Evaluation Indicator System for China's Agricultural Industrial Safety

Qingpeng GAO[1*], Bin CHEN[2], Qinyang LI[2]

1. Guanghua School of Management, Peking University, Beijing 100871, China; 2. School of Agricultural Economics and Rural Development, the People's University of China, Beijing 100872, China

Abstract On the basis of new characteristics and trend of China's agricultural development in the post-WTO period, combining analysis of factors influencing agricultural industrial safety, this paper builds an evaluation indicator system for China's agricultural industrial safety by scientific indicator system design method. This indicator system includes risk factor indicators (showing risk degree) and capacity factor indicators (showing guaranteeing ability), and consists of 7 subsystems: consumption safety, production safety, industrial controlling capacity, industrial development capacity, industrial development environment, government functions and industrial foundation condition. Risk factor is divided into 5 levels: higher risk, high risk, medium risk, low risk and lower risk; guarantee risk is also divided into five levels: strong, healthy, normal, weak and disabled. According to the overall evaluation score obtained from weighting sum, the agricultural industrial safety includes 5 types: very safe, safe, basically safe, not safe and hazardous. This evaluation indicator system is expected to providing theoretical reference for evaluating China's agricultural industrial safety.

Key words Agriculture, Industrial safety, Safety evaluation, Indicator system

1 Background

On the one hand, it is an undisputable fact that China's agricultural production has been restrained by cultivated land and water resource for a long time. On the other hand, rapid growth of consumption demands for agricultural products will inevitably widens the gap between production and demand. To fill this gap, China has to take advantage of foreign resources in wider range and deeper degree. Globalization makes it possible. However, once the domestic market is incorporated into the world system, there will be fierce competition of products, capital and technology among countries. Then, some industries (products) will be subject to significant impact. These become the background of agricultural industrial safety[1]. As the five-year WTO transitional period drew to a close, China has implemented concession of tariff, eliminated non-tariff measures, and further opened its market. In this situation, China's agriculture will become more market-oriented and internationalized. What's worse, trade protectionism in the world is gaining ground, while legal trade protection methods (such as anti-dumping, anti-subsidy, and measure of safeguard) are abused by some countries, and agriculture is extremely vulnerable to impact of these unfair competition acts[2]. Under this background, we established evaluation indicator system for China's agricultural industrial safety, to provide theoretical reference for evaluating China's agricultural industrial safety, avoiding agricultural industrial crisis, and guiding sustainable agricultural development.

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* Corresponding author. E-mail: gaoqphappy@163.com

2 Design principles and methods of the indicator system

2.1 Design principles

2.1.1 It should fully consider Chinese national conditions and agricultural characteristics. Chinese agriculture is weak and comprehensive. These characteristics and its fundamental and strategic position in national economy determine that China's agricultural industrial safety is different from other industries in connotation, cause, influence factors, generation mechanism, and countermeasures. Thus, the evaluation indicator system for agricultural industrial safety should fully consider these characteristics and select key and typical indicators as far as possible.

2.1.2 It should be scientific and controllable. As to scientific principle, it means that indicator design should have basis in theory, and it should also reflect objective situations of evaluation object. Further, it is manifested in evaluation methods which should make the indicator system well and reasonably organized in basic concepts and logic structure, so as to catch the essence of evaluation object (agricultural industrial safety). For controllable principle, it means that all indicators should be controllable and operable in policy. Specifically, when the industrial safety is at lower level, it should be able to take certain measures to change indicator value, and accordingly realize the objective of maintaining agricultural industrial safety.

2.1.3 It should be systematic and open. The systematic means indicators in the evaluation system should make up of a system. Especially, systematic balance and internal systematic structure should be noted, to keep highly consistent and systemic in logic and evaluation content of the evaluation indicator system. As to open principle, it means industrial safety is dynamic. Factors influencing agricultural industrial safety are changing with changes

of external environment. Thus, it is required to promptly and accurately know these changes, and reflect them in the evaluation system, and evaluate the agricultural industrial safety from dynamic perspective.

