in clothing spending: when people's incomes rise, clothing can also be used as entertainment in addition to the most basic needs of life. So after solving the basic needs, people's clothing spending will also increase accordingly.

## diet

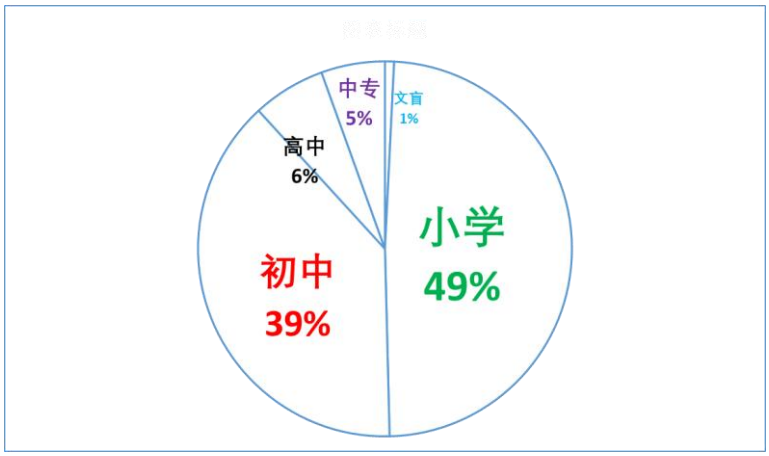



As can be seen from the figure, the food expenditure of most peasant households has increased. This may be due to rising prices or changes in farmers' households. But it is also important to note that there are many families where the increase is very large. The data shows that most of these households are due to changes in their industries after the implementation of the "separation of powers" policy: for example, from farmers to workers or businessmen. These farmers need to obtain food raw materials at a higher cost because they do not have agricultural output in their households. At the same time, since many farmers move to the cities to work, the

level of food expenditure in the cities will become higher, so this will also lead to a significant increase in food expenditure.

## (4) Educational attainment




The questionnaire shows that after the implementation of the "separation of powers" policy, some farmers with high school education will have more time and energy to devote to business, which makes their business income increase significantly. At the same time, there are also some farmers with higher education who have changed their occupations, from farming to business. In rural areas, the proportion of people with secondary school education is very small, and they often have studied in vocational and technical schools, have a skill, and choose to stay in rural areas.

At the same time, thanks to the promotion of the nine-year compulsory education, illiteracy in rural areas has been reduced a lot, and now accounts for less than 1% of the village, while the main educational background of rural people is still primary school and junior high school, and the primary school education is mainly for older villagers.

We learned that after the separation of powers, many of them went out of the countryside, saw urban life, realized the importance of education, and with the improvement of material living standards, they increasingly hoped that their children could get a better education, and chose to send their children to study in places with more abundant educational resources.

Summary: The increase in net income and disposable time after the implementation of the "separation of powers" policy has enabled farmers to devote more energy to the education of themselves and their descendants, and the education level of themselves and their descendants has generally increased.

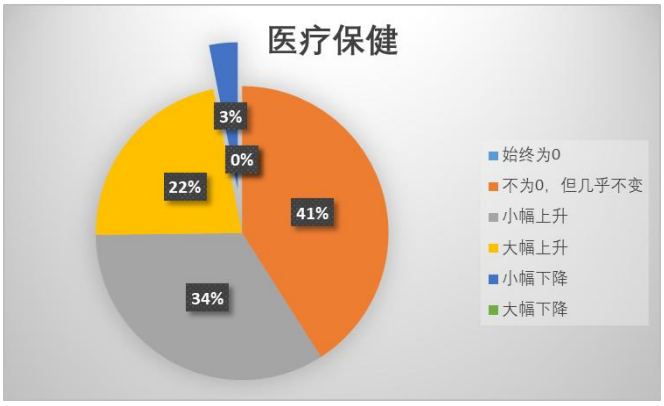
## (5) Engage in industry

There were many peasants who became workers and businessmen after the policy of separation of powers.

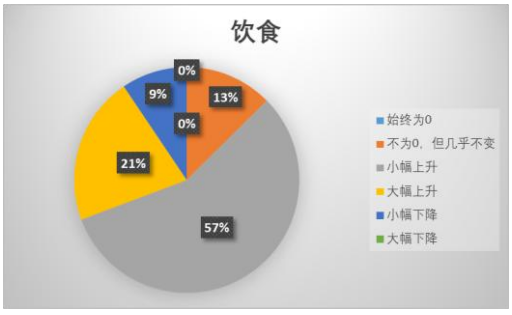
According to statistics, those with an annual income of more than 20,000 yuan in the later period have been transformed into workers, and there are 18 families in this situation; The other 48 families all have part-time income, which can only be counted as odd jobs, many for six months a year or less, such as when the farm is busy. When analyzing the data, we also found a phenomenon that the net income of many migrant families is relatively low because there are seriously ill elderly people in the family, and the annual health care expenditure is very high, so we speculate that it is likely that the family has to go out to work because of the high medical expenses, and the children have to go out to work to pay for medical expenses.

According to statistics, those with an annual income of more than 10,000 yuan in the later period have turned into businessmen, and this situation has occurred in 11 families. Two of the families had not been in business before, choosing to do business because of the separation of powers; There are nine families who have been in business before, but they also have arable land, because the separation of powers policy has more energy to do business, and the original land has been contracted out, and the income is more. Moreover, the data shows that households engaged in business are also households with higher per capita net income.

