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Construction and Application of Agricultural Modernization Assessment System in China

¹Guomin Wang and ²Qingyuan Zhou

¹School of Political Science, Sichuan University, China

²Center for Rural Development, Sichuan University, China

Abstract: It has to make the correct judgment of the stage and level of development as a logical starting point for the realization and its implementation model of agricultural modernization. Starting from the latest achievements in recognition of the connotation on agricultural modernization, it adopts the method of multiple index assessment to improve the evaluation system of agricultural modernization and calculates the level of agricultural modernization in the mainland of China. The results show that agricultural modernization in China has reached the initial implementation phase in general; meanwhile, it shows the characteristics of unbalance, the overall low, gradient evolution and dynamic for the regional levels of agricultural modernization. Realization of agricultural modernization can't be used by one way, but should adopt different strategies for different "regional situation" and "agricultural conditions".

Key words: Agricultural modernization, evaluation system, improvement, policy implications

INTRODUCTION

Modernization is a historical process and a state of development, too. As a state of development, modernization has to be able to be measured. Overall, there are two methods for modernization evaluation—the modern qualitative evaluation and the quantitative evaluation. Such as Hakone model, Levy model and modern model belong to the former and Black standard, Inkeles system and sound evaluation model the latter. Focuses of these methods are quite different, but they reflect the contemporary social understanding and recognition of the modern development (tolerance and homogeneous of inner factors of the society) and reflect the modern historical trends and directions. It can not only clearly recognize the status and the level of the modernization of a country or region, but also find the gaps among the other regions by using these methods and standards to measure the achievement of the modernization of a country or a region.

We believe that agricultural modernization is a composite concept. From the perspective of development history, agricultural modernization is the historical process transforming from a homegrown family workshops in the traditional agriculture to commercial agriculture using the advanced science and technology and production tools. From its content, it includes agricultural production technology, agricultural economic organization, agricultural management system,

modernization management of tools and human on agricultural modernization and so on. Therefore, agricultural modernization is a dynamic historical development process and also the multi-level, three-dimensional and integrated system composed by the specific economy, politics, society, culture and other aspects.

Realization and its realization model of agricultural modernization for a country or a region should take the correct judgment of the stage and developed level of agricultural modernization as a logical starting point. It has more important theoretical value and practical significance to be based on the reality, improve the composite evaluation of the index system on agricultural modernization from the nature and implications of agricultural modernization, entirely evaluate the developed level of the regional agricultural modernization, confirm the stage of agricultural modernization and find the short boards and constraints factors of the agricultural modernization for the various regions to develop the future development goals of agricultural modernization and agricultural modernization mode for making the developed goals and correct models of agricultural modernization of the regions in the future.

In recent years, with the rise of the "Three Rural Issues", researches on Chinese macroeconomic management sector, academia research design and evaluation index system of agricultural modernization are becoming in-depth constantly (Guo and Li, 2003). The

level of the agricultural modernization evaluation is to build a scientific and effective evaluation index system and accurate the measurement and the interpretation of the dynamic characteristics of the process on agricultural modernization in time and space after unifying quantitative criteria, according to the inherent nature and the external characterization of agricultural modernization, by researching different periods and areas of agricultural modernization changes and integrating all resource endowments and economic social development on the basis of the functions of the full recognizing and systematically grasping the impact factors of the effect of agricultural modernization. From the starting point of the index system design, the principles followed by various researches are different, one is from the connotation of agricultural modernization, designing the targets and trying to fully reflect its contents, however, it often lacks maneuverability because of poor accessibility of some index data; the other is based on existing statistics, in accordance with the core meaning of agricultural modernization to design and the drawback is the index system lacking the systematic and composite characters. From the design of the index system itself, most of the research designs are in terms of agricultural production conditions, the levels of agricultural technology, the agricultural management, the life quality of the peasants and the rural ecological environment. Representative: Mei (1999) proposed the system of seven major categories and 22 indexes and four-stage division of agricultural modernization; Ke (2000) the index system of the basic realization of agricultural modernization all over the country including 10 indexes (Jiang and Huang, 2006) the evaluation index system of agricultural modernization including four criteria and the 15 individual indexes (Jiang and Huang, 2006; Cheng and Cheng, 2003) the index system of agricultural modernization from aspects of the level and the quality of agricultural modernization (Zhao *et al.*, 2007) the generalization evaluation index system of agricultural modernization including agricultural modernization, rural modernization and farmers modernization. However, it leads to a big difference in the index systems of agricultural modernization because of differences in regional nature, economy and social conditions, objectively; differences in understanding of the connotation of agricultural modernization from researchers, subjectively (Guo and Li, 2003). From the view of evaluation methods, there are Cobb-Douglas expansion function method, via time series analysis and multiple regression, analyzing the contribution of each factor on agricultural production and evaluating modernization process by the extent of the role of scientific and technological progress in the development

