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Demands of New Professional Farmers for Agricultural Leading Industry in Anhui Province

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Abstract In the context of growing problems of part-time farming, farmers' aging and hollow rural areas, and increasing restrictive factors of new professional farmers, based on current situations of agricultural resources in Anhui Province, this paper studied feasibility of increasing new professional farmers from the perspectives of urbanization level, labor employment, population development trend, agricultural industrial development and talent demands, current situations of farmers' family management, and agricultural socialized service development trend. Based on decisions, planning, and related data issued by Anhui Provincial Party Committee and Provincial Government, it analyzed and predicted demands of new professional farmers in Anhui Province by industries and types, in the hope of providing references for relevant researches.

Key words New professional farmers, Demands, Number, Anhui Province

1 Introduction

New professional farmers refer to modern agricultural workers taking agriculture as profession, having certain cultural level and professional skills, and income mainly coming from agriculture; new professional farmers include production and management type farmers (mainly large specialized farmer households, family farmers, and leaders of farmers' cooperatives), professional skill type farmers (mainly agricultural workers and employees), and professional service type farmers (mainly rural information assistants, rural brokers, agricultural machinery service personnel, plant protection personnel, village level animal epidemic prevention workers)^[1]. The definition of new professional farmers is introduced based on integration of basic management system of rural areas, current situations and development of agricultural production and management with international situations. The theoretical basis is socialized labor division of modern agriculture; agricultural workers can obtain only one type qualification, and there are obvious differences in education and training demands, identification management standards, and necessary support policies; there is no cross between each type but there is possibility of mutual conversion, and it needs confirmation through dynamic management^[2]. *The Opinions of the Central Committee and State Council on Formulating the Outline of the 13th Five-year Plan* issued at the Fifth Plenary Session of the 18th Central Committee of the CPC clearly set forth cultivation of new professional farmers. *Government Work Report* (2014) of the State Council added cultivation of new professional farmers, to adapt to demands of innovation of agricultural

production and management mode, showing that cultivation of new professional farmers has been lifted to national strategy. Anhui Province is a large agricultural province. Anhui Provincial Party Committee and Provincial Government decided to undertake pilot project for modern ecological agricultural industrialization, accelerate development of agricultural modernization. Cultivation of new professional farmers is to provide important human resources and talent support for development of modern agriculture in Anhui Province. At present, there are prominent problems of part-time farming, farmers' aging and hollow rural areas, and restrictive factors of new professional farmers are increasing. To adapt to demands of modern agricultural development of Anhui Province and based on resource endowment of Anhui Province, we analyzed and predicted number of demands of new professional farmers in Anhui Province.

2 Research methods, objects, and condition setting

2.1 Research methods Using historical review, empirical analysis, comparison, investigation, diagram, inference, and calculation methods, from the perspectives of urbanization level, labor employment, population development trend, agricultural industrial development and talent demands, current situations of farmers' family management, and agricultural socialized service development trend, we discussed and analyzed feasibility, and predicted number of demands of new professional farmers in Anhui Province based on decisions, planning, and related data issued by Anhui Provincial Party Committee and Provincial Government.

2.2 Research object According to *Implementation Scheme for Agricultural Industrialization 671 Transformation and Multiplication Plan of Anhui Province*, Anhui Province focused on develop-

ment of food, oil crop, animal husbandry, aquatic products, vegetables, fruits, Chinese herbal medicines, cotton, silk, tea, special forestry products, other industries. Since oil crop and cotton production mainly alternates with grain crop production, Chinese traditional herbal medicines have concentrated production area but occupy little capital farmland, and special forestry products are mainly mountain and forest land production, the analysis objective of demand number of new professional farmers in Anhui Province is divided into 7 production system: grain (crop), livestock and poultry, fishery, vegetable, fruit, tea, and silkworm and mulberry^[3]. In this program, we mainly analyzed demands of three types of new professional farmers: production and management type farmers, professional skill type farmers, professional service type farmers.

2.3 Condition setting The capital farmland circulation prediction area altered by Anhui Provincial Government as moderately large-scale land management area of new professional farmers; based on grain price rise, and agricultural subsidy fair or slightly higher than price rise; the price in 2013 as base price to assess grain production and management; moderately large-scale management area, cost analysis, and income analysis as calculation basis.