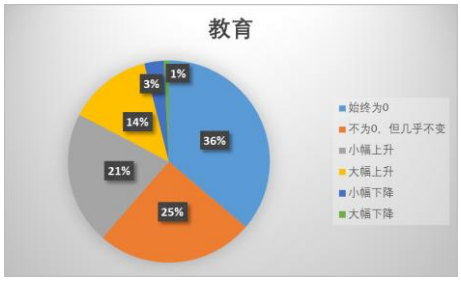
## (6) Happiness



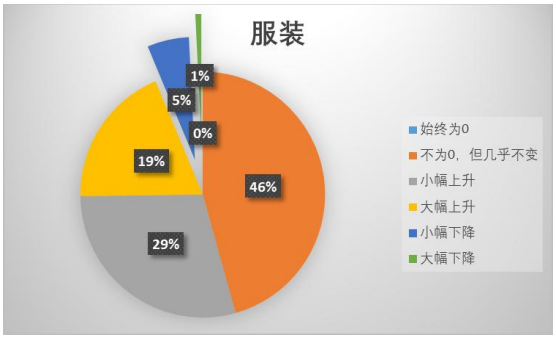

Nearly half of the people think that health care spending will be basically unchanged, one-third think it will increase slightly, one-fifth think it will increase significantly, and a small number think it will decrease slightly.



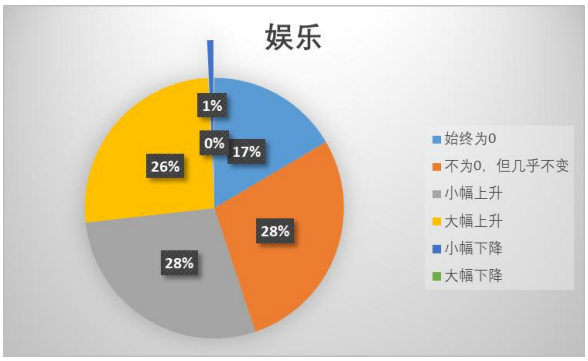
Nearly half of people think that food and beverage spending has increased slightly, 1 in 10 think it will be basically unchanged, 1 in 5 think it has increased significantly, and 1 in 10 think it has decreased slightly.



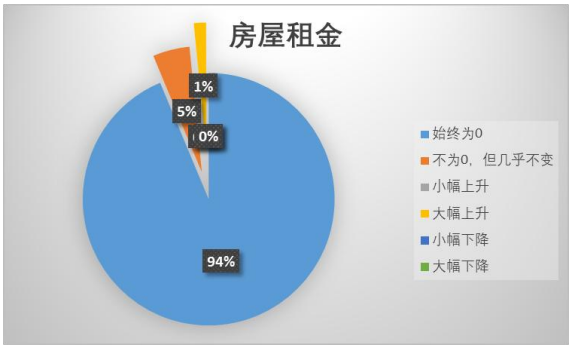

About one-third of people think that education spending will always be 0, one-quarter think it will be basically the same, one-fifth think it will increase slightly, one-tenth think it will increase significantly, a minority think it will decrease slightly, and very few people think it will fall significantly.



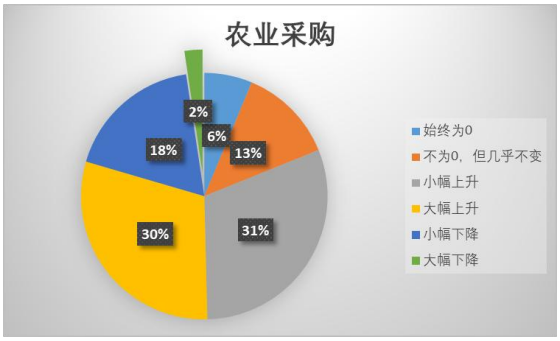

Nearly half of people think clothing spending is basically unchanged, one-third think it will increase slightly, one-fifth think it will increase sharply, and one-quarter think it will go down slightly.



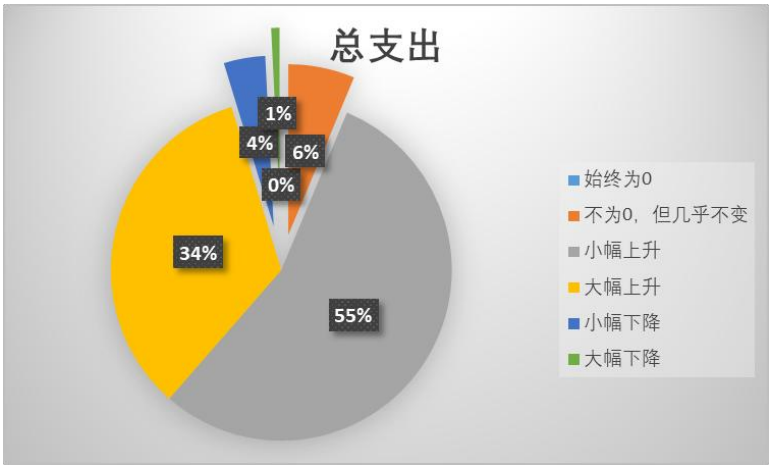

One-third of people think entertainment spending will remain largely unchanged, one-third will see a slight increase, one-third will see a significant increase, one-fifth will always see zero, and a very small number will see a slight decline.



