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Comparative Analysis and Cultivation of New Agricultural Business Entities Based on Comparison of Family Farms and Professional Cooperatives

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Abstract Cultivating new business entities is the key to speeding up improving new agricultural production and operating system. This study discussed two representative entities under the agricultural production and operating system based on household contract management, namely, family farms and cooperatives. It introduced current development status of these two entities in Chongqing region, and discussed prominent problems of understanding, management, fund, personnel, technology, information, and system in the development process. In line with common problems such as single production structure and short supply of agricultural insurance, and different problems like organizational degree, it made comparative analysis. Finally, it is concluded that different institutional arrangement and pertinent support policy according to different development characteristics.

Key words New business entity, Family farms, Cooperatives, Cultivation, Chongqing

1 Introduction

At Central Conference on Rural Work at the end of 2012, central government of China asked to cultivate new agricultural business entities. 2013 No. 1 document of central government stressed that we should build a new type of system for intensive agricultural operations that are specialized, well organized and commercialized, and provide clear policy support for new agricultural business entity including cooperatives and family farms. The Third Plenary Session of the 18th Central Committee of the CPC further called for accelerating establishing new agricultural operating system. 2014 No. 1 document of central government further stressed that we should support developing farmers' specialized cooperatives and joint share cooperatives, guide development of association of cooperatives, and carry out registration of family farms in accordance with voluntary principle. Cultivating new business entity, innovating upon operating methods and improving socialized service system are three major parts of building new operating system^[1]. In this situation, it is urgent to find out current development situation of new business entity, make comparative analysis, and come up with different institutional arrangement and pertinent support policies. Cultivating new agricultural business entity is an urgent demand for increasing comprehensive agricultural benefits and mar-

ket competitiveness, an important basis for building new agricultural operating system, and also an essential guarantee for development of characteristic and profitable agriculture in Chongqing region. Modern agricultural development of Chongqing needs support of more, powerful and vigorous new agricultural business entity.

There are many foreign and domestic researches about development prospect and advantages of new business entity, but few specific analyses on current situation and cultivation of business entity. Some research findings of foreign scholars are as follows: Boehkij^[2] believed that characteristics of cooperatives are reflection of agricultural characteristics, cooperatives are employers of cooperative members, and cooperatives are engaged in specialized production and active in various levels and links of the supply chain. Cook^[3] divided internal drawbacks of cooperatives into 5 aspects: hitchhiking, field of vision, control, investment portfolio, and influencing cost. Based on data of India, Michael R. Carter^[4] reached following conclusion: there is negative correlation between farm size and output, in other words, the larger the farm, the less the farm output. This empirical result clearly indicates that small scale agricultural production really has higher agricultural production efficiency in countries with rare land. Domestic scholars mainly have following findings: (i) before 2010, there was no introduction of new agricultural business entity. Huang Zuhui, Xu Xuchu and Feng Guansheng^[5], combining current development situations of cooperatives in Zhejiang Province, believed that government plays an utmost important role in the cultivation of these organizations; Sun Yafan^[6], taking cooperatives in Jiangsu Province as examples, argued that farmers' cognition and acceptance degree directly relate cultivation and development of cooperatives. (ii) After 2010, studies mainly focused on current situation of

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China's agriculture, development requirement of modern agriculture, and influence of policies concerning countryside, farmers and rural areas on classification and current development status of new business entity. Huang Zuhui and Yu Ning^[7], Lou Dong and Kong Xiangzhi^[8] believed that cooperatives, family farms, large specialized households, and agricultural enterprises will become 4 major new agricultural business entity. Zhang Zhaoxin and Zhao Hai^[9] stated that operational agricultural service organizations should also be incorporated into new operating organizations apart from the above 4 major entities. Guo Qinghai^[10] considered that family farm is the development direction of agriculture and it should grasp yardstick of equity and efficiency and attach importance to diversified development of farmers' cooperatives. Agricultural enterprises should pay close attention to negative effect of non-agricultural subjects in business activities other than planting and breeding. These show that there are few comparative researches about current development situation and cultivation of business entity.

