Research on the moderate-scale of apple farmers in different targets

From the end of 1970s to the middle of 1980s, the household contract responsibility system with the average land contract as the main feature achieved clear institutional performance in promoting the development of China's agricultural production, increasing farmers' income and narrowing urban-rural income gap. However, under the background of market deepening, population transformation and urban-rural integration, the agricultural production target has changed from the traditional goal of "developing production and ensuring supply" to the dual goal of "increasing grain output and farmers' income", and the small-scale business model has been increasingly challenged. It has become an inevitable choice for agricultural development to innovate agricultural management system and expand agricultural management scale.

Existing research on "agriculture moderate scale" shows differences in different geographical regions and different historical stage, and mainly concentrated in five aspects. Firstly, using "land productivity" to evaluate the moderate-scale management, but there has not been consistent conclusion. Secondly, the moderate scale management of agriculture is evaluated by "labor productivity". Most scholars believe that there is a positive relationship between the scale of agricultural land and labor productivity. Thirdly, using "production cost" to evaluate the moderate-scale management. Some scholars believe up-scaling could reduce production cost while some scholars believe that there exists a non-linear relation between scale enlargement and cost reduction. Fourthly, the moderate scale of agriculture is evaluated with "the maximization of farmers' net income". Fifthly, using "the opportunity cost" to evaluate the moderate scale operation of agriculture. As you see, the research conclusions of moderate scale operation are obviously different under different objectives and research methods. So the paper tries to explore the coupling results of moderate scale operation in rural areas under different goals.

On the basis of referring to the existing literature, the paper builds production model, profit model and cost model based on the survey data of 661 apples growers from eight countries in Shaanxi Province to analyze the moderate-scale of apples in terms of output maximization, net-income maximization and cost minimization, respectively. The empirical research shows that:

Firstly, whether under the goal of the output level of farmers, net income of farmers or under the goal of scale economy, there exists a moderate scale in theory while there are significant differences among the moderate scales under different goals in reality. As far as the perspective of guaranteeing apple supply, namely

oriented by the maximization of farmers' output level, the optimal moderate scale of shaanxi apple farmers should be within 13-23 mu. As far as the perspective of promoting the increase of farmers' income, namely oriented by the maximization of farmers' net income, the optimal moderate scale of shaanxi apple farmers should be above 23 mu. As far as increasing the competitiveness of agricultural products, namely oriented by the minimum production cost, the optimal moderate scale of shaanxi apple farmers should be within 3-8 mu. It can be seen that the optimal moderate scale of shaanxi apple farmers based on different orientations is contradictory and it is difficult to realize the coupling of the three orientations. However, from the perspective of actual operation, the moderate scale under the goal of the maximum output, the maximum benefit and the minimum cost can still realize the sub-optimal configuration. Specifically speaking, the contribution to increasing apple output among different scale ranges is 13-23 mu > 8-13 mu > 3-8 mu >more than 23 mu > below 3 mu; the contribution to increasing farmers' net income among different scale ranges is more than 23 mu >13-23 mu > below 8-13 mu > below 3 mu > 3-8 mu; the contribution to reducing the apple's production cost is 3-8 mu > 8-13 mu > 13-23 mu > below 3 mu > more than 23 mu. Therefore, the apple farmer' moderate scale in Shaanxi can be set at 13-23 mu under balancing the goals of the maximum output, the maximum benefit and the minimum cost. In addition, the apple farmers' output level and production cost show obvious regional differences. Therefore, when carrying out moderate scale operation, the government should take regional environment and economic development level into consideration, not follow suit blindly and avoid similarity.

Secondly, considering the impact of land fragmentation, Shaanxi's apple production is increasing returns to scale, but is no significant economies of scale, that is, the increase in labor, land and capital doubled is one time, the increase in apple output is more than one time; the output elasticity of labor, land and capital is positive in the setting range of this paper, but with the continuous expansion of apple planting scale, the total output is not necessarily increased.

Thirdly, the effect of aging population on apple production has not been reflected in the main apple producing areas of shaanxi. Therefore, at the present stage, it is not necessary to worry too much about the aging of fruit farmers hindering the development of apple industry. But the phenomenon of farmers' part-time job has gradually eliminated the rural demographic dividend, and continuously strengthening technical training and policy support to train a batch of new professional fruit farmers to focus on the production and operation is an urgent task for the development of apple industry.