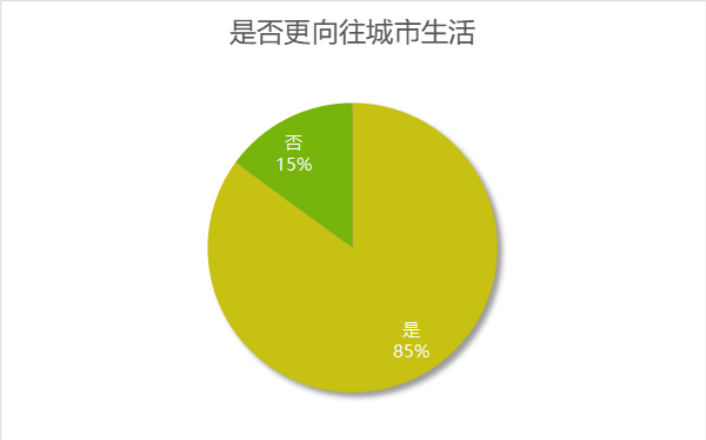

The vast majority of people believe that the rent of a house will always be zero, a few people think it will always be the same, and a very small number of people think that it will increase significantly.




One-third of people think that spending on agricultural procurement has increased slightly, one-third think that it has risen sharply, one-fifth think that it has decreased slightly, one-tenth think it will remain basically unchanged, a small number of people will always have zero, and very few people think it has fallen sharply.




More than half of the population believe that total spending has increased slightly, one-third believe that total expenditure has increased significantly, a small number believe that it has decreased slightly or remained basically unchanged, and a very small number believe that it has decreased significantly.




The survey data shows that most farmers are more yearning for urban life after the implementation of the policy, which may be due to the increasing number of farmers working in the city, and they yearn for high income in the city, but because high income in the city is often accompanied by high consumption and the tradition of relocating to the land, there are also some farmers who do not yearn for urban life more, but want to stay in the countryside and live in peace.

After the implementation of the "separation of powers" policy, the happiness of farmers has been significantly enhanced. All aspects of peasant life, such as economic income, working conditions, recreation, children's education, and so on, have been improved. Policies have given farmers more outlets and more opportunities, so their sense of well-being has increased significantly

Ecological environment

The local people's awareness of ecological and environmental protection has improved with the rise of living standards. During our field visits, we were deeply impressed by the beautiful environment and pleasant scenery.

## 2. Regional mobility of agricultural population

The rural population is large, and it is only a minority of peasants who move their families to the cities, and most of them are young people who work in the cities, and their parents and children live in the rural areas. The aging of the rural population is even more serious due to the large number of people who have been working in urban areas for a long time. The members of our social practice group can only meet very few young people when they are doing social practice, so we have a very intuitive feeling about this problem.

Some peasants often do not choose to withdraw from the contracted land after moving to the cities. A large part of this is due to the fact that some farmers have already poor land and low yields, and in this case, the land left in the countryside is

often abandoned. The rest of the land is left to other agricultural operators through the transfer of management rights or contract rights.

Summary: The policy of separation of powers enables farmers to transfer the management rights of land to business entities with higher production efficiency, and instead of engaging in land agricultural planting, they can devote themselves to the secondary and tertiary industries of the city, injecting fresh blood into urban development.

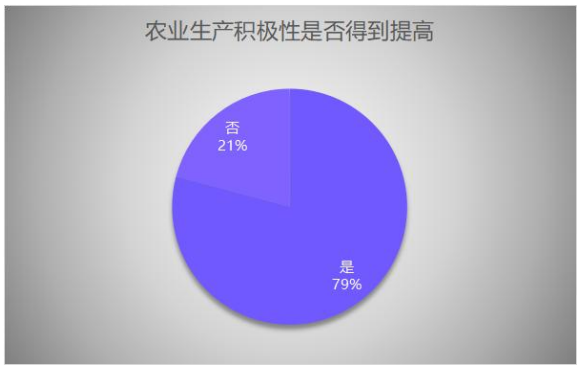
# 3. The impact of new production relations on productivity

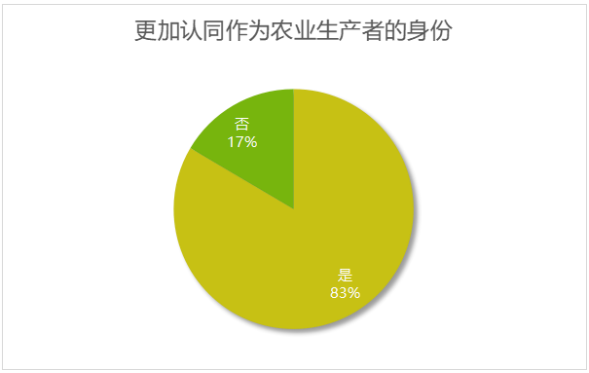
## (1) How to protect the rights of agricultural operators through the "separation of powers".

The policy of "separation of powers" clearly stipulates that, on the basis of guaranteeing collective ownership and farmers' contracting rights in accordance with the law, the legitimate management rights of business entities are equally protected, and the stable business expectations of business entities are guaranteed.

