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Development of Poultry Production Clusters in China: A Policy Review

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Abstract: The poultry sector is important for the livelihoods of rural people in China. Under increased public concerns on bio-security, how to integrate the small scale poultry producers into safe and high value production chains is a key political issue in many developing countries. In this context, China initiated a model of building poultry production clusters (PPCs) and moving small producers into the clusters so as to increase the scale of production as well as bio-security. It was considered an innovative model in China and the government issued various policies to promote this model since 2003. However, the model failed after a couple of years of practice. This paper reviews the social, economic and political elements of this endeavor and the impacts of PPCs in China. The main reason for the failure is that, without external authority, the small producers were fated into the dilemma of collection actions, which means that each individual will maximize individual interest with the expense of the public interest. The failure of PPCs supports the previous research results in that as income growth and urbanization increases consumer demand for food safety, the small producers could not meet those high food safety standards and the government has limited capacities to work with millions of small producers to encourage them to follow the same production standards. The political commitment to control transmissible disease outbreaks was given higher priority than the commitment to small producer development since it was difficult for the government to balance the two.

Key words: Livestock products, PPC policies, economic development, China

INTRODUCTION

Population expansion, urbanization and income growth in developing countries are fueling a massive global increase in demand for livestock products and has caused a "livestock revolution" in global agriculture that has profound implications for our health, livelihoods and environment (Delgado *et al.*, 1999). Since livestock makes a significant contribution to economic activity, particularly in agriculture-based and transforming countries, many scholars have raised the question: Can smallholder livestock production systems in developing countries be transformed to take advantage of the increasing demand for livestock products? (e.g. Tarawali *et al.*, 2011).

Some scholars think that the growing demand for livestock products can provide small holders with the opportunities to increase income by expanding production and sales. Livestock production is considered to be an important pathway out of poverty for the rural poor in developing countries (Kristjanson *et al.*, 2010). For example, one study shows that the smallholders in Ea Kar District of Vietnam were able to convert from traditional cattle production to efficient market-oriented production and compete successfully in city markets with other suppliers (Stür *et al.*, 2014). Others argue that while a growing livestock sector can provide opportunities for the poor, there are deep

concerns about the competitiveness and economic viability of the small livestock producers in a rapidly changing livestock sector (McDermott *et al.*, 2010). Growing resource scarcity, particularly water and land, imply that intensifying livestock production in mixed crop-livestock systems in a sustainable way will pose significant social and environmental challenges (McDermott *et al.*, 2010). Furthermore, animal diseases pose significant threats to livestock sectors throughout the world, both from the standpoint of the economic impacts of the diseases themselves and the measures taken to mitigate the risk of disease occurrence and spread (Perry *et al.*, 2003). In agriculturally-based economies, people with low and slowly increasing incomes will provide much of the increasing demand for livestock products largely from local, informal and domestic markets (Staal, 2001). Smallholders are competitive in such local markets. But, will these markets continue to provide growth opportunities for smallholders in the long run as income growth and urbanization increase consumer demand for food safety (McDermott *et al.*, 2010)?

Improving incomes and providing employment to the poor who have limited livelihood options is an important development objective in many developing countries. However, can public policy and related institutions provide a supportive environment for dynamic

smallholder-led growth that minimizes negative impacts on the environment and the risks of transmissible diseases (McDermott *et al.*, 2010)?

Poultry production is an important sector in China's economy. In 2009, China produced 2.54 billion layers and 47 billion broilers, accounting for 38.24% and 14.38% of the total in the world¹, respectively. Both were ranked first and second in the world, respectively. In 1996, among 234 million small farmers, 104 million households (44%) had poultry operations. Of those farmers who raised poultry, 99.7 percent were small producers with a yearly production of 1,000 birds or less. Poultry produced from this huge number of small farmers accounted for about 43 percent of total poultry production in China². Therefore, poultry has been an important means of livelihood support for rural populations in China.

