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Recent Food Consumption Trends in China and Trade
Implications to 2020¹

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Abstract

China has experienced rapid economic growth in the past three decades. This has resulted in a sustained increase in consumer income, which in turn has led to changes in the patterns and quantities of food consumed. In this study recent trends in food consumption in China over 2000-2010 are examined. Demand has been increasing for a diverse range of foods and for foods of higher quality than traditionally has been supplied. Constrained by limited and sometimes degraded agricultural resources, China will be unable to meet fully the increasing, and changing, demand for foods. However, while the food import needs of China will be significant in the longer term, the evidence of this study suggests the food import needs of China until 2020 will be relatively small. Realistic, though relatively constrained, prospects for increased food trade between Australia and China are outlined.

1. Introduction

China is the largest producer and consumer of food in the world. In recent years China has been a net food importer, with the quantity of food imports increasing. For the first three quarters of 2012, agricultural imports into China were US\$82.78 billion and exports were US\$44.76 billion; a US\$38.02 billion deficit in trade of agricultural products, and an increase of 62.3% compared to the same three quarters of 2011 (China Food and Beverages Net 2012).

The growing imports of food into China have attracted the attention of commercial firms and governments alike, both in China and worldwide. Information and insights about trends in

¹ This paper is extracted, with updates, from a report by Zhou et al. (2012) which was submitted to the Australian Department of Agriculture, Fisheries and Forestry (DAFF). It is entitled *Food Consumption Trends in China* and is available at: <http://www.daff.gov.au/market-access-trade/food-consumption-trends-in-china>). The authors wish to thank DAFF for the financial support that made this study possible. The authors also wish to thank the reviewers and the editors of *Australasian Agribusiness Review* for their comments and suggestions to improve the paper.

China's food consumption are valuable for assessing future opportunities. Such insight helps China and food exporting countries to anticipate how food consumption may evolve in coming years and to plan how to meet China's growing requirements for food. In this study recent trends in food consumption of Chinese consumers are examined and the way these trends may develop in the future is investigated.

Consumer income is increasing in rapidly-growing countries, such as China, India and Malaysia, which is inducing major changes in the amount and composition of food consumed (Garnaut and Ma 1992, Cranfield *et al.* 1998, Coyle *et al.* 1998, Regmi *et al.* 2001, Jones *et al.* 2003, Ishida *et al.* 2003, Liu *et al.* 2009, and Gandhi and Zhou 2010).

The significant implications of changes in food consumption in China have led researchers from within and outside China to examine the issue (see, for example, Halbrendt *et al.* 1994, Fan *et al.* 1995, Brown 1995, Wu and Li 1995, Huang and Rozelle 1998, Wan 1998, Wu 1999, Guo *et al.* 2000, Gould 2002, Ma *et al.* 2004, and Liu *et al.* 2009). The findings of these studies have been varied and are becoming 'dated'.² The rapid changes in food consumption in recent years, resulting chiefly from increased consumer income, has led to researchers putting the case that parameters derived using 'old' data is inadequate for understanding China's *current* food consumption. New estimates of food consumption using more recent data is needed (He and Tian 2000, and Zhou *et al.* 2003).

Food consumption in China is analysed in this paper using the latest available data and information. Section 2 evaluates changes in the consumption of major food items between urban and rural areas, between the rich and poor, and between consumers of different regions. In Section 3, judgements are presented about China's likely food imports by 2020. In Section 4 prospects of food trade between Australia and China are considered, and a conclusion follows.

Note that it is imperative to keep in mind that the China State Statistical Bureau (SSB) food consumption data from household surveys, on which this study is primarily based, *do not* include away-from-home consumption. This means the SSB data *underestimate* food consumption in China, particularly for foods of animal origin.

2. Changes in Patterns of Food Consumption in China from 2000 to 2010

Changes in the patterns of consumption of food in China are detailed exhaustively in the Appendix; only the main findings are summarized in this section.

Rural-urban consumption differences:

- During the past decade, in both rural and urban areas, direct consumption of food grains per capita declined, while consumption of animal products increased.
- Rural residents consumed significantly more grain per head than urban people. Direct consumption of grains by rural residents in 2010 was roughly comparable to that by urban residents in 1982.
- Meat consumption per head (including pork, beef, mutton and poultry) by rural residents lagged behind that of urban residents by about 30 years. In 2010 per capita consumption by rural residents was almost 20 kg, lower than the 21kg per head consumed by urban residents in 1982.³
- The difference in pork and poultry meat consumption per head between rural and urban consumers was small, with a larger difference between beef and mutton consumption per head between people in rural and urban areas.

² This study does not cover in any detail the possible reasons behind these differences. Fan and Agcaoili-Sombilla (1997) and Zhou *et al.* (2008) provide some details about the causes for discrepancies in projecting China's future food and feed demand.

³ Note that in China lamb and mutton are not distinguished. In this paper, these two terms are used interchangeably.

- Consumption of beef and mutton per capita by people in the top income group of rural dwellers has been less than the beef and mutton consumed per head by people in the bottom income urban group.
- Rural and urban consumers consumed quite different quantities of poultry eggs, aquatic products and dairy products. Rural consumption of poultry eggs, aquatic and dairy products per capita in 2010 was about one half, one third, and one quarter of that by urban residents in 2010, respectively; lower than consumption by urban residents in 1982, lagging urban residents by about 30 years.
- When incomes of rural residents improve there is potential for direct human consumption of grains in China to decline further, with a corresponding large potential for consumption of animal products to increase.

Consumption differences between the rich and poor:

- Consumption patterns of low income and high income consumers were different for almost all of the food products examined, with the only exception being in the consumption of food grains and milk powder in urban areas.
- Generally, high income residents consumed more of all foods compared with poorer people, with two exceptions: food grains and Chinese liquor.
- Higher income consumers ate 50 per cent or more of pork, beef, mutton and poultry meats than low income consumers.
- Higher income people in urban areas consumed significantly more dairy products and aquatic products.
- In the past decade, egg consumption per head by all urban income groups declined as incomes increased.
- Except for the consumption of food grains and Chinese liquor in urban areas, the consumption of all other foods examined in this study will increase when consumer incomes increase, suggesting there is a huge potential for increased consumption of a wide range of foods in China.

Regional consumption differences:

- All the major wheat-consuming provinces are in Northern China where wheat and other coarse grains are the staple foods.
- Rice is the staple food for people in southern China.
- Pork is widely consumed in different parts of the country, with people in southern provinces being the largest consumers of pork. People in North-west China consume the most beef and mutton. Poultry meats and eggs are more preferred by people in central and eastern China.
- Consumption of aquatic products is typically concentrated in China's coastal south-east provinces, which is the base of most aquacultural production.
- Per capita consumption of dairy products is higher in regions (i) where ethnic minorities are prevalent and dairy products form a major part of their diet or (ii) where consumers have higher incomes.
- The different levels and patterns of food consumption between regions are mainly determined by local income level; food availability; and ethnic background.
- Convergence in food tastes and preferences between people in different parts of China in the past decade has been slow. Nonetheless, such convergence is expected to accelerate in the years to come because:
 - (i) The improved availability of chilled transportation facilities, where some foods (such as aquatic products, beef and mutton, dairy products) will become more widely available across the country. Improved home refrigeration facilities will also enable people to utilize these foods.

- (ii) Travel between different parts of the country has become much easier, enabling regional cuisines to be discovered and enjoyed across China.
- (iii) A large number of workers, mainly from rural areas, seek employment in other provinces and are exposed to, and influenced by, different foods, leading to changes in food use behaviour back home.

Major factors identified as influencing China's food consumption trends are: rising real income; rapid urbanisation; changes in lifestyle; availability of new cooking methods; changes in consumer tastes and preferences; better organisation of food production and marketing; and changes in population structure. Of these factors, growth in income and urbanisation are most influential. All these factors will continue to push food consumption higher as urbanization and its impacts continue apace.⁴

3. 2020 Outlook for Food Consumption and Import Needs in China

With the exception of rice and wheat, the consumption of foods per head by Chinese consumers has increased during the last decade. The factors that have motivated these increases will continue to increase consumption, with the impact of urbanisation potentially being the most influential factor. Given this likelihood, it will be beneficial to know about how China's consumption of various foods might increase in the future? Whether China could produce enough to meet such rising demand? And if imports are needed, how much China may import?

Projecting the future food production of China, and domestic consumption and trade in food products requires reliable data and soundly based forecasting. While the sound forecasting approaches abound, the necessary data of acceptable quality are generally not available. Various researchers, governments and international organisations have attempted to forecast the future food situation of China using freely available data, mostly from Chinese government publications, plus data obtained from field work, and in some cases self-generated estimates or assumptions. The resulting projections of food consumption vary widely; see, for example, Huang *et al.* (1999), FAPRI (2001), USDA (2001), OECD-FAO (2001), Chen (2004). The discrepancies in such forecasting work arise, not only from data differences, but also from differences in assumptions that underlie the projections.

