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Analysis on the Development of Agricultural Science-technology Enterprises in Shaoxing during 2013-2015

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Abstract. Based on the survey of 68 Shaoxing agricultural science-technology enterprises, we found the input factors are relatively stable in agricultural science-technology enterprises in this region, including personnel input, agricultural production base, R & D funds and technology project etc. In terms of output of agricultural science-technology enterprises, the number of new technologies, the introduction of new varieties, patent applications and licensing, as well as access to government awards at various levels, the number of the output is also relatively stable, there is no significant increase. These results show that the development of agricultural science-technology enterprises in Shaoxing is in a stable period, and it is difficult to achieve significant growth in both input and output in the future. Government departments need to according to the status, in-depth understanding of the agricultural science-technology enterprises' situation, search the breakthrough point for the development of agricultural science-technology enterprises, for example, support some leading enterprises, then through the leading enterprises to promote the development of regional agricultural science-technology enterprises.

Introduction

With the development of economic globalization, many countries have taken measures to increase investment, reform the economic structure and promote scientific and technological actions to accelerate the development and innovation of agricultural science and technology. Agricultural science-technology enterprises play an important role in the innovation of agricultural science and technology, and they are the main drivers and executors of agricultural scientific and technological innovation. Therefore, by investigating the development status of agricultural science-technology enterprises, we can find out its advantages and disadvantages and provide the necessary factual basis for formulating relevant policies and measures scientifically. This paper will investigate the agricultural science-technology enterprises in Shaoxing, analyze the two aspects of both input and output, and reveal the development of agricultural science-technology enterprises in recent years.

Data Sources

The survey conducted by Shaoxing scientific and technologic bureau, issued questionnaires to the provincial agricultural science-technology enterprises in Shaoxing city [1][2]. The investigation of agricultural science-technology enterprises' development in the last three years (2013-2015). The questionnaires collected in this survey include 68 agricultural science and technology enterprises from four counties in Shaoxing (Keqiao, Shengzhou, Xinchang and Zhuji) (Table 1). Each enterprise has reported the relevant data in the past three years.

Table 1 Data sources

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	23	11	10	24	68
2014	23	11	10	24	68
2015	23	11	10	24	68

The Number of Input

Personnel Input. All types of workers play a central role in the development of agricultural science-technology enterprises, and the quantity and quality of staff are directly related to the development of enterprises [3]. In recent three years, the number of workers and staff members in all areas of agricultural science-technology enterprises has increased slightly except for Shengzhou, the overall situation in other areas remains basically stable. From the proportion of the number of college degree or above, the proportion of Zhuji is slightly higher, reaching 28%, and the proportion of other areas is basically stable between 19%-24% (Table 2).

Table 2 The number of employees of agricultural science-technology enterprises

Year\Region	Keqiao			Shengzhou		
	Number of employees	College degree or above	Percentage of college degree or above	Number of employees	College degree or above	Percentage of college degree or above
2013	5564	1266	22.8%	1788	362	20.2%
2014	5595	1315	23.5%	1968	381	19.4%
2015	5336	1228	23.0%	2084	403	19.3%
Total	16495	3809	-	5840	1146	-
Year\Region	Xinchang			Zhuji		
	Number of employees	College degree or above	Percentage of college degree or above	Number of employees	College degree or above	Percentage of college degree or above
2013	1811	398	22.0%	2270	611	26.9%
2014	1821	397	21.8%	2414	684	28.3%
2015	1851	446	24.1%	2333	667	28.6%
Total	5483	1241	-	7017	1962	-

Agricultural Production Base. Agricultural production base construction is an important guarantee for agricultural production. In the past three years, the number of agricultural production bases in various regions of Shaoxing has not increased significantly. Xinchang has hardly increased in recent years, while other regions have only slightly increased (Table 3).

Table 3 The number of agricultural production base unit: Mu

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	416468	8671.5	252053	170946	848138.5
2014	416618	9471.5	252293	171480	849862.5
2015	466818	10171.5	252625	175746	905360.5

The Input of R & D Funds. The technological innovation of agricultural science-technology enterprises cannot be separated from the input of R & D funds. From the total investment in four counties of Shaoxing City, the annual R & D investment exceeded 200 million yuan, but the investment in the past three years has not increased.