2.2 Design methods During the design of the evaluation system, research ideas of Tian Zhiyou *et al.*[3] were used for reference, to avoid random selection of indicators. We mainly adopted the Expert Grading Method, Normative Approach, and sampling survey method. The Expert Grading Method is mainly applied in selection of indicators, determination of indicator weight, and indicator assignment. Normative Approach is used in selection of reasonable interval of indicators, to realize relatively scientific principle. Sampling survey method mainly takes the form of questionnaire. We surveyed and analyzed reactions of different industrial subjects (consumers and producers) to issues concerning agricultural industrial safety.

3 Indicator selection and variable description

In this study, the evaluation indicator system of agricultural industrial safety is made up of risk factor indicator system (showing risk degree) and capacity factor indicator system (showing guaranteeing ability of resisting risks)[4]. Firstly, we consulted statistics, found actual value of each indicator, and assigned standard value to each indicator. By the Expert Grading Method, we conducted weight assignment. Finally, using the weighting method, we calculated the entire indicator system and obtained the overall score. Combining risk factors and guaranteeing ability, we comprehensively evaluated situations of China's agricultural industrial safety. This evaluation indicator system consists of 7 subsystems and 31 indicators. For the structure of entire evaluation system, see Fig. 1.

3.1 Risk factor indicators Risk factor indicators are designed on the basis of major concerns of agricultural industrial safety. These concerns include the consumption safety, production safety, industrial controlling capacity and industrial development capacity, and are subdivided into 13 indicators, as listed in Table 1.

3.1.1 L_1 Consumption safety system. This is mainly to evaluate realization of industrial functions from consumers, namely, whether consumers are guaranteed to purchase adequate agricultural products at reasonable price. The consumption safety factor includes 2 secondary indicators: quantity and price. In the quantity aspect, grain ration satisfaction and supply and demand gap of staple agricultural products are selected as evaluation indicators; in the price aspect, retail price indices by category of commodities (food category) is taken as evaluation indicator.

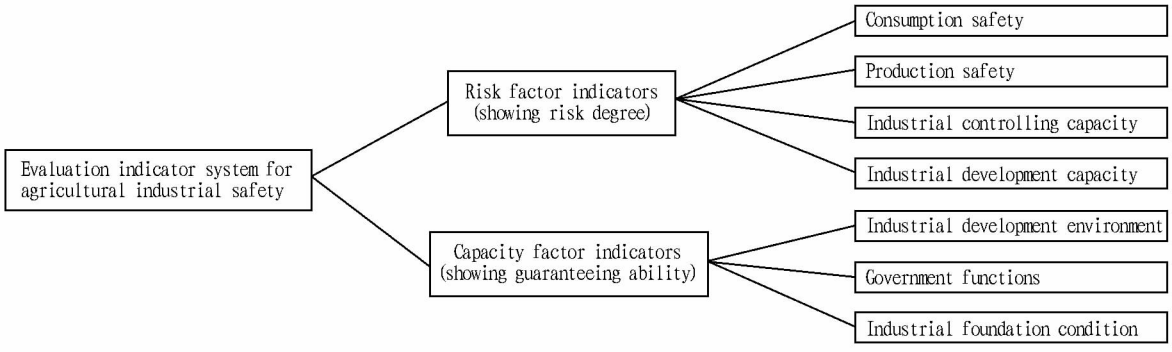

Fig. 1 Structure of evaluation indicator system for agricultural industrial safety

Table 1 Risk factor indicators of agricultural industrial safety

Factors	Sub-factors	Evaluation indicators
L_1 Consumption safety	Quantity	Grain ration satisfaction
		Supply and demand gap of staple agricultural products
	Price	Retail price indices by category of commodities (food category)
L_2 Production safety	Employment	Labor absorbed
	Income	Per capita net operational income of farmers
L_3 Industrial controlling capacity	Degree of dependence of products	General index of dependence on import
		General index of dependence on export
	Degree of dependence of capital	Ratio of paid-in capital of foreign investment into agricultural capital
		Ratio of foreign investment into agricultural investment
		Ratio of paid-in capital of foreign investment into warehousing investment
		Ratio of paid-in capital of foreign investment into agricultural product processing
		Ratio of paid-in capital of foreign investment into retail and wholesale trade
L_4 Industrial development capacity	Agricultural growth	Growth rate of agricultural output value

X_1: Grain ration satisfaction. This refers to the degree of satisfaction of grain supply for direct grain consumption of residents. Grain ration is the amount of grain demanded by residents for direct consumption. In China, wheat and rice are staple food grain

or grain ration. Thus, in this study, grain ration is the sum of rice consumption as food and wheat flour consumption. The grain ration = (current year yield - net export)/consumption. Under any circumstance, the grain ration satisfaction should be higher than 100%.