However, since 2004, the unprecedented Highly-Pathogenic Avian Influenza (HPAI) outbreaks in poultry occurred in more than 20 provinces of China. Since then, the Chinese government applied various control measures and initiated higher bio-security requirements for livestock producers. The small scale producers faced various institutional, physical, technical and financial constraints to developing standardized and large scale livestock farms.

Rural income growth has been a fundamental goal for Chinese policy makers especially given China's longstanding commitment to reducing rural poverty (Park *et al.*, 2002). Therefore, the policy makers did not want to see the farmers lose their livelihoods from the poultry sector. The question was, how to integrate the traditional and small scales of production into the high-value and safer livestock value chains in China.

To address this problem, China developed a new model for poultry production-the construction of poultry production clusters (PPC)-as a vehicle to drive small producers into intensive and standardized livestock production. A production cluster was given a designated area in rural districts separate from residential areas, where various farm households jointly manage the poultry production. The clusters share the infrastructure such as roads, electricity, water supplies and some of the facilities such as waste treatment facilities. In this way, they can apply standard biological safety measures and environmental-friendly practices.

Since 2004, China has issued a series of policies, clauses in laws, circulars and technical standards to promote the development of Livestock Production Clusters (LPCs) covering different types of animals: poultry, pigs, cows, etc. The LPCs developed quickly during this early period and it is estimated that there were over 70,000 LPCs in China by the end of 2006³, though there is no data to show how many of them were PPCs. However, after several years of practice, the policy makers in China realized that the LPC model was not

viable as many of the LPCs were not able to achieve the intended results. After the failure of LPCs, the China government enhanced its efforts to develop large scale and high standard livestock farms instead of supporting the small producers.

The LPC policy has had profound impacts on the livestock production structure and the small producers in China. However, there is no literature in English that analyzes the processes and impacts of LPC policies in China. This paper describes the background, driving forces, evolution and the effects of government policies on Livestock Production Clusters, which will provide an explanation of the causes for its failure, with an emphasis on PPCs. The reflections on China's experience to develop PPCs will provide valuable lessons on small producer development in the livestock sector for other developing countries.

MATERIALS AND METHODS

Since this study was intended to review the background and impacts of PPC policies in China, a document review and interviews with key informants were applied in this research.

The document review analyzed the related government documents and literatures related to this study, so as to understand the social, economic and political background of the policy implementation and the key events in China which have driven the formation and development of PPCs. The documents reviewed include: the policy documents related to PPCs and China's agricultural statistics yearbooks. A number of academic papers by Chinese scholars' related to PPCs were also reviewed to form an analysis from secondary data.

The key informant interviews were mainly conducted with the officials in the livestock department of the Ministry of Agriculture. The purpose was to understand the origins and evolution of PPC policies and the rationale of the policy makers to initiate this program.

RESULTS

There were three phases of PPC development in China after the national rural reform in 1978: emergence (late 1980s-2003), fast development (2003-2007) and decline (2008 and after). In addition, this section analyzes the social, economic and political background of China and the key events that have driven the evolution of PPCs.

Rural reform and the emergency of PPCs (1979-late 1980s): In 1978, frustrated by the failure to raise substantially population living standards after 30 years of socialist revolution, the new political leaders in China shifted the core task of the Communist Party and the national government from the class struggle to economic development. Recognizing that agriculture was the foundation of the national economy and since 80% of the population lived in rural areas, the

government emphasized that the priority task was to develop agriculture and increase farmers' income (Lin, 1997). The rural reform adopted the Household Responsibility System (HRS) to replace the previous collective production system and contracted the collective land to individual households for production. The reform also loosened the government control of markets and prices and farmers could trade their surplus products in the free market. The rural reform was one of the most successful reforms in China. For example, from 1982-1989, the production of poultry and eggs increased from 2.81 million tons to 7.2 million tons, up 156%⁴.