Efficient economic organization is the key to economic growth^[11]. Obviously, new business entity are essential forces of China's modern agricultural development. Agricultural enterprises are few and mainly engaged in non-production activities, while family farms and farmers' cooperatives are closer to characteristics of agricultural economic entities and have wider participation of farmer households. Therefore, in this study, we mainly focus on family farms and cooperatives in Chongqing Region. We carried out field survey in Qianjiang, Nanchuan, Dianjiang, Beibei and Liangping Counties through random sampling. We distributed 200 and 400 copies of questionnaire for family farms and cooperatives respectively. Finally, we received 168 and 355 copies, and the valid questionnaire copies were 134 and 320 (the valid response rate up to 67% and 80%), as listed in Table 1.

Table 1 Recovery of questionnaire ($n = 454$)

| | Copies distributed | Copies recovered | Valid copies | Response rate// % | Valid response rate// % |
|--------------|--------------------|------------------|--------------|-------------------|-------------------------|
| Family farms | 200 | 168 | 134 | 96.67 | 67.00 |
| Cooperatives | 400 | 355 | 320 | 88.75 | 80.00 |
| Total | 600 | 523 | 454 | 87.17 | 75.67 |

2 Current development situation and comparative analysis of family farms and cooperatives

2.1 Current development situation of family farms Agriculture in developed countries is mainly farm operation, especially in American – European countries with rich land resources and wide application of advanced technologies. In China, a family farm is a farm owned and operated by a family established on the basis of family management system. Family farms are entities adaptable to modern agricultural development. In the process of development of family farms, there are still many immature aspects. Data have shown that by September 2013, there were 8955 family farms meeting standards in Chongqing region. For

Chongqing region, "large population but little land" is major factor restricting agricultural development. The development of family farms in Chongqing is much lower than eastern regions. Thus, it is required to deeply understand current situation of family farms, and find out prominent problems, so as to provide pertinent policy guidance and support.

2.1.1 Understanding of family farms is gradually deepening. Among 134 valid samples of family farms, average years of establishment are 3.8. More than 80% farmers have certain understanding of family farmers and are able to organize production and management activities in accordance with certain standard, while the rest farmers are vague about concept of family farms and they only registered in the administration for industry and commerce but did not make reasonable plan for development of family farms.

2.1.2 Family members are major labors. Production and management of family farms are mainly implemented by family members, but there are also some employees or seasonal employees. Our survey indicates that each family farm has 3.24 labors on average, mainly family members having blood relationship. On average, one family farm can provide 33.36 jobs. The larger the family farms, the more jobs they can provide, and most employees come from local villages or production teams.

2.1.3 Cost of internal supervision is low. Labors of family farms are core family members in the sense of registered permanent residence. This fully reflects the hypothesis of Theodore Schultz that "farmers are poor – but – efficient". Profit of agricultural industry is low, but agricultural production with family as production unit is more advantageous in labor and cost input compared with collective management, cooperative management, and corporate management. On the one hand, labors are willing to extend labor time for keeping their jobs, they will conduct intensive and meticulous farming, which will save coordinating and supervision cost. On the other hand, family operators avoid opportunism action, saving management cost and evading losses from default.

2.1.4 Production scale is moderate. Domestic scholars have made a lot of calculation of scale of family farms as per different standards. Different regions, industries and organizations adopt different measurement indicators, showing different moderate scale. For example, Guo Bin overviewed reasonableness of moderate scale of farmland operation^[12]. Survey data indicate that farms mainly for planting have average planting area of 62.46 mu. According to the criterion of keeping family income of large grain planting households basically consistent with per capita disposable income of urban residents, the calculated moderate scale criterion is 120 mu/household for northern regions and 60 mu/household for southern regions^[13]. Thus, family farms in Chongqing region have basically reached the moderate-scale planting area of southern regions. Certainly, there is an obvious gap in moderate scale between eastern regions and western regions. For example, in Songjiang District of Shanghai, family farms have operation scale of 100 – 150 mu (80 mu at least and 200 mu at most). At present, the whole Songjiang District has 1 206 family farms, operat-

ing farmland of 137 000 mu (on average, each farm covers an area of 113 mu)^[14].