of modern agriculture; Parameters comparison, using variable indexes, considering the actual geographical situation simultaneously and making the evaluation and the classification referring to historical data and the process of developed countries; DEA method, evaluation process of agricultural modernization by comparing relative benefits between material inputs and outputs from agricultural production sectors; multi-index composite measurement, using principal component analysis, cluster analysis or gray relational analysis to bring together a number of indexes of the evaluation objects, standardizing and evaluating, which is a commonly used method (Zhou *et al.*, 2010).

The above research results provide an important reference for the evaluation of agricultural modernization, form a number of valuable application results and accordingly deduce the corresponding policy implications. Although, the existing research is voluminous, its scope, reliability and effectiveness are still difficult to achieve a satisfactory level, partly due to their own characteristics of the evaluation of agricultural modernization process of and the lack of research methods. Characteristics of the evaluation on agricultural modernization process mainly reflect in: Firstly, indirect characters of the evaluation on agricultural modernization process, because the evaluation can only be displayed by the performance of specific indexes, the choice of indexes will be necessarily affected by a variety of factors, which is bound to have evaluation errors and affect the accuracy of the evaluation; secondly, dynamic characters of the evaluation on agricultural modernization process, as long as the economic society develops constantly, the process and the standard of agricultural modernization will change correspondingly and the index system itself in terms of time. Thirdly, the complexity of the evaluation of agricultural modernization process, agricultural modernization is the combination and interaction of many factors, even if each factor is to ensure that there is no systematic error, but can't rule out the possibility of random error, which may be a fallacy of composition resulting in the deviation of evaluation results. Research methods, mainly reflected in: Firstly, poor comparability, index systems of macroeconomic management and academia circles are quite different and difficult to be compared and verified; secondly, the choice of the index system data is biased. Some qualitative indexes are difficult to quantify, some quantitative indexes cannot reflect the core content of the agricultural modernization and some indexes are too complex; thirdly, the poor manipulity, not yet reflected in its role of guidance and decision support practice; fourthly, lack of deep research of the different regions ignoring the differences of the starting point of various regions.

PRINCIPLES COMPOSED BY EVALUATION SYSTEM OF AGRICULTURAL MODERNIZATION

The index system and the model of the level evaluation of agriculture modernization start from the connotation of agriculture modernization in the study, considering the characters of composite, systematic, comparability and data-available. After comparison and selection, we choose the multi-index composite evaluation for research, set a series of evaluation models, compose evaluation models and reasonably choose parameters so as to evaluate the levels of agricultural modernization in all the regions. Agricultural modernization involves all aspects of economy, technology, education, culture, ecological environment, people's lives and so on, which is both a dynamic process and an existing state. The standard of agricultural modernization is a subjective abstraction and simulation of objective reality. Using the indexes to measure and reflect, its connotation will face the contradictions between the finite and the infinite, the quantity and quality. In the theory, the more indexes are limited, but the connotation of agricultural modernization is infinitely rich; indexes and their data is the concept of the amount, whereas, agricultural modernization is the organic synthesis of quality and quantity. Therefore, there is a certain logic predicament by using the index system to measure agricultural modernization. In order to reflect the development levels of the agricultural modernization construction of different countries and regions objectively, accurately and compositely, while choosing the evaluation of agricultural modernization, we should follow several principles as below.

