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Coordination Issues in Thailand's Broiler Value Chain

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Abstract

Poultry production (predominately broilers) is the most important livestock industry in Thailand. It is the major source of meat and generates substantial employment and income. There are a number of different production systems ranging from modern integrated commercial systems to smallholder production systems. However, the Thai poultry value chain, in general, suffers from several major issues or constraints affecting value chain coordination. These problems include reduced availability and rising prices of feedgrains, poor infrastructure, and food safety issues. For feedgrains, more research into more productive crops and alternative crops is likely to help. Regarding social and physical infrastructure, the government could usefully play a greater role in building more road networks, setting up power grids and securing water sources. Finally, food safety concerns can be resolved by upgrading the value chain to closed production systems, focussing on biosecurity measures and compartmentalization.

1. Introduction

The poultry industry (predominately broilers) has been hailed as the most successful agro-business in Thailand. It contributes over 50% of Thailand's total meat production and is one of the country's most important food sources, generating substantial employment and income (NaRanong, 2007). Production reached 1.4m tonnes in 2013, higher than both pork and beef (see Table 1). Broiler meat is the most important poultry product, both for domestic consumption and export. It represented 97% of total poultry exports in 2009 and accounted for 30% of livestock total value (Thailand Livestock Report, n.d). Lower prices of chicken meat and the growing presence of global fast food chains are the main drivers of domestic consumption. On the other hand, Thailand exported about 35% of its total chicken meat production in 2012. The main importers of Thai chicken are Japan and the European Union (EU) (Ipsos, 2013).

Thailand, aiming to be a "kitchen of the world" (Department of International Trade Promotion, 2013), was the 12th largest food exporter in 2012. Since the outbreak of Highly Pathogenic Avian Influenza (HPAI) or avian flu in 2004 and new rules set by the EU for quality control and animal welfare, the Thai chicken meat industry has experienced tremendous transformation. The industry has increased its scale of production and has moved towards vertically integrated farming systems. As a result, average farm sizes have increased along with declining numbers of producers. In 2012, integrated commercial farms represented 70% of the total production, followed by commercial farms at 20% and smallholder backyard farms at 10% (Ipsos, 2013).

The increasing importance of the Thai poultry sector can be attributed, to a great extent, to rising exports of chicken meat (see Table 1). For large producers, the industry represents a major global food trader and a significant contributor to the Thai economy.

Table 1: Production, Consumption and Export of Thai Chicken Meat and Products (2006-2010)

Year	Production (Million birds)	Production (tonne)	Consumption (tonne)	Export (tonne)		
				Frozen chicken	Processed Chicken	Total
2006	849.88	1,068,809	809,105	4,937	254,767	259,704
2007	879.98	1,106,663	810,619	18,547	277,497	296,044
2008	920.75	1,157,935	774,621	23,323	359,991	383,314
2009	917.26	1,257,365	878,014	25,227	354,124	379,351
2010	945.86	1,296,570	879,070	27,500	390,000	417,500

Source: Thailand Livestock Report, Italian Trade Commission (n.d)