3 Development trend of scale management of rural land circulation in Anhui Province

According to statistical data of Anhui Provincial Agricultural Commission^[4], the total circulation area of family contract farmland was 20.76 million mu, accounting for 33.4% of total area of family contract farmland, 7.7 percentage points higher than that in 2012. From the development trend of rural land circulation, the land circulation rate gradually keeps paces with the urbanization rate. In 2020, the urbanization rate of Anhui Province will be close to 60% with annual growth of 1.73 percentage points; the land circulation rate needs annual growth rate of 3.8 percentage points, and it reached 50% in 2012, showing accelerated land circulation. In 2030, the urbanization rate of Anhui Province will reach 70%. Considering that the total population of Anhui Province will exceed 71 million in 2020, in addition to the second round of rural land contract will expire from 2025, contractual farmers will wait and see, they may be unwilling to circulate their land. Then, the land circulation will grow at a slower pace. Since the capital farmland area altered by Anhui Provincial Government is basically stable, the area will be 11.4535 million mu less than total area of family contractual farmland. The demand number of new professional farmers is directly connected with moderately large-scale management area. Here, we conducted calculation taking the altered capital farmland area as base number.

4 Prediction of demand number of new professional farmers in Anhui Province

4.1 Prediction of number of new professional farmers demanded by grain production system Using the years 2015, 2020, and 2030 as prediction time nodes, 50 mu, 100 mu and 200

mu as unit, with reference to the prediction area of capital farmland circulation in Table 1, and based on prediction model of Kan Yanhua^[5], we calculated demand number of new professional farmers for grain production system, and the results were listed in Table 2. In Anhui Province, grain production mode is mainly crop rotation of "rice - wheat" and "wheat - maize". On the basis of survey and research, with reference to model, the calculation results are as follows: moderately large-scale management area for double-harvest crop regions should be not lower than 50 mu, the ratio of demands of three types of new professional farmers is $\leq 1.0:0.5:0.5$; the ratio of three types of new professional farmers is $\leq 1.0:1.0:1.0$ for 100 mu scale management; the ratio of three types of new professional farmers is $\leq 1.0:2.0:2.0$ for 200 mu scale management. When the area is larger than 200 mu, the annual income of production managers exceeds wage income of urban employees in non-private organizations, and the ratio of three types of new professional farmers shows new changes; for the area of scale management within 300 mu, the ratio of three types of new professional farmers $\leq 1.0:2.2:2.3$; for the area of scale management within 400 mu, the ratio of three types of new professional farmers $\leq 1.0:3.0:3.0$; for the area of scale management within 500 mu, the ratio of three types of new professional farmers $\leq 1.0:3.7:3.8$. The prediction results is consistent with survey results. In the area of capital farmland circulation, it may not plant rice, wheat and maize wholly, there may also be soybean, potato, oil crop, and cotton planting. Labor demands of related industries exceed or get close to new professional farmers demanded by grain production. Thus, this factor only affects distribution of new professional farmers in different industries, while it exerts little influence on prediction results of total demands. By 2030, the number of new professional farmers demanded by scale grain production and management of Anhui Province will account for 1.78% - 2.80% of total population (72.42 million), close to the figure in developed countries.

4.2 Prediction of number of new professional farmers demanded by large-scale livestock and poultry breeding Based on large-scale poultry breeding division indicators advocated by the Ministry of Agriculture in 2010, for convenience of study, we called those breeding units reaching the division indicators as large-scale breeding farms (households), and those breeding units satisfying more than one labor income demand as breeding farms (households). According to industrial statistical data of Anhui provincial bureau of animal husbandry in 2013, under the assistance and guidance of related animal husbandry and veterinary experts, we analyzed and predicted number of new professional farmers demanded by large-scale livestock and poultry breeding in Anhui Province. To further strengthen market supervision of veterinary medicines and feeds, regulate market operation of input of animal husbandry, and comprehensive promote quality and safety level of livestock products, calculated at 3 people for each town and village, Anhui Province needs 52000 professional service type professional farmers. The existing large-scale breeding farms (house-

holds) need more than 238000 workers throughout the year. With the scientific and technological development and constant improvement in large-scale livestock and poultry breeding level, specialized production (such as leading enterprise + cooperative, or base + farmer and company + farmer, and cooperative + farmer) needs participation of small farmers, and circular agricultural production management mode (planting + breeding) is more and more. The income of breeding farmers is basically main source of their family income. After completion of technology and fund ac-

cumulation, they will develop towards large-scale breeding. About 212000 workers are basically labors engaged in livestock and poultry production all the year round. Therefore, to keep the annual slaughter of livestock and poultry at the existing level, and increase the total amount through constantly improve scientific and technological extension and application and large-scale breeding level, the annual demand of professional workers is about 500000, in which production and management type professional farmers are more than 61000.