The shift to household responsibility systems gave farmers the freedom to allocate their resources to the most profitable activities based upon their individual competitive advantages. As a result, so-called "specialized households" emerged in rural China. They focused their resources on one product to make commercial production. When they made profits, their extended family members, relatives, friends and neighbors all learned from them and started to develop the same product. Poultry raising is a good example of this development.

Gradually, when most of the farm households in the village also raised poultry, this formed the "villages specialized in poultry". During that time, with the increasing living standards after the reform, the market generated a huge demand for poultry products. These small commercial producers were very competitive in the market since they mainly used reliable family labour and used few purchased inputs. Therefore, they were much more competitive than the large farms which were operated by the state or collectives. The large farms went bankrupt and the majority of the poultry products in China were supplied by small commercial producers.

During the early period of poultry development after the reform, the scale of poultry farms was quite small. For example, the so-called specialized households only raised 30-50 chickens, so they had no problems raising poultry in their backyards. Economic growth after the rural reform generated high demand for meat products which caused the shortage of supply in the urban market in the late 1980s. The farmers were able to make good profits and thus they kept increasing the scale of livestock production.

When more and more farmers started to raise poultry in the same village and each farm household kept increasing the scale of production, it produced lots of waste and unpleasant smells in the village. Furthermore, the farmers were limited by the size of their backyards when they wanted to increase their poultry production. Therefore, in many villages, they were allocated a piece of land to rent, such that a group of producers moved out of the village and produced the

poultry together in the designated area, which formed a PPC. The initial cluster emerged in the late 1980s and gradually spread to all the northern provinces of China, which were the main areas of poultry production. This mode was considered to be an improvement over the backyard mode and therefore received the bulk of investments from the government and private enterprises. However, clusters were not developed in mass until 2003.

From 1978 to 1995, the share of livestock in the agricultural production value structure in China grew from 15% to 30%⁵. The reason was that the farmers could not make much income from the fragmented and small pieces of arable land, so that livestock had become the main income generating source for those households who depended on agriculture to make a living.

The poultry sector continued to grow since the initiation of the rural reform and the poultry and egg production hit a new record of 19.65 million tons in 1996⁶. In the middle of the 1990s, a critical moment came for the poultry sector in China: the supply and demand of livestock products was balanced and there was no longer a shortage of supply in the market. Since then, the quantity of poultry production was no longer an issue. Instead, quality became more and more important. At the same time, the poultry sector in China encountered more challenges.

In 1996, another significant event occurred and attracted the serious attention of the government on livestock product quality. In April 1996, the EU sent a delegation to China to investigate the PPCs in China and they concluded that the poultry meat exported to EU contained transmissible diseases, residues from chemicals and veterinary medicines and thus Chinese export was banned to 15 countries of the EU and this ban lasted for 5 years. From this event, the government became more conscious of food safety and planned to improve the bio-security in the poultry sector. According to the interview of a senior official from the Ministry of Agriculture (MOA), "since then, MOA started to think about how to standardize the PPCs."

In 2000, China entered into the WTO. At that time, livestock production had already met the needs of the domestic market, but had not yet a sufficient access to the international market. Therefore, China policy adopted the need to take a greater share of the international market with the opportunity of entering into WTO. During that time, there was a heated discussion among the government, academics and enterprise leaders on what would be the impacts of WTO on the livestock sector of China and how China should prepare the livestock industry to join WTO. The main conclusions were: China had the comparative advantages in livestock production and entering into WTO provided China with a good

opportunity to participate in the international market; China should make the best use of the opportunities to explore the global market (Lin, 2001; Liu, 2002; Zhao, 2001; Deng, *et al.*, 2003).

To enter into the international market, China had to meet the high technical standards related to bio-security. For example, the EU had thousands of technical standards for foreign exporters. When the majority of the suppliers were small producers, how could they meet those high technical standards? How could the export enterprises control the production behaviors and processes of so many different small suppliers? China's government had to find a way out of this dilemma.