In this study, constrained by data, no attempts were made to carry out sophisticated econometric forecasting. Indeed, given the data deficiencies, any new modelling efforts are unlikely to produce results that are any more reliable than those from the USDA (USDA Agricultural Projections), FAPRI (FAPRI World Agricultural Outlook), or OECD-FAO (OECD-FAO Agricultural Outlook), for example. In this study, the focus is on analysing and evaluating the reliability of previous forecasts based on understanding of current market situations in China to form judgements about the likely import needs of China by 2020.

The approach used to derive the judgements about China's food consumption and food import needs by 2020 involves:

- 1) Determine recent past and current food consumption per capita to identify and understand developing trends.
- 2) Derive income elasticities of demand for various foods to identify the way the demand for various foods is likely to change when incomes of consumers increase.
- 3) Collate and compare existing forecasts of production and consumption of various foods for China.
- 4) Analyse likely trends in demand for food imports by China.

⁴ The full discussion about each of the key influences are omitted to save space but can be found in the report in Zhou *et al.* (2012). Other empirical studies examining drivers behind changes in China's food consumption include, for example, Huang and Rozelle (1998), Guo *et al.* (2000), He and Tian (2000), Wang and Zhou (2005) and Liu *et al.* (2009).

Details of the approach and the elaborations on the likely food import needs of each food item are not detailed in this paper. Interested readers are recommended to consult the whole report by Zhou *et al.* (2012) for full details. Instead, only the final judgements about net imports by China of several key food items are given (see Table 1). Table 1 has three parts. The first part contains the actual production, consumption and net imports of various food items in 2010 based on the Production Supply and Distribution (PSD) database of the USDA and also imports, exports, and net imports based on UN Comtrade database. These statistics serve as references. In the second part, projections of China's food production, consumption and net imports for 2020 by three organisations are provided. Finally, the judgements derived from this study about the likely trade position in 2020 for each of the major food items are shown.

The data in Table 1 suggests that the food import needs of China by 2020 are unlikely to be large although in the longer term, such needs can be significant. The exceptions are soybean and possibly maize. To be specific:

- By 2020, China is expected to be largely self-sufficient in wheat and rice; although a small amount of net wheat imports is possible.
- Maize imports are expected to increase but the amount is uncertain depending on China's choice of options in increasing its meat supply.
- Soybean imports may increase to a small extent above the current 55 mt. The imports of other oil-bearing crops such as rapeseed will vary depending on the amount of oil imported such as rapeseed oil and palm oil.
- China has limited capacity to boost sugar production and sugar imports will continue.
- China will continue to be a net barley importer but the size of imports will be comparable to current levels.
- The imports of high quality beef and mutton/lamb are expected to increase to meet the demands of high-end hospitality industries, foreigners (expatriates and tourists) and wealthy local consumers.
- China is likely to be less restrictive on pork imports. Pork imports are unlikely to have a major impact on the domestic market given that domestic output is high, with China producing around 50 per cent of world production.
- It is also highly possible that China will increase poultry meat imports, though China is expected to be self-sufficient in egg supply.
- China will need to import dairy products, chiefly milk powder and whey.

Table 1 Summary of China's Food Production, Consumption and Net Imports in 2010 and Forecasts in 2020

		Wheat	Rice	Maize	Barley	Soybean	Rapeseed	Sugarcane	Pork	Beef	Mutton	Poultry	Milk
Actual production, consumption and trade in 2010 according to:													
USDA	TP*	114.50	136.00	168.00	2.40	14.40			50.00	5.55		12.56	
	TC	107.80	135.00	162.00	4.60	68.85			50.05	5.53		12.53	
	NI	-6.70	-1.00	-6.00	2.20	54.45			0.05	-0.02		-0.03	
UN Comtrade	Import	1.22	0.37	1.57	2.37	54.80	1.60	n.a	0.20	0.02	0.06	0.54	0.75
	Export	0.00	0.62	0.13	0.01	0.16	0.00	n.a	0.11	0.02	0.01	0.21	0.03
	NI	1.22	-0.25	1.45	2.35	54.63	1.60	n.a	0.09	0.00	0.04	0.34	0.71
Forecast production, consumption and trade in 2020 according to:													
USDA	TP	114.31	136.30	198.83	3.09	16.65			61.39	6.56		16.47	
	TC	112.65	135.66	210.38	6.07	104.42			61.40	6.54		16.33	
	NI	-1.66	-0.65	11.55	2.99	87.77			0.01	-0.02		-0.14	
FAPRI	TP	114.64		201.80	2.93	15.00	14.05		65.78	7.08			47.2
	TC	109.03		203.94	5.62	88.08	16.33		66.24	7.36			47.4
	NI	-5.62		2.15	2.69	73.09	2.28		0.46	0.29			0.16
OECD -FAO	TP	115.70	125.83	210.31		64.96		17.89	61.48	7.18	4.80	20.85	59.0
	TC	114.18	125.86	213.61		127.34		23.07	61.20	7.18	4.88	20.92	56.9
	NI	-1.52	0.03	3.30		62.38		5.19	-0.28	0.00	0.08	0.07	-2.09
Net import needs in 2020 according to:													
This study	NI	2.00	0.00	5.00	2.00	70.00	2.00	3.00	1.00	0.50	0.30	0.50	1.50

* TP: total production; TC: total consumption; NI: net imports.

Notes: Maize: OECD-FAO data is for coarse grains. Soybeans: OECD-FAO data is for oilseeds. Sugarcane: OECD-FAO data is for sugar.

Sources: FAO food balance, www.fao.org; USDA 2011 baseline projections, <http://www.ers.usda.gov/data/internationalbaseline/sutabs11.htm>; OECD-FAO agricultural outlook, <http://stats.oecd.org/index.aspx>; and FAPRI international agricultural outlook: <http://www.fapri.iastate.edu/tools/outlook.aspx>; trade data: UN Comtrade, <http://www.comtrade.un.org/db>.

In the foreseeable future, China seems to have sufficient protein feed, assuming China continues to import a large amount of soybean. China will be short of energy feed supplies such as maize. Imports of energy feedstuffs will increase if producers in China are to produce more animal products.

Realising the pressure to ensure adequate food supply for the huge population, the Chinese government has been working on various strategies. A useful summary of possible strategies adopted by the Chinese government can be found in its 'Outlines of medium- and long-term national grain security plan (2008-2020)' (Government of China 2008). Some of the strategies include, for example, increase in agricultural R&D investment; strictest measures to prevent the decline in arable land, investment in foreign agriculture to produce more foods from diverse supply sources, increase in investment in and subsidy to agriculture, especially grain production. However, how effective these strategies will be is yet to be seen due to China's widespread corruption and various other institutional barriers. Currently, a large portion of investment in agricultural R&D has been wasted: abused by individuals of funds management bodies and some researchers for private gains; or wasted on funding low-quality and low-value projects. Corruption has also made it very difficult to prevent unnecessary loss of agricultural land. China does not have an organisation equivalent to Australia's Austrade or Japan's JETRO that assists companies in investing overseas, making the progress of the agriculture-going-out campaign very slow. In short, despite the efforts by the Chinese government to ensure its future food supply, enormous challenges remain.

4. Prospects of Food Trade between Australia and China

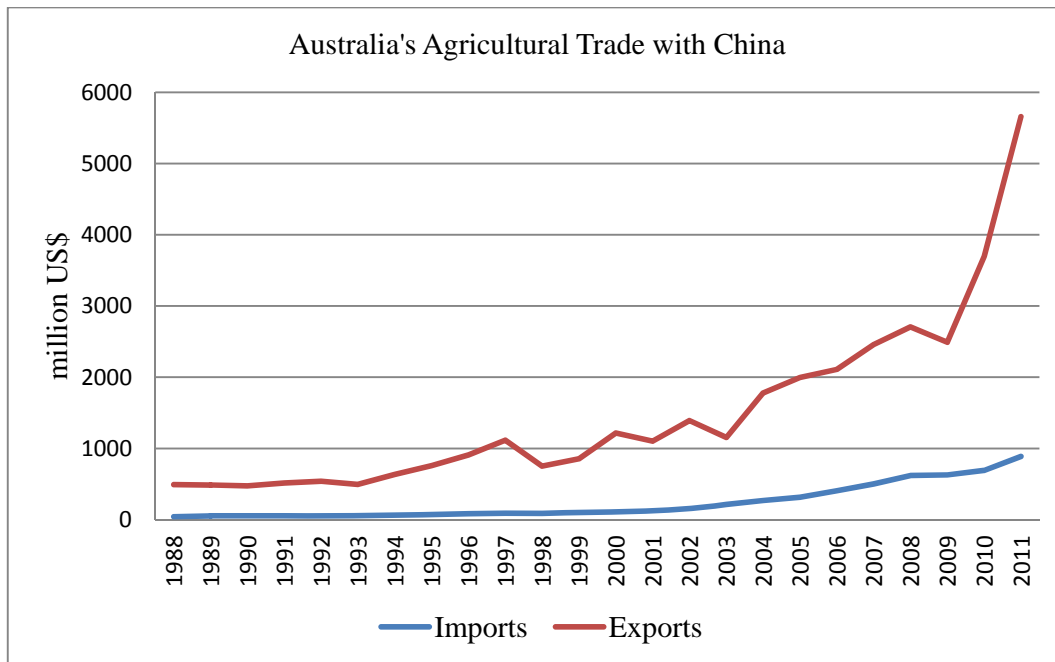
The size of the population of China, the large gap in consumption between the poor and the rich, and between rural and urban consumers, means the potential for the Chinese food market to expand is immense should the income level of the urban poor grow towards the incomes of the current wealthy, and incomes of the rural people move closer to the level of income of urban people. The analysis in this study shows that China will not be able to meet all the increased demand for foodstuffs with domestic supplies. Imports will be required, which provides opportunities to all countries which export food, including Australia.