X_2: Supply and demand gap of staple agricultural products. This reflects situation of demand satisfied at current production capacity. The higher this gap, the higher pressure it will bring to grain security[5]. China's grain security must base on domestic side. In normal yield, at present, the self-sufficiency ratio is set at 95%. On the basis of guaranteeing grain ration satisfaction, the ratio may be reduced to 90% in future. At present, China's domestic grain consumption is about 500 million tons. At the 95% self-sufficiency ratio, the warning line will be 25 million tons of gap between grain production and demand; at the 90% self-sufficiency ration, the warning line will be 50 million tons of gap between grain production and demand. Therefore, the reference range of warning should be 25 million to 50 million tons. At 25 million tons, it is general risk; at 50 million tons, it is high risk; above 50 million tons, it is higher risk.

X_3: Retail price indices by category of commodities (food category). This indicator comprehensively reflects change trend of price of agricultural products, directly influences living expenses of consumers, and directly reflects realization of reasonable price. The grain consumption price index should be controlled within certain range. Excessive growth or reduction will impair industrial safety; rapid growth will influence consumption expenses of residents, and rapid reduction will shrink farmers' income. Thus, this index should be controlled at ±5% level.

3.1.2 L_2 Production safety. This mainly evaluates realization of industrial functions of agricultural producers, namely, whether it can ensure constant income and stable employment of agricultural producers, including two sub-factors (employment and income). The employment factor takes employment population of agriculture as evaluation indicator, and the income factor takes per capita net operational income of farmers as evaluation indicator.

X_4: Employment population of agriculture, reflecting whether stable employment is realized in agriculture. On the one hand, reasonable labor transfer to other industries is favorable for industrial development. On the other hand, drop of employment population resulted from industrial impact is not safe. Therefore, stable employment population manifests industrial safety. The criterion is to comprehensively judge the rate of change of employment population and the overall change trend.

X_5: Per capita net operational income of farmers. This indicator is used to reflect the impact on farmers' income. The judging criterion should comprehensively consider absolute value and growth rate of per capital net operational income of farmers, and per capita net total income of farmers.

3.1.3 L_3 Industrial controlling capacity system. This includes degree of dependence of products and degree of dependence of capital. The former is reflected from general index of dependence on import and general index of dependence on export. The latter, mainly divided from agricultural industrial chain, includes 5 indicators, as listed in Table 1.

X_6: General index of dependence on import. This indicator reflects dependence on import and is closely related to stability of supply of import. The dependence on agricultural products of a country should not merely consider the proportion into total import. Other factors, including the closeness of trade relationship between two countries, importance of Chinese agricultural product market to the exported country, importance of the agricultural product of the exported country to export of agricultural products, and importance of the product to international agricultural product market. In this study, we referred to and improved method of Fu Longbo et al. in calculating the Chinese grain dependence on import and the impact on grain security[6].

X_7: General index of dependence on export, reflecting potential risks in export. The dependence on agricultural products of a country should not merely consider the proportion into total export. Other factors, including the closeness of trade relationship between two countries, importance of Chinese agricultural product market to the imported country, importance of the agricultural product of imported country to import of agricultural products, and importance of the product to international agricultural product market.

X_8: The control of foreign investment in means of agricultural production, reflecting degree of risk of foreign investment in means of agricultural production. We selected the ratio of paid-in capital of foreign investment into total paid-in capital in enterprises of pesticide and fertilizing making above designated scale. The paid-in capital is the capital actually invested into enterprise by investor in accordance with articles of association, agreement or contract. It is source of total legal capital registered by enterprise, and manifests basic relations between ownership and management of enterprises. Thus, it can be taken as indicator of controlling capacity of foreign investment.