Systematization principle: Agricultural modernization is a complex social system project; the inspection should take the agriculture and the related economic and social relations into a composite analysis of the rural system, rather than simply discuss agriculture separately. Therefore, while designing the index system, it is necessary to take the administrative and composite levels of index system into account and the complementary and mutually exclusive in the same level index.

Compositeness Principle: Agricultural modernization is clearly based on the level of the agricultural productivity as a basic point. However, while designing the index system, we should not only fully reflect the input and output levels of the modern agricultural production, but also need to compositely consider the level of social development in rural areas, farmers' living conditions and ecological environment all aspects, etc. In particular, we

need to emphasize the composite development and the progress of human beings overcoming the shortcomings of focus on things only.

Main-character principle: When we design the index system, it is necessary to closely focus on the most central goal of agricultural modernization, highlighting the key points and strives to reflect the problems essentially and compositely.

Guiding principle: We should have appropriate foresight, while designing the index system, which will reflect a basic judgment of the future development of country and agriculture, in favor of promoting the process of agricultural modernization. At this stage, the needs for appropriate increase on the indexes of livelihood and its weights are necessary.

Practice principle: In designing the index system, it is necessary to reflect the situation of agricultural development compositely and systematically and also easy to operate. The statistical data selected should be relatively mature, universally acknowledged and ensure the index implication is clear so as to collect and manage the data.

Comparability principle: In the design of the index system, we should not only start from the national conditions to meet the actual needs, but also reflect the times and the historical process to make the indexes relatively comparable and expand the scope of the index system use.

CONSTRUCTION OF EVALUATION INDEX ON AGRICULTURAL MODERNIZATION

Choice of agricultural modernization evaluation: According to the definition of the connotation of agricultural modernization and selection principles of index systems, in reference to different evaluation index systems of agricultural modernization in the academic community, we adopt the multi-index composite mensuration and determine the composite evaluation index system of agricultural modernization through the strict layered screening. The entire system is divided into three layers-the composite index, the main index and the group index.

The first layer is the composite index, on behalf of the agricultural modernization level, expressed as a composite index of agricultural modernization. The second layer is the main index, representing the level of the main aspects of agricultural modernization, includes four, namely,

agricultural production and investment conditions index, the index of aggregate output capacity of agriculture, the index of the rural and social development level and the index of conditions on the agricultural resources environment. The third layer is the group index, reflecting the basic content of the main indexes to measure the specific index of the level of agricultural modernization, including 21 items.

Determination of index weight of all layers: Combine the advantages of Delphi method and the analytic hierarchy process and determine the weight of indexes of all layers. Firstly, based on expert opinion and compared to the composite index, it constructs the discriminant matrix of the main index; compared to the main index, the discriminant matrix of groups index. Secondly, the consistent test of the discriminant matrix, judging the discriminant matrix whether through logical consistency check. Finally, calculate the weights of the main index and the group index.

Data standardization: Because of different dimensions of the raw data of the evaluation on agricultural modernization, it needs to standardize the raw data processing. There are several methods for data standardization, such as the standard value method, six segments assignment method, the threshold method and so on. By comparison, the research adopts the optimal state value for the data standardization, in order to avoid using the standardization value method or six segments assignment method which may lead to subjectivity and randomness and take the value of each index in the optimal state as the standard, reflecting the dynamic changes, relativity and instability of the development level of the agricultural modernization so as to make the result in good comparability.

Firstly, according to the statistical data, calculate the numerical value of the index of regional groups. Secondly, identify the optimal state value. The maximum value of index is the optimal state value; the minimum inverse of the index is the optimal state value. Finally, the optimal state value of each index coefficient is 1; calculate the percentage coefficient of the regional groups of index compared to the optimal index. Standardized value of positive index is:

$$a_{ki} = \frac{A_{ki}}{\max A_{ki}}$$

where, a_{ki} is the standardized value of the group index for the group index value, $\max A_{ki}$ the maximum index of the group. Inverse index uses $100\% - A_{ki}$, then calculate following the above formula processing. After

data standardization, a_{ki} fully meet $0 \leq a_{ki} \leq 1$, eliminating the difference of dimensionless and achieving to the permutation matrix of standardized data of the agricultural modernization evaluation.