Table 1 Development trend of scale management of rural land circulation in Anhui Province

Year	2013	2015	2020	2030
Area of household contractual management farmland//10 ⁴ mu	6215.57	—	—	—
Circulation area of household contractual farmland//10 ⁴ mu	2076	—	—	—
Percentage of land circulation scale management (circulation rate) // %	33.4	41.2	60	70
Urbanization rate of Anhui Province//%	47.9	51.4	60	70
Capital farmland area altered by Anhui Provincial Government//10 ⁴ mu	—	7360.95	7360.95	7360.95
Calculated area of capital farmland circulation//10 ⁴ mu	—	3032.71	4416.57	5152.67

Table 2 Number of new professional farmers demanded by moderately scale grain production and management in Anhui Province^[5]

Time	2015				2020				2030	
Calculated area of capital farmland circulation//10 ⁴ mu	3032.71				4416.57				5152.67	
Set value of unit variable of scale management//mu	50.00	100.00	200.00	50.00	100.00	200.00	50.00	100.00	200.00	200.00
Number of production and management type professional farmers//10 ⁴ people	60.65	30.33	15.16	88.33	44.17	22.08	103.05	51.53	25.76	25.76
Number of skilled type professional farmers//10 ⁴ people	30.33	30.33	30.33	44.17	44.17	44.17	51.53	51.53	51.53	51.53
Number of professional service type professional farmers//10 ⁴ people	30.33	30.33	30.33	44.17	44.17	44.17	51.53	51.53	51.53	51.53
Total demands of new professional farmers//10 ⁴ people	121.31	90.99	75.82	176.67	132.51	110.42	206.11	154.59	128.82	128.82

Table 3 Demands of labors for large-scale livestock and poultry breeding in Anhui Province^[6]

Indicator	Number of large-scale breeding farms	Annual slaughter	Demand number of production and management type professional farmers//people	Demand number of skilled type professional farmers//people	Demand number of breeding farm labors//people
Swine	36123	More than 100	36123	75412	47663
Egg – laying chicken	8561	More than 2000	8561	26412	22544
Meat chicken	8398	More than 10000	8398	50655	25488
Milk cow	118	More than 100	118	1130	1298
Beef cattle	742	More than 100	742	4545	22098
Sheep	7691	More than 100	7691	18465	92692
Total	60893		60893	176619	211783

Note;the annual slaughter is based on large-scale poultry breeding division indicators advocated by the Ministry of Agriculture in 2010; annual slaughter of breeding households: swine: 50 – 99; egg-laying chicken: 500 – 1999; meat chicken: 2000 – 9999; milk cow: 10 – 99; beef cattle: 10 – 99; sheep: 30 – 99.

4.3 Prediction of number of new professional farmers demanded by fishery breeding in Anhui Province According to *China Fishery Statistical Yearbook* (2014), in Anhui Province in 2013, the total output of aquatic products was 2.155 million tons, total production of fishery breeding was 1.83 million tons; the total area of fresh-water aquiculture was 570384 ha, including 209643 ha pond, 202095 ha lake, 93792 ha reservoir, 52046 ha river, and 12808 ha other water body. In the end of 2013, there were 209625 fishery households and 688257 workers, including 344177 professional workers (64933 fishing workers, 246163 professional fishery breeding workers, and 33081 other workers), 264235 part-time workers, and 79845 temporary workers. The per capita net income of fisherman was 10724.44 yuan. According to current development situation of fishery, if the breeding area is above 100 mu, the annu-

al net income is about 200000 yuan, which can satisfy demands of employment and income of a couple or 3 or more workers. Fishery drugs, feeds, and tools are directly supplied by manufacturers or agents; aquatic product processing, transport, terminal sales, and professional market management personnel belong to workers of secondary and tertiary industries; fishery technical staff have been included into public welfare agricultural technical extension team; each large-scale fishery breeding unit only needs 3 professional workers. Therefore, the fishery breeding of Anhui Province needs 260000 new professional farmers, including more than 86000 production and management type professional farmers.