2.2 Current development situation of cooperatives The data of Chongqing Municipal Agricultural Commission indicate that by the end of 2012, there were 15895 farmers' specialized cooperatives in Chongqing Municipality, only second to Shaanxi and Sichuan provinces. Opinions of Chongqing Municipal Supply and Marketing Cooperative about Implementation of New Joint Share Cooperatives became carrier of further transformation for cooperatives. In particular, in accordance with the Decision of the Third Plenary Session of the 18th Central Committee of the CPC on encouraging development of rural cooperative economy, assets formed by financial subsidy will be held and maintained by cooperatives. The formation of state stock will also accelerate transformation of cooperative operating system to joint share system.

2.2.1 Management system is standard and non-agricultural participation is obvious. According to our survey, among 320 samples of cooperatives in Chongqing, council members are 16 on average, core members (mainly large production households, large transportation and marketing households, supply and marketing cooperatives, and enterprise representatives) take up an average of 49% in council members, showing that cooperative management system is gradually standard. 58.33% cooperatives surveyed have non-agricultural members, indicating that new agricultural operating subjects are gradually breaking through original mode with farmer households as major part. Non-agricultural members will become new fresh blood of agricultural production and management. Also, they are helpful for extension of technologies, enlargement of organizations, and realization of effective transformation of agricultural economy.

2.2.2 Source of initial capital is traditional and rural financial support is insufficient. Capital, as lifeline of economic development, is of utmost importance to production and operation of cooperatives. From source of initial input capital (as shown in Fig. 1), the channel of cooperatives' initial capital is diversified. Most cooperatives use their own funds, 1/3 cooperatives receive financial allocations of the state, and less than 1/3 cooperatives borrow money from friends and relatives and banks. There is basically no change in traditional financing method of cooperatives. Lagging of rural finance fails to satisfy desire of cooperative to finance from financial institutions, which indirectly restricts enlargement of cooperatives and increase of economic benefit.

2.2.3 The entrepreneurial ability is low and innovation ability is weak. Based on innovation ability, willpower, extroverted nature or not, management ability, market expansion ability, industrial concern, and learning ability, our team surveyed persons responsible for cooperatives. Each item has a score of 1 – 5 points (35 points in total). Statistics indicate that average score of 7 items is 3.44, 4.41, 4.25, 4.10, 3.69, 4.31, and 4.25 respectively. From the entrepreneurial perspective, these cooperative leaders obtained highest score in willpower, and the lowest score in innovation ability, which will directly lead to lack of innovation in op-

eration and management of their cooperatives. Overall average score is only 26.93, showing that comprehensive ability of these leaders has development space and can be improved through exercising personal courage and insight^[15], and the development of cooperatives can be promoted through innovative entrepreneurial activities.

2.2.4 Product certification level is low and brand construction awareness is strong. Cooperatives in Chongqing region have 1 055 registered trademarks, among which there are 497 agricultural product quality certifications (accounting for 47.10%). In surveyed cooperatives, the proportion of cooperatives applied for green product certification, pollution-free product certification, and organic product certification is 27.62%, 37.57% and 7.73% respectively, generally lower than average level of Chongqing, showing that their awareness for product certification is not high, about 27.07% cooperatives have not applied any product certification, and commercialization level and commodity awareness of cooperatives in Chongqing are still at early stage of development. Our survey also indicates that 44.46% cooperatives registered their brands, and near 70% of those cooperatives without brand registration are desired to register brands, showing strong brand construction awareness.