X_9: The control of foreign investment in agricultural investment, reflecting degree of risk of foreign investment in agricultural field. To assess this indicator, we selected the ratio of foreign investment in urban fixed capital investment of agriculture (including farming, forestry, animal husbandry, sideline production and fishery).

X_{10}: The control of foreign investment in warehousing, reflecting the degree of risk in warehousing field. We selected the ratio of paid-in capital of foreign investment into total paid-in capital in warehousing enterprises above designated scale.

X_{11}: The control of foreign investment in agricultural product processing industry, reflecting the degree of risk in agricultural product processing field. We selected the ratio of paid-in capital of foreign investment into total paid-in capital in agricultural product processing enterprises above designated scale. Meanwhile, considering the importance of this section to agricultural industry and statistical data are full and actuate, we added two indicators:

the ratio of total industrial output value of three types of foreign-funded enterprises in agricultural product processing industry and the ratio of total assets of three types of foreign-funded enterprises in agricultural product processing industry.

X_{12}: The control of foreign investment in retail and wholesale trade, reflecting the degree of risk in retail and wholesale links of agricultural products. We selected the ratio of paid-in capital of foreign investment into total paid-in capital in retail and wholesale enterprises above designated scale.

Here, it should be noted that there may be lack of specific statistical data about certain product or industry during evaluation. Accordingly it is required to combine on-the-spot survey of industrial chain and Expert Grading Method. For example, for corn industry, evaluation can be made on the control of foreign investment in means of agricultural production (corn seed industry and fertilizer industry), the control of foreign investment in corn warehousing, and the control of foreign investment in corn processing industry.

3.1.4 L_4 Industrial development capacity system. This is evaluated from the perspective of stable and sustainable development of the entire agricultural industry. We selected the agricultural growth as secondary indicator and the growth rate of agricultural output value as evaluation indicator.

X_{13}: Total output value and growth rate of farming, forestry, animal husbandry, sideline production and fishery. We selected 3% as basic parameter of the growth rate for evaluation.

Safety is relatively indistinct feeling of people. Thus, apart from quantitative indicators, it is still required to select some qualitative indicators, including sampling survey of agricultural industrial safety from points of view of production and consumption and judgment of experts (including government sectors and scholars) on agricultural industrial safety, as listed in Table 2.

Table 2 Survey of risk factor indicators of agricultural industrial safety

Qualitative indicators	Sampling survey of agricultural industrial safety from different points of view	Judgment of experts (including government sectors and scholars) on agricultural industrial safety
Consumers		
Farmer households		
Enterprises in industrial chain		
Overall score		

3.2 Capacity factor indicator The capacity factor indicators are factors guaranteeing agricultural industrial safety, namely, capacity factors resisting risks. These include 3 subsystems (industrial development environment, government functions, and industrial foundation conditions) and 18 indicators.

Table 3 Indicators for guaranteeing agricultural industrial safety

Factors	Sub-factors	Evaluation indicators
L_5 Industrial development environment	Market demand	Growth rate of demand market
	International trade competition environment	Trade disputes and qualitative assessment of TBT
	Market competition environment	Market concentration degree
L_6 Government functions	Macro guaranteeing capacity	Foreign exchange reserve
		Per capita financial revenue
	Industrial policy	Market regulation policy
		Financial support for agriculture
	Soft environment support	Perfection of information service system
		Perfection of emergency mechanism (*e. g.* trade remedy)
L_7 Industrial foundation	Comparative advantages of industry	Industrial competitiveness index
		Revealed comparative advantage index
	Conditions of production factors	Per capita cultivated land resource
		Effective irrigated area per unit area
		Yield per unit area
		Production cost
	Production scale	Proportion of small peasants
	Labor productivity	Output value per unit laborer
	Competitiveness of processing industry	Growth rate of agricultural product processing industry

3.2.1 L_5 Industrial development environment system, reflecting external factors of industrial development. As basis for industrial development, it mainly includes market demand, international trade competition environment, and market competition environment. Separately, the market demand is evaluated from growth rate of demand market, the international trade competition environment is evaluated from combination with changes in policies of trading countries of major agricultural products, and the market competition environment is measured from the market concentration degree.