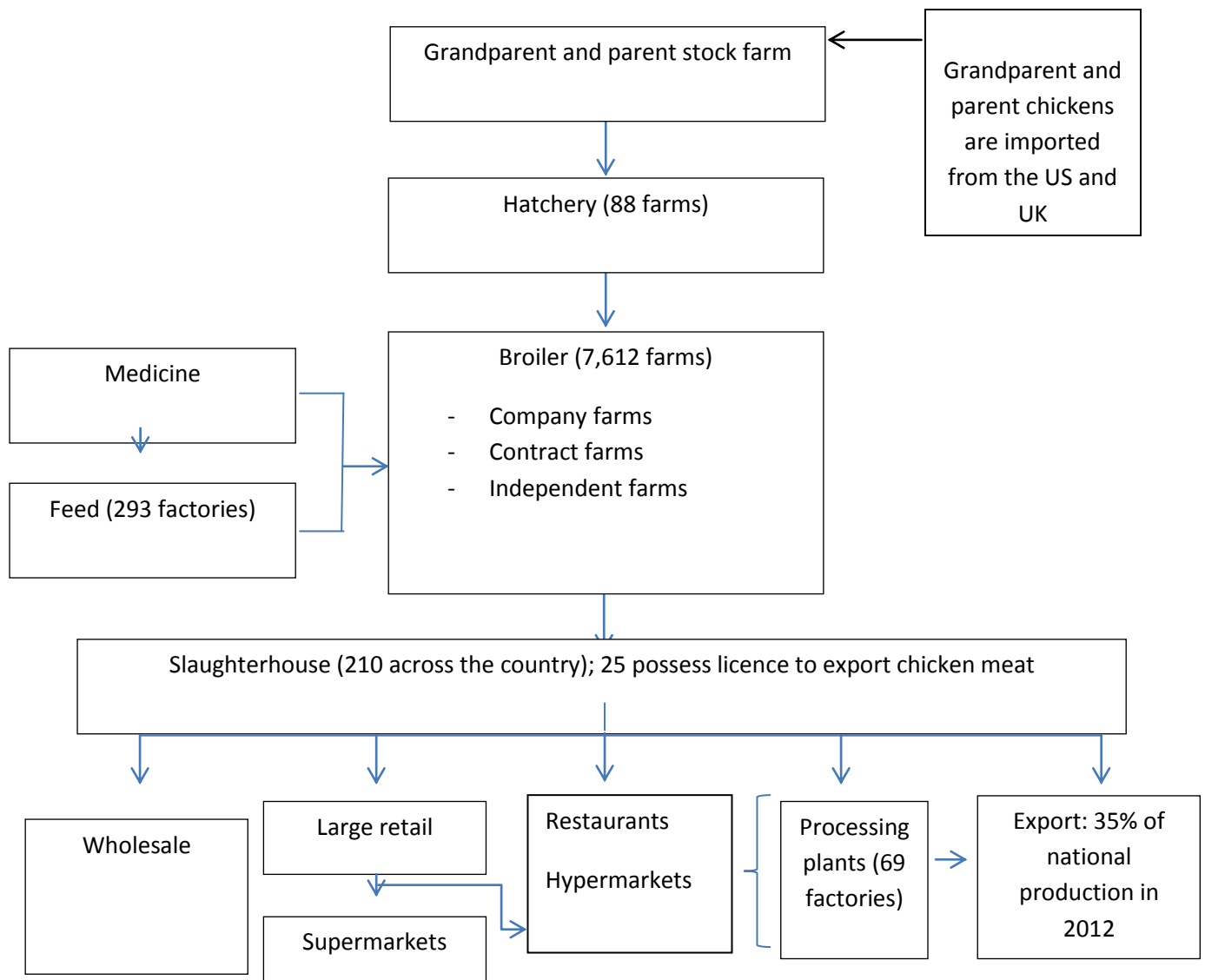
In rural areas, chicken production is mainly for the purpose of consumption and extra income for many smallholders (Heft-Neal et al., 2008). The Thai poultry value chain is therefore an interesting example of food industry transition and transformation, playing a major role in world food systems but also still contributing to the livelihoods of the rural poor.

2. Poultry Value Chain Mapping

Poultry production systems in Thailand include large-scale industrial or integrated production, semi-industrial or commercial production and smallholder or independent farming production. Industrial production is by vertically-integrated corporations who control every aspect of production. Semi-industrial production consists of small-to-medium farms which are usually contracted to raise poultry for integrators. Smallholder farming systems refer to independent households rearing native chickens for their own consumption and supplemental income (Heft-Neal et al., 2008).

The poultry value chain in Thailand (see Figure 1) consists of the following stages:

- *Hatcheries and breeding farms*: hatcheries import grandparent or parent stock, mainly from the United Kingdom and the United States. Grandparent stock is kept separately in the breeding farm. In the case of parent stock, birds are spread out across hatcheries where chicks are produced. Hatcheries have to be highly mechanized and well-equipped with automated feeding mechanisms, evaporative cooling systems (EVAP) and other structures to maintain chicks before they are distributed to production farms.
- *Production*: production takes place at integrated firms, contract producers and independent farmers. Like hatcheries, commercial farms require modern facilities especially the EVAP systems. Under these systems, growth and survival rates are improved with higher density, thus reducing average costs per bird. After the avian flu outbreak in 2004, most commercial farms have adopted closed housing systems, especially those who grow chickens for export. Smallholder farmers who cannot afford the systems remain with their traditional ways. Most integrators in Thailand own their own feed companies. They supply feed and medicines to the integrated farms, contract farms and also sell feed to small farmers.
- *Processing*: market weight chickens are transported to abattoirs and processing facilities, most of which are owned by large integrators. Primary processing involves slaughtering, chilling, cutting and weighing. Secondary processing includes pre-cooking, dressing and other value-added processes.
- *Distribution and marketing*: chicken products in Thailand are distributed to supermarkets, fast food outlets, fresh markets and restaurants for local consumption. Poultry products are distributed to the supermarket distribution centres before being allocated to their respective outlets. Apart from large retailers, chicken products are also sold to wet markets through wholesalers (unwritten contract), and to smaller markets through traders or street vendors. Such distribution activities are conducted using motorbikes. High value-added products are exported to potential markets such as Japan and the EU. In 2012, exports represented 35% of the total production.

Figure 1: Thai Poultry Value Chain Map

Domestic consumption: 65% of national production

Source: Ipsos (2013)

3. Value Chain Strategies, Drivers and Performance

A set of products or services that a company aims to provide to its customers by competing with others is termed its *competitive strategy*. An example of this can be selling a particular product at a lower price. Competitive strategy is based on customers' priorities whether it is product variety, cost, delivery time or quality. On the other hand, *supply chain strategy* involves decisions around logistics such as facilities, inventory, transportation and flows of relevant information. The competitive strategy and supply chain strategy must have shared goals in order for the company to succeed; this is called *strategic fit*. To attain strategic fit, the company, in turn, must match supply chain capabilities with consumers' demand (Chopra & Meindl, 2012).

Supply chain performance is influenced by logistical and cross-functional drivers such as information, sourcing and pricing. These drivers are interrelated and act to balance the level of responsiveness and efficiency determining the supply chain surplus (Chopra & Meindl, 2012).

In the case of the Thai poultry industry, the competitive strategy of the major firms plays a crucial role in determining the market share. Likewise, their supply chain strategy is key to ensuring that the value chain can achieve efficient operations. Key drivers of the Thai poultry value chain include modern facilities and technologies, flows of information and outsourcing of input supplies.

The poultry sector in Thailand involves one of the most technologically advanced industries in the world. Over the past few decades, broiler production has been transformed from backyard or smallholder farms to highly integrated commercial farming systems. The sector has recently become a leading exporter of chicken meat and enjoyed equal or better efficiency and overall performance than those of many other countries (Heft-Neal et al., 2008). The trend towards low cost poultry production is the result of improved technologies, especially the EVAP systems introduced by Charoen Pokphand company (CP) in the 1970s. Technologies have also minimized production costs by improving feed conversion ratio and reducing grow-out time (Farrelly, 1996).

The vertically integrated system has provided increased production efficiency. It enables the business to achieve "economies of scale", reliable supply, quality and uniform products. Moreover, better coordination in the vertically-integrated value chain may reduce both operating and transaction costs (Farrelly, 1996; Steinfeld et al. 2006; NaRanong, 2007). Through contract arrangements between a few input suppliers and operators, and/or operators and retailers/wholesalers, information related to supply and demand, quality and standards can be obtained by all stakeholders at potentially low cost. The vertical integration structure also allows integrators to have control over inputs by the means of sourcing supplies at various levels and across boundaries (Costale et al., 2005).

The poultry value chain in Thailand has adopted a combination of responsive and efficient strategies. The value chain is efficient because only a few players control important stages such as breeding, production, processing, distribution and marketing which means they can "align supply and demand that allow them to match the flows of inputs with the supply of products to the market" (Heft-Neal et al., 2008, p.25). The vertical integration leads to low production costs. Responsiveness occurs at some points of the distribution process where products are distributed to wet markets through wholesalers or vendors without formal contract. This may lead to variations in supply and demand from time to time.