Australia is better positioned than many food exporters to benefit from China's needs for increased food imports because of a strong complementarity in the trade of agricultural products between Australia and China, as shown by Zhou *et al.* (2007). Such potential opportunities for Australia to export increased agrifood to China and other Asian rising economies have also been clearly recognised in the 'Australia in the Asian Century' White Paper, recently released by the Australian Government (Australian Government 2012). Currently, the volume of trade between the two countries is still relatively small. Yet the scope of commodities already traded is extensive; and the increase in Australia's agricultural exports to China is most impressive, as shown in Figure 1.

As shown in Table 1, demand in China for food products from overseas will continue to rise because of (i) increased demand as a result of rising income, and to some extent, by population increase; (ii) the increasing demand for higher quality and diverse products as consumer tastes and preferences change; and (iii) limited land and other natural resources of China. Australia has a reputation for producing good quality products, which will be important if Australia is to increase food exports to China.

China is internationally competitive in producing labour-intensive food products and processed foods, such as Asian vegetables, horticultural products, and aquatic products. There is also considerable potential for China to increase exports of speciality foods to Australia such as dried lily flower and dried fungi, meeting demand from people of Asian descent living in Australia and the changing tastes in the wider Australian population.

Australia's international competitiveness lies in the production of food products that use large areas of land, such as grains (e.g., barley and wheat), and animal foods (meats and dairy products). By 2020 though, China is unlikely to import large amounts of wheat or animal products except for speciality, niche or high quality products. It will, however, need to import, in relatively larger quantities, oilseeds (such as rapeseed), coarse grains (particularly barley and perhaps maize), and dairy products.

Figure 1 Australia's Agricultural Trade with China

According to the study by Zhou *et al.* (2007), there are many good reasons why total food trade between Australia and China can be expected to increase. Australia will continue to export more to China than it imports from China. An important complementarity, attractive to food traders in both countries, is the opportunity to import and export products based on seasonal differences.

Significantly, Zhou *et al.* (2007) concluded that increased exports from Australia to China are unlikely to have an impact on China's domestic production in general. This is because imports from Australia are chiefly for niche markets. Australian products, because of their higher quality or scarcity in China, are not attempting to compete with locally produced low-cost products. Likewise, increased imports from China will not generate large negative impacts on the Australian agricultural sector, although producers in some industries, such as the horticultural sector, parts of the fisheries industries and the food processing sector, may face increased competition.

Although China's net beef and lamb (or mutton) imports are unlikely to be very large by 2020, being only about 1 mt, its lack of resources to further expand its beef and lamb output points to increased needs to import more beef and lamb into China in the longer term. Indeed, the impact of resource constraints on beef and lamb output has already started to emerge. In 2012, beef and lamb prices, especially beef, have increased very rapidly, chiefly due to reduced supply. Imports of beef from other parts of the world are possible but high costs of logistics may not see this to happen easily. For example, due to MCD concerns, imports of beef from the EU and USA require the meats are boneless and are from animals of 30 months old. These requirements seem to be enough to discourage the EU and USA in their attempts to sell beef to China. Imports from South America, e.g., Argentina and Brazil, are also likely to be costly. Import sources of lamb are even more limited; while New Zealand has some potential, Australia is the only country that is best positioned to increase lamb output. As such, the current supply shortage of beef and lamb in the Chinese market provides Australia with an opportunity to increase its involvement in this market.

As to supplying beef to China, four approaches could be considered: (1) export live cattle to China and provide China with technical assistance for border quarantine inspections and feedlot management; (2) collaborate with Chinese firms to build abattoir in Australia to slaughter cattle in the way that can make use of all edible parts of the animal according to the Chinese consumption habits and then export to China and use labour chiefly from China; (3) export cattle carcass (quarter cuts) to China; and (4) export already-cut beef to China. The first two approaches can be more value-adding as they allow all edible parts of the animals to be made use of.

Although China's lack of capacity to increase its beef and lamb provides opportunities, exporting to China often is not an easy task to accomplish. Currently, some beef-producing individuals or groups have been working very hard in an attempt to tap into the Chinese market (R. Kaus, Principal Trade & Investment Officer, Queensland Treasury & Trade, 15 November 2012). While their efforts are admirable, individuals' or groups' efforts may be not sufficient and concerted efforts from the whole beef industries and lamb industries and federal and state governments are also needed. Such efforts could be rewarding for a long time to come.

In addition to goods trade, another area that should not be overlooked is the potential of China's investment into Australian agriculture. Two major forces lead to strong desire of Chinese investors to invest in Australian agriculture. (1) The Chinese Government supports agriculture to go out so that there will be increased secure sources for China to import agricultural foods and fibres. Financial assistance is provided for such ventures. (2) In view of social tensions in China, some investors look for "safe havens" to invest. Investing in Australia is an attractive proposition due to Australia's stable business environment, clean and green image to produce foods that are in high demand in today's world. There have been strong interests from Chinese business people to invest in Australia's agriculture in recent years. However, not many inquiries have ended up in business deals. Possible reasons for such low rate of success are as follows: lack of understanding of agricultural operations in Australia; lack of help to assist Chinese business people to understand Australia's business environment; and concerns of the local community about China's investment in Australian agriculture. Given that the Chinese government still has not established an agency like Austrade to help its business people to do business in other countries, it may be useful for Australian governments to provide such assistance to potential investors. Some unfounded concerns about China's investment in Australia also need to be dismissed.

5. Conclusions and Implications

In this paper food consumption trends in China since 2000 and China's likely food import needs by 2020 have been assessed. Judgements about these questions have been informed by data from the SSB, food balance sheets from FAO and projections of production and consumption trends from FAPRI, USDA, OECD-FAO, and some simple calculations. The analyses lead to the following conclusions about trends in food consumption in China since 2000:

- Following the classic pattern that occurs as economic growth proceeds, total expenditure on foods has increased as incomes have risen, and the expenditures on food as a proportion of total expenditures by households have continued to decline.
- Direct consumption per head of staple foods, mainly rice and wheat, has declined. Consumption of such foods by high-income urban consumers has largely stabilised. Consumption of staple foods per head will continue to decline, particularly among lower-income urban residents and all rural residents, both rich and poor, if their incomes continue to increase.
- Consumption of higher value foods is increasing, especially milk and dairy products, aquatic products, and fruits.
- Rural consumption of food lags significantly behind urban consumption. In 2010, the consumption level of several food items by high income rural residents (top 20 per cent) was below that of the bottom 20 per cent of residents in urban areas. People in rural China are at least 30 years behind urban areas in their level of consumption of animal products.
- Food consumption levels and patterns differ between regions. Convergence of food consumption patterns is taking place but slowly.
- With increasing affluence, some Chinese consumers are starting to demand safer and higher quality foods than previously has been the case. Instances of foods of dubious quality have negatively affected consumer demand for foods. Foods with health-damaging ingredients, such as milk/milk powder with melamine, have led to reduced consumption of such foods.
- Some very wealthy Chinese consumers demand foods of superior quality, with some mainly consuming imported foods because of concerns over the safety of foods produced in China.
- Food diversity has increased rapidly in recent years and consumers have more choice.

- In response to consumer wealth and demand for convenience, retail-processed foods have also increased rapidly.
- Some more educated consumers are increasingly paying attention to food nutrition.
- Younger consumers more readily try foods from different cultures.

In the future, the scope and size of food imports by China will depend on whether the foods are of plant origin or animal origin and whether the foods are staples. In the near future, China's overall food imports needs are unlikely large. In the longer term, China's demand for food imports would inevitably grow should the income level of the poor move towards that of the rich, and incomes of the rural people move closer to the income levels of urban people.

The inability of China to meet all increased domestic demand with domestic supplies provides significant potential opportunities to Australia. Australian producers could benefit, directly and indirectly, from China's rising demand for foods. Directly, it is expected that Australia will be able to export more foods to China. Indirectly, China's increased imports from the world market will put pressure on supplies from elsewhere, creating opportunities for Australia to increase its exports to other parts of the world.

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Appendix

Further Detail about Developments in Food Consumption in China (2000-2010)

Changes in food consumption in China since the 1980s have been significant, both in terms of the amount of food consumed and in the composition of foods consumed (Table A1). There has been a marked decline in per capita direct consumption of food grains and vegetables, while the consumption of aquatic products (seafood) and animal products such as meat, eggs and dairy products has increased steadily.