## (2) The willingness of the business entity to invest in agricultural activities

According to the data collected in the questionnaire, after the implementation of the policy, about 60% of farmers who are still involved in agricultural production believe that the degree of competition in agricultural production has increased. After in-depth investigation, we found that the concentrated cultivation of land has brought about an increase in productivity, and the output of crops has increased by the main producers of concentrated land, although the price of crops is relatively stable, it is difficult for farmers who still produce in family units to compete with them, so about half of these farmers have a decline in production enthusiasm, and the production subjects of concentrated land have generally increased their enthusiasm for agricultural production compared with before the implementation of the policy. The implementation of relevant policies such as "rural revitalization" has made rural people's lives better and strengthened their sense of identity. From the data point of view, the degree of recognition of agricultural producers with their own identity is also well correlated with production enthusiasm.

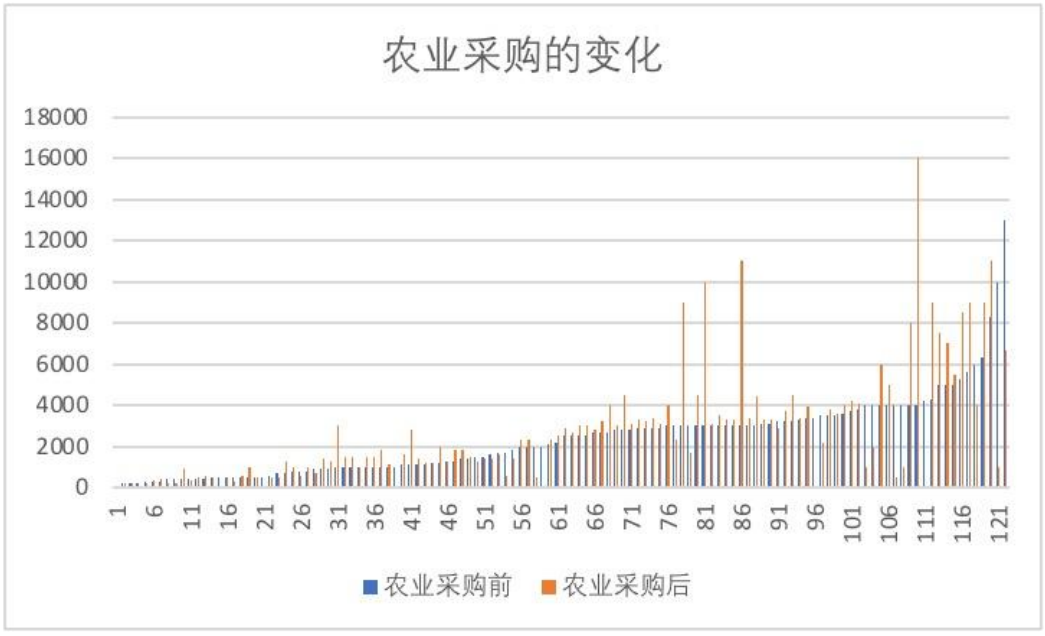



## (3) Whether the business entity dares to increase the investment in various supporting facilities when carrying out agricultural activities

According to the survey data, about 54% believe that they have increased their spending on agricultural procurement.

It can be compared with the data of real agricultural purchases filled in by farmers.



It can be found that these two data are basically consistent.

About half of the households have increased their input into agricultural procurement. On the one hand, it is an increase in the procurement of agricultural equipment, and on the other hand, it is an increase in the procurement of agricultural materials, crop varieties, etc. These are all related to the scale of cultivation. Due to the separation of powers, each family can decide the most advantageous land size and planting scale, and the planting scale determines whether it needs to increase the investment in various supporting facilities.

Since the total amount of land remains constant, the number of households that have increased the size of the land should be roughly equal to the number of households that have decreased. So the data we get is also theoretically sound.

Summary: The policy of "separation of powers" stipulates the guarantee of the legitimate management rights of the business entity, so that the business entity dares to increase investment in various agricultural supporting facilities, improves agricultural production efficiency, and provides inexhaustible impetus for local economic growth.

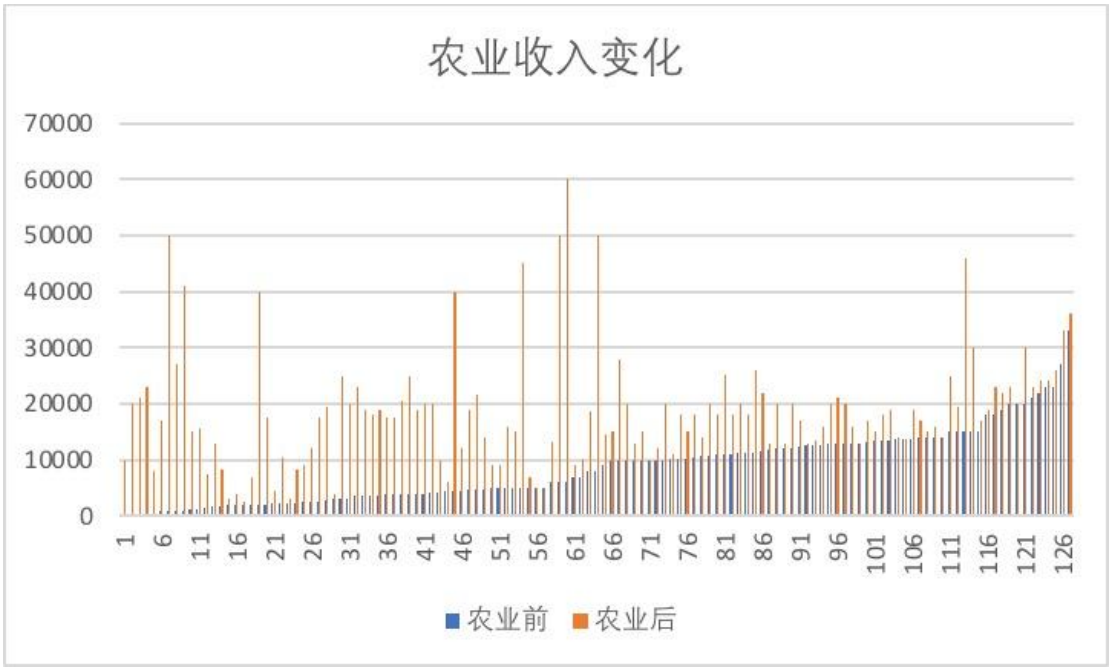
## (4) Whether it has promoted the upgrading of agricultural development mode and the improvement of agricultural production efficiency

