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Food Climate Research Network

China briefings
Supply chain transformations

Photo:
Kung Fu burger lorry

Chris Tse
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Summary

Several key transformations have affected China's food supply chains over recent decades.

1. Gross agricultural output, the value of output, and agricultural productivity have all increased considerably.
2. Agriculture's relative contribution to national GDP and employment has fallen.
3. There has been a shift toward higher value production, with considerable growth in the livestock, horticulture and aquaculture sectors. These changes have been matched by shifts in demand, with particularly strong increases in consumption of animal products and in 'added value' processed foods.
4. There has been increased interaction between China's food system and other parts of the world. Not only have imports and exports increased, but two-way foreign direct investment and other forms of cooperation have also risen.
5. There have been changes in the structure, locality and control of production.

CHINA BRIEFINGS
OVERVIEW OF CHANGES AND DRIVERS IN CHINA'S FOOD SYSTEM

May 2015

Written by Huw Pohlner based on Garnett, T. and Wilkes, A. (2014) *Appetite for change: Social, economic and environmental transformations in China's food system.*

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In coming years, a range of biophysical constraints triggered by global and local environmental change could, unless effective policies are implemented, limit further production increases. These include the impacts of climate change on crop productivity both in China and in regions from which imports flow; changes in water availability and reductions in its quality due to climate change and competition from other water-using sectors (such as industry and urban households); and reductions in the quantity and quality of agricultural land available due to agricultural and industry-induced soil pollution, and encroachment by industry and urbanisation.

Further downstream in the supply chain, the food processing, manufacturing and distribution sectors are experiencing rapid growth as consumer demand for value-added processed and packaged foods increases. Greater interactions with international companies now include overseas investments in the food sector by Chinese firms. The wholesale and retail sectors are very diverse, and range from street stalls to hypermarkets. Supermarkets are expanding rapidly in China, but traditional wet markets are still often preferred because they have the edge on product freshness and price. Eating out has become increasingly common over the years, with the fast food market growing rapidly. These and other consumption patterns are driven most directly by rising incomes and urbanisation.

Key agricultural transformations

Changing contribution of agriculture to livelihoods and the economy

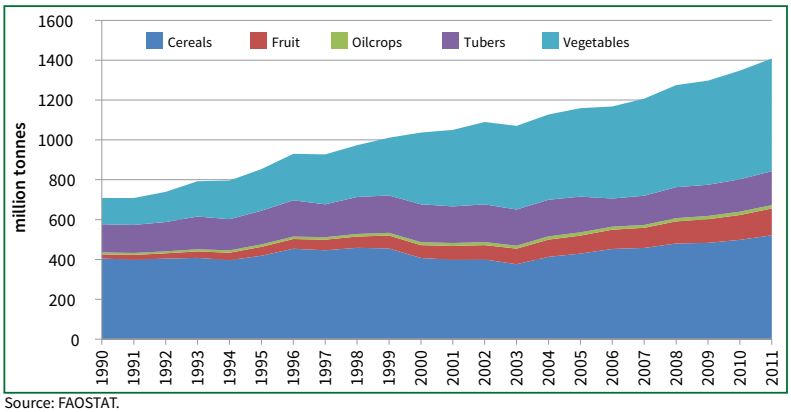
- The relative decline of agriculture's contribution to GDP and employment masks an increase in the *absolute* economic value of agriculture, and the fact that 200 million smallholders continue to engage in farming.
- Rising off-farm wages have been a major driver of migration, with those left to farm tending to be older and often female.

Agriculture's contribution to national GDP (40% in 1970 ▸ 11% in 2007) and employment (80% in 1970 ▸ 38% in 2009) has fallen.

Substantial increases in food output

- Despite the declining relative contribution of agriculture to the economy, there has been strong growth in total food output (Figure 7).

Figure 7: Total output of main agricultural crops, 1990-2010



Source: FAOSTAT.

For a more detailed discussion, see the original report here.

- Historical changes in China's land tenure and marketing policies led to increases in production and incomes in the 1980s. The Household Responsibility System and market liberalisation gave farmers greater freedom to grow what they wanted and to sell surpluses on the open market.

- Land tenure reforms continue to be promoted, in particular to increase farm scale, with the persistence of small average farm sizes (0.6 ha nationally) identified by many as a constraint to productivity increases.

- Investments in technological innovation (especially in high-yielding varieties) have also helped drive agricultural growth since the 1980s.