Fast growth of PPCs (2003-2007): Since 2004, the Avian Influenza (AI) outbreak appeared in more than 20 provinces of China, causing the culling of millions of poultry and a significant drop on exports. In 2005, 186,000 poultry died of AI and 22.8 million poultry were culled in China (Jiang, 2006). Since this disease was also transmissible from animals to humans, the AI outbreak caused top level attention from the government. After analyzing the cases of the AI outbreak in China, it was found that all of the AI outbreak cases happened in small scale commercial poultry producer farms (Jiang, 2006). The field investigation of the outbreak sites by the government also found the poor bio-security status of the small farmers. In addition, the small producers raised poultry in or near their houses, so that the animals and the humans lived together, which is believed to be risky in spreading diseases. Therefore, the small producers received lots of criticism during the AI outbreak. Since China has too many poultry for the domestic market and as most of these birds were raised in farmyards, it became very difficult to effectively control diseases.

Entry into WTO and the AI outbreak are the two main driving forces behind China's transformation of the livestock sector. The government policy makers made up their minds to transform the traditional way of raising animals. At that time, increasing farmers' income was still the priority political task of the government. During the early 2000s, the stagnant income growth of farmers had become a serious social problem and China's government was trying to make policies to speed up the increase of farmers' income. Therefore, the government needed to keep farmers in the poultry sector instead of driving them out which would further cause the slowing down of farm income generation. However, the government felt that the farmers' traditional ways to raise poultry needed to be standardized, upgraded and modernized. In addition, the animals and the producers needed to be separated.

The next problem was how to transform the small producers into modern producers? The policy makers of China had the experience of adopting farmer's

existing good practices and scaling them up to the national level, such as the case of the household responsibility system. Therefore, the existing PPCs attracted the attention of the policy makers in the Ministry of Agriculture. The policy makers thought that an advantage of the cluster was that it was located away from the villages with dense populations and thus, it separated animals and human beings. In addition, by putting producers together, the clusters could also have the following potential benefits:

- 1: It would be easier to require the producers to follow the same procedures and requirements on bio-security and environmental management
- 2: It would be more cost-effective to install high standard bio-security facilities, such as the facilities to treat the wastes
- 3: It would be more convenient for the government to provide technical and financial services to the small farmers in PPCs and monitor for transmissible diseases
- 4: It would reach the scale of economy in terms of production, so that the farmers could be more competitive in the markets and could get better economic returns

It seemed that the PPC model was a good vehicle to keep the small producers in the livestock sector while transforming them into safe and high value production. What the government needed to do was to standardize the operation of clusters and provide technical, financial and policy support.

In 2003, MOA held a propaganda meeting to guide the provinces to adopt the Livestock Production Cluster (LPC) model, which did not only cover poultry, but also other animals, such as pigs, cows, etc. Since 2003, a series of policies, regulations, clauses in the law and technical standards were issued and pilot programs were funded to launch the LPC actions in the whole nation. In the *Opinions on Promoting the Modern Livestock Production Practices* issued by the MOA in 2004, it was proposed that efforts would be made to use the LPC as an effective tool to help increase the income of farmers, improve agricultural production efficiency and boost the market competitiveness of livestock products. In 2005, MOA issued a series of technical manuals for standardizing the LPCs, covering 8 livestock species: layers, broilers, ducks for eggs, ducks for meat, cows, cattle, pigs and goats. In 2006, MOA implemented the demonstration projects for standard livestock production focusing on treatment of wastes.

As a key approach to promote the transformation of livestock production practices, the statements and opinions encouraging the development of LPCs have been included in the official documents of the Central Committee of the Communist Party of China (CCCPC) many times. For example:

- 1: In the No.1 Document of the CCCPC in 2004 entitled "*Opinions on Policies of Helping the Farmers Increase Their Incomes*", it was proposed that efforts should be made "to strengthen the development of animal epidemic prevention system, implement the projects of emergency animal epidemic prevention and control in key areas and encourage the rural areas to build LPCs"
- 2: In the No.1 Document of the CCCPC in 2005 entitled "*Opinions on Policies of Further Strengthening the Work in Rural Areas and Improving the Comprehensive Agricultural Production Capacity*", it was stated that actions can be taken "to guide the areas that meet the relevant conditions in developing LPCs through micro-credit, fiscal discount and other means"
- 3: In the No.1 Document of CCCPC in 2006 entitled "*Opinions on Promoting the Construction of New Socialist Countryside*", it was reiterated that efforts should be made to encourage the construction of LPCs"
- 4: In the Animal Husbandry Law of China promulgated on July 1, 2006, it was stated that "the State supports the rural collective economic organizations, farmers and livestock cooperative economic organizations in building LPCs to operate in a standard and scale-based manner"

The local governments had also responded actively to the policies of the central government on developing LPCs. It was estimated that by the end of 2007, there were about 70,000 LPCs in China (Leng, 2007).

After several years of rapid growth of PPCs, the expected results have not been achieved due to many constraints. The challenges facing the development of PPCs mainly include the shortage in land, funding and appropriate technology and the difficulty that producers have in taking joint actions, which made it hardly possible for the clusters to achieve consistent planning, construction, epidemic prevention, pollution treatment, sales and branding. Specifically, these challenges are:

Nonstandard construction of PPCs: To build a PPC, a special land allocation in the rural area is required. But in reality, it is often very difficult to find such land, whether for the village or for the producers. As a consequence, the existing PPCs are facing the problems of inappropriate site selection, such as the proximity to main roads and water sources.

Improper internal layout of the PPCs: PPCs are featured with disorderly internal layout. These problems mainly include too little space and poor ventilation of hen house and unreasonable design of feeds storage and other facilities. In addition, while designing the paths, many clusters have not separated the clean paths which

are used for producers and transporting healthy chickens and feeds from the "dirty" paths which are used to transport wastes and different units of poultry production have not been isolated from each other with enclosures; no waste and sewage discharge and treatment facilities are available in most of the clusters; the production area, living area and waste area in many clusters have not been strictly separated from each other, which also makes it easy for diseases to spread (Li, 2010).

Poor technical skills of the producers within PPCs: As some of the producers within the PPCs have not attended professional and systematic training courses, they cannot organize production in a scientific way and only operate at a low level of standardization and with poor management practices. Specifically, they cannot select and identify the right sprouts, veterinary drugs and feedstuff in production and often purchase the production material of poor quality. They do not make epidemic prevention efforts when the livestock do not suffer from diseases and abuse veterinary drugs when the livestock are actually affected by diseases. This not only adversely affects the result of epidemic prevention and control, but also impacts the output and quality of livestock and livestock products (Ji, 2008).

No entrance control in the PPCs: The vehicles used to collect poultry and eggs are often parked near the clusters, or just stop on the village's roads, which not only causes hidden danger for the spreading of epidemics, but also affects the transport and causes inconvenience for local people (Ren, 2008).

Lack of coordinated actions in the clusters: In a nutshell, although the government has issued many policies related to the operational practice and construction model of LPCs, these clusters are faced with a great challenge that it is difficult for many stakeholders to take joint actions. After over 20 years of household responsibility systems, the farmer households become more and more independent and make their own decisions regarding production. They may pick up different livestock species and schedule the production at different times, based upon individual forecast on the market demand and family situation (such as labor availability). Therefore, they have different production schedules or even different animal species and they can not perform "all in and all out" policies to prevent diseases in the clusters

Declining of PPCs in China: 2008 and onward: After five years of practice with PPCs, the government became frustrated by their poor performance and to some extent, gave up the efforts to integrate the small producers into the high value production chain. The PPC was no longer

thought to be a viable model for small producer development. Therefore, there is a tacit agreement among the government agencies that the PPC was a failure, although there are no official documents to confirm the official view that the PPC model in practice had failed. Therefore, the national and the local government no longer promoted this model.