2.3 Comparative analysis on family farms and cooperatives

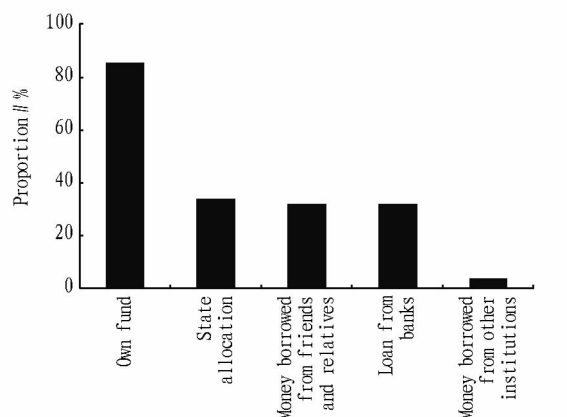
2.3.1 Comparison of basic characteristics of leaders of family farms and cooperatives. Leaders of family farmers and cooperatives are mainly male (more than 83%) and their experience is rich (as listed in Table 2). Influenced by traditional culture, this reflects gender advantage of male leaders and particularly reflects their courage in undertaking. Leaders of family farms and cooperatives are 41 and 45.88 years old on average. In middle age, they are full of vitality and have rich experience, which can be shown from proportion of political status, industrial and commercial experience and serving as village cadres of respondents. In basic characteristics of these leaders, the most distinct difference lies in educational level. Generally, educational level of cooperatives is significantly higher than that of family farms, indicating that comprehensive operation and management of cooperatives have higher requirement for cultural quality of leaders.

2.3.2 Comparison of decision influencing factors. According to our survey, factors influencing production and operation decisions of new business entity in Chongqing region take on following characteristics: government plays an essential role in operation decision of cooperatives, while market plays a decisive role in decision of family farms. We analyzed 4 key factors influencing operation decision, *i.e.* government, market, self-experience and local industrial characteristics. Statistical results are shown in Fig. 2. Market is the powerful baton in operation of family farms. Cooperatives are developed under double motive force of government and market. Comparatively speaking, policy guidance is obvious and operation decision relies more on policy support.

2.3.3 Comparison of system construction (as listed in Table 3). We surveyed completeness of system construction in family farms

and cooperatives from 6 aspects, including detailed record of income and expenditure, production plan, *etc* (as listed in Table 3). Statistical results show that, except detailed production plan, there is a great difference in system construction between family farmers and cooperatives, especially in in-house personnel cultivation,

universal production standard and scientific field management, the difference is up to 15 – 20% , reflecting that family farms neglects system construction and their standardization is still to be improved.



Note: The above content is multiple – choice questions, and the sum of proportion is larger than 1. (This is the same for Fig.2 and Fig.4 and thus will be omitted).

Fig.1 Source of initial capital of cooperatives (N=320)

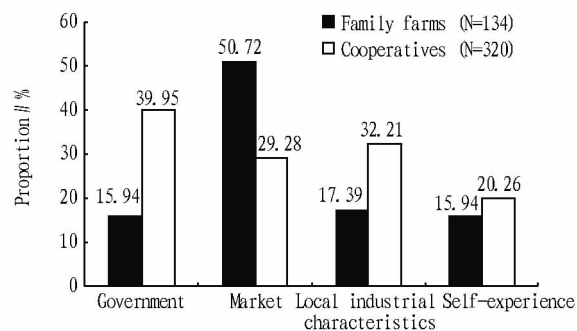


Fig.2 Statistics for proportion of factors influencing operation decision of family farms and cooperatives