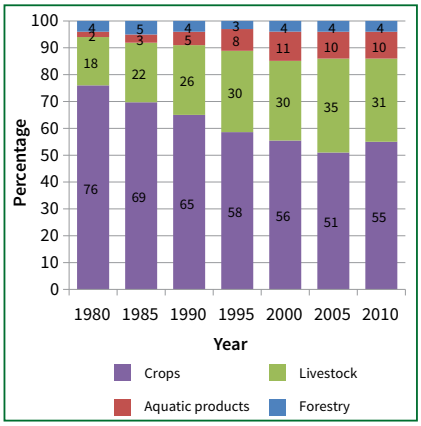
- Food output and productivity have increased despite stagnant or negative growth in the land area devoted to agriculture. This growth has largely been due to increasing use of inputs – especially chemical fertilisers. However, yield increases in response to inorganic fertiliser have begun to level off, while the scale of non-point pollution is increasingly recognised.

- Explicit government policies support increased input use. Input subsidies account for 15% of all agricultural support in China, and help make grain production profitable enough to prevent mass switching to higher value production.

Shift towards higher value food production

- A general shift to higher value food production has been driven by several factors, including productivity increases, China's comparative advantage in producing high-value labour-intensive crops, specific policy incentives, and increased demand for these foods as incomes rise.

Figure 9: Changes in composition of agricultural value, 1980-2010 (% of total value of agricultural output)



Source: Huang J, Wang X and Qiu H (2012) *Small-scale farmers in China in the face of modernisation and globalisation*. London/The Hague: IIED/HIVOS.

For a more detailed discussion, see the original report here.

The crop sector's share of total agricultural value has fallen from 76% in 1980 to 55% in 2010, with livestock now accounting for 31% of value (see Figure 9).

Greater interaction between China's food supply chain and the rest of the world

- Internationalisation of China's supply chain has occurred since the 1980s but was accelerated following China's accession to the WTO in 2001.

- Of China's imports, soybeans have the largest aggregate value, driven by the growth of China's livestock sector and related feed requirements.

- Processed and semi-processed foods dominate China's food exports (e.g. dried and preserved foods, fruit pastes, frozen vegetables, canned chicken, and value-added aquaculture products).
- Cooperation and knowledge flows are intensifying and diversifying, involving bilateral government exchange, and increasingly exchange and cooperation between companies.
- An emerging focus of Western media interest is China's role as investor abroad; however, despite this attention, actual operational land acquisitions are currently relatively modest, equivalent to about 1.25% of China's domestic arable land resources.

Changes in the structure, locality and control of production

- Greater specialisation in agricultural subsectors has developed in certain regions of China (e.g. specialisation in rice and maize production in the northeast).
- The persistence of smallholder farming in China has been enabled by government policies that have promoted coordination and cooperation among farmers without increasing the scale of individual operations; 'dragon-head enterprises' are a category of lead enterprise within regional value chains that has been supported by government to encourage this coordination.
- However, the livestock sector is seeing an increase in the scale of livestock operations, with smallholders accounting for a diminishing share of total output relative to larger enterprises.

Future drivers of the agricultural system: focus on environmental change

See 'Environmental Transformations' for further discussion of the impacts of environmental change on the food system, and the food system's role in driving those changes

Climate change

- Suitability zones for various crops are already changing, with a general northwards shift as temperatures rise and growing seasons lengthen.
- Water is already the main constraining factor in many regions and the trend of uncertainty in predicting precipitation could have major impacts on agricultural production.
- Academic studies generally show that China's yields of maize, rice and wheat may decline towards the middle of this century if adaptation measures are not taken.
- Climate change effects abroad will also impact China's globalised food system – an anticipated decline in soy yields indicated by some studies is significant given China's reliance on imports.

Constraints in land quality and availability

- In recent years, large amounts of often highly productive land have been taken out of agricultural production to enable urban and industrial development.
- A negative feedback loop exists between productivity gains and land availability/quality in China: while limited land resources have driven investments in productivity, the input-heavy path to increased production is now starting to undermine the productive capacity of those limited lands.

Food processing, manufacturing and distribution

- The total processed food market is growing rapidly and was valued at US$ 140.4 billion in 2011. Total Chinese consumption of packaged goods could exceed that of the US as early as 2015.

The domestic food processing sector

- The processed food market is dominated by local Chinese companies, of which 93% are small or micro-scale enterprises.
- A dedicated Five-Year Plan for the food processing sector stresses the importance of food processing to the economy and the provision of diverse sources of nutrition. The health impacts of processed foods are discussed in 'Health transformations: nutrition and diet'.
- Health foods are a booming sub-sector within processed foods. Traditional health foods still dominate but 'modern' health products are growing in importance in an industry set to expand by 20-30% each year.

Arable land availability in China is only 0.08 hectares per person.