X_{14}: Growth rate of demand market, reflecting functions of market. It is comprehensively evaluated through growth rate of

consumption of major agricultural products.

X_{15}: International trade competition environment, reflecting influence of external policies on import. This should be evaluated through combining quantitative and qualitative method, mainly based on trade disputes of agricultural products, TBT report related to agriculture and changes in policies of trading countries of major agricultural products.

X_{16}: Market concentration degree, reflecting situation of market competition. In some years, it may be difficult to obtain data related to this. It needs to base on existing data calculation and to combine general development scale, total number of enterprises and average scale data.

3.2.2 L_6 Government functions. These are evaluated from macro guaranteeing capacity, industrial policies and soft environment support[1]. The macro guaranteeing capacity can be reflected from foreign exchange reserve and per capita financial revenue; industrial policies include market regulation policies and industrial support policies (with the former evaluated from regulation of market monopoly and regulation of foreign capital and the latter evaluated from financial support for agriculture); soft environment support is measured by qualitative method, including perfection of information service system and perfection of emergency mechanism (trade remedy, for instance).

X_{17}: Foreign exchange reserve, reflecting financial strength of purchasing grain in the world. This can be reflected from the proportion of net import of agricultural products into foreign exchange reserve.

X_{18}: Per capita financial revenue, reflecting domestic macro regulation and control capacity. There are many indices for measuring domestic macro regulation and control capacity. In this study, we referred to the index set by Gu Yikang *et al*[7].

X_{19}: Market regulation, reflecting the guaranteeing capacity of government in market system. This is mainly evaluated with reference to the formulation of special antimonopoly laws and regulations, and detaining degree of antimonopoly laws and regulations, as well as special safety review for regulation of foreign capital. And it is evaluated mainly by qualitative method.

X_{20}: Financial support for agriculture, reflecting financial support of government for agriculture. In this study, we selected the sum of absolute total amount (total amount of financial support for agriculture), absolute growth rate (growth rate of financial support for agriculture) and relative indicator (the proportion into total financial expenditure) to evaluate this factor.

The perfection of information service system (X_{21}) and the perfection of emergency mechanism (X_{22}) are mainly evaluated on the basis of construction of comprehensive system.

3.2.3 L_7 Industrial foundation condition system: this system is the basis of survival and development of agricultural industry. These industrial foundation conditions will decide total supply of agricultural products, competitiveness with foreign products (whether the products will be under attack and whether exported products have competitiveness at international market). In addition, they are core parts of inducing factors and self guaranteeing factors. Thus, evaluation on them is favorable for making clear source of industrial competitiveness and direction of industrial development. This indicator is evaluated mainly from industrial comparative advantages, conditions of production factors, production scale, labor productivity and development capacity of processing industry. For the industrial comparative advantage, we selected industrial competitiveness index and revealed comparative advantage index as evaluation indicators; for conditions of production factors, we selected per capita cultivated land resource, effective irrigated area per unit area, yield per unit area, and production cost as evaluation indicators; for production scale, we selected proportion of small peasants as evaluation indicator; the labor productivity is evaluated by output value of per unit laborer / output; development capacity of processing industry is evaluated by development situations of processing industry.

X_{23}: International competitiveness index, signifying the proportion of Balance of Trade (BOT) into total volume of import and export trade of certain product.

$$TC_{it} = (X_{it} - M_{it})(/X_{it} + M_{it})$$

where X and M signify volume of export and volume of import, i stands for certain product. This value is used to reflect competitiveness of the product at international market. When the value is positive, it means the product has international competitiveness (or has comparative advantage); when the value is negative, it means the product lacks international competitiveness (or has comparative disadvantage). The closer to 1 of this indicator, the higher international competitiveness of the product.