In the integrated system, chickens are reared in integrated commercial farms and contract farms. Most integrators possess their own hatcheries, feed mills, processing plants and other facilities such as laboratory and R&D research centres (Costale, 2004; NaRanong, 2007). Processing facilities are very efficient and highly mechanized because they are constructed to meet the standards of major importers. Generally, processing takes place at night time because the delivery of raw chickens for domestic markets is undertaken in the early morning. These facilities are primarily located in close proximity to each other to reduce transport cost. In the case of contract farming, integrators transport broilers from the farm to the processing plants. This is also usually done at night in order to reduce weight loss and mortality rates (Farrelly, 1996).

On the other end of the value chain, the number of supermarkets in Thailand has been increasing. These retail outlets demand reliable supplies of standardized and quality chicken meat from large processors. Poultry products are distributed to the supermarket distribution centres before being

allocated to their respective outlets. Distribution to wet and small markets using motorbikes are often undertaken at night due to the lack of cold storage facilities (Heft-Neal et al., 2008).

Thailand's export of poultry products, which is almost all in the form of broiler meat, has increased substantially. Major integrators have turned from frozen or raw to pre-cooked or finished products which are easily prepared and prices have become lower than those in the past. This has, as a result, caused export volumes of broiler products to European countries to rise dramatically due to becoming more competitive (NaRanong, 2007).

4. Coordination and Driver Issues

Jaffee (1992) states that coordination is the arrangement of interdependent activities which involve the decisions and actions of concerned stakeholders. In food value chains, vertical coordination presents the greatest challenge. It is the process of matching supply and demand of raw materials and final products at an agreed set of quantity, quality, time and location between suppliers, producers, processors and traders in the value chain. Often, it requires efficient flows of information and other resources in order to make the process work.

In most developing countries, producers and marketing entities often face severe problems in relation to information, logistics and overall transaction costs, mainly due to the intrinsic technical and economic properties of raw materials, marketing infrastructure and services. These factors serve as significant barriers to effective and efficient coordination in the process (Jaffee, 1992). In comparison to other products, food supply chains are far more subject to handling and transport problems which demand the utilisation of infrastructure capacities and high logistical costs. In addition, well-established processing facilities with sufficient power and water supply are required to be built in close proximity to the production areas (Jaffee, 1992). Furthermore, the seasonality of animal production is another issue which contributes to the cost-effectiveness of transport and processing facilities.

Physical infrastructure systems such as roads, ports and rails are needed for efficient food procurement and distribution. A lack, or poor quality, of these resources will cause the overall costs to rise, reduce competitiveness and constrain trade. In terms of exports, physical distance to target markets, language barriers and different standards are all attributed to restraining trade by increasing logistical costs, absence of face-to-face negotiations and misinterpretations of standards (Jaffee, 1992).

There is very little literature about these issues of coordination in the poultry value chain. In Thailand, supplies and prices of feed grains are likely to be one of the major obstacles to the development of the poultry sector. Competition for land resources from urbanisation and increasing demands for feed crops for biofuel production will cause reduced availability and rising prices of grains for poultry production in the future (Upton, 2007). Maize and soybean are the primary inputs of feed for poultry in Thailand. Maize is cultivated locally for livestock production. Soybean is both grown locally and imported due to high demands for human consumption and animal feeds (Heft-Neal et al., 2008).

Another recent issue affecting Thai poultry production and expansion is food-safety related problems including antibiotic residues and HPAI. In the past, the industry has applied a great deal of vaccination, antibiotics and antiseptics. These chemicals are believed to leave unfavourable residues in the products and lead to import bans by major importers (NaRanong, 2007).

Further, deficiencies in the transport and market infrastructure are another weakness of the poultry supply chain in Thailand. Poor roads, telecommunications and insufficient marketing facilities such as cold chains badly affect the whole value chain including production, processing and distribution (Upton, 2007). Unfortunately, as yet there is no specific study of the impact of physical and social infrastructure on the performance of the poultry value chain in Thailand.