Table A1 Per Capita Food Consumption in China (1978-2010, yuan, kg)

Year	Per capita income	Food grains	Vegetables	Cooking oil	Meats	Poultry	Poultry Eggs	Aquatic products	Sugar	Alcoholic drinks	Milk and dairy products
Rural											
1978	134	248	142	1.96	5.76	0.25	0.80	0.84	0.73	1.22	n.a.
1980	191	257	127	2.49	7.75	0.66	1.20	1.10	1.06	1.89	n.a.
1985	398	257	131	4.04	10.97	1.03	2.05	1.64	1.46	4.37	n.a.
1990	686	262	135	5.17	11.34	1.26	2.41	2.13	1.50	6.14	n.a.
1995	1578	259	105	5.80	11.29	1.83	3.22	3.36	1.28	6.53	0.64
2000	2253	250	107	5.45	14.41	2.81	4.77	3.92	1.28	7.02	1.06
2001	2366	239	109	5.51	14.50	2.87	4.72	4.12	1.43	7.10	1.20
2002	2476	237	111	5.77	14.87	2.91	4.66	4.36	1.64	7.49	1.19
2003	2622	222	107	5.31	15.04	3.20	4.81	4.65	1.28	7.67	1.71
2004	2936	218	107	4.31	14.76	3.13	4.59	4.49	1.11	7.84	1.98
2005	3255	209	102	4.90	17.09	3.67	4.71	4.94	1.11	9.59	2.86
2006	3587	206	101	5.84	17.03	3.51	5.00	5.01	1.09	9.97	3.15
2007	4140	199	99	5.96	14.88	3.86	4.72	5.36	1.09	10.18	3.52
2008	4761	199	100	6.25	13.94	4.36	5.43	5.25	1.11	9.67	3.43
2009	5153	189	98	6.25	15.33	4.25	5.32	5.27	1.07	10.08	3.60
2010	5919	181	93	6.31	15.80	4.17	5.12	5.15	1.03	9.74	3.55
Urban											
1982	535	145	159	5.78	18.67	2.26	5.88	7.67	2.80	4.48	n.a.
1985	739	135	144	5.76	19.32	3.24	6.84	7.08	2.52	7.80	n.a.
1990	1510	131	139	6.40	21.74	3.42	7.25	7.69	2.17	9.25	4.6

									4		
									1.6		
1995	4283	97	116	7.11	19.68	3.97	9.74	9.20	8	9.93	4.6
									1.7		
2000	6280	82	115	8.16	20.06	5.44	11.21	11.74	0	10.01	11.55
									1.6		
2001	6860	80	116	8.08	19.12	5.30	10.41	10.33	7	9.68	13.76
2002	7703	78	117	8.52	23.28	9.24	10.56	13.20	n.a.	9.12	18.12
2003	8472	80	118	9.20	23.74	9.20	11.19	13.35	n.a.	9.39	21.71
2004	9422	78	122	9.29	22.85	6.37	10.35	12.48	n.a.	8.94	22.19
	1049										
2005	3	77	119	9.25	23.86	8.97	10.40	12.55	n.a.	8.85	21.67
	1176										
2006	0	76	118	9.38	23.78	8.34	10.41	12.95	n.a.	9.12	22.54
	1378										
2007	6	78	118	9.63	22.14	9.66	10.33	14.20	n.a.	9.14	22.17
	1578										
2008	1	n.a.	123	10.27	22.70	8.00	10.74	14.00	n.a.	n.a.	19.30
	1717										
2009	5	81	120	9.67	24.20	10.47	10.57	14.30	n.a.	n.a.	19.27
	1910										
2010	9	82	116	8.84	24.51	10.21	10.00	n.a.	n.a.	7.02	18.10

Meats include pork, beef and mutton/lamb.

Source: SSBA, various issues.

As shown in Table A1, direct consumption of grains per person has declined from 257 kg in 1985 to 181 kg in 2010 (a decrease of 42 per cent) for rural areas (un-milled grains) and declined from 135 kg to 82 kg (a decrease of 65 per cent) in urban areas (milled grains). Consumption of meat (including pork, beef and mutton) and poultry has increased from 12 kg in total in 1985 to 20 kg in 2010 (an increase of 67 per cent) in rural areas and from 22.5 kg in 1985 to 34.7 kg in 2010 (an increase of 54 per cent) in urban areas. While the percentage increase in food consumption was larger for rural consumers, the increase in volume terms was significantly larger for urban consumers (12.2 kg for urban compared to 8 kg for rural). Consumption of aquatic products, eggs, milk and dairy products has more than doubled in both rural and urban areas.

Between 2000 and 2010, nominal expenditure on food more than doubled in both rural and urban areas (Table A2). In the meantime, food expenditure share of total consumption has continued declining, from 49 per cent in 2000 to 41 per cent in 2010 in rural areas. In urban areas, the corresponding shares were 39 per cent and 36 per cent, respectively. Further, as expenditure on food increased while consumption of food grains declined in the last decade, the higher income must have been spent on foods other than food grains.

Table A2 Per Capita Annual Consumption Expenditure in China (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: SSBA, various issues.

If the trends continue, the consumption of foods of higher value will continue to increase in China. An interesting question is what foods are in greater/lesser demand by which consumers in which regions.

Changes in consumption and composition of food between China's urban and rural residents, between high and low income consumers, and between consumers in different regions, are explored below, for 2000-2010.

Food grains

In Table A3 is shown declining consumption of food grains, including the two staple food grains – rice and wheat. Urban consumption of rice and wheat flour seems to have stabilised, with relatively small changes in consumption of all food grains occurring. “Other grains” includes coarse cereals (such as maize, millet and sorghum) which are relatively minor and showing negligible increases.

Table A3 Per Capita Grain Consumption in China (2000-10, yuan, kg)

(a) Rural							
Year	Per capita income	Paddy Rice	Wheat	Maize	Tuber	Beans and Processed Products	Of Which: Soybean
2000	2253	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2001	2366	123	77	18.67	8.44	5.65	2.46
2002	2476	123	76	17.79	8.43	5.76	2.20
2003	2622	119	73	16.40	3.30	3.30	2.10
2004	2936	117	72	15.60	3.20	3.00	1.90
2005	3255	113	68	14.20	3.00	3.30	1.90
2006	3587	112	66	14.60	2.80	3.50	2.10
2007	4140	109	64	13.40	2.90	3.00	1.70
2008	4761	111	63	13.30	2.70	3.00	1.80
2009	5153	106	60	12.00	2.50	3.20	1.70
2010	5919	102	58	n.a.	n.a.	n.a.	1.61

(b) Urban						
Year	Per capita income	Rice	Wheat Flour	Other Grains	Processed Grains	Starch and Tubers
2000	6280	46	16.52	2.85	16.32	13.43
2001	6860	44	15.05	2.93	16.60	13.09
2002	7703	44	12.12	2.88	19.68	9.00
2003	8472	44	12.95	3.00	19.80	10.14
2004	9422	42	12.08	3.04	20.32	9.60
2005	10493	42	12.25	3.08	19.83	12.37
2006	11760	41	11.87	3.21	20.08	11.25
2007	13786	42	11.97	n.a.	n.a.	n.a.
2008	15781	45	13.43	n.a.	n.a.	n.a.
2009	17175	43	12.47	n.a.	n.a.	n.a.
2010	19110	40	11.37	n.a.	n.a.	n.a.

Sources: Per capita income data is from SSBa (2011). Per capita rural consumption data is from SSBb, various issues. Per capita urban consumption data is from SSBc, various issues.

Declining consumption of rice and flour in rural areas is understandable. The stable consumption of flour by urban consumers runs counter to claims in early studies that consumers, even in developing countries, will consume more wheat-based products (Bouis 1991, and Huang and David 1993). However, the data here refer only to the quantity purchased and do not include away-from-home consumption. Earlier studies also expected that consumers will demand more processed cereal foods as income increases (Ito *et al.* 1989, and Huang and Bouis 2001). Data (2000-2006; such data became unavailable from 2007 onwards) support this claim. Further investigation into the demand for processed cereal foods is warranted.

The decline in direct consumption of grains is likely to be mostly in rural areas. The same applies to starchy staples. In 2000, maize and tuber consumption was 19 kg and 8 kg, respectively. By 2009, consumption of these products, especially tubers, had dropped sharply. As income increases higher protein foods are substituted for high carbohydrate foods.

It is useful to examine how the consumption level of food grains and various other food items varies when consumer income changes. Income is the main factor affecting per capita food consumption

(Cranfield *et al.* 1998, Guo *et al.* 2000, Gould 2002, Zhou and Tian 2003, and Wang and Zhou 2005). Data on the consumption of major food items by income groups are made available by China's SSB based on household surveys. Rural and urban residents are divided into five income groups. For urban residents, the first quintile (bottom 20 per cent) is further divided into two deciles. Separate statistics for the bottom 5 per cent of the first decile are also given. The last quintile (top 20 per cent) is also divided into two deciles.