X_{24}: Revealed comparative advantage index (RCA). As an indicator for measuring international competitiveness of certain product, it is intended to quantitatively describe performance of industries (product groups) relative to export.

$$RCA_{ij} = (X_{ij}/X_{tj}) \div (X_{iW}/X_{tW})$$

where X_{ij} signifies the export value of product i of country j; X_{tj} stands for total export value of country j; X_{iW} indicates the export value of the product i in the world; X_{tW} represents the total export value of the world. Generally, if the RCA is approximately 1, there is no comparative advantage or disadvantage; if the RCA is greater than 1, it means the export proportion of the product in the country is larger than that in the world, and accordingly the product has comparative advantage at international market and has certain international competitiveness; if the RCA is lower than 1, the product will not have comparative advantage and the international competitiveness is relatively weak.

X_{25}: Per capita cultivated land area, reflecting situation of land factor.

X_{26}: Effective irrigated area per unit area, reflecting situation of water resource factor.

X_{27}: Yield per unit area, reflecting situation of technological factor.

X_{28}: Production cost, reflecting situation of input of other factors.

X_{29}: Proportion of small peasants, reflecting scale of agricultural production. The data were selected from 2 times of agricultural census.

X_{30}: Output value per unit laborer, reflecting labor efficiency of agricultural industry. This is evaluated from output value of unit labor and output of unit labor of agricultural products.

X_{31}: Development capacity of processing industry, reflecting guaranteeing capacity of related industries supporting agriculture.

Some qualitative indicators of capacity factor indicator can be evaluated by Expert Grading Method (Table 4), mainly including government soft environment support system (reflecting information service and emergency mechanism, industrial development is closely related with soft environment provided by government, perfect information service system and trade remedy can promote industrial development and strengthen ability resisting industrial risk); market regulation policies, including regulation of market monopoly and regulation of review of industrial safety in foreign capital merger, the score is in the interval of (0,100), consistent with quantitative indicator scoring method. We separately calculated score of each group, and summarized as per certain weight/proportion (3:4:3, for instance), and finally obtained the overall score.

Table 4 Capacity factor survey indicators

Qualitative indicators	Government soft environment support		Market regulation policy	
	Perfection of information service system	Perfection of emergency mechanism (*e. g.* trade remedy)	Regulation of market monopoly	Regulation of review of industrial safety in foreign capital merger
Scholars				
Government sectors				
Enterprises in key control points of industrial chain				
Overall score				

4 Evaluation criteria and methods

(1) We assigned indicators at all levels with corresponding weight by Expert Grading Method. (2) We scored indicators. Different risk factors and guaranteeing factors were evaluated in different ways. Evaluation of risk factors is divided into 5 levels: higher risk, high risk, general risk, low risk and lower risk, which are scored 20, 50, 65, 75, 90 points separately. These are classified as strong, healthy, normal, weak and disabled levels with points of 90, 75, 65, 50 and 20 respectively. Some indicators are scored by Expert Grading Method or Public Scoring Method, and the score interval is consistent with quantitative indicators. Finally, we get the overall score. (3) We calculated weighted sum of indicators value by the respective weight, and obtained corresponding indicator score; summarized weight of indicator score as per respective weight, and finally obtained the industrial safety value.

5 Judgment of safety types

5.1 Judgment criteria Through this indicator system, we obtained score of risk factors and guaranteeing factors. Risk factors and guaranteeing factors correspond to division of 5 ranges separately. We obtained dual evaluation of risk and guaranteeing capacity. For example, if risk factor scored 70 points, and guaranteeing factor also scored 70 points, the agricultural industrial safety will be deemed as general risk and general guaranteeing capacity (as listed in Table 5)[8].

In this study, we divided agricultural industrial safety into 5 types: very safe, safe, basically safe, not safe and dangerous. Through division of overall score of indicator system, the higher the points, the higher the safety, and we set 5 different symbols to correspond to each type (as shown in Table 5).