Table 4 The input of R & D funds units: 10000 yuan

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	9294	1400	4714	5447	20855
2014	9091	1759	4823	5090	20763
2015	9295	1518	5341	4539	20694
Total	27680	4677	14878	15076	62311

From the survey data, Shengzhou R & D investment is significantly less than other regions, only Keqiao's 1/6, Zhuji's 1/3 (Table 4).

The Number of R & D Center. R & D center, as a specialized technological innovation department within an enterprise, is an organizational guarantee for enterprises to carry out various R & D activities [4]. In the past three years, except for the addition of one research and development center every year in Zhuji, the rest of the region remained unchanged. This shows that the agricultural science-technology enterprises in Shaoxing have not been significantly developed in the R & D center of enterprises (Table 5).

Table 5 The number of R & D center

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	18	6	7	12	43
2014	18	6	7	13	44
2015	18	6	7	14	45

The Number of the Scientific and Technological Plan Projects. The scientific and technological plan projects from all levels of government provide some financial support for the scientific and technological innovation of enterprises, and they are important carriers to promote the science and technology innovation in enterprises. From the survey data, in addition to the number of projects in Keqiao a slight increase every year, the rest of the region is basically declining, Xinchang and Zhuji have declined for two consecutive years, the reasons for which worth exploring (Table 6).

Table 6 The number of the scientific and technological plan projects

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	55	7	11	41	114
2014	59	9	9	35	112
2015	64	5	7	34	110
Total	178	21	27	110	336

The Number of Output

The Number of New Technology Promotion. Xinchang has some growth in the number of new technology promotion, and the other regions are basically stable every year. The number of new technologies promoted in Shengzhou is significantly less than in other regions, less than 1/7 in Zhuji (Table 7).

Table 7 The number of new technology promotion

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	24	3	13	29	69
2014	27	4	17	31	79
2015	25	4	21	29	79
Total	76	11	51	89	227

The Introduction of New Species. In the introduction of new species, Zhuji has outstanding performance, and the number of new species introduction is basically the sum of the other three counties. The four counties of Shaoxing have the rise or fall in different years, but show no obvious trend of increase (Table 8).

The Number of Patent Application and Authorization. In the past three years, the number of patent applications in Keqiao, Shengzhou and Zhuji has dropped slightly every year. The number of patent authorization in Zhuji is also declining every year, and in other counties has been increasing

or descending in different years, and has not maintained the momentum of sustained growth (Table 9).

Table 8 The number of new species introduction

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	27	27	34	120	208
2014	24	31	31	98	184
2015	28	46	32	120	226
Total	79	104	97	338	618

Table 9 The number of patent application and authorization

Year\Region	Keqiao		Shengzhou		Xinchang		Zhuji	
	A	B	A	B	A	B	A	B
2013	29	14	21	6	38	34	40	37
2014	28	28	15	14	30	22	38	30
2015	24	18	12	10	44	37	31	22
Total	81	60	48	30	112	93	109	89

A: Number of patent applications
B: Number of patent authorization

The Number of Awards. Zhuji has the largest number of awards annually, and the number of awards in Shengzhou is at least. The number of awards has fluctuated every year (Table 10).

Table 10 The number of awards

Year\Region	Keqiao	Shengzhou	Xinchang	Zhuji	Total
2013	9	1	7	14	31
2014	10	3	5	15	33
2015	6	3	6	12	27
Total	25	7	18	41	91

Conclusion

In terms of personnel input, the number of workers in the enterprise is basically stable, and the proportion of employees with college degree or above is about 25%, which basically meets the needs of scientific research and production. The number of agricultural production bases has been stable and no significant growth. Although the annual overall investment in research and development is higher, but in the past three years there is basically no increase, and the difference among regions is larger. The number of research centers remained unchanged, while the number of scientific and technological projects declined in recent years. In the agricultural science-technology enterprises, the number of output, for example, the promotion of new technologies, the number of new varieties introduced, the number of patent application and authorization, and the number of awards from all levels of government, are relatively stable, no significant increase. The above survey results show that the development of agricultural science-technology enterprises in Shaoxing is in a stable period, and it is difficult to achieve significant growth in input and output in the future. Government departments need to according to the situation, in-depth understanding of the actual agricultural science-technology enterprises, then explore the breakthrough point for the development of agricultural science-technology enterprises, for example, support a number of leading enterprises, through these leading enterprises to promote the development of agricultural science-technology enterprises in the region [5]

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