Large differences exist between incomes in the bottom and top income groups. In rural areas, the income of the bottom 20 per cent does not cover total expenditure in each year between 2002 and 2010 (Table A4, Panel a; for rural residents, total expenditure includes both total production expenditure and total living expenditure; total food expenditure is part of total living expenditure). For the second quintile, after deducting total expenditure, the surplus is minimal. On the other hand, food expenditure by the top 20 per cent of rural consumers is double that by the bottom 20 per cent of rural dwellers, and total income and total living expenditure of the top 20 per cent of rural consumers are several times higher than those in the bottom 20 per cent. Indeed, the savings of the top 20 per cent group are higher than the annual income of the bottom 20 per cent. A similar pattern exists for urban residents (see Table A4, Panel b). The bottom 20 per cent of urban people fare better than their rural counterparts; they have some cash surplus after living expenses are met (for urban residents, production expenditure is irrelevant).

Table A4 Per Capita Food Expenditure in China by Income Group (2002-10, yuan)

(a) Rural		Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Quintile 1	TI *	1552	1573	1779	2090	2245	2555	3072	3152	3566	
	TE	1725	1803	2050	2647	2771	3170	3839	4137	4394	
	TI - TE	-174	-230	-271	-557	-527	-616	-767	-985	-828	
	TLE	1006	1065	1248	1548	1625	1851	2145	2355	2535	
	TFE	562	576	694	796	805	932	1088	1107	1237	
	EC (%)	55.88	54.07	55.63	51.43	49.57	50.37	50.75	47.00	48.78	
Quintile 2	TI	2288	2328	2667	3024	3249	3718	4264	4431	5102	
	TE	2094	2149	2464	3036	3173	3625	4167	4396	4933	
	TI - TE	195	179	204	-12	76	93	97	36	169	
	TLE	1310	1378	1581	1913	2039	2358	2653	2871	3219	
	TFE	687	714	841	950	980	1129	1294	1317	1465	
	EC (%)	52.41	51.84	53.20	49.66	48.05	47.86	48.77	45.88	45.49	
Quintile 3	TI	3025	3123	3535	4023	4347	5042	5765	6057	6986	
	TE	2581	2668	3005	3653	3942	4526	5099	5392	6046	
	TI - TE	444	455	530	370	405	516	666	665	941	
	TLE	1645	1733	1951	2328	2568	2938	3286	3546	3964	
	TFE	809	841	986	1121	1155	1327	1527	1550	1718	
	EC (%)	49.18	48.52	50.53	48.15	44.97	45.15	46.46	43.70	43.34	
Quintile 4	TI	4076	4220	4785	5454	6003	6798	7931	8488	9702	
	TE	3259	3336	3807	4561	5068	5637	6563	7038	7761	
	TI - TE	816	883	978	892	935	1161	1368	1450	1941	
	TLE	2087	2189	2460	2879	3230	3683	4191	4592	5026	
	TFE	950	999	1168	1297	1368	1572	1816	1862	2048	
	EC (%)	45.51	45.64	47.47	45.06	42.34	42.69	43.32	40.54	40.74	
Quintile 5	TI	7567	7999	8890	10211	11066	12927	14895	16007	18327	
	TE	5534	5764	6505	7515	8369	9812	11216	12091	13483	
	TI - TE	2034	2236	2385	2696	2698	3115	3680	3915	4844	
	TLE	3500	3756	4129	4593	5277	5994	6854	7486	8190	
	TFE	1354	1429	1615	1808	1966	2203	2522	2602	2828	
	EC (%)	38.69	38.05	39.11	39.36	37.25	36.75	36.79	34.76	34.53	

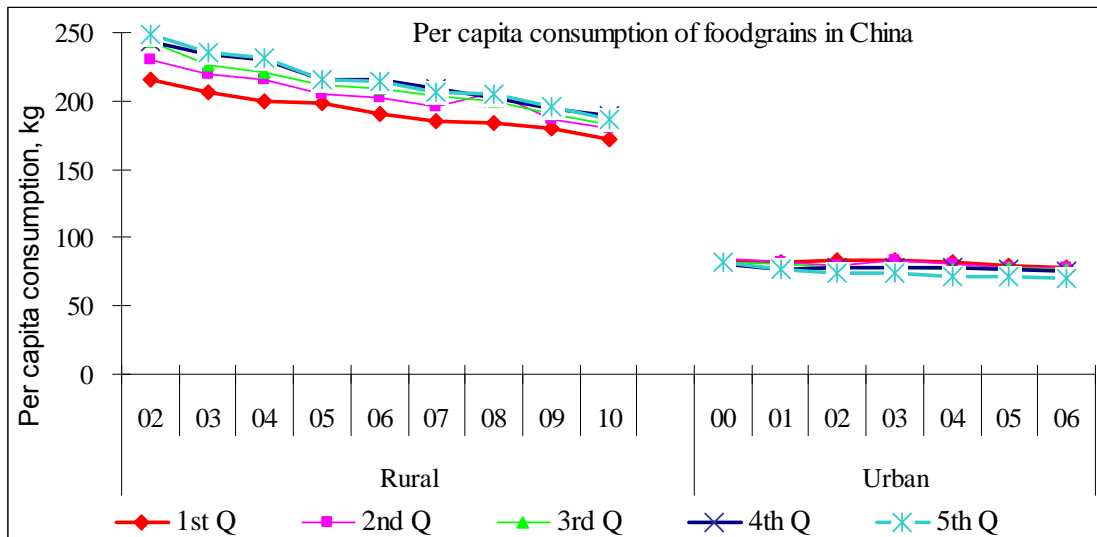
(b) Urban

	Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Quintile 1	TI	3029	3280	3646	4010	4555	5357	6058	6708	8080
	TLE	2824	3056	3399	3703	4094	4835	5364	5822	6416
	TI - TLE	205	224	247	307	460	522	694	886	1664
	TFE	1293	1409	1623	1701	1830	2178	2514	2652	2886
	EC (%)	42.68	42.95	44.51	42.41	40.17	40.65	41.50	39.53	35.72
Quintile 2	TI	3649	5377	6024	6711	7554	8901	10196	11244	12388
	TLE	3260	4558	5096	5574	6108	7124	7994	8739	9649
	TI - TLE	390	819	928	1136	1446	1777	2202	2505	2739
	TFE	1773	1926	2202	2336	2484	2943	3429	3640	3946
	EC (%)	48.58	35.82	36.55	34.82	32.89	33.06	33.63	32.38	31.85
Quintile 3	TI	4932	7279	8167	9190	10270	12042	13984	15400	16693
	TLE	4206	5848	6498	7308	7905	9097	10345	11310	12609
	TI - TLE	726	1431	1668	1882	2364	2945	3640	4090	4084
	TFE	2140	2294	2581	2839	3019	3538	4181	4410	4774
	EC (%)	43.40	31.52	31.61	30.89	29.40	29.38	29.90	28.64	28.60
Quintile 4	TI	6657	9763	11051	12603	14049	16386	19254	21018	21667
	TLE	5453	7547	8346	9411	10218	11570	13317	14964	16140
	TI - TLE	1204	2216	2705	3193	3831	4815	5937	6054	5527
	TFE	2597	2763	3131	3426	3648	4230	5044	5367	5710
	EC (%)	39.01	28.30	28.33	27.18	25.97	25.81	26.20	25.54	26.35
Quintile 5	TI	15384	17480	20174	22988	25518	29509	34932	37606	38207
	TLE	10980	12072	13796	15628	17116	19318	22435	24134	26381
	TI - TLE	4404	5409	6378	7360	8402	10192	12497	13472	11826
	TFE	3636	3835	4328	4759	5070	5751	6981	7248	7646
	EC (%)	23.63	21.94	21.45	20.70	19.87	19.49	19.98	19.27	20.01

*: TI: Total income; TE: Total expenditure; TLE: total living expenditure; TFE: Total food expenditure; EC: Engel coefficient. Engel coefficient = total food expenditure / total living expenditure. In rural China, total expenditure includes total living expenditure plus expenses for production purpose; while in urban China, there is only living expense and no expenses for production purpose involved. Source: SSBa, various issues.

It would be expected on the basis of the differences in incomes that consumers with higher disposable income will consume proportionately less food grains. The data on consumption per capita by income group (from SSB) confirm that higher income urban residents spend proportionately less on food grains than those with lower incomes, though the difference is small (see Figure A1). Over time, grain consumption by all income groups has been declining.

