Coordinated Development of Urbanization and Animal Husbandry Industrialization in Western Regions of China

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Abstract Animal husbandry industrialization and rural urbanization in western regions of China are not independent, but two aspects of development with mutual interaction. Animal husbandry industrialization provides material basis of progress in productivity for rural urbanization. In turn, rural urbanization provides development conditions, such as industry, technology, science, information, market, finance, transportation, communication, and social service, for animal husbandry industrialization. This paper analyzed existing problems and interaction between animal husbandry industrialization and rural urbanization in western regions are analyzed, and finally it came up with policy recommendations for coordinated development of animal husbandry industrialization and rural urbanization.

Key words Western regions of China, Urbanization, Animal husbandry industrialization

1 Introduction

Animal husbandry industrialization and rural urbanization in western regions of China are not independent, but two aspects of development with mutual interaction. The development of animal husbandry industrialization is the process of rapid development of livestock product processing and circulation industry, and integrated operation of animal husbandry production, processing, and sales, trade, industry and agriculture sectors, and union of many industries, and overall promotion of single sector and industry of traditional animal husbandry. The improvement of rural urbanization is the process of constant improvement of industrialization, and transfer of resources from traditional industrial sectors with low marginal productivity to new industrial sectors with high marginal productivity. Animal husbandry industrialization provides material basis of progress in productivity for rural urbanization. In turn, rural urbanization provides development conditions, such as industry, technology, science, information, market, finance, transportation, communication, and social service, for animal husbandry industrialization. After all, the animal husbandry industrialization is marketization of animal husbandry. Animal husbandry industrialization is to promote integrated operation of animal husbandry production, processing and sales, and trade, industry, and agriculture through accelerating development of animal husbandry, so as to improve market competitive power, and increase farmers' income. Rural urbanization is to accelerate agricultural development and transfer of rural population, alleviate rural employment pressure, increase non-agricultural proportion, and realize upgrade of industrial structure through developing small rural towns. Western regions are characterized by much land but few people, relatively backward economic and social environment, scattered distribution, and nomadic lifestyle, resource concentration, but vulnerable economy. These make the urbanization of western regions particularly special. Besides, settlement of some nomadic people and traditional animal husbandry production mode greatly deteriorate surrounding pasture, rendering urbanization mode in pastoral area being involved in dispute. If not changing traditional animal husbandry production mode, settlement or urbanization will bring a new round of destruction to surrounding pasture, which is not conforming to ecological requirement. Without modernized production mode, modernization of lifestyle will become empty talk.

2 Problems in development of urbanization and animal husbandry industrialization in western regions

2.1 Problems in development of urbanization in western regions (i) Relatively backward regional urbanization development level. The urbanization development level in western regions lags far behind the national average level, eastern regions, and central regions. Statistical data of 2013 made by State Statistics Bureau (Table 1) indicate that there is a big gap in urbanization development level of western regions. (ii) Unbalance in regional urbanization development level. Firstly, there is big gap in the urbanization rate. In 2012, in western regions, the first rank of urbanization level includes the Inner Mongolia and Chongqing, both higher than the national average level; Ningxia, Shaanxi and Qinghai belong to the second rank, lower than the national average level, but higher than the western average level (44.26%); Guangxi, Sichuan, and Xinjiang belong to the third rank and have urbanization rate above 40%; Yunnan, Guizhou, Gansu, and Tibet have urbanization level lower than 40% (Table 2). Secondly, unbalanced urbanization development speed. In 2000-2012, Chongqing and Ningxia developed at highest speed, higher than the national average level, and faster than other western provinces; Shaanxi and Sichuan had basically the same level as the national average level; Yunnan, Guangxi, Inner Mongolia, and

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Gansu developed at intermediate level, up to or higher than the western average level, but lower than national average level; Qinghai, Guizhou, Xinjiang, and Tibet developed slowly; the slowest was Tibet, having a gap of 1.67% with Chongqing (Table 2). (iii) Defective urban size structure. From Table 3, we can see that western regions have small urban size, few large cities, the density is low, and most are far from economic center, making spatial transactional cost very high but the scale economic benefits are low. As to the spatial distribution, urban level ranking is not complete, the distribution is unbalanced, spatial structure is out of balance. All levels of cities take on decentralized self-development status to a certain extent, lack combined effect, and it is difficult to release agglomeration effect and radiation effect of urbanization. From the perspective of functions, most western cities are resource open cities, taking on extensive development, and urban economic strength and service functions are weak. (iv) Bad interaction between urbanization and ecological environment. In many areas, the urbanization process is accompanied with deterioration of ecological environment. In western regions, the energy consumption is mainly coal, and the energy utilization efficiency is low and environmental pollution is serious, and the pollution of small towns is more serious. Western regions are situated in arid and semi-arid areas. Due to restriction of drought, water loss and soil erosion, desertification and pasture degradation, as well as ecological environment, urbanization development is slow. In addition to occupation of agricultural land, urbanization has posed a big threat to ecological environment in western regions. Deterioration of ecological environment not only influences living environment of western regions, but also threatens ecological foundation for urban survival and development, and gradually restricts sustainable development of urbanization.

