



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Analysis of the Impact of the Growing Area of Food Crops on Farmers' Income in Yunnan Province

Lu FENG^{1,2*}, Chongguang LI¹

1. College of Economics and Management, College of Land Management, Huazhong Agricultural University, Wuhan 400070, China; 2. Agricultural Economics and Information Institute, Yunnan Academy of Agricultural Sciences, Kunming 650205, China

Abstract As a major agricultural province, Yunnan has always attached great importance to food production, and the proportion of the growing area of food crops to the growing area of total crops is more than one half in Yunnan Province, but the grain production efficiency has been low in recent years. Therefore, under the guidance of stabilizing food production and adjusting structure proposed by Yunnan provincial government, we analyze the impact of the growing area of food crops on farmers' income, based on the recent trends of the growing area of food crops. Finally we put forth the following recommendations: developing the food production based on market; rationally making overall arrangement of planting structure; paying attention to the agricultural science and technology progress.

Key words Food crops, Growing area, Farmers' income, Yunnan

1 The basic situation of farming in Yunnan Province

Yunnan is a typical mountainous agricultural province. Yunnan provincial government has long attached great importance to food production and rural work. In the context of declining comparative benefit of growing grain in recent years, the government always adheres to the guideline of stabilizing food production and adjusting structure, regards food production as a top priority task in agricultural and rural economic work, and gives human, financial and material support, having effectively promoted the development of the province's food production. It is mainly reflected in the increase in the growing area of food crops and total production. The growing area of food increased from 3.622 million hm^2 in 1990 to 4.254 million hm^2 in 2005, the proportion of growing area of food crops to total growing area of crops rose from 58% to 70.3%, and the total food production also increased from 10.612 million tons in 1990 to 15.149 million tons in 2005.

During the period 1993–2005, in the five major food crops in Yunnan Province, the growing area of wheat decreased most, with decline of 0.078 million hm^2 in the total area; the growing area of other crops increased in different degrees, increase of 0.1179 million hm^2 in rice, 0.1845 million hm^2 in corn, 0.0058 million hm^2 in beans and 0.3895 million hm^2 in potato. Total food production increased by 71.63%, with increase of 1.5% in the average annual yield, and the yield of food crops was increased substantially due to remarkable promotion rate of rice and corn varieties. Over the 13 years, the yield of rice per unit area was increased by 1.01 t/hm^2 and the yield of corn per unit area was increased by 0.92 t/hm^2 . In the same period, per capita net income of farmers in Yunnan Province was steadily increased, from 675 yuan in 1993 to 2042 yuan in 2005. Although Yunnan

Province has reached food self-seeking balance since 1997, the food production in Yunnan Province does not achieve success in general terms. In particular, the long-term mechanism for stable development of food production has not yet been established; the inadequate input to food production, weak foundation and poor resilience have not been fundamentally changed. In addition, the food science and technology level is still low, and the growth mode of food production has not been fundamentally improved, so the variety structure of food crops needs further adjustment^[2].

2 The impact of the growing area of food crops on farmers' income

2.1 Data sources and research methods In this paper, we use the data of *Yunnan Statistical Yearbook* to analyze according to the following technical processes: (i) Using *Yunnan Statistical Yearbook* during the period 1993–2005, and the data on the growing area of food crops and per capita net income of farmers, we conduct correlation analysis, and test the impact of increase in the proportion of food crops on the growth of farmers' income; (ii) From the perspective of increasing farmers' income, we analyze the impact of the growing area of food crops on the contribution rate of increase in farmers' income, and provide recommendations for the adjustment of agricultural structure in Yunnan Province.

2.2 Correlation between the growing area of food crops and farmers' income in Yunnan Province The data during the period 1993–2005 show that the total area of grain cultivation in Yunnan Province was rising, and we believe that the proportion of the growing area of food crops to the growing area of agricultural crops can describe the trends of food crops (Fig. 1), and this proportion can better describe the adjustment of farming structure in Yunnan Province.

Although from 1993 to 2005, the growing area of food crops showed an upward trend in Yunnan Province, and the per capita net income of farmers increased constantly in the same period, but