Figure A1 Per Capita Direct Consumption of Food Grains by Income Group in China, 2000-10

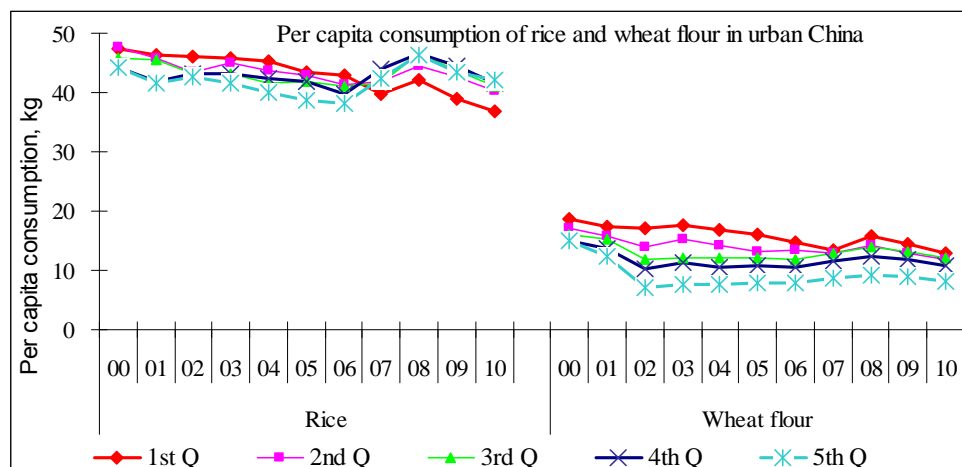


Note: Food grains in rural areas are unprocessed, while processed in urban areas.
 Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

Direct consumption of grains for all income groups in rural areas has also been declining (Figure A1). Interestingly, higher-income rural residents are consuming more food grains than those with lower incomes. This could be because, hitherto, lower income people did not have enough income to consume as much food grains as they would prefer. This explanation is contradicted by the overall decline in rural food grain consumption. If the above explanation were to hold, rural consumption of food grains would have increased when rural incomes increased. Another possible explanation is that low income rural people are highly concentrated in northwest China and southwest China. Wheat and coarse grains are their staple foods. When milled, they produce a higher consumable proportion than does processed paddy rice. Hence, when expressed as un-milled raw grains, the direct consumption per capita by lower-income people is lower. Another possible explanation is that low income groups have fewer members with jobs. Rural labourers with a higher physical workload require higher energy than older and younger ones. This difference in household demographic structure may be partially responsible for different consumption per capita.

Data on consumption of food grains by income group for urban consumers ceased to be available from 2007. Data available (2000-2006) show that direct urban consumption of grains per capita was declining slightly (Figure A1). Future increases in consumer income may lead to a further decline in demand. Consumption data for rice and wheat flour are available for urban areas. Per capita consumption of rice flour has stabilised around 42-44 kg per year for consumers in the second income quintile and above (Figure A2). Per capita consumption of rice and wheat flour by lower income consumers had been more than those on higher incomes, but has become lower over time, as in rural areas. Changing geographic distribution of people in different income groups could be a reason for this change. Lower income people tend to be increasingly concentrated in the northwest and southwest, where wheat is a greater part of total diets.

Figure A2 Per Capita Consumption of Rice and Wheat Flour by Income Group in Urban China, 2000-10



Source: Based on data from SSBc, various issues.

Poorer people consume more wheat flour than richer people. Over time, the consumption of wheat flour has declined for people in all income groups (Figure A2).

Further reductions in direct consumption of grains per capita could be expected in future. In Figure A1 all groups in rural areas are shown to reduce food grain consumption as their income increases. If average urban rice consumption (Figure A2) is used as a reference, there will be further overall reductions in rice consumption. The picture for wheat is less clear; higher income urban consumers may have consumed more retail processed wheat-based foods but no data on away-from-home consumption are available to support this claim. Our judgement is that urban lower income consumers are likely to consume less wheat per head in the future and hence, overall, direct wheat consumption per head in China may decrease to some extent. It is noteworthy though that while direct consumption of grains per capita is anticipated to continue to decline, total consumption (or utilisation) of grains per capita is expected to remain relatively stable or even slightly increase, because of increased indirect consumption of grains that are used as animal feeds.

Not only are there distinct differences in food grain consumption between rural and urban residents and between different income groups, but there are also notable variations in consumption between regions. China's SSB collects and publishes data on the quantity of food grain consumption and various other major foods at the provincial level for rural residents. For urban areas, only the expenditure of consumption is published by SSB. The 2009 consumption data for rural areas and the 2001 expenditure data for urban areas (after 2001 disaggregated data were no longer available for urban residents and many consumption items have been merged into one, e.g., pork, beef and mutton are merged to be meat), indicate the variations in consumption between different regions.

Considering geographic patterns of consumption of food grains, based on information about rural consumption, wheat is consumed mostly in China's north, especially in the northwest region such as Xinjiang, Gansu and Qinghai. Little wheat is consumed in China's south and southeast (e.g., Hainan, Guangxi and Guangdong). Rice is the dominant staple food in China's south and southeast (Hunan, Jiangxi and Hainan) but little rice is consumed in China's north and northwest (Qinghai, Shandong and Gansu). Maize consumption is concentrated in China's north and northwest. Disaggregated data for wheat, rice and maize consumption at the provincial level for urban areas are not available. However, the patterns of consumption for food grains in urban areas would be largely similar to those for rural areas.

Pork

In rural areas, the consumption of all animal products increased during the 2000s (Table A5). In urban areas, while the consumption of most animal products increased, consumption of eggs and egg products decreased slightly. During 2000-2010, pork consumption was increasing but has fluctuated over the years, from variations in pork prices affecting demand and diseases affecting supply. The increase in consumption of pork in rural areas was minimal, less than 1 kg per capita over the decade.

In urban areas annual pork consumption increased about 3 kg per capita over this time. Pork consumption accounted for a large share of total meat consumption in rural and urban areas.

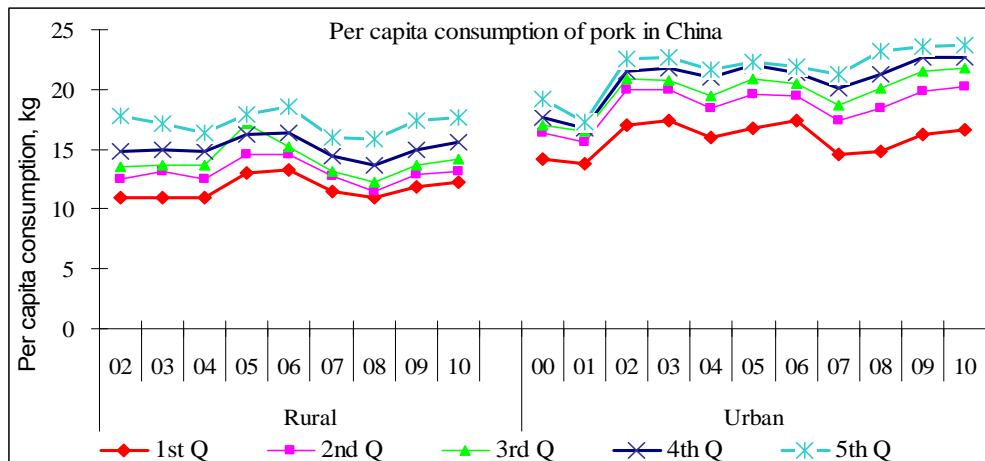
Table A5 Per Capita Consumption of Animal Products in China (2000-10, kg)

Year	Pork	Beef	Mutton	Poultry meats	Other meats and processed meats	Egg and egg products	Milk and dairy products	Aquatic products
Rural								
2000	13.28	0.52	0.61	2.81	n.a.	4.77	1.06	3.92
2001	13.35	0.55	0.60	2.87	0.68	4.72	1.20	4.12
2002	13.70	0.52	0.65	2.91	0.64	4.66	1.19	4.36
2003	13.80	0.50	0.80	3.20	1.43	4.81	1.71	4.65
2004	13.50	0.50	0.80	3.10	1.40	4.60	2.00	4.50
2005	15.60	0.60	0.80	3.70	1.70	4.70	2.90	4.90
2006	15.50	0.70	0.90	3.50	1.80	5.00	3.20	5.00
2007	13.40	0.70	0.80	3.90	1.80	4.70	3.50	5.40
2008	12.60	0.60	0.70	4.40	1.80	5.40	3.40	5.20
2009	13.96	0.56	0.81	4.25	1.95	5.32	3.60	5.27
2010	14.40	0.63	0.80	4.17	2.14	5.12	3.55	5.15
Urban								
2000	16.73	1.98	1.35	7.38	2.41	11.89	11.55	11.74
2001	15.95	1.92	1.25	7.31	2.51	11.10	13.76	10.33
2002	20.28	1.93	1.08	9.22	3.72	10.56	18.12	13.20
2003	20.43	1.98	1.33	9.20	3.84	11.19	21.71	13.35
2004	19.52	2.42	1.50	8.42	3.86	10.61	22.19	12.04
2005	20.15	2.28	1.43	8.97	3.80	10.40	21.67	12.55
2006	20.00	2.41	1.37	8.34	3.80	10.41	22.54	12.95
2007	18.21	2.59	1.34	n.a.	n.a.	10.33	22.17	14.20
2008	19.26	2.22	1.22	n.a.	n.a.	10.74	19.30	14.00
2009	20.50	2.38	1.32	n.a.	n.a.	10.57	19.27	14.30
2010	20.73	2.53	1.25	n.a.	n.a.	10.00	18.10	n.a.

Sources: Per capita rural consumption data is from SSBb, various issues. Per capita urban consumption data is from SSBc, various issues.

As expected consumers with higher disposable income consume more foods of higher value such as meats, dairy products and aquatic products, and this is the case with pork too (Figure A3).

Figure A3 Per Capita Consumption of Pork by Income Group in China, 2000-10



Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

The highest income urban dwellers were the largest consumers of pork in recent years and pork consumption continues to increase. In both rural and urban areas, pork consumption by the top income group was about 50 per cent higher than that by the bottom income group. In the past decade, consumers in the bottom income groups in both rural and urban areas increased pork consumption and then reduced pork consumption. Changes in income and in the prices of pork relative to substitutes (e.g., mutton, beef, and poultry) may be responsible for such changes.