According to the data of the questionnaire, about 73% of farmers subjectively believe that the efficiency of their agricultural production has improved compared with before the implementation of the "separation of powers" policy. These peasants are villagers with agricultural income, i.e. they do not include mere workers and merchants.

Surveys show that after the implementation of the "separation of powers" policy, farmers contract their land to specialized companies, and the company hires the farmers to cultivate the land as a beneficial and effective scheme. The advantage of this option is that farmers do not have to take risks – such as the impact of external factors such as weather on the harvest. At the same time, the concentration of land has become higher, and the company will have a more scientific plan for land arrangement, which avoids the misuse of land by individual farmers. The programme can also improve the living conditions of the elderly to a certain extent. Since the elderly do not have the physical strength to manage the family's fields, they can lease the land to the company to operate, and at the same time do some pruning and maintenance work. In this way, you can not only collect rent, but also receive wages, which is indeed of great help to the lives of the elderly.

By analyzing the data, it is possible to find the link between changes in agricultural production efficiency and changes in agricultural income. As can be seen from the chart below, almost all households have seen a significant increase in their agricultural income; Many families have seen a significant increase in their agricultural income, even by more than 10,000 yuan. Since agricultural income is

equal to the product of yield and land area, which is determined by production efficiency. It can be considered that a considerable part of the peasants' land has not been transferred during this period, so the significant increase in agricultural income is inseparable from the increase in agricultural production efficiency.




At the same time, due to the influence of the "separation of powers" policy, farmers contract or lease land according to their own capabilities. This makes the distribution of land more rational. If the farmer with less ability contracts out the land, he will have more time and energy to focus on his remaining land, which will make the production efficiency higher. Capable farmers, on the other hand, may be more likely to achieve large-scale operations because they contract more land. This can also lead to an increase in the efficiency of agricultural production.

## (5) Does the mortgageability of the management right introduce the necessary funds for the development of agriculture for the business entity, thereby indirectly stabilizing the agricultural production activities of the business entity?

We had expected that a small number of farmers would mortgage their management rights to bring in capital. According to the questionnaire data, about 95% of the farmers have not mortgaged their management rights. Only a very small number of questionnaire data were filled in with the mortgage management right, and it may be that the meaning of "mortgage management right" was filled in by mistake. This shows that the vast majority of villagers will not engage in such an act as "mortgaging the right to operate". Although some farmers have expanded their production scale, they seldom bring in the required funds by mortgaging their management rights. On the one hand, it may be because there is no need to obtain

funds by mortgaging business rights, and you may borrow money from acquaintances or raise funds through other means; On the other hand, it also reflects that the scale of local agricultural production is generally small, and it may not be necessary to prepare a large amount of funds to purchase contracted land. This may also be the reason why the actual situation on this data does not match our expectations.

### (6) How can agricultural production enter a virtuous circle of "input-income-input"?

Farmers with a certain degree of economic acumen will mortgage part of their management rights to obtain more development funds, and use these funds to purchase agricultural supporting facilities to improve productivity, and then enter a virtuous circle of funds, improving the agricultural production efficiency of the main business entity.

## 3. Recommendations

1. The policy of separation of powers has improved the enthusiasm of the main body of production and operation, and in order to further liberate the productive forces, it is urgent to organize the main body of production to learn more advanced knowledge of production and operation and improve production efficiency.

2. The policy of separation of powers has improved the productivity of production and operation entities, and in order to further expand the demand side, it is necessary to accurately identify consumer needs and create local characteristic agricultural products.

3. The policy of separation of powers provides a valuable opportunity for attracting investment, and in order to further attract investment sources, we can rely on the brand effect to enhance the added value of products, and improve local visibility with the help of the Internet economy.

## 4. Meaning and inspiration

# 1. Intuitive feeling

In the process of this practice, we have exercised our communication skills in an unfamiliar environment, improved our computer operation skills, enriched our vision and experience, and enhanced our word processing skills. Most importantly, we got a real feel for country life. We are deeply touched that the lives of farmers are getting better. Their income has grown, their sense of happiness has increased, and their recognition of themselves has increased! The reason for this is that the policy caters to the needs of most farmers. Without the "separation of powers" policy, more and more peasants would have gone to the cities to work, and most of the land would have been wasted, and the development of the countryside would have been more restricted. Therefore, we really feel the benefits of this policy to local farmers, and we also realize that only by going to the grassroots level and understanding the needs, expectations and difficulties of the people can we formulate relevant policies and seek better development. This is also the original intention of our social practice research, to go deep into the grassroots, into the countryside, to truly understand the situation, and to collect real statistics. Only by seeing and feeling with your own eyes can you truly understand.