Table 2 Statistics for characteristics of leaders of family farms and cooperatives (N₁ =134 and N₂ =320)

| Basic characteristics | Groups | Number of people | | Proportion to total samples// % | |
|---|---|------------------|--------------|---------------------------------|--------------|
| | | Family farms | Cooperatives | Family farms | Cooperatives |
| Educational level | Primary school | 10 | 8 | 7.46 | 2.5 |
| | Junior middle school | 50 | 65 | 37.31 | 20.31 |
| | Special secondary school and senior middle school | 60 | 148 | 44.78 | 46.25 |
| | College | 8 | 85 | 5.97 | 26.56 |
| | University or above | 6 | 14 | 4.48 | 4.38 |
| Party member | Yes | 45 | 191 | 33.58 | 59.69 |
| | No | 89 | 129 | 66.42 | 40.31 |
| Experience in private industry and commerce | Yes | 76 | 185 | 56.72 | 57.81 |
| | No | 58 | 135 | 43.28 | 42.19 |
| Experience in serving as village cadres | Yes | 43 | 136 | 32.09 | 42.5 |
| | No | 91 | 184 | 67.91 | 57.5 |

Table 3 Comparison of system construction between family farms and cooperatives (N₁ =134 and N₂ =320)

| Basic characteristics | Groups | Number of people | | Proportion to total samples// % | |
|---|--------|------------------|--------------|---------------------------------|--------------|
| | | Family farms | Cooperatives | Family farms | Cooperatives |
| Detailed record of income and expenditure | Yes | 104 | 288 | 79.10 | 90.00 |
| | No | 28 | 32 | 20.90 | 10.00 |
| Production plan | Yes | 126 | 306 | 94.03 | 95.63 |
| | No | 8 | 14 | 5.97 | 4.37 |
| In – house personnel cultivation | Yes | 80 | 262 | 59.70 | 81.87 |
| | No | 54 | 58 | 40.30 | 18.13 |
| Production quality supervision | Yes | 114 | 292 | 85.07 | 91.25 |
| | No | 20 | 28 | 14.93 | 8.75 |
| Universal production standard | Yes | 88 | 260 | 65.67 | 81.25 |
| | No | 46 | 60 | 34.33 | 18.75 |
| Scientific field management | Yes | 75 | 220 | 55.68 | 68.75 |
| | No | 44 | 100 | 44.03 | 31.25 |

2.3.4 Comparison of information acquisition (as listed in Table 4). Obviously, both family farms and cooperatives acquire information mainly from peers. For family farms, the second largest

channel is friends and network, but the proportion is only half the peers; for cooperatives, other information acquisition channels, especially associations and network account for near 50% ; from

the overall data, we can see that information acquisition channel of cooperatives is wide, while family farms mainly depend on peers, other channels are narrow. The above data fully reflect that, comparative speaking, cooperatives, as cooperative economic organization, have diversified information acquisition channel.

Table 4 Comparison of information acquisition channels between family farms and cooperatives (%)

| | Relatives and friends | Peers | Associations | News | Network |
|------------------------|-----------------------|-------|--------------|-------|---------|
| Family farms (N = 134) | 26.87 | 52.24 | 16.42 | 20.90 | 26.87 |
| Cooperatives (N = 320) | 23.75 | 58.75 | 47.50 | 31.25 | 43.75 |

2.4 Problems in cultivation of family farms and cooperatives

2.4.1 Common problems faced by family farms and cooperatives.

(i) Problem of operating structure: production operation and single content. Among surveyed cooperatives, 75% are engaged in planting, 11.88% are engaged in breeding, and only 13.12% are engaged in joint cooperation of planting and breeding; family farms only have production operation, planting and breeding proportion is 44.78% and 55.22% respectively, and no mixed operation. These indicate that operation of family farms and cooperatives is limited to agricultural production (planting and breeding) section, and little related to social service, circulation and sales sections. Existing industrial chain is simple, rough and not perfect, lacks specialized labor division and deep development of products. Thus, horizontal connection between new entities is not close and lacks cooperation.