Note that the urban data only shows the amount purchased for consumption at home and does not include away-from-home consumption. Should away-from-home consumption be included, the urban consumption level would be higher. As such, pork consumption by consumers in each of the rural quintiles could be significantly behind those in corresponding quintiles in urban areas. This implies that there is still sizeable potential for pork consumption to increase in China when rural income further increases.

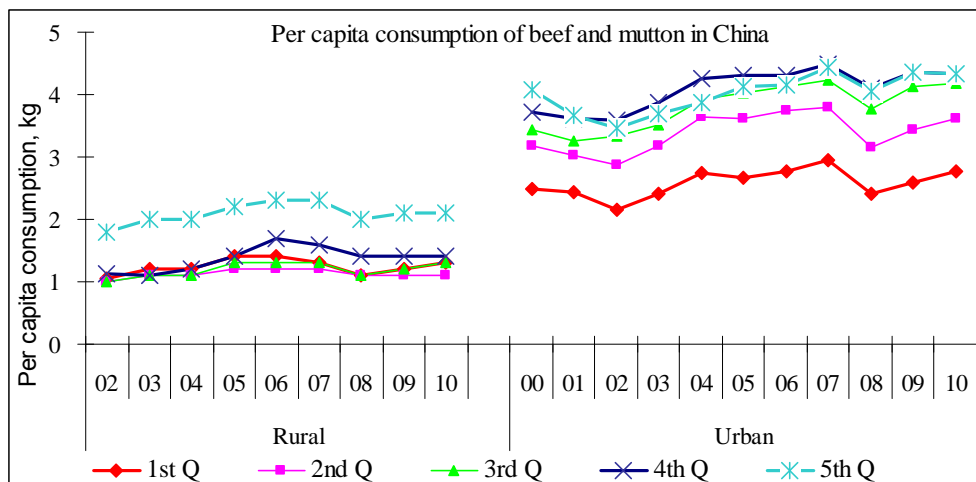
Pork is consumed widely in China. Major consumers are in the country's south and southwest, e.g., Yunnan, Sichuan, Guizhou and Guangdong, which are all major pork producing regions. Xinjiang, where Muslim ethnic groups account for a large portion of the population, has the lowest per capita consumption of pork.

Beef

In Table A5 is shown that although beef consumption is increasing, it is only by small amounts in the rural areas (about 0.6 kg per capita per annum) and urban areas (about 2.4 kg per capita per annum). Significant beef consumption would have taken place on away-from-home occasions. Many Chinese consumers are reluctant to cook beef dishes at home because of their unfamiliarity with beef cooking. Consuming beef away from home in restaurants is popular. Hence, the quantity consumed as reported in Table A5 based on SSB survey data does not reflect the true level of consumption.

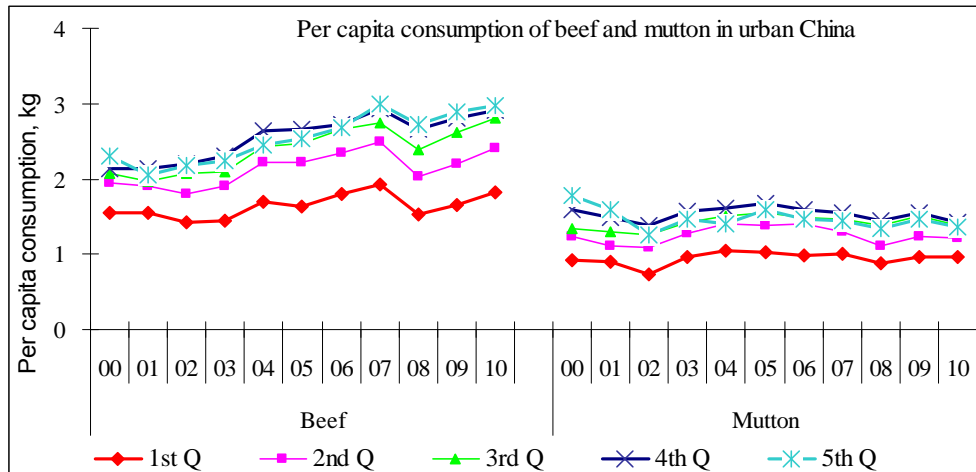
The consumption of beef is much higher for consumers with higher incomes (Figures 4-5; data with separate beef and mutton consumption are not available for rural China). Similar to pork, the consumption of beef by the top income group is about 50 per cent higher than that by the bottom income group in both rural and urban areas. The consumption of beef remained low and increased slowly for all income groups as shown in Figures 4-5. However, as noted earlier, away-from-home consumption is not included in the data. It is more than likely that the actual consumption of beef is much higher than what the data demonstrate.

Figure A4 Per Capita Consumption of Beef and Mutton by Income Group in China, 2000-10



Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

Figure A5 Per Capita Consumption of Beef and Mutton by Income Group in Urban China, 2000-10



Source: based on data from SSBc, various issues.

Beef is chiefly consumed in China's west, north and northwest (i.e., Tibet, Xinjiang, Ningxia and Inner Mongolia). Consumption in China's south is very low.

Mutton

During the past decade, mutton consumption increased little according to the data from SSB (Table A5). Consumption was only about 0.8 kg per capita per annum in rural areas in 2010 and 1.3 kg per capita per annum in urban areas. As in the case of beef, a significant amount of mutton consumption takes place away from home. The quantity consumed of mutton as reported in Table A5 would be much higher if away-from-home consumption was included.

Consumers with higher incomes consumed more mutton (Figures 4-5). Consumption of mutton by the high income group was about 50 per cent more than that by the low income group in both rural and urban areas. Consumption of lamb in absolute amounts remained low and increased slowly. Again, the actual consumption level as shown in Figures 4-5 would be much higher had away-from-home consumption been included.

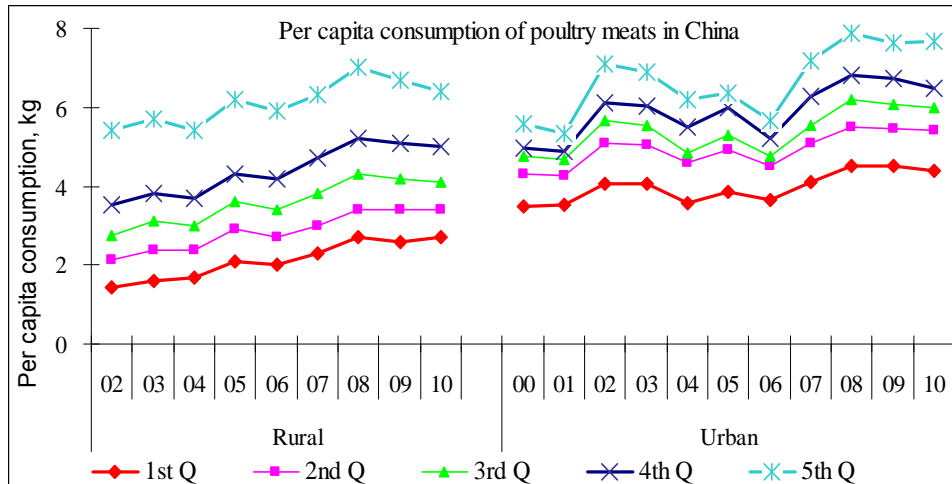
As with beef, mutton is chiefly consumed in China's west, north and northwest (i.e., Tibet, Xinjiang, Ningxia and Inner Mongolia). Consumption in China's south is much lower.

Poultry meat

In terms of quantity consumed, poultry meat, chiefly, chicken meat, was the second most popular meat after pork (Table A5). Urban consumption was about twice that of rural consumption at the end of the 2000s. Consumption of poultry meat by people in rural areas steadily increased. Urban consumption did not show a consistent upward pattern, perhaps because of more consumption away from home (restaurants like Kentucky Fried Chicken are popular in urban China).

The consumption of poultry meat was also much higher for consumers with higher incomes. Figure A6 shows that as consumer income increases, per capita consumption of poultry meat increased rapidly in both rural and urban areas. The decline in consumption in 2006 was related to an outbreak of avian influenza. Poultry meat is more preferred by people in the south (Hainan, Guangdong and Guangxi).

Figure A6 Per Capita Consumption of Poultry Meat by Income Group in China, 2000-10



Note: Poultry data in urban China refer to chicken only.

