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Economic benefit analysis on agriculture of Jiangsu province

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ABSTRACT

By quantitatively analyzing the relationship among Gross output value of Agriculture and consumption of chemical fertilizer in agriculture, the affected area and agricultural investment in fixed assets, the paper has investigated three aspects influencing Jiangsu province agriculture on regression analysis by using econometric analysis software EVIEWS 6.0. The analysis results have shown that the agricultural chemical fertilizer and agricultural investment in fixed assets have joint effects on agricultural output, and they two are positively related. The affected area will suffer the decrease of agricultural output value. Finally, some suggestions have been put forward based on the results.

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INTRODUCTION

By the end of 2010, China's grain had been getting harvest for six years; food security problems of our country have got, to some degree, eased. From the view of resources and technology, there was great potential in the yields of agricultural products including food, but the supply problem of agricultural products will still be there in the future. It still remains a long-term and arduous task to enhance the agricultural economic benefit. Jiangsu province has 1.16 million acres of cultivated land area, 3.85% of that in the country, 0.15 acres per capita. There are 0.17 million acres in the coastal area, one-fourth per cent of the country, which is an important reserve resource of land. Consequently improving the economic efficiency of agriculture in Jiangsu province will have a very important practical significance of improving the supply status of agricultural products in China and further alleviating the problems of food security in China.

In the studies on agricultural production of Jiangsu province, Mengjie Xu etc[1], from the perspective of Chaos Theory, studied grain yield per unit area of Jiangsu province with classification methods for time series, analyzed changes in grain of chaotic property from attractor dimension and Kolomogorov entropy aspects. It came to the conclusion that the influencing factors of grain yield per unit area include strong random factors, such as meteorological climate, and some more identified factors such as production technology and variety[1], but it failed to analyze the influence of these factors on the yield per unit area. The order of factors which influence grain production in Jiangsu province had been drawn by Huiyun Liu[2], with the use of grey correlation analysis. The order was: the per unit area yield of grain, grain crops sowing area, effective

irrigation area, the annual precipitation, the total power of agricultural machinery, chemical fertilizer, rural power consumption, grain purchasing price index [2]. This method can only sort the factors which impact the grain production in order of importance. While the extent of these factors could not be verified in empirical levels, and the specific impact of these factors on food production size could not be quantitatively measured.

On the basis of the above findings, another variable, which affect agricultural production in Jiangsu province, should be joined, namely, agricultural fixed assets investment. In this paper, three indices that affect gross output value of agriculture in Jiangsu province have been put on regression analysis by using econometric analysis software Eviews6.0. Finally, we put forward corresponding policies based on the analysis results so as to guide and promote agricultural activities.

INDICATORS SELECTION

There are many factors affecting the agricultural production. The interactions between these factors also have combined effect on the quality of agricultural activities. In this paper, we take three indexes into consideration. They are the consumption of agricultural chemical fertilizer, the affected area and the agricultural investment in fixed assets

Consumption of chemical fertilizers in agriculture

refers to the quantity of chemical fertilizers applied in agriculture in the year. The consumption of chemical fertilizers is calculated in terms of volume of effective components by means of converting the gross weight of the respective fertilizers into weight containing effective component. The formula is:

Volume of effective component= physical quantity× effective component of certain chemical fertilizer (%)

The meteorological hazards in Jiangsu mainly are drought, water logging, meteorological disasters, tropical storm (Typhoon), frost, hail, etc.

At present, China's agricultural investment in fixed assets is mainly poured into infrastructure construction. However, agricultural infrastructure is lagging behind in many areas, which restricted the growth of the agricultural economy to a great extent.

DATA COLLECTION

In this paper, four variables were selected from the corresponding data in Jiangsu province between1995 and 2009. As is shown in TABLE1:

MODEL ESTABLISHMENT

Utilizing the above data (TABLE 1) and econometric analysis software Eviews 6.0 to do regression analysis, we can obtain equation 1 among the data, and

TABLE 1 : Agricultural indexes of Jiangsu province

Year	Consumption of agricultural chemical fertilizers (X1)	Affected area (X2)	Agricultural investment in fixed assets (X3)	Gross output value of Agriculture (X4)
1995	292.77	2660.00	0.52	1686.78
1996	306.7	1516.2	0.55	1693.76
1997	322.7	4240	0.78	1816.37
1998	333.32	3467	4.66	1849.20
1999	335.4	1774	4.99	1837.43
2000	335.45	3411.68	3.01	1869.73
2001	338	2283.24	1.9	1956.10
2002	337.53	2288.46	1.33	2011.48
2003	334.67	3305	2.44	1952.20
2004	336.80	836.58	0.71	2417.63
2005	340.81	2139.50	2.10	2576.98
2006	342.01	1324.07	2.13	2718.61
2007	342.03	1642	3.54	3064.72
2008	340.76	483.70	9.6	3590.64
2009	344.00	1001.63	13.89	3816.02

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figure 1 shows the results of regression analysis based on the data from TABLE 1 by software Eviews 6.0.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5152.562	1126.429	4.574247	0.0008
X1*X3	17.33233	5.154157	3.362787	0.0063
LOG(X2)	-385.6684	147.0610	-2.622506	0.0237
X3	-5847.652	1768.403	-3.306741	0.0070
R-squared	0.882829	Mean dependent var		2323.843
Adjusted R-squared	0.850873	S.D. dependent var		692.2216
S.E. of regression	267.3150	Akaike info criterion		14.23791
Sum squared resid	786030.3	Schwarz criterion		14.42672
Log likelihood	-102.7843	Hannan-Quinn criter.		14.23590
F-statistic	27.62657	Durbin-Watson stat		1.543134
Prob(F-statistic)	0.000020			

Figure 1 : The output of the model

$$Y=5152.562+17.3323X1*X3-385.6684LOG(X2)-5847.652X3 \quad (1)$$

From figure 1 we can see Prob. < 0.05 and pass t-test, and we can obtain the related model of R- squared = 0.8828. That is to say, the fitting degree is good.