Construction of the evaluation models: According to the above indicator system, as well as analyses of index layers, composing agricultural modernization model and its formula is:

$$Z = \sum_{j=1}^4 W_j Y_j$$

where, Z is the composite evaluation index for agricultural modernization, reflecting overall level in a certain stage of agricultural modernization and the size is related to modernization level. W_j is the weight of all the main index and Y_j indicates the value of the main index:

$$Y_j = \sum W_i X_i \times 100\%$$

where, W_i indicates the index weight and X_i the normalized value of the group indexes.

Based on the foregoing analysis, the numerical values of Z and Y_j are determined by the following formula:

$$Z = 0.2404Y_1 + 0.1472Y_2 + 0.5479Y_3 + 0.0646Y_4$$

$$Y_1 = \left(\frac{0.2303X_1 + 0.3229X_2 + 0.1160X_3 + 0.0813X_4}{0.0695X_5 + 0.1160X_6 + 0.0640X_7} \right) \times 100$$

$$Y_2 = (0.2749X_8 + 0.1300X_9 + 0.5355X_{10} + 0.0597X_{11}) \times 100$$

$$Y_3 = \left(\frac{0.0898X_{12} + 0.2016X_{13} + 0.0630X_{14} + 0.1259X_{15}}{0.3308X_{16} + 0.0630X_{17} + 0.1259X_{18}} \right) \times 100$$

$$Y_4 = (0.7258X_{19} + 0.1721X_{20} + 0.1020X_{21}) \times 100$$

According to the index system and the evaluation model, we can confirm the weights of all group indexes, whose original numerical value can be layered and its main index weightily calculated and get the composite index of agricultural modernization to research the composite level of agricultural modernization for a country or a region. The percentile score of the composite evaluation index, we used, is 100 and the agricultural modernization index values range between 0 and 100.

Phases of the process on agricultural modernization: Rostow believes that economic development presents obvious stage characteristics (Rostow, 1960). According to the history and the characteristics of agricultural development in developed countries, agricultural

modernization can be divided into the preparation phase, the starting phase, the initial implementation phase, the elementary implementation phase and the developed phase reflecting the degree of agricultural modernization from low to high dynamic development process. At this point, with reference to the following criteria (Table 1).

ASSESSMENT AND ANALYSIS OF 31 PROVINCES IN THE MAINLAND OF CHINA

Data sources and description: “China Statistical Yearbook”(1979-2010), “China Rural Statistical Yearbook”(1979-2010), “China Agriculture Yearbook”(1979-2010), “Compilation Statistic of Sixty Years in New China”, foundation information and Yearbook of the provinces and autonomous regions and other data as the basis for evaluation data. What should be noted is that the measure of the process of agricultural modernization, a wide range of the data which has been tested and is related to modernization is in the urgent need, however, the existing data and the economic analysis are short in the existing leakage of the number. This is not only closely related to the modernization process including the statistical system and some data are not disclosed due to various reasons, because they cannot be collected. Even if we had the existing data, there are some discrepancies in the various versions of the Yearbook. Based on it, the research group has collected the index data can be quantified and the data related to research information and made a tentative evaluation of the process of agricultural modernization in China, according to the published yearbook. Considering the long term evaluation of the needs for agricultural modernization, to some raw

data which is lack of some indexes lack, we supplement and repair these data referring to the year before and after or the situations of the related region.

Calculation of the composite evaluation index on agricultural modernization in china: According to the foregoing design of the aforementioned index system, we obtain the raw data table after finishing calculation. According to the design of the evaluation model, at first, we standardize the data, then, according to the evaluation index system of agricultural modernization, the index numbers of the composite evaluation on agricultural modernization and the index numbers of each subject are layered, weighted and calculated:

- The development level of agricultural modernization in a continuing upward trend

The evaluation showed that the whole China since 1978, the overall level of agricultural modernization is in a rising trend (Fig. 1), although fluctuates in some years, but has no influence on the fundamental rise.