4.4 Prediction of number of new professional farmers demanded by vegetable industry in Anhui Province

4.4.1 Prediction of number of new professional farmers deman-

ded by protected vegetable production. The area of protected vegetable production (including melon and fruit, hereafter referred to as melon and vegetable) should be greater than 5 million mu, to satisfy basic demands of vegetable basket. Taking provincial level demonstration family farm standard 20 mu as calculation unit, in general, it can satisfy demands of employment and basic income of a couple, and also can satisfy demand of income of one professional skilled workers and 0.5 professional service type worker. Calculating one management unit, the ratio of three types of professional farmers exceeds 1:2:0.5. Considering labors for terminal sales included into urban tertiary industry, it is excluded the scope of prediction of demands of new professional farmers. Therefore, protected melon and vegetable production of Anhui Province needs 250000 production and management type professional farmers, not less than 500000 professional skilled farmers, and 125000 professional service type professional farmers, and the total should exceed 825000. Considering high seasonal labor demands, one production and management unit needs one seasonal labor, it needs 250000 workers, part of whom may become new professional farmers, so the total of new professional farmers demanded by protected melon and vegetable industry is up to 1.075 million in Anhui Province.

4.4.2 Prediction of number of new professional farmers demanded by outdoor melon and vegetable production. In Anhui Province, the outdoor melon and vegetable planting area remains 10 million mu annually. Considering market and natural disasters, according to data supplied by the provincial vegetable office and our survey, average annual production income of melon and vegetable exceeds 2000 yuan/mu, it can satisfy demands of employment and income of a couple, but it needs at least 5 whole-year labors and seasonal labors, and socialized service income can satisfy demands of more than 2 social service people. The ratio of three types of new professional farmers is up to 1:6:2. Therefore, outdoor melon and vegetable production of Anhui Province needs 50000 production and management type professional farmers, 300000 professional skilled farmers, and 100000 professional service type professional farmers, and the total should be not less than 450000.

4.4.3 Total demands. The total melon and vegetable planting area in Anhui Province is about 10 million mu. Considering grain production circulation area, when land circulation rate reaches 70%, the capital farmland area beyond large-scale grain production and management is still 22.0828 million mu, it can satisfy land demands of other agricultural production, so the demand of new professional farmers for grain production may be omitted. Therefore, the total number of new professional farmers demanded by melon and vegetable production and management should be at least 1.5 million in Anhui Province.

4.5 Prediction of number of new professional farmers demanded by fruit production in Anhui Province Fruit is essential garden crop in Anhui Province, and fruit industry is one of top ten pillar industries of agricultural industrialization in Anhui Province. In 2010, the fruit (excluding strawberry) planting area

was 1.606 million mu and total yield was 2.357 million tons, 0.84 million more than in 2005, growing by 64.4%. Main fruit planted in Anhui includes pear, apple, peach, grape, and persimmon. The pear planting area was 0.572 million mu, the yield was 0.966 million tons; apple planting area was 0.252 million mu, the yield was 0.407 million tons; peach planting area was 0.362 million mu, the yield was 0.43 million tons; grape planting area was 0.141 million mu, the yield was 0.261 million tons; persimmon planting area was 0.087 million mu, the yield was 0.13 million tons. According to the Twelfth Five-Year Plan for Fruit Industry Development in Anhui Province, by 2015, the fruit planting area would remain at 1.6 million mu, and total yield up to 2.2 million tons. Fruit production belongs to labor intensive production, and it needs high labor input in manual pollination, bagging, picking and treatment. According to survey results of Suzhou City Agricultural Radio and Television School, for outdoor fruit (apple, pear, and peach) planting management, a couple may manage 15 mu, if the yield is 2500 kg/mu, the net income is up to 4500–7500 yuan/mu. According to 100 mu planting standard of provincial level demonstration family farm, it needs 13 labors, so the fruit production needs about 200000 labors in the whole province, including 16000 production and management type professional farmers, and the seasonal labor demand is high.