Table 1 Comparison of population proportion in eastern, central and western regions in 2012

Region	Total population//10^4	Urban population		Rural population	
		Population//10^4	Percentage// %	Population//10^4	Percentage// %
The whole country	135404	71182	52.57	64222	47.43
Eastern regions	55850	34714	66.07	21137	33.93
Central regions	42511	20614	49.81	21897	50.19
Western regions	36428	16298	44.26	20132	55.74

Data source: *China Statistical Yearbook* (2013).

Table 2 Urban population proportion and changes of western regions in 2000-2012

Time Region	2000			2012			Increase	Annual increase
	Urban population	Total population	Percentage of urban population	Urban population	Total population	Percentage of urban population		
Inner Mongolia	1 014	2 376	42.68	1 438	2 490	57.74	15.06	1.26
Guangxi	1 264	4 489	28.15	2 038	4 682	43.53	15.38	1.28
Chongqing	1 023	3 090	33.09	1 678	2 945	56.98	23.89	1.99
Sichuan	2 223	8 329	26.69	3 516	8 077	43.53	16.84	1.40
Guizhou	841	3 525	23.87	1 269	3 482	36.44	12.54	1.05
Yunnan	1 002	4 228	23.36	1 831	4 659	39.30	15.95	1.33
Tibet	50	262	18.93	70	308	22.73	3.82	0.32
Shaanxi	1 163	3 605	32.26	1 877	3 753	50.01	17.86	1.48
Gansu	651	2 562	24.01	999	2 578	38.75	14.74	1.23
Qinghai	180	518	34.76	272	573	47.47	12.69	1.06
Ningxia	182	562	32.43	328	647	50.70	18.24	1.52
Xinjiang	650	1 925	33.82	982	2 233	43.98	10.16	0.85
Western regions	10 207	35 471	29.50	16 298	3 6428	44.74	14.76	1.23
The whole country	45 844	126 583	36.22	71 182	135 404	52.57	16.35	1.36

Data source: *China Statistical Yearbook* (2013).

2.2 Problems in development of animal husbandry industrialization in western regions (i) Fund. Animal husbandry industrialization generally includes large scale animal husbandry operation, corporate management, corporate production, and market-oriented sales, while the fundamental condition for industrialization is large scale fund and specialization of equipment. Lack of fund input and weak cost affordability are fundamental obstacles to industrialized operation for herdsmen. Difficult financing is another obstacle. For farmers developing the animal husbandry, there is still no support policy, so the funds for animal husbandry development are quite insufficient. (ii) Specialization. In vast pastoral area, the production mode of animal husbandry is backward, and breeding is mainly traditional separate breeding of farmers. There are still problems of scale, intensive, block, and very low standardized level, leading to difficult control of animal epidemics, difficult extension of advanced breeding technologies, and difficult

increase of economic benefits. Market competition ability of enterprises is weak, while most leading enterprises have obsolete equipment, backward process, and low technology level. Many enterprises are family type operation, lack modern management mechanism and marketing mode, and their market expansion ability is weak. (iii) Science and technology level. The realization of animal husbandry industrialization lies in science and technology level. At present, technology service system for animal husbandry production is not perfect, grass-roots veterinary service organization system is not well established, funds are quite insufficient, infrastructure conditions are poor, facility and equipment are backward, and technical service means are simple, leading to difficult to extend new breeding technologies and implement anti-epidemic measures.

Table 3 Urban size comparison between eastern, central and western regions in 2012

Region	Item	Total	Mega-cities	Ultra-cities	Megalopolis	Large cities	Medium cities	Small cities
The whole country	Number of cities	289	14	31	82	108	50	4
	Percentage to the whole country	100	4	10	28	37	17	1
Western regions	Number of cities	87	3	5	26	27	24	2
	Percentage to the whole country	30	1	1	9	9	8	0
	Percentage to the local region	100	3	5	28	31	27	2
Eastern regions	Number of cities	102	8	19	29	35	10	1
	Percentage to the whole country	35	2	6	10	12	3	0
	Percentage to the local region	100	7	18	28	34	9	0
Central regions	Number of cities	100	3	7	27	46	16	1
	Percentage to the whole country	34	1	2	9	15	5	0
	Percentage to the local region	100	3	7	27	46	16	1

Data source: *China Statistical Yearbook* (2013).

Note: as per population division standard of prefecture level cities, mega-cities have population more than 4 million, ultra-cities have population of 2 million - 4 million, megalopolis have population of 1 million - 2 million, large cities have population of 0.5 million to 1 million, medium cities have population of 0.2 million to 0.5 million, and small cities have population less than 0.2 million.