Table 5 Subsystem evaluation criteria

Evaluation method	Evaluation criteria	Range of score	Safety type
Evaluation of risk factors	Higher risk	(0, 40]	Dangerous
	High risk	(40, 60]	Not safe
	General risk	(60, 75]	Basically safe
	Lower risk	(75, 85]	Safe
	Low risk	(85, 100]	Very safe
Evaluation of guaranteeing factors	Strong	(85, 100]	Very safe
	Healthy	(75, 85]	Safe
	General	(60, 75]	Basically safe
	Weak	(40, 60]	Not safe
	Disabled	(0, 40]	Dangerous

5.2 Economic definition of 5 types of safety

(1) Very safe: agricultural industry operates excellently with slight risk and high self guaranteeing capacity.

(2) Safe: agricultural industry operates basically well. Both foreign and domestic factors have impact on China, but the impact is limited.

(3) Basically safe: agricultural industry has certain risk in some fields. If not properly handled, it may develop towards unsafe state. However, in this state, a country can eliminate related risks through self regulation.

(4) Not safe: agricultural industry clearly has certain threat (including endogenous and exogenous threats). If treated improperly or not promptly, it may lead to local crisis, or even severe crisis.

(5) Highly not safe or dangerous: there will be major agricultural crisis, which will not be self-restored in short term.

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farming, and implementing comprehensive control of mountain, water, forest, field and road. The objective is to increase vegetation within the basin, change slope land into terraced field, expand surface water and water storage, improve soil quality, and turn the past water loss, soil erosion and fertilizer loss into the present soil conservation, water protection and fertilizer retention. Press corps of protecting mother river Yangtze River in Centurial Trip for Chinese Environmental Protection, said with deep feeling that "here, we see hope of Guizhou".

4 Solving population problem in many ways

4.1 Human-land linkage model integrating population control with ecological protection As basic means of production for agriculture, land also has limitation. Population expansion in Bijie aggravates human-land conflict, and excessive reclamation leads to water loss and soil erosion and ecological crisis in karst mountain areas. Some farmers give birth to more children to get more contracted land. To contain such action, Taoyuan Town of Jinsha County started implementing the human-land linkage policy from 1989. Specifically, on the basis of household contract responsibility system, the area of land owned by a farmer household will not change regardless of increase or reduction in family member. Such policy stops the connection between newly increased population with redistribution of contractual land use right. It not only restrains rapid growth of population, but also well combines cultivation land protection with family planning, ecological protection, as well as population control, so as to explore feasible way for scientific development of poverty-stricken regions[6].

4.2 Population control model through combining favorable policies with propaganda and education To complete transform the old idea of "the more sons, the more blessings", Bijie Experimental Region firstly rewards only-child family by material, sets endowment insurance reserve, provides favorable policies for approval of homestead, and provides skills training, and establishes preferential policy for education and medical care of children of those families. Secondly, it should create healthy marriage and childbirth culture: holding book reading class and study class in Party schools at all levels, to make cadres in the government and the Party understand the necessity of population control; carrying out propaganda of policies and regulations through movie, television, newspaper and magazine; providing marriage and childbirth education for women of child - bearing age through rural population schools; setting propaganda boards along transportation lines; establishing propaganda team of "new marriage and childbirth style among tens of thousands of families". Thirdly, transforming rush jobs into setting up three-level (county, township and village) standing management organization, shifting the focus from county and township to village, so as to facilitate mutual supervision of villagers. In addition, Bijie Experimental Region also recruits college and university graduates to strengthen family planning team, and increase convincingness of family planning work.

4.3 Human resource development model through combining ambition arousing and education promotion Problems of Bijie Experimental Region not only come from objective nature, but also from subjective men. President of China, Hu Jintao, once called for energetically developing education in experimental region, developing human resources, never vacillate in or relax efforts or act recklessly, and forge ahead with tenacity and resolve, overcome subjective factors causing poverty, and fire spiritual motivation of development-oriented poverty reduction. Bijie Experimental Region should improve people's educational and intellectual level through developing elementary education and various types of vocational education and training, and gradually set up its own spirit of "having firm belief, working hard, being realistic and forging ahead with selfless dedication". It has proved that combing ambition arousing and education promotion is a comprehensive poverty reduction model integrating relief anti-poverty and development-oriented poverty reduction, so it is an inevitable choice for sustainable development of Bijie Experimental Region.

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