From the trend map we can find: Before 1986, agricultural modernization is in the preparation phase in the whole of China and few modernization factors enter the agricultural systems; since 1987, agricultural modernization has entered the starting phase in the whole of China, modernized factors have the promotion function on agriculture and risen steady, especially in new century and the growth rate is significant; in 2009, agricultural modernization has entered the initial implementation phase in the whole of China, input and output levels of modernized materials have been much higher. Agricultural modernization has entered the rapid-developed phase, however, the interior of agricultural system, agricultural production, rural social economy don't coordinate well with the environmental development:

- The apparent gaps in the development levels of the regional agricultural modernization

Table 1: Phases of the process on agricultural modernization

Ranges of scores on composite index	Phases of agricultural development
0-30	Preparation phase
30-50	Starting phase
50-70	Initial implementation phase
70-90	Elementary implementation phase
More than 90	Developed phase

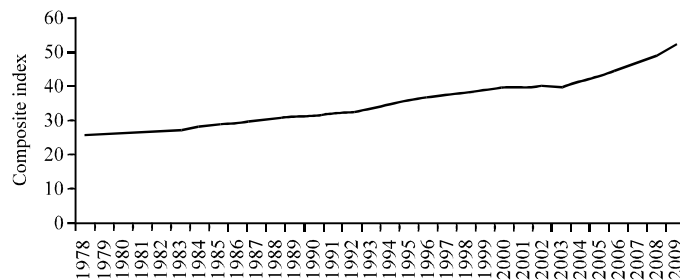


Fig. 1: Trends of the composite index changes on agricultural modernization in China (1978-2009)

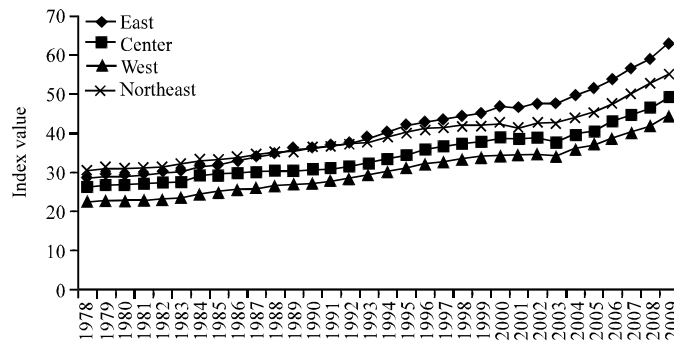


Fig. 2: Index changes of the composite evaluation on agricultural modernization in eastern, central, western and the northeastern regions (1978-2009)

In accordance with the division of East, Center, West and Northeast, the eastern region includes Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan; the central region includes: Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan; the western region includes: Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang; the northeast region includes: Liaoning, Jilin and Heilongjiang. Index changes of the composite evaluation on agricultural modernization in eastern, central, western and the northeastern regions from 1978 to 2009 are as follows (Fig. 2).

The eastern region is in the preparation phase of agricultural modernization from 1978-1982; in the starting phase of agricultural modernization from 1983 to 2004; into the initial implementation phase of agricultural modernization since 2005. The central region is in the preparation phase of agricultural modernization from 1978 to 1986, intending to enter the initial implementation phase of agricultural modernization. The western region is in the preparation phase of agricultural modernization from 1978 to 1993; in the starting phase of agricultural modernization from 1994 to 2009, still existing a distance to realize the initial implementation phase of agricultural modernization. The northeastern region is in the starting phase of agricultural modernization, however, enters the initial implementation phase of agricultural modernization until 2008.

Taking 31 provinces in the Mainland as the units, the level gaps of agricultural modernization in various regions are significant, Beijing, Shanghai and other places as the vanguard have been in the forefront, whereas, Tibet, Guizhou and other places are located at the bottom and the trend of the absolute gap of agricultural modernization is widening. In 1978, the absolute gap of agricultural modernization between Beijing and Tibet is 19.64; has increased to 25.19 in 1985; to 34.82 in 1993, declines

slightly to 32.41 in 2001; has widened to 46.83 in 2009. According to the cross-sectional data of 1978, 1985, 1993, 2001 and 2009, the regions of relatively stable ranking include Beijing, Tianjin, Inner Mongolia, Shanghai, Anhui, Jiangxi, Henan, Guangxi, Hainan, Chongqing, Guizhou, Yunnan, Tibet, Gansu, Qinghai, Ningxia and other places; the regions of ranking showing the upward trend include Hebei, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and other places; the regions of ranking showing a downward trend include Shanxi, Heilongjiang, Hubei, Shaanxi, Xinjiang and other places; the regions of ranking with little fluctuations include Liaoning, Jilin, Hunan, Sichuan and other places. This interesting phenomenon suggests that starting from natural conditions, resource endowments and development foundation, late-development area can obtain advantages for development if choosing the reasonable development model of agricultural modernization and vice versa:

- The phase division of agricultural modernization development in each region

In 2009, the composite index of agricultural modernization development in all the regions of China and various main indexes refer to Table 2. The composite index of agriculture modernization in China is 52.07, has entered the low level of the initial implementation phase of agricultural modernization.

According to the composite index of the level of agricultural modernization in 2009, China can be divided into three regions. The first class region includes Beijing and Shanghai, which have entered the elementary implementation phase of agricultural modernization; the second class regions includes Zhejiang, Tianjin, Jiangsu, Fujian, Shandong, Guangdong, Liaoning, Jilin, Hebei, Inner Mongolia, Heilongjiang and Jiangxi, which have entered the initial implementation phase of agricultural

Table 2: Main index, composite index and development phases of agricultural modernization in all regions of China in 2009

Region	Production input	Composite production output	Rural social development	Resource environment	Modernization	Ranking	Development phase
Nationwide	34.87	44.94	62.10	47.15	52.07	-	Initial implementation phase
Beijing	75.23	75.13	91.01	42.47	81.75	1	Elementary implementation phase
Tianjin	57.73	58.53	73.78	13.24	63.78	4	Initial implementation phase
Hebei	41.62	47.48	65.25	37.83	55.19	11	Initial implementation phase
Shanxi	27.61	29.71	65.29	24.46	48.36	19	Starting point phase
Inner mongolia	36.31	52.23	62.45	33.93	52.82	12	Initial implementation phase
Liaoning	28.74	56.99	68.14	51.52	55.96	9	Initial implementation phase
Jilin	40.00	53.75	62.89	52.14	55.35	10	Initial implementation phase
Heilongjiang	28.28	47.41	64.04	60.32	52.76	13	Initial implementation phase
Shanghai	69.98	87.50	88.81	19.51	79.62	2	Elementary implementation phase
Jiangsu	48.37	59.48	71.01	24.73	60.89	5	Initial implementation phase
Zhejiang	52.06	59.86	71.26	74.57	65.18	3	Initial implementation phase
Anhui	28.19	39.34	56.55	45.87	46.52	25	Starting point phase
Fujian	32.09	59.83	66.30	83.35	58.23	6	Initial implementation phase
Jiangxi	33.76	39.70	61.00	81.44	52.64	14	Initial implementation phase
Shandong	42.36	49.40	69.39	29.91	57.41	7	Initial implementation phase
Henan	31.55	38.84	61.14	38.84	49.31	17	Starting point phase
Hubei	21.99	38.20	59.94	55.05	47.31	22	Starting point phase
Hunan	31.50	39.92	58.62	66.73	49.88	15	Starting point phase
Guangdong	31.09	52.07	66.42	69.83	56.04	8	Initial implementation phase
Guangxi	19.30	37.98	56.87	80.92	46.62	24	Starting point phase
Hainan	18.27	56.00	55.75	71.56	47.80	21	Starting point phase
Chongqing	18.59	33.32	57.14	55.24	44.25	27	Starting point phase
Sichuan	29.74	40.71	58.53	55.84	48.82	18	Starting point phase
Guizhou	13.79	18.62	47.67	50.44	35.43	30	Starting point phase
Yunnan	16.94	26.15	49.11	71.92	39.48	28	Starting point phase
Tibet	30.41	24.45	40.58	27.51	34.92	31	Starting point phase
Shaanxi	23.33	29.23	61.42	55.74	47.17	23	Starting point phase
Gansu	20.21	24.35	51.85	26.14	38.54	29	Starting point phase
Qinghai	39.49	25.86	54.46	18.19	44.32	26	Starting point phase
Ningxia	44.51	37.32	54.94	28.31	48.13	20	Starting point phase
Sinkiang	47.82	53.67	53.60	14.00	49.67	16	Starting point phase

modernization; the third class of the regions includes Hunan, Xinjiang, Henan, Sichuan, Shanxi, Ningxia, Hainan, Hubei, Shaanxi, Guangxi, Anhui, Qinghai, Chongqing, Yunnan, Gansu, Guizhou and Tibet, which are still in the starting point phase of agricultural modernization.