# 2. Indirect heuristics

# (1) The application of big data science and technology in the field of sociology

This is the work that four of our first-year undergraduates do. But I'm still not satisfied with this, because this level of data processing is far from meeting the standards of big data. We only collected data from one village, and although this data was already big data for our four first-year undergraduates, the power of big data expertise was not yet fully demonstrated. The so-called full presentation refers to the research stage that researchers with non-science and engineering backgrounds cannot reach even with a computer. When faced with a real amount of data, the human brain can no longer even distinguish valuable data from worthless data. In the face of high-dimensional spatiotemporal data, data associations must be discovered by using complex algorithms.

In research in the social sciences, the key step is attribution analysis. It can even be said that attribution analysis is a cornerstone of research in the field of social science. However, due to the limited ability of the human brain to process data, previous research in the field of social sciences has been limited to attribution analysis at the macro level. Once controversy and disagreement arise, it will be difficult to avoid the situation of different parties holding their own views and opposing

the same party. The fundamental reason for this situation is the limited ability to understand the objective world.

Social science is essentially science, which can be falsified and there is a knowable truth. In the past, social sciences were classified as humanities because people could not carry out theoretical verification at the micro level, which led to vague concepts, and social sciences once became a "game of words".

Today, the emergence of big data has made it a not-too-distant reality, and the interdisciplinary discipline of big data science, technology and social science has emerged. Moreover, this interdisciplinary discipline has considerable attainments and almost strict requirements for researchers in both big data science and technology and social science. To carry out this interdisciplinary research, it is necessary not only to think in science, but also to distinguish between concepts and imaginary conjectures in liberal arts. Because, if you only have the knowledge of big data science and technology, you can do computational derivation, but you don't have the ability to distinguish concepts, how can you perform attribution analysis and display results? Without the ability to imagine and conjecture, how to find research gaps and research paths? If we only have the knowledge of social sciences, although we can distinguish concepts, but we do not have the ability to calculate and derive, how can we process data and make logical associations? Without the ability of technical support, how to find hypothetical correspondence and strong evidence?

At the current stage, due to the cost considerations and self-isolation of the education system, the development of interdisciplinary fields is difficult, but it is still possible to carry out research through the team skills of communication and coordination, but the contradictions are still acute. Bridging the gap in research capabilities through communication and coordination is like connecting a data line between two computers, not to mention the limited information transmission capacity, the ideological operation is in a state of fragmentation, and the two sides can only receive the information processed by the other party, so it is naturally impossible to reach a new stage of thinking integration and innovation.

There are no boundaries in the world, and artificially prescribed boundaries are both rules and self-limitations. In the face of the unsolved practical problems of the objective world, following the rules and inherent routines is tantamount to seeking fish from the wood. Because, if the inherent routine can solve the problem, the problem will be solved quickly. Only by solving problems that have no precedent to follow can the purpose of research be achieved. How can humanity be confident that the existing fragmented and fragmented body of knowledge is fully capable of doing the job?

The application of big data science and technology in the field of sociology research is still in its infancy. Focusing on the so-called practical benefits, with a little result, some people think that the development has reached the end. From a certain standpoint, deliberately select some data for processing and publishing, and some people think that the matter is over. When will the scientific spirit of seeking truth and pragmatism and the humanistic spirit of embracing all rivers be able to "advance after the void and let go to the four seas"?

# (2) Applied conjecture

I suspect that the social system is essentially an object-oriented memory algorithm, and the system composed of all social systems is a parallel distributed algorithm system. Society is the object of the algorithm, the institutions that implement the social system are the framework and code implementation of the algorithm, the setting structure of the mechanism determines the complexity of the algorithm, and the operation of the institution determines the robustness of the algorithm. The objective condition of the society is the input of the algorithm, the development level of the society under the influence of the system is the output of the

algorithm, and the behavior of people in the social system is the feedback of the real-time output of the algorithm and back to the input, and the feedback is not completely determined by a single algorithm, so predicting the feedback situation is also a necessary function of the algorithm. The inputs, outputs, and feedback are all big data.

Based on the above conjectures, the social system is operationally efficient, and can be optimized and reconstructed. When designing an algorithm, we should first focus on the input, and we should insist on a case-by-case analysis. The quality of a social system is settled at the time of design, but it cannot be concluded until it is fully operational. This sentence seems to be very contradictory, but in fact, it only emphasizes that it is necessary to carefully examine the objective situation of society at the beginning of the design of the system, otherwise it is equivalent to a wrong understanding of the input, and it will inevitably fail; At the beginning of the implementation of the system, we cannot evaluate it in a hurry, otherwise it is equivalent to a one-sided understanding of the output, how can it be successful?

Based on the above conjectures, the social system is limited and in the process of continuous iterative change. Once the social system takes root, it becomes an objective existence independent of human thinking, and its modification and adjustment means social costs. The system of an era represents the algorithm of an era, which is manifested as ideology in people's minds, and has relative stability and historical inheritance. The fundamental reason for its finite nature is that the feedback is random, or that the feedback of eternal motion changes will one day be unpredictable by the original algorithm, and then the original algorithm will fail, and the slight one is manifested as the constraint on productivity, and the serious one is manifested as social crisis and turmoil. Taking the education system as an example, although the institutional arrangement of entering the professional field to learn professional knowledge as early as possible can quickly train professionals for the society, when the society has a need for talents in interdisciplinary fields, the people trained by the original education system are completely incompetent because of serious defects in the knowledge structure. This is when productivity is constrained. What is even more terrible is that the people of this country do not recognize the problem and continue to stick to the old ways until they are destroyed by another, more powerful country, and finally their lives are destroyed. The UG in the original algorithm, or the defects in the social system, will obviously greatly shorten the life of the algorithm. Therefore, it is said: "The Tao is the Tao, and the Tao is very Tao; The name is famous, and the name is not very famous". Any social system has a life cycle, and any algorithm will produce a new algorithm, because the input is always changing.