5. Possible Intervention Options and Assessment

There is a wide range of measures needed to deal with coordination problems in the Thai broiler value chain. They involve the participation of all levels, including technical/technological and institutional, so as to facilitate the flows of information and goods in the systems to yield reliable supplies of inputs, technical support, quality and standards, and marketing. As a result, economies of scale can be achieved and transaction costs reduced along the value chain (Jaffee, 1992; Farrelly, 1996).

Food marketing enterprises or large integrators often play an important role in promoting the production of raw materials. They can provide producers or farmers with technical information, finance and supply of material inputs such as seeds, and fertilisers. These types of services may help increase yields and quality which in turn benefit the integrators or food enterprises.

Upton (2007) stresses the importance of coordination of feed supplies for chicken production from a young age up to harvesting time. Since feed constitutes most of the production costs, the right amount and type of feed at the right time are essential for the attainment of productive efficiency. To achieve this, formal contracts are needed to cut down on costs and default risks. It is clear that vertical integration provides such solutions in reducing transaction costs and ensuring well-coordinated supplies (Farrelly, 1996).

In Thailand, feed is the largest production cost, making up to 75% of the total expenses. Therefore, access to low cost and high quality feed is a prerequisite for firms to make profit and remain competitive. A number of steps have been suggested to solve the feed problem. The government and large corporations have put a great deal of effort into research aimed at improving feed efficiency of the animals. Moreover, further research may delve into other alternative crops such as cassava. More importantly, the leading integrator in Thailand, CP, advocates that the most effective way to increasing cost productivity of feed grains is yield improvement which can be achieved through the application of hybrid seeds. It has cooperated with major food corporations such as DeKalb and Cargill on maize joint research ventures. CP promotes hybrid seeds by creating contracts with maize producers in the country. Consequently, contract farmers produce an average of 1,200 kg/rai compared to normal seeds which yield only 400 kg/rai (Heft-Neal et al., 2008).

Food safety issues have negatively affected the poultry industry in Thailand. The avian flu outbreak in 2004 caused a considerable drop in domestic consumption of chicken meat, on top of the import ban of poultry by Japan and the EU. Further, vaccination seems to not work against the flu virus. Therefore, the industry has adopted improved biosecurity measures instead. In practice, the measures involve growing chickens in a closed system that minimises contact and contamination. Furthermore, under guidance from the Department of Livestock Development, the poultry industry has taken up a more robust form of control - compartmentalisation. This action has enabled large corporations to share facilities and provide space or service to smaller commercial farms (NaRanong, 2007). In 2013, about 7,000 of the 10,000 farms upgraded to meet the closed system standards. Only 5% of poultry producers operate their farms at less than the new biosecurity standards. Subsequently, Thailand's poultry industry has recovered from the HPAI disease and regained its trend growth rate. The reopening of the EU and Japanese markets has enabled the industry to regain its position as one of the world's leading exporters of chicken products (Ipsos, 2013).

In developing countries like Thailand, the government is responsible for providing necessary infrastructure such as roads, water, power and other facilities aimed at enhancing the industry research and development (Upton, 2007). In addition, the Thai government has provided various support programmes for the industry. For example, it compensated producers up to 75-100% for the loss of chickens during the avian flu outbreak. The government also created a soft loan fund to help affected poultry farmers who were keen to start new businesses. To protect domestic production, Thailand also imposes heavy taxes on imported chicken products to fend off competition from other suppliers, the US in particular (NaRanong, 2007).

6. Conclusion

Vertical integration is the key factor driving the transformation of the poultry sector in Thailand. It allows the realisation of economies of scale across the subsector of the value chain by ensuring reliable and timely input supplies, regular supply of chickens for processing, and control over quality. All of these factors contribute significantly to increasing demand for chicken meat locally and internationally. Thai broiler exports are mainly of a diverse range of value-added products aiming to meet the preferences of Japanese consumers. Most importantly, the vertically integrated and coordinated production, processing and distribution of the Thai poultry sector gives the industry a favourable competitive cost advantage over its competitors and this is assisted by the close distance to major markets. However, the continuing growth of the broiler sector is likely to be hampered by the increasing prices of feed, poor infrastructure and food safety concerns. These issues seem to require various coordination interventions from all stakeholders in the value chain including the government, broiler producers, processors, distributors and marketing agencies.

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