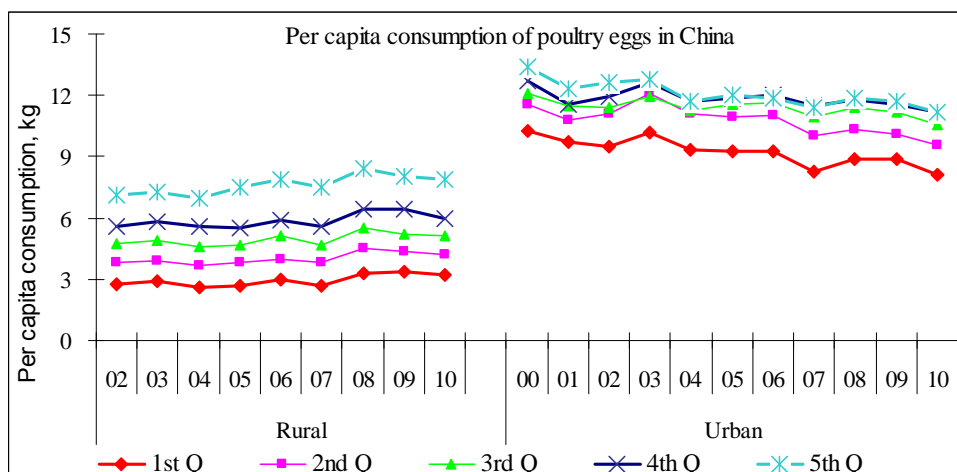
Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

Poultry eggs

The quantity of eggs purchased dropped slightly in urban areas, perhaps due to health concerns (there is not a significant amount of egg products consumed away-from-home, so these figures are likely to be close to actual consumption). In rural areas, the increase in per capita consumption has been slow in the past ten years. Rural per capita consumption of poultry eggs was only about half that of urban consumers (Table A5).

In Figure A7 is shown that consumers with higher incomes consumed more eggs. Top income residents in rural China consumed twice as many eggs as the bottom income residents. In 2010, consumption by the top income group was 8 kg per capita while the bottom income group consumed only 3.4 kg per head. In urban areas, consumers with higher incomes also consumed more eggs than consumers with lower incomes; however, the difference (around 30 per cent) was much smaller than that for rural areas. Figure A7 also shows a small increase in egg consumption by rural residents of all income groups. In urban areas, egg consumption has tended to decrease for all income groups. This should be an interesting trend to observe. In Figure A7, it is clear that for corresponding quintiles, rural consumption of eggs was much lower than urban consumption. For example, egg consumption by the richest 20 per cent of rural residents in 2010 was even below that by the poorest 20 per cent of urban residents. This suggests there is further space for increased egg consumption in rural China should rural incomes increase. Poultry eggs are more preferred by people in China's northeast (e.g., Tianjin, Shandong, Henan and Liaoning).

Figure A7 Per Capita Consumption of Poultry Eggs by Income Group in China, 2000-10



Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

Dairy products

In Table A5 is shown that the consumption of dairy products increased significantly during the past ten years. Further details about the composition of dairy consumption are given in Table A6. In 2010, rural consumption of dairy products was approximately only one quarter of urban consumption. It is noted, however, that the percentage increase in dairy consumption is much greater in rural areas; the consumption of dairy products increased three-fold from 2000-2010 in rural areas. The corresponding increase in urban areas was 67 per cent but with a much larger absolute increase (7 kg compared with less than 4 kg in rural areas).

Fresh milk consumption dropped in both rural and urban areas in the past few years. This drop is probably related to consumer concerns regarding milk quality and food safety, particularly regarding melamine contamination.

Table A6 Per Capita Consumption of Dairy Products in China (2000-10, kg)

Year	Rural			Urban			
	Total	Milk	Other dairy products	Total	Milk	Milk powder	Yoghurt
2000	1.06	0.16	0.90	11.55	9.94	0.49	1.12
2001	1.20	0.27	0.93	13.76	11.90	0.50	1.36
2002	1.19	0.33	0.86	18.12	15.72	0.60	1.80
2003	1.71	0.60	1.11	21.71	18.62	0.56	2.53
2004	1.98	0.78	1.20	22.19	18.83	0.51	2.85
2005	2.86	1.22	1.64	21.67	17.92	0.52	3.23
2006	3.15	1.42	1.73	22.54	18.32	0.50	3.72
2007	3.52	1.62	1.90	22.17	17.75	0.45	3.97
2008	3.43	1.38	2.05	19.30	15.19	0.57	3.54
2009	3.60	1.39	2.21	19.27	14.91	0.48	3.88
2010	3.55	n.a.	n.a.	18.10	13.98	0.45	3.67

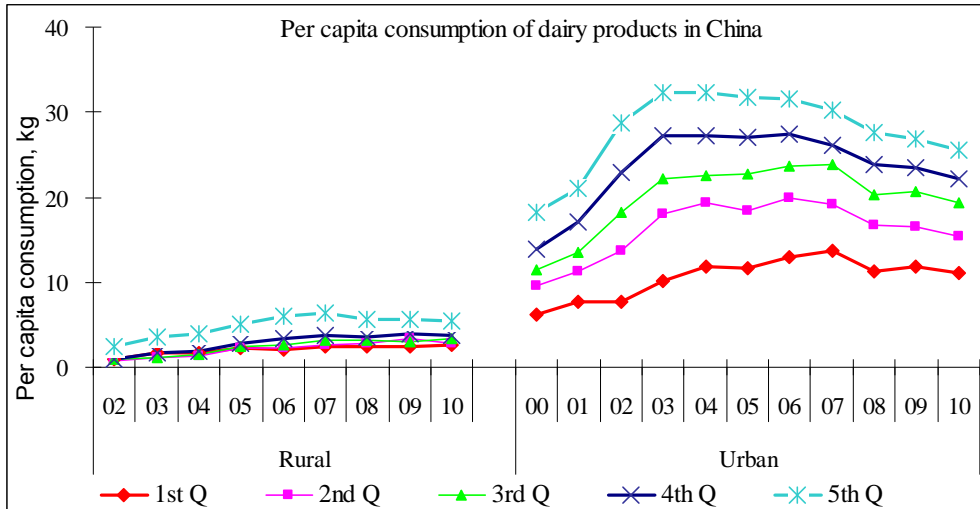
Sources: Per capita rural consumption data is from China Dairy Industry Yearbook, various issues. Per capita urban consumption data is from SSBc, various issues.

Urban areas did not record any increase in the consumption of milk powder, possibly reflecting a perception that milk powder is an “inferior” product and consumers prefer to consume more liquid milk and other “higher quality” dairy products when their income improves (Zhou 2001, and Zhou *et al.* 2002) (It is noted that because of the lack of confidence in domestically produced milk powder, foreign milk powder, chiefly for baby use, is being imported into China through mail or travellers and such

consumption is not included in the statistics). Yoghurt consumption registered a significant increase in urban areas (by 246 per cent between 2000 and 2010, from 1.12 kg to 3.67 kg).

In rural areas, the consumption of dairy products by the top income residents increased from 2.47 kg in 2002 to 5.7 kg in 2010, which was more than double that of the bottom income residents (0.97 kg in 2002 and 2.4 kg in 2010) (Figure A8). In urban areas, consumption of dairy products (chiefly, liquid milk, milk powder and yoghurt) consumed by the top income group consumers increased from 18.3 kg in 2000 to 26 kg in 2010. As in rural China, this was more than double that of the bottom income group (6.2 kg in 2000 and 12 kg in 2010) (Figure A8).

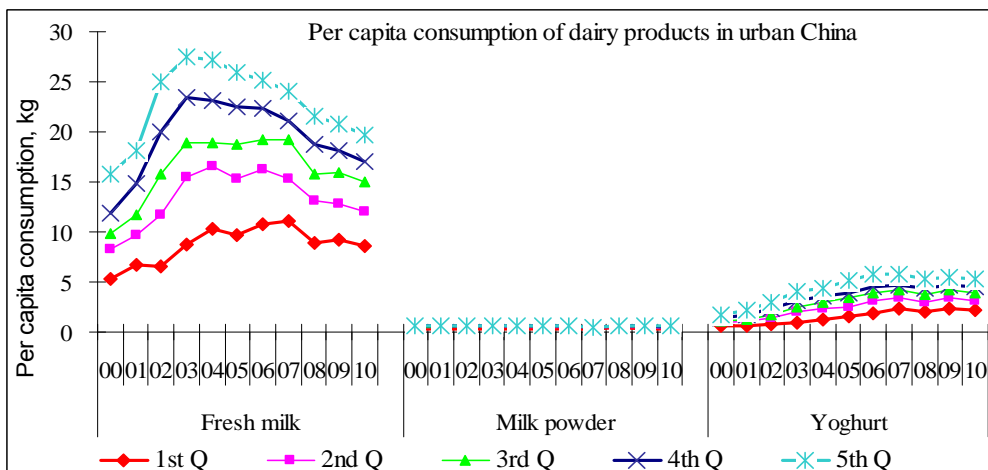
Figure A8 Per Capita Consumption of Dairy Products by Income Group in China, 2000-10



Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

The amount of milk powder purchased by all urban income groups was small, being less than 1 kg in all years during 2000-2010 (Figure A9, disaggregated consumption data for different kinds of dairy products for rural income groups are not available). On the other hand, the amount of yoghurt consumption increased rapidly for all income groups.

Figure A9 Per Capita Consumption of Dairy Products by Income Group in Urban China, 2000-10



Source: based on data from SSBc, various issues.

In urban areas, the consumption of fresh milk accounts for a major portion of dairy products consumed. However, in recent years, it declined in all income groups, with the decline being greatest in the higher income groups. During 2000-2010, the consumption of milk increased and peaked in 2003 to 2004 for various income groups, and then started to decline. This decline has continued through to 2010. As