At this point, the pre-proof has ended. Let's start the main text.

My algorithmic abstraction of social institutions is based on big data science and technology. Only when big data science and technology develop to a very high level, can the objective situation and efficiency of the whole society be interpreted as input and output; But when the social system is a system within a certain field, it is much less difficult. Big data science and technology have greatly improved people's cognitive ability, so that abstract problems at the macro level can be mapped to concrete problems at the micro level, and concrete problems at the micro level can be summarized into abstract problems at the macro level, building a bridge between the micro and the macro. I can even guess again intuitively that the microscopic level from the perspective of big data science and technology surprisingly follows the same laws as the microcosm in quantum mechanics: discontinuity, single-point randomness, and global regularity. Therefore, how quantum mechanics studies the micro field, how big data science and technology will study the micro level. Statistics, probability theory, matrices, and more will all come in handy.

Under the condition that the fundamental social system is stable, there is still considerable room for institutional design in many fields, and there is also a lot of

room for revision and improvement on the basis of the existing system. Therefore, for a relatively stable society, the use of big data science and technology to evaluate the efficiency of existing algorithms in order to improve and improve is a key step to improve the efficiency of social operation. Therefore, assessing the effectiveness of social institutions is an important task in this cross-cutting field. In the past, the evaluation of the effectiveness of the social system was often carried out by writing an article for so-called analysis and judgment. There are serious problems with this research method: researchers can often only study institutional effectiveness from a single field and perspective, resulting in one-sided conclusions; Researchers often only use existing procedures and methods to study the effectiveness of the system, resulting in duplicate conclusions. Researchers can often only examine information directly related to the system and find it difficult to find the implicit connection, which leads to limited conclusions. The traditional sociological paradigm used by researchers focuses on macro-level derivation and lacks micro-level support, which makes the conclusions difficult to convince. The fundamental problem is that the objective world is causally propagated according to the law of addition of vector quadrilaterals, and the existing state is the result of the superposition of multiple factors, which makes it particularly difficult to determine the true input and output of a social system algorithm. At this time, only big data science and technology can break the game.

Four-dimensional space-time causal graph theory model conjecture. Everything in the world is regarded as an atomic node, and each node has rights, and the weight quantifies the amount of energy that the node can transform the world. Nodes can be subdivided and merged, but nodes are discrete and finite in nature, and it is impossible to subdivide them indefinitely. The interaction between nodes produces causality, and a directed line segment is connected between cause and effect, and each line segment has a right, and the weight quantifies the strength of the causal connection. In the temporal horizon, these are dynamic processes. Four-dimensional space-time does not arise out of thin air, but develops from zero-dimensional (point) to one-dimensional (line) to two-dimensional (surface) to three-dimensional (space) to four-dimensional (space-time). Therefore, the establishment of the four-dimensional space-time causal graph theory model must be deduced step by step in this order. Therefore, it is said: "One gives birth to two rituals, two rituals give birth to four elephants, and four elephants give birth to gossip." Under the effect of time, each hexagram corresponds to the change of eight hexagrams, so there are a total of 64 hexagrams in "Zhou Yi".

Four-dimensional spatio-temporal causal retrospective algorithm conjecture. Taking the education system as an example, assessing the effectiveness of the system requires tracing the trajectory of each student in time and space. If I had collected the college entrance examination scores and teaching content as input, I would have been able to analyze a lot of valuable results by analyzing all the data on each person's annual income, work, place of life, and status over the past 100 years, without anything else. Take a question as an example: should the arts and sciences be divided or not? To solve this problem, we must first explore the difference between the lives of people who are divided into arts and sciences and those who do not: the impact of whether arts and sciences are divided into students' average salary, the impact of scientific research ability, the impact of entrepreneurial ability, and the impact of communication ability. Assuming that we have collected data, we need to use big data science and technology to solve this problem. Each of these indicators can be found, and then these results may have other reasons for the influence in addition to the arts and sciences sub-disciplines, so it is necessary to collect a large amount of data and compare them with each otherWhen all of this data is taken together, it is very likely that there is no correlation, but as a researcher, I firmly believe that there must be some kind of pattern.

The first is the database, because the massive data is stored in the database, any operation requires specific access and search algorithms, the noisy data needs to be screened and eliminated, and the new data generated by the original data requires the library to be updated and modified. Then there is the application of large models, because the work is described through natural language, and the large model will definitely need to Entity Match these texts in order to classify and discuss the data.

So how do you achieve causal traceability? Given that the state is the result of a combination of factors, I suspect that this needs to be hypothesis-driven. That is to say, the existing data is often very random and scattered, so we cannot directly deduce a certain conclusion from it, so we can only assume some conclusions as conjectures, and then search for relevant data from this conclusion to analyze and confirm, and compare the analysis results of multiple conjectures in order to get the most reasonable explanation and explore what factors lead to such a result. The state of these exploration assumptions is like a search tree that implements a traversal of the graph. This process is to add imaginary edges to the graph, and after going through all the cases, we have to compare the result graphs of each run, find the most reasonable graph, turn the imaginary edges into real edges, and then further expand the graph. And it's not just about comparing the results, but also about whether there are other possible factors in each of them, so that there is no wrong analysis of cause and effect.