China's connections with overseas manufacturing and processing enterprises

- Chinese companies have begun to take ownership of major overseas companies (e.g. Shuanghui International's US$ 4.7 billion takeover of US pork processor Smithfield in 2013).
- Outward investment is actively encouraged by the Government as a means of improving international competiveness, benefitting from foreign expertise and technology, and of ensuring supplies of high quality, safe food.
- Large overseas companies play key roles in agricultural processing, manufacturing and food services in China – they are also investing in research and innovation.

Wholesale and retail sectors

- Within a diverse sector including street stalls and hypermarkets, a process of concentration and consolidation is occurring, mirroring developments elsewhere in the food chain.

China has recently overtaken the US to become the world's largest food and beverage retail market, worth US$ 607 billion.

- Growth in the supermarket sector (30% p.a. in the 2000s) was three times that of general retail sales growth, though supermarkets are more important in urban than in rural areas.

- Past government policy has actively supported the supermarket sector – the *nonggaichao* ('wet market to supermarket reform') of the 2000s aimed to improve hygiene and waste management while also generating more profit and tax revenue per unit land area in cities.

  In practice, supermarket and wet market supply chains remain linked due to the dominance of smallholders in the horticultural sector. Supermarkets are still unable to compete against wet markets on price or freshness.

Online food sales are growing rapidly; online retail now accounts for 4.3% of the retail total.

Catering and restaurants sector

- The out-of-home food consumption market grew 159-fold from 1978-2008; this trend is primarily driven by rising affluence, the cheapness and abundance of restaurants, and the cultural roles of food and hospitality, with other factors including long working hours and cramped living conditions in cities.

The fast food market doubled from 2007 to 2012 to reach an estimated US$ 161 billion. Foreign companies account for 12% of the market. The market is also highly fragmented – in 2011, the top ten operators accounted for less than 1% of the market.

Consumption patterns

- Table 2 shows a rise in per capita spending on food over the past 30 years but a decline in spending as a proportion of overall household expenditure.

- In general, people in China today are eating more animal products (meat, eggs, dairy, and aquatic products), oils, processed foods, sugars and confectionary products, soy products, fruit, and alcohol than ever before. Consumption of coarse grains and tubers, vegetables, and pulses has declined.

- Income levels and urbanisation have emerged as the key drivers of changing food consumption patterns – rural consumption patterns lag behind urban consumption patterns by 20–30 years.

Table 2: Composition of consumption expenditures in rural and urban areas, 1978-2010

Item	Value (Yuan)							Share (%)		
	1978	1985	1990	1995	2000	2005	2010	1978	2000	2010
Rural										
Food total	79	183	344	768	821	1162	1801	67.7	49.2	41.0
Nonfood total	37	134	241	542	850	1393	2581	32.3	50.8	59.0
Total cons. exp.	**116**	**317**	**585**	**1310**	**1670**	**2555**	**4382**	**100**	**100**	**100**
Urban										
Food total	311	673	694	1766	1958	2914	4805	57.5	39.2	35.7
Nonfood total	230	590	586	1772	3040	5028	8667	42.5	60.8	64.3
Total cons. exp.	**541**	**1263**	**1280**	**3538**	**4998**	**7943**	**13471**	**100**	**100**	**100**

Source: Cao L, Tian W, Wang J, Malcolm B, Liu H and Zhou Z. (2013). Recent food consumption trends in China and trade implications to 2020. Australasian Agribusiness Review, (21): 15-44

For a more detailed discussion, see the original report here.

Policy implications

1. An ageing workforce may mean there is a need for increased use of machinery and training to substitute for manual labour.

2. Despite a national policy to maintain total agricultural area at 120 million ha (a so-called 'red line policy'), laws to achieve this goal continue to be flouted or weakly implemented by local officials, possibly requiring further policy intervention.

3. The increasing incentives for farmers to switch to higher-value production, combined with pressures to convert agricultural land to other uses, may prompt further changes in the policy measures China takes to ensure food security.

4. Environmental policies may be required to counteract the negative effects of livestock concentration and specialisation – surrounding cropland can no longer absorb nutrient surpluses from livestock, while crop production can no longer benefit from manure applications.

5. Global climate change impacts could negatively affect the security of feed supplies to China's booming livestock sector, potentially requiring direct policy intervention.

6. Current fragmentation in the wholesale sector is a target for policy-driven modernisation; reforms to contracting, distribution and packaging will affect supermarkets in particular.

7. The currently observed health benefits and risks associated with changing consumption patterns in cities may provide policymakers with insights into the potential future of consumption in China's rural areas.

8. Measures to promote a shift to higher value production and to modernise the supply chain are having consequences for the environment, explored elsewhere, while influencing consumption patterns in ways that have varying implications for public health (see 'Environmental transformations' and 'Health transformations: nutrition and diet').

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