3 Correlation between urbanization and animal husbandry industrialization

3.1 Animal husbandry industrialization influences rural urbanization The development of animal husbandry industrialization is the process of rapid development of livestock product processing and circulation industry, and integrated operation of animal husbandry production, processing, and sales, trade, industry and agriculture departments, and union of many industries, and overall promotion of single department and industry of traditional animal husbandry. The higher animal husbandry industrialization, the larger market share of livestock and poultry products with higher income elasticity, and the greater proportion of animal husbandry processing and circulation, reflecting in rural labor employment and rural urbanization level, it is decrease in labor engaged in primary industry and improvement in rural urbanization level. In countries with developed agriculture, animal husbandry industrialization level is high, output value of animal husbandry accounts for 70-80% of total agricultural output value, and the rural urbanization level is higher than 80%. Animal husbandry production in Denmark has basically realized integrated operation of production, processing and trade, and trade, industry and agriculture. Its animal husbandry takes dominant place in agriculture, with output value accounting for 90% of total agricultural output value, and its rural urbanization level is considerably high, and agricultural employment proportion is less than 6% of total population. Animal husbandry of the Netherlands takes up 56.9% of total agricultural output value, while its agricultural employment proportion is only 4%. By contrast, in some countries, animal husbandry develops slowly, and animal husbandry industrialization level is low, and their rural urbanization level is also relatively low. For example, in Indonesia and China, the output value of animal husbandry is below 45%, and rural urbanization level is only about 30%.

3.2 Rural urbanization promotes animal husbandry industrialization The improvement of rural urbanization is the process of constant improvement of industrialization, and transfer of resources from traditional industrial sectors with low marginal productivity to new industrial sectors with high marginal productivity. National income realizes rapid growth, and national food structure undergoes changes. Demands for high quality foods increase with growth of income, while demands for low quality foods decrease with growth of income. Changes in food structure become a basic market signal determining the direction of agricultural resource allocation, which induces decline in the proportion of planting products with low income elasticity and rise in the proportion of livestock products with high income elasticity. In sum, rural urbanization is an essential condition for animal husbandry industrialization. On the one hand, the per capita livestock and poultry consumption of urban residents is greatly higher than that of rural residents, thus rural urbanization is favorable for generation of large volume of livestock and poultry products and stimulating the development of animal husbandry. On the other hand, large scale transfer of rural labor and agricultural population and constant expansion of urban secondary and tertiary industries are favorable for constant expansion of market scale of livestock and poultry products and changes in market structure, and also favorable for reasonable flow of agricultural population and animal husbandry work-

ers, to realize large scale operation and consolidation of breeding resources and reach the industrialization with optimal allocation of breeding resources.

3.3 The promotion of animal husbandry industrialization and rural urbanization is integrated process The *Report to the Sixteenth National Congress of the Communist Party of China* states that the priority of rural economic work is to promote agricultural structural adjustment and promote rural urbanization. At present, the fundamental direction of agricultural structural adjustment is adjustment from planting to animal husbandry, constantly increasing the proportion of animal husbandry to total agricultural output value and raise market competitive power of agriculture, especially animal husbandry. Therefore, animal husbandry industrialization and rural urbanization are two key points of China's rural economic development and also two mutually interactive aspects. On the one hand, the animal husbandry industrialization is favorable for improving the allocation efficiency of agricultural resources and even resources of the whole society, helping small rural towns to accumulate development funds, promote transfer of agricultural population and rural labor to non-agricultural sectors, and promote rural urbanization process. On the other hand, development of small rural towns is favorable for rural labor expanding employment channel, increasing rural non-agricultural level, providing places for collecting information for production, processing, circulation and information technology of animal husbandry, and promoting consolidation and optimal allocation of breeding resources. Therefore, development of agricultural industrialization and rural urbanization is not only a process of self-development, but also a process of mutual promotion.

4 Recommendations

4.1 Establishing coordinated and interactive promotion mechanism Firstly, it is recommended to take the road of shareholding operation of agricultural land, and promote reasonable flow of breeding resources, to provide conditions for development of animal husbandry industrialization and rural urbanization. Agricultural land shareholding system converts breeding resources into shares, and separates ownership, use right, and operation right of breeding resources. Share holders can obtain breeding profit from shareholding right. With approval of resource owners, breeding operators can develop animal husbandry in large scale to promote industrialized operation of animal husbandry without prejudice to benefits of resource owners. Secondly, it is recommended to take the road of agricultural operation, to promote interactive progress of animal husbandry industrialization and rural urbanization in the manner of cooperation. Cooperative operation not only stresses intensification and sharing of production means, but emphasizes common realization of democratic rights, which conforms to essential requirement for risk sharing and benefit sharing of animal husbandry. It can reduce production cost, and promote reasonable labor division, processing and circulation of the animal husbandry. Thirdly, it is recommended to reform the dual household registration system and dual economic structure, and strengthen enthusiasm of farmers to go to cities. Farmers should enjoy the same treatment as urban residents in social insurance and welfare system, to reduce threshold of farmers going to cities, increase the proportion of rural non-agricultural population and per capita rural breeding resources, and promote large-scale and intensive operation of animal husbandry, so as to realize rural urbanization promoting animal husbandry.