Government officials learned that it is difficult to coordinate the different producers in a PPC, so it was thought that one PPC should be managed by a single producer instead of multiple producers. Then, for the government, the large commercial enterprises are the ideal producers for poultry production since they can afford to invest in high standard bio-security facilities, develop larger scale production and hire professional veterinary staff. More importantly, the owners of the enterprises can have full control over the clusters, so that they do not have to coordinate with other producers. China's economy has continued to develop after 2008. The contribution from agriculture to GDP kept decreasing, from 30.2% in 1980 to 10.7% in 2008⁷ and the rural population keeps declining due to accelerated urbanization. Since 2010, China implemented a policy on "industry nurturing agriculture" and supported commercial capital to invest in agriculture. The government and private enterprise have more financial capacities to build up the modern and standardized livestock production farms with high levels of bio-security.

With increased public concern on food safety, the customers with greater income increasingly like to pay a premium for high quality and safe food. Many enterprises also realized that agriculture can bring higher and more reliable returns, especially in the sector of high quality agricultural and livestock products. Therefore, many private enterprises entered into agriculture and the livestock sector. For many government officials, introducing enterprises to develop livestock can achieve the high standards, large scale and modernized poultry production and it will be more able to control diseases. It is much easier to manage large enterprises than managing numerous small producers. In addition, attracting enterprises is one of the most important performance indicators for local governments. So, no wonder that the government was motivated to attract enterprises to enter the livestock sector and in essence, to replace the millions of small producers.

As a result, more and more modern poultry production farms were built up and the small producers were further driven out of the market. Though the government had invested lots of agricultural funds which could be used by farm households, most of these funds have requirements for the scale of production. Therefore, only those bigger farmers, or the enterprises who renamed themselves as farmer cooperatives, can have access to

these funds. As a result, the PPC policies have been converted into policies to support the development of large scale poultry farms.

After the LPC programs, the state government stressed the scale and standardization of the livestock production units and tended to assume that the farmers can make better income by taking migration jobs instead of staying in livestock sectors to compete with increasingly bigger companies. In the Livestock Development Plan 2011-2015 of China, the target was to increase the proportion of the large scale farms by 10-15%.

After the LPC program, the small producers were situated in a disadvantaged position. As disease control has become the top priority and it has given political justification to develop large scale poultry farms.

DISCUSSION

The PPC policy of China was driven by three forces: the first was to access to bigger international markets when China entered the WTO, the second was to control the transmissible animal diseases under AI outbreaks in China and the third was to keep small producers in the poultry sector to maintain their livelihoods under the political commitment to help farmers increase their income. The government of China intended to promote an equal growth in the poultry sector for different producers, with the special consideration in the interests of the small producers. The government expected to make the PPC model a platform to drive the small producers into standard and scaled production and enhance the bio-security and environmental management.

However, the PPC model failed. The main reason for the failure is that though the government gave financial and physical support to build up PPCs, a lack of organizational support to the group of small producers was fatal. More than 20 years of being independent under the household responsibility system has made farmers lacking in the collective identity and cohesion for effective group management. Without external authority, the small producers were fated into the dilemma of collection actions, which means that each individual will maximize individual interest with the expense of the public interest. Therefore, the potential dilemma of collective action should be considered in future policy development.

The failure of PPCs supports the previous research results in that smallholders are most competitive in countries where people have low and slowly increasing incomes (Staal, 2001). This study also answered McDermott *et al.* (2010) question about whether the markets would continue to provide growth opportunities for smallholders in the long run as income growth and urbanization increases consumer demand for food safety. The case of PPC development in China has showed that it is very difficult for the small producers to

meet those high food safety standards and the government has limited capacities to work with millions of small producers to encourage them to follow the same production standards. The political commitment to control transmissible disease outbreaks was given higher priority than the commitment to small producer development since it was difficult for the government to balance the two.

The failure of the PPC model caused the government to give up the efforts to support the development of the small producers in the poultry sector with the conclusion that the small producers are not suitable for standard and large scale production. Therefore, the government turned to support the large producers to reduce the cost of oversight and supervision of disease control. Predictably, this has forced more and more small producers out of the sector.

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