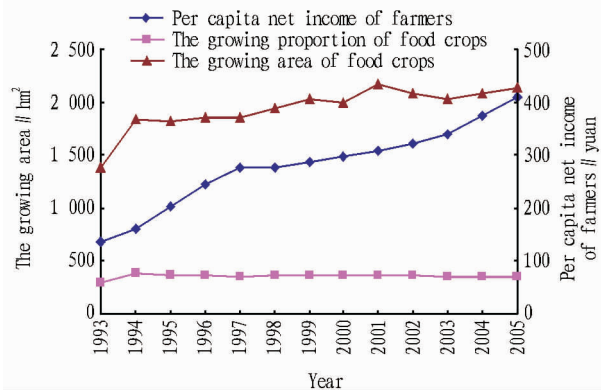


Fig. 1 The growing area, proportion of food crops and changes in per capita net income of farmers in Yunnan Province

the cultivation proportion of food crops experienced no great change but a slight trend of fluctuation, so we can not continue to rely solely on the expansion of the growing area of food crops to increase income. According to statistical software SPSS, we conduct the correlation analysis on the growing area of food crops and per capita net income of farmers, indicating that there is significant positive correlation between the two, $R^2 = 0.846$, $P = 0.014 < 0.05$ in F test. We thus see that the development of food crops is conducive to increasing farmers' income, which is also well known. But speaking from the agricultural structure adjustment, as the food security in Yunnan Province continues to be protected, the overall cultivation structure adjustment of food crops seems to have been stabilized, and the cultivation proportion of food crops in Yunnan Province reached 70% in 2005.

But under the high proportion, we need to note the fact that the total food production still can not meet the demand, and the production and demand contradiction has not yet been solved fundamentally. It is necessary to explore the planting structure of varieties of food crops in Yunnan Province.

2.3 The impact of the food crops on farmers' income

Based on the characteristics of multiple regression analysis, we analyze the overall impact of food crops on farmers' income, and now we further analyze the relationship between five major food crops in Yunnan province (rice, corn, beans, potatoes and wheat) and farmers' income, in order to quantitatively determine the impact of each food crop on farmers' income.

First, according to the specific data from *Statistical Yearbook* during the period 1993–2005, we take per capita net income of farmers as the dependent variable, the growing area of food crops as the independent variable, to conduct multiple regression analysis. According to the linear regression equation:

$$Y = b + b_1 \times X_1 + b_2 \times X_2 + b_3 \times X_3 + b_4 \times X_4 + b_5 \times X_5$$

The results show that the Pearson correlation coefficient of wheat and beans > 0.05 , not significantly correlated with per capita net income of farmers; the Pearson correlation coefficient of rice, corn and potato < 0.05 , significantly correlated with per capita net income of farmers. According to the correlation coefficient, the food crops are sequenced in terms of influence as fol-

lows: potato $>$ corn $>$ rice $>$ wheat $>$ beans.

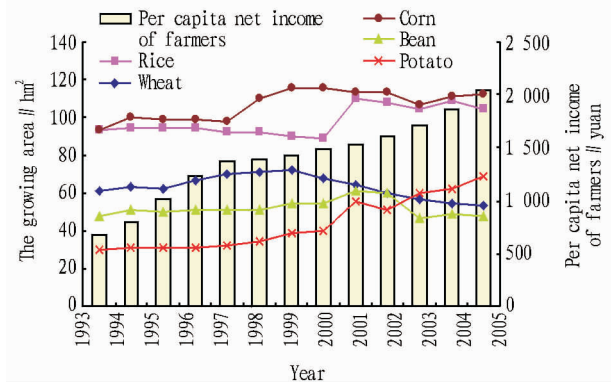


Fig. 2 The growing area of food crops and changes in per capita net income of farmers in Yunnan Province

Second, according to the growing area of food crops in Yunnan Province during the period 1993–2005, coupled with the market price, we calculate the annual output value of rice, corn, beans, potatoes and wheat per unit area, and further calculate the average output value of food crops per unit area during the period 1993–2005 (Table 1). In terms of the output value per unit area, the food crops are sequenced as follows: rice $>$ corn $>$ Beans $>$ wheat $>$ potato. It indicates that the price competitiveness of food crops in the market is different. The prices of rice and corn continue to rise in recent years, so they have a great impact on farmers' income. Precisely because of this, food crops face the problem of structural adjustment.

Table 1 The average output value of food crops per unit area in Yunnan Province during the period 1993–2005

Unit: 10^4 yuan//hm ²				
Rice (mainly polished round-grained rice)	Wheat	Corn	Beans (mainly soybean)	Potato
1.351	0.270	0.439	0.438	0.239

3 Recommendations for the adjustment of the grain planting structure

3.1 Developing the food production based on market First of all, from the above analysis, the internal planting structure of food crops is not consistent with the sequencing of their output value. The potatoes as the crops with low output value emerge all of a sudden, exceeding rice and corn in the sequencing of relationship between the area of food crops and per capita net income of farmers. The reason is that in recent years, the diversification and marketization make potato crops as high added value crops favored by the market.

Secondly, in terms of the sequencing of average production per unit area, the prices of rice and corn rise steadily in recent years, indicating that the demand gap of these two crops is relatively large; meanwhile, there is positive correlation between the two and per capita net income of farmers, indicating that rice and corn are the main force in the food crops for the farmers' income

growth. Especially with the rising prices of rice and corn currently, on the one hand, it improves the farmers' enthusiasm for growing grain; on the other hand, it poses new challenges to the comprehensive grain production capacity.