4.2 Promoting industrialized operation of animal husbandry Firstly, the key for realizing animal husbandry industrialization lies in advantages in market and resources. To find larger demands pulling production, it is required to develop animal husbandry products combining demands. For industrialization operation, market orientation is the key. Pastoral areas can energetically develop grassland animal husbandry with the aid of their rich grassland resources, to realize specialized and industrialized production of animal husbandry. Secondly, it is recommended to help farmers to transform ideas and change production mode, to realize large scale breeding as fast as possible. Industrialized operation of agriculture and animal husbandry is to extend processing and manufacturing chain through guidance of leading enterprises, increase comprehensive benefits of agriculture and animal husbandry, and strengthen market competitive power of agricultural and livestock products, so as to realize increase in yield and efficiency of agriculture and animal husbandry. It is recommended to greatly support farmers and herdsmen specialized cooperatives and farmers and herdsmen broker team, improve organization level of farmers and herdsmen, to bring into full play bridge and link function of them in industrialized operation. Thirdly, a key part of animal husbandry is herdsmen's education and scientific research, so it is required to establish perfect scientific research system for animal husbandry. It is required to speed up the reform in grass-roots scientific and technological service system for agriculture and animal husbandry, accelerate conversion of agriculture and animal husbandry scientific and technological achievements, and take fine seed practice as a starting point of increasing yield and efficiency. Fourthly, it is required to encourage various circles of the society to invest in animal husbandry, to establish high-efficient and flexible financing system for animal husbandry. For example, it is feasible to provide farmers organizations and individual investment in animal husbandry with property right security under the premise of voluntariness of farmers, approval of the connective, registration of grass-roots government, and practically safeguarding basic living standards of farmers. Also, it is recommended to encourage farmers to set up cooperative financial organizations serving production and circulation of animal husbandry, encourage large and medium sized agricultural and animal husbandry enterprises to set up bonding companies for serving animal husbandry, to solve the problem of circulating funds for breeding farmers.

4.3 Strengthening comprehensive radiation function of rural towns (i) It is recommended to attach great importance to com-

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and too much rural labor is transferred. In reality, a large area of abandoned rural land, conversion of agricultural land to non-agricultural land, and agricultural production reduction caused by soil and water pollution, fully demonstrate this point.

5 Conclusions and recommendations

5.1 Conclusions Based on the population floating theory under the Ranis-Fei dual economic structure, this paper designs an econometric model to study the isoquant curve and production factor substitution law. Finally, through the empirical analysis of labor-capital investment in Henan's agricultural production, combined with the principles of isoquant curve model, this paper determines the labor required for a certain scale of investment in agricultural production, and concludes that the fixed assets investment in Henan's agricultural production is not fully utilized, and too much labor is transferred.

5.2 Recommendations It is necessary to improve agricultural land management system, and rationally utilize arable land resources; regulate land consolidation measures, and make rational land use plan; strictly supervise agricultural investment projects, and rationally use agricultural investment funds; vigorously improve the ecological environment, and enhance land productivity effectiveness; innovate upon labor reflux policy, cultivate new occupational farmers, improve agricultural productivity, and promote agriculture to a new level.

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prehensive functions of existing towns in the process of animal husbandry industrialization and strengthen radiation force and area of towns. Specifically, it is required to fully realize functions of small rural towns in promoting industrialized operation of animal husbandry, formulate pertinent incentive and preferential conditions, create favorable environment, actively cultivate secondary and tertiary industrial development of rural towns, cultivate technology, information, management, operation, and education functions of rural towns, to realize their rapid development. (ii) It is recommended to pay attention to organic integration of small rural town construction with local areas in relatively developed areas and areas with higher industrialization level of animal husbandry. The animal husbandry industrialization is in fact marketization. Whether it can realize specialized large-scale production and operation on principle of market labor division lies in marketization of superior livestock and poultry products with regional characteristics. Therefore, for small rural town construction in developed breeding areas, it is required to adapt to industrialized development of animal husbandry, integrate overall distribution of rural towns, and make reasonable plan to satisfy demands of urban economic development and residents' living standards for livestock and poultry products, and build small rural towns integrating various characteristic functions, livestock and poultry product production, processing, and circulation with reasonable and scientific distribution.

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