As is shown in White test, $TR2 = 15 \times 0.4848 = 7.272$, because $x_{0.05}^2(3) = 7.815$, and $7.272 < 7.815$, so the null hypothesis is accepted. It shows that there is no heteroscedasticity. And in the L-M test, $LM = TR2 = 15 \times 0.1722 = 2.583$, because $x_{0.05}^2(3) = 7.815$, $LM = 2.583 < 7.815$, so we can accept the null hypothesis. It shows that there is no automatic correlation. To sum up, the regression equation can be used as the final model.

MODEL ANALYSIS AND EVALUATION

We can see from the model that the agricultural investment in fixed assets and the consumption of agricultural chemical fertilizer has positive effects on gross output value of agriculture. This may be due to the increase of fixed assets investment mainly through investment in infrastructure construction, which, to a certain extent, ensures farmland and water stability, helps to maintain agricultural fertilizer absorption, and thereby increase the gross output value of agriculture. When other conditions remain unchanged, the affected area increases 1%, gross output value of agriculture decrease 385.6684%. apparently, the disaster area has significant impact on the gross output value of agriculture, therefore, correspondingly, the agricultural sector should increase investment, establish the system of disaster prevention and reduction, so as to improve the resilience and reduce disaster area.

RECOMMENDATIONS

According to the analysis results, some corresponding policies are put forward in order to guide and promote agricultural activities.

First of all, agricultural sector should improve scientific fertilization techniques. Leveling up grain yield per unit area through fertilization is an important way to increase food production. However, blind application of fertilizer is still widespread. Therefore, in the provincewide, agricultural sectors should promote scientific fertilization technology, guide farmers to adopt scientific, economic and reasonable fertilization techniques and cultivate high-quality agricultural products through high-quality fertilization. This can save money, reduce costs, increase production capacity of cultivated land, and it helps to improve the soil, protect soil and the environment.

Secondly, the government should increase the proportion of agricultural fixed assets investment in the whole society investment in Jiangsu province and strengthen agricultural infrastructure construction to improve resilience. In particular, the construction of water conservancy should be strengthened, the proportion of water conservancy investment in the agricultural sector investment should be increased, and the consolidation project of dangerous reservoirs and construction of large-sized irrigation should be intensified in the future.

Finally, more attention should be paid to the construction work than to the job of management and support. We need to strengthen the construction of disaster prevention and reduction system to reduce the loss of natural disaster. System of disaster prevention and mitigation includes disaster research, monitoring, disaster information processing, disaster forecast, early warning, disaster prevention, disaster relief and post-disaster reconstruction system. It is an essential safeguarding system which will eventually promote the sustainable development of agricultural economy.

SUMMARY

From the above regression analysis, we can see

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that the increase of agricultural investment in fixed assets has the biggest impact on agricultural economy, followed by the disaster-affected area and the consumption of chemical fertilizer in agriculture.

In this paper, the economic significance of the parameters in the model is basically reasonable. The explanatory variable could better explain the dependent variable, and there is a certain value on the prediction. The agricultural sector could schedule production more effectively, avoid the waste of resources. However, this paper also has certain defects itself, because there are many other factors affecting the total output value of agriculture. At the same time, the model inevitably produces error restricted by the statistics. In the future practice, the model needs to be constantly adjusted, with the constant changes of the statistical data.

REFERENCES

[1] Xu Meng-jie,Peng Bu-zhuo; The Fractal Dimension of Grain Yield in Jiangsu Province,submitted to Human geography, 53 **(2001)**.

[2] Liu Hui-yu, Zhang Ming-yang, Lin Zhen-shan; Multiple Time Scales Analysis of Grain Output in Jiangsu Province after the Founding of Our People's Republic, submitted to Resources Science, 107 **(2004)**.

[3] Nie Feng-ying; During the New Period of China Food Security Situation and Countermeasures, submitted to Agricultural Economics and management, 75 **(2010)**.

[4] Jiang Chang-yun, Zhang Yan-ping; The Grain Production in China: Current Status and Long-term Potential, submitted to Economic research, 16 **(2009)**.

[5] Jiang Hai-chao, Wang Hai-yun, Chen Hong-ying: Chinese Grain Issue Research, submitted to Regional economy and industrial economy, **(2010)**.

[6] Liang Zi-qian, Li Xiao-jun; The Factors Affecting Grain Production in China, submitted to Problems of agricultural economy, 11 **(2006)**.

[7] Statistical Bureau of Jiangsu Province: Statistical Yearbook of Jiangsu, edited by China Statistical Publishing House, **(1996-2010)**.

[8] Zhang Xiao-tong; Basic Econometrics, edited by Nankai University press, **(2007)**.

[9] Zhang Xiao-tong; Guide to Use EViews and Cases, edited by Mechanical Industry Press, **(2007)**.

[10] G.Mazure; Financial support for agriculture and rural development: credits, credit guarantees, and investments, submitted to Proceedings of the International Scientific Conference Economic Science for Rural Development, 81 **(2007)**.

[11] M.Tada; The role of foreign direct investment and food processing industry toward high value agriculture in Asia: Cross country statistical analysis and farm level evidence, submitted to JARQ, 317 **(2009)**.

[12] A.Hyvaerinen; Effect of demographic and market related variables on farmers' investment behavior – econometric study, submitted to Economic Science for Rural Development, **(2011)**.