Since the efficacy of food crops is mainly to meet the most basic needs of life, it is necessary to increase farmers' income based on meeting consumer demand. Therefore, we should promote market-oriented development of food crops, on the basis of meeting the basic needs of food consumption.

3.2 Rationally making overall arrangement of planting structure So, to develop both the staple food crops and the food crops with high added value, it is necessary to conduct planting of the growing regions, based on the principles of intensification, optimization and reasonableness. Meanwhile, different industrial structures are often directly related to some advantages, and varying advantages are an important factor influencing the formation and changes of the industrial structure of agriculture from the perspective of supply^[3].

The interaction of supply and demand requires us to rationally adjust the cultivation proportion of food crops while strengthening production capacity, based on the comparative advantages for production in various regions, such as concentrating advantages to develop the main producing areas of potatoes, rice and corn.

3.3 Paying attention to the agricultural science and technology progress In the above two points, whether it is to increase production capacity, or lay out the planting structure, it is inseparable from the progress of agricultural science and technology, and whether the quality of agriculture and rural economy can be fundamentally improved hinges in a large measure on the scientific and technological support. The progress of agricultural science and technology is the main driving force for one region to carry out transformation of traditional agriculture, and promote the transformation and upgrading of agricultural institutions toward high-class and modern structure. Increasing the technology content from the source of production means a high starting point for the farmers to

increase income. The production of food crops is low added value industry in the traditional sense, so we must develop agriculture by applying scientific and technological advances, and actively play the role of agricultural research and technology promotion in enhancing the development of agricultural production, and improving the agricultural restructuring.

For a long time, the food production in Yunnan Province is self-sufficient with low commercialization rate. Although the cultivation proportion of food crops in Yunnan Province has reached more than 70% and tended to be stable, the food is still unable to meet demand, and the prices still constantly rise. So it is necessary to focus on agricultural science and technology from the internal cultivation structure of food, to improve the commercialization of food, and conduct reasonable adjustment on the basis of high proportion planting currently. Based on the above analysis, it is necessary to continue to develop agricultural science and technology according to the principle of ensuring food security, strengthen the food production capacity, and adjust the planting proportion of rice, corn and potato based on the comparative advantages of local production.

References

- [1] Yunnan Statistics Bureau. Yunnan Statistical Yearbook[M]. China Statistics Press. (in Chinese).
- [2] Yunnan Academy of Agricultural Sciences. Study on food safety problems and countermeasures in Yunnan Province[M]. China Agricultural Science and Technology Press. (in Chinese).
- [3] JIANG ZH. To comprehensively deepen Yunnan agricultural structure adjustment[J]. Journal of Yunnan University of Finance and Economics (Social Science Edition), 2003, 19(5): 67–68. (in Chinese).
- [4] YOU CL, SUN XQ. Comparative study on the current situation and increment potential of Yunnan farmers' income[J]. Yunnan Agricultural Science and Technology, 2004(3): 3–5. (in Chinese).
- [5] YANG YH. Try to talk about the dilemma of farmers' increment faced by Yunnan impoverished mountainous areas and the countermeasures[J]. The Journal of Yunnan Provincial Committee School of the CPC, 2004, 5(4): 95–97. (in Chinese).

(From page 31)

According to the static benefit analysis, benefit-cost ratio for applying efficient water-saving irrigation for the 240 – km² arable land is 2.55, investment recovery period is 4 years, internal rate of return is 37.2%, the net present value is 618.8 million yuan, beneficiaries will achieve 290 000, and per capita income increase 1 117 yuan. The above data show the outstanding economic benefits, social and economic benefits of efficient water-saving irrigation. Therefore, if financial capacity allows, increasing the input in efficient water-saving irrigation will bring remarkable economic, social and ecological benefits.

References

- [1] Lixin People's Govern. Outline of the twelfth five-year plan for national economic and social development, 2010. (in Chinese).
- [2] Anhui · Huaiwei Water Conservancy Science Research Institute. Lixin irrigation and water conservancy planning(2011–2020), 2011. (in Chinese).
- [3] ZENG JJ, LI JB. The demonstration and extension of water-saving irrigation technique in Lixin County [J]. Harnessing the Huaihe River, 2002(12): 18–20. (in Chinese).
- [4] JIANG JY. The scheme comparison of water-saving irrigation technique [J]. Scientific Chinese, 2000(10): 53–54. (in Chinese).
- [5] ZHANG J, FENG B. The remarkable effects of great development of Lixin water-saving irrigation technique [J]. Harnessing the Huaihe River, 2000(12): 32–33. (in Chinese).
- [6] LIU ZJ. Analysis on the water-saving irrigation technique and economic benefits of water-saving irrigation technique [J]. Journal of North China Institute of Water Conservancy and Hydroelectric Power, 1994(3): 64–68. (in Chinese).