4.6 Prediction of number of new professional farmers demanded by tea production in Anhui Province Anhui Province has a long history of tea and is a major province of tea production in China. Tea is also a pillar industry of rural economy in mountain areas of Anhui Province. Developing tea economy is of great significance for revitalizing rural economy, increasing income of tea farmers, and keeping social stability. In Anhui Province, 58 counties of 12 cities produce tea, the tea garden area is up to 1.8 million mu, involving more than 3 million tea workers, and one million production management people. According to 100 mu planting standard of provincial level demonstration tea farms, the demand of production and management professional farmers is about 18000, which is obviously not consistent with actual situation. According to survey of Huangshan City Radio and Television School, tea production generally takes a couple as main labor. The preferred tea garden area is 10 mu, production time is 2–3 months. Dry tea yield is 200 kg/mu, total family production is about 2000 kg. In 2014, calculated at 3.5 yuan/kg, the gross income is 28000 yuan. Excluding 0.75 yuan/kg cost consumption (including traffic cost and processing on a commission basis), tea garden management, fertilizer, and pesticide 200 yuan/mu, the net income per household is 20000 yuan. According to current family production and management situation, tea production of Anhui Province needs at least 180000 new professional farmers. Since tea picking time is concentrated and needs lots of labors, the seasonal labor shortage is outstanding, it needs planning in advance to find better solutions.

4.7 Prediction of number of new professional farmers demanded by sericulture production in Anhui Province With

superior climatic and geographical conditions, Anhui Province is a major province of sericulture production. Cocoon and silk industry is one of top ten pillar industries of Anhui's agricultural industrialization. In 2010, the mulberry garden area reached 0.8 million mu in Anhui Province, ranking the 7th place in the whole country; the silkworm cocoon production reached 31000 tons, also ranking the 7th position in China; the silk production was 40 million meters; pure silk products reached export volume of 22.2428 million USD, ranking the 11th position in China. The total output value of cocoon and silk industry was 4.6 billion yuan, the profit tax reached 400 million yuan, it provided 40000 jobs, promoted 450000 farmers, and farmers engaged in cocoon and silk industry had monthly income of 2600 yuan. Anhui Province's sericulture production takes large-scale and base construction as direction, production areas are gradually moving to base type counties, and it has established organization modes of "company + farmer", "base + farmer", and "company + cooperative organization + farmer". In 2010, the cooperative economic organizations of sericulture production in Anhui Province reached 146 (including 4 provincial demonstration specialized cooperatives), preliminarily forming the superior industrial belt. In large-scale and base production area, sericulture production has certain demands for new professional farmers. For the whole province, it is recommended to strengthen training and education of production and management type and social service type professional farmers. According to survey of Huangshan City Agricultural Radio and Television School, for family sericulture production with the couple as main labor, the mulberry garden area should be 5 mu, the preferred silkworm breeding is 15–20 pieces (8 pieces in spring, 2 in summer, 4 in autumn, and 4 in early winter), the income per household is 35000 yuan, which fails to satisfy employment and income demand of a couple. Calculated at current family production and management situation of sericulture, the sericulture in Anhui Province needs no more than 160000 new professional farmers.

4.8 Prediction of demand number of new professional farmers in Anhui Province in 2030 According to prediction in sections 4.1–4.7, the total demand of new professional farmers in Anhui Province is more than 4.09 million in 2030, including 0.76 million production and management type professional farmers, accounting to 5.7% and 1.1% of total population predicted (72.42 mil-

(From page 15)

operatives is the precondition for development and expansion of cooperatives. However, to realize voluntary participation of farmers, it is recommended to raise attraction of cooperatives. On the basis of specialized cooperation, qualified cooperatives may consider providing endowment and medical care services. In rural areas of China, the problem of empty nest is very serious. If it is able to provide such services for cooperative members, it will obtain more support of cooperative members, then cooperative will have broader development space.

lion), slightly higher than current level in developed countries. Since about 5 million farmers are still engaged in family management and traditional Chinese medicinal material and special forestry products, more than 5 million less than 14.697 million people engaged in the primary industry in the end of 2013, annually reducing 0.3 million people, lower than half of the 0.615 million people reduced in the primary industry of Anhui Province in 2013.

5 Conclusions

Rural economic and social development depends on the personnel. The State Council has decided to reform the household registration system. Thus, the concept of farmer in traditional sense will gradually fade out. Farmer will become a new profession. In this situation, it is urgent to study how to cultivate and educate new professional farmers. To realize four modernizations at the same time, it is recommended to accelerate agricultural modernization, innovate upon systems and mechanism, speed up establishing national system for new professional farmers, and constantly enrich and improve China's rural basic management system. In conclusion, cultivation of new professional farmers is a fundamental and strategic project, and it determines solution to issues concerning agriculture, farmers and rural areas, so it is of profound significance.

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