For example, I'll start by conjecturing that students who don't have a distinction between arts and sciences are more communicative. Then we searched through a huge database to find out the relevant data: how many people I met at each age, what important people I met, what important opportunities I received, and what inspiration I received. A lot of the data in this is based on natural language, so there will definitely be applications for AI large models for Entity Matching. In the end, I found that compared with those who were divided into arts and sciences, people who did not study arts and sciences read more books and had a clearer route for their life planning. Wider social circle, communication and exchange with others, better at expressing themselves, and more inspiration; Although those who will be accomplished in professional and technical fields will temporarily lag behind those in the arts and sciences sub-disciplines, the average salary will be slightly higher. Of course, there will also be some people who do not divide arts and sciences with a weak foundation in science and engineering, and they lag far behind those in arts and sciences in terms of salary. Due to the current state of the art, I can't say much more about it.

Another method is correlation discovery, that is, when the data is turned upside down without obvious purpose, and suddenly it is found that there is a connection between the two data, such as the magical phenomenon of "beer and diapers", which can bring us a new discovery, which often has great use value. It's like a huge treasure while we're mining. This association is not necessarily causal retrospective, but the results of the association can also be used for comparative analysis.

After the realization of causal traceability, the good and bad of a system are clearly revealed. Because we've got all the impact it has, we can adjust and optimize it based on those results.

Some people say that data science research is about collecting and processing data, and drawing conclusions from it is the business of downstream researchers. But can these two processes really be completely separated? The R&D and application of basic disciplines is indeed a fragmented process.

Once the results of the research are produced, the efficiency gains brought about by adjustment and optimization will bring about rapid development of society. When there are multiple systems in the same field with the same purpose and different ways of implementation, the results of research will be richer, because each different method means the result of an algorithm test. The research results can not

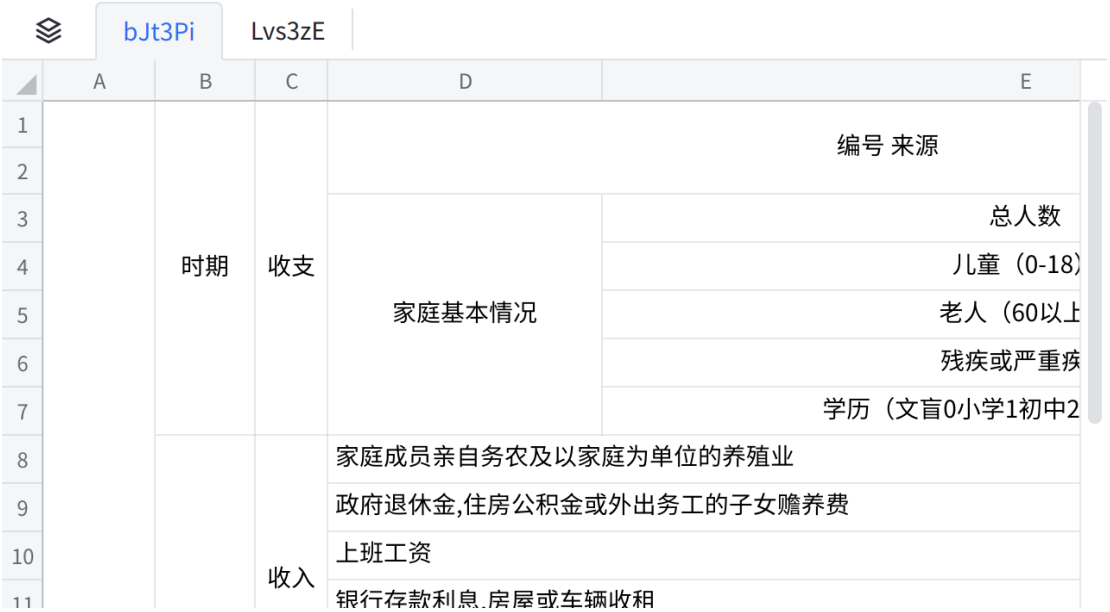
only improve the overall efficiency of the algorithm, but also make the algorithm more suitable for local conditions. This study has really succeeded in adapting the relations of production to the productive forces, and the superstructure to the economic base.

The implementation of this kind of research thinking and method will not only improve the efficiency of social operation, but also bring new dawn to the development of the democratic process. In the past, due to the strong subjectivity of the research methods, the two sides of the disagreement could not compromise, and when it was necessary to put it into practice, one side could only unconditionally have the dominant power, which led to the struggle between the same party and the different schools, and the internal friction between various groups and institutions was very serious. The results of this kind of research will have a strong objectivity, which can not only be questioned by everyone, but also controversy and questioning will only make the results better and better (the premise of questioning is to have sufficient literacy and reason). Hiding all social contradictions will certainly make them peaceful on the surface, but in reality they will only make them deeper. Although open contradictions will bring about many struggles and quarrels, they will put various groups in a state of mutual understanding and coordination.

This is the application conjecture of big data science and technology in the field of sociological research.

# 5. Appendices

## 1. Questionnaire header




**Click on the image to view the full spreadsheet**