(ii) Problem of security mechanism: agricultural insurance is in short supply. Agricultural insurance will promote construction of modern agricultural operating system. However, our survey indicates that only 29.85% family farms purchased agricultural insurance, and among family farms that have not purchased agricultural insurance, 32.84% are strongly willing to buy, but 41.79% consider agricultural insurance has little impact on farm operation, and 25.37% is unwilling to buy agricultural insurance. For cooperatives, 30.67% have purchased agricultural insurance and 70% obtained from policy; among cooperatives that have not purchased agricultural insurance, 62.5% are strongly willing to buy, 31.25% are neutral, and 6.25% are unwilling to purchase. Comparatively speaking, family farms know little about agricultural insurance and have weak awareness of risk prevention.

(iii) Problem of public service: social service level is low. Our survey indicates that there are widespread problems of low social service level, separate supply subject, and poor standardization. We surveyed satisfaction of 8 items, namely machinery service, infrastructure, rural public service, policy and law information service, financial service, price information service, organization and collective loan service, and sales channel service. Av-

erage score cooperatives giving to social service is 3.74, slightly higher than 3.22 of family farms (the full mark is 5 points), showing that there is still a large space to improve social service satisfaction of family farms and cooperatives. Low social service quality and low specialization level cause that family farms and cooperatives fail to obtain after-sales service guarantee, seriously reduce quality of agricultural products and agricultural production efficiency, and greatly increase the probability of uncertain risk faced by new business entity.

2.4.2 Special problems in development of family farms.

(i) No inheritance of right of management. According to our survey, most farmers think farming work is not promising and they are unwilling to let their children to inherit their farms. What's more, their children are unwilling to return to their hometown to engage in agricultural production. Even in modern farms, their children are still unwilling to manage.

(ii) Prominent problem of autocratic decision. Management of family farms is mainly taken by internal family members, so public trust and coercive power of decisions will get restricted. The data indicate that 42.42% family farmers independently make decisions, 30.3% make decisions after discussing with their family members, 24.24% make decisions together with their whole family members, and 3.03% implement "one - man - one - vote" decision mechanism. Therefore, compared with council decision system of cooperatives, family farms in Chongqing region have prominent problem of autocratic decision. Major decisions of most farms are ultimately decided by family farmers themselves, which are not favorable for increasing production efficiency of family farms.

2.4.3 Special problems in development of cooperatives.

(i) Chaotic organization mechanism. On the basis of special characteristics of cooperative economy of farmers' specialized cooperatives, we surveyed restriction of organization itself on their development. Results indicate that there are prominent problems, such as difficult to balance labor division of cooperative members (12.05%), poor cohesive force (40.36%), unbalanced income distribution (3.01%), free rider problem (9.04%), and difficult to seek unity of opinions (28.92%). As cooperative agricultural economic organization, cooperatives need coordinating relationship between farmers and farmer households, farmer households and cooperatives, farmer households and market, balancing monitoring and encouragement in proper manner, and creating stable internal environment, to increase organization efficiency.

(ii) Poor stability of contract. Our survey indicates that only 60% cooperatives signed stable purchases and sales contract with cooperative members, and the rate of contract implementation was 93.23%. Cooperatives have not established stable contractual relationship with farmer households like agricultural enterprises. Without contractual restriction, farmer households' opportunism action will naturally lead to risk of breach of contract, and consequently lead to increase in internal management and coordination cost of cooperatives.

(iii) Lack of service function. In providing services for members, cooperatives have serious problem of vacancy. In modern agriculture, cooperatives have such comprehensive functions as driving separate farmer households, organizing large households, connecting enterprises, and linking market, and have responsibilities and obligations to provide machinery, technology, and information. Nevertheless, our survey indicates that only 32.5% cooperatives can provide complete production and operation services for members, the rest cooperatives fail to provide complete support for members, even only 27.81% cooperatives only function as "unified purchase and sale" and have no other guidance.