To verify the effectiveness of the improved evaluation system and the result of agricultural modernization, we introduce the criteria about per capita GDP, industrial structure and correspondence of economy development phases proposed by U.S. economists Chenery and compare with the results of measure and calculation (Chenery *et al*, 1986). The result shows that the judgment on the phases of agricultural modernization development in all the regions is consistent with the criteria of Chenery.

CONCLUSION AND IMPLICATIONS

Starting from the latest achievements of the recognition on the connotation of agricultural modernization, the research adopts the method of multi-index composite mensuration to improve the evaluation

system of agricultural modernization and calculate the level of agricultural modernization in the mainland of China with the conclusion of high reliability. The analysis shows that China has entered the initial implementation phase of agricultural modernization in general. Meanwhile, the levels of agricultural modernization in all the regions have the characters of unbalance, the overall low, gradient evolution and dynamic.

Firstly, the gaps of the level of regional agricultural modernization are quite different; Beijing, Shanghai and other places are in the absolutely leading position on the level of agricultural modernization in the country. Whether in economic or social points, the gaps of all the regions are quite different, specifically reflecting the differences in all the group indexes. Secondly, although the regional growth speed of the elementary implementation and the initial implementation phase is quick, their composite indexes of agricultural modernization are still low, existing obvious short boards and the entire average level of agricultural modernization is still low; Then, the levels of agricultural modernization in China obviously show the gradient increasing trend like the western region-the central region-the northeast

region-the eastern region; finally, the development of agricultural modernization in all the regions is with the character of dynamic and the levels of agricultural modernization in all the regions have had the evolution to a certain degree.

All things considered, the construction of agricultural modernization in overall level of the modernization in China, which needs to start from the reality of each region and adopt various strategies and realization models of agricultural modernization development towards “regional situations” and “agricultural conditions” of different regions. The regions in the elementary implementation phase should fully develop the advantages and play the exemplary role, continue guiding, pay more attention to the social development and the improvement of resource environment and be the first to enter the development phase; the regions in the initial implementation phase, having some development conditions, should find the gaps and short boards, further improve the ability of the agricultural composite output and make the echeloned progress step by step; the regions in the starting point phase should further improve the agricultural production output, seize the chance, exploit their advantages and accelerate the development.

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REFERENCES

- Chenery, H.B., S. Robinson and M. Syrquin, 1986. *Industrialization and Growth: A Comparative Study*. Oxford University Press, New York, USA., ISBN-13: 9780195205473, Pages: 387.
- Cheng, Z. and X. Cheng, 2003. The design of the index system of agricultural modernization. *J. Agrotechnical Econ.*, 2: 1-4.
- Guo, Q. and R. Li, 2003. An evaluation system of development level of agricultural modernization. *J. Southwest Jiaotong Univ.*, 38: 98-101.
- Jiang, H.P. and D.L. Huang, 2006. Econometrics evaluation of china agricultural modernization. *Res. Agric. Modernization*, 27: 87-91.
- Ke, B., 2000. Some points on the elementary implementation promotion of agricultural modernization. *Chin. Rural Economy*, 9: 4-8.
- Mei, F., 1999. Development goals and strategy choice of Chinese grain in earlier stage of the 21st century. *Grain Technol. Econ.*, 4: 3-7.
- Rostow, W.W., 1960. *The Stages of Economic Growth: A Non-Communist Manifesto*. Cambridge University Press, London, pp: 1-37.
- Zhao, J., Y. Guo and Q. Mi, 2007. Connotation and evaluation of generalized agricultural modernization. *Res. Agric. Modernization*, 1: 28-31.
- Zhou, Q.Y., J.J. Luo and Q.C. Liu, 2010. Agricultural modernization index system and evaluation method research. *Key Eng. Mater.*, 439-440: 842-847.