3 Recommendations for cultivation of new business entity in Chongqing

3.1 Strengthening fundamental position of family farms and consolidating crucial position of cooperatives

In the development of modern agriculture, to ensure foundation of family household contract management system and safeguard fundamental interest of farmers, it is required to strengthen fundamental position of family farms in new entities, actively create favorable conditions for developing and cultivating family farms, and support transformation of large specialized households to family farms. Special terrain of Chongqing region leads to scattered distribution of farmer households. Generally, farmer households are ill-informed. Thus, it is extremely necessary to popularize and extend concept of family farms in widespread propaganda manner. Besides, it is recommended to consolidate crucial position of cooperatives in agricultural economy. Cooperatives solve the basic conflict of "small farmer households but large market" to a certain extent. Competent authorities should continue taking preferential policies in accordance with local realities, to support transformation of cooperatives to joint share cooperatives and joint cooperatives.

3.2 Different institutional arrangement: encouraging cooperatives and family farms to conduct planting, breeding and classified operation

Production factors used by cooperatives and family farms are greatly different. As for special terrain of Chongqing region, individual family farm has limited ability to realize large scale land operation, which increases difficulty in developing planting. Government can make different institutional arrangement: for cooperatives having conditions to obtain land resource, providing production technological and financial support in fine seed, encouraging development of characteristic planting, developing valuable and marketable agricultural crops, and building characteristic local agricultural industry; for family farms with limited land scale, specialized technicians should make evaluation on farmer households, natural environment, and market, help them to develop characteristic breeding with the aid of limited land resource, develop fine seed, and so as to realize maximum marginal benefit of production factors.

3.3 Inclined policy support: supporting development of family farms

Compared with large scale mechanized farms, la-

bor and capital intensive moderate scale operation for farmer households (family farms) is more suitable for current resource situation of "large population but little land", and is a feasible path for solving hidden unemployment of agriculture at current stage^[16]. Therefore, agricultural policy should incline towards new business entity, focus on such problems as low organizational level, high restriction of means of production, and disorderly management, take pertinent measures to guide and cultivate, and provide preferential policies, such as increasing subsidy for family farms, attaching importance to technological supply, increasing investment in construction of infrastructure for family farms, raising market acceptance of family farms, and strengthening cooperation between government, other new business entity and family farms.

3.4 Coordinating relationship between government and market and guiding cooperation of new business entity

According to development requirement of modern agriculture, and in combination with backward situation of agricultural development in Chongqing region, different business entity should establish vertical cooperation relationship on the basis of characteristics of "production, supply, sales and processing", fully develop the merit while avoid the shortcomings, share information, and work out new value adding methods. Government should actively guide cooperation of new business entity, make then actively and clearly find out combination points based on natural industrial chain of "supplier → producer → distributor → customer", accurately position, grasp the market, raise core competitive power of new business entity, and realize optimum allocation of agricultural resources through market competition of agricultural products.

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(To page 65)

Continued Table 4

| Sampling point | Type of heavy metal | Average pollution index ($P_{j\text{ave}}$) | Max. pollution index ($P_{j\text{max}}$) | Synthetic pollution index (P_j) | Evaluation result |
|----------------|---------------------|---|--|-------------------------------------|-------------------|
| F | Cd | 0.02 | 0.03 | 0.02 | Safe |
| | Hg | 0.47 | 0.54 | 0.50 | Safe |
| | As | 0.85 | 1.00 | 0.93 | Alarming line |
| | Pb | 0.14 | 0.16 | 0.15 | Safe |
| | Cr | 0.21 | 0.22 | 0.22 | Safe |
| | Cd | 0.30 | 0.30 | 0.30 | Safe |
| | Hg | 0.25 | 0.27 | 0.26 | Safe |
| | As | 0.45 | 0.58 | 0.52 | Safe |

4 Conclusions

Through determination of Pb, Cd, Cr, Hg and As content in soil of pollution-free agricultural product bases in Guangxi Zhuang Autonomous Region, it evaluated the pollution of soil using single factor pollution index method and Nemerow synthetic pollution index method in combination with evaluation standard of heavy metals in soil and grading standard for soil pollution. The results show that major pollution-free agricultural products bases in Guangxi Zhuang Autonomous Region have excellent soil quality which is suitable for producing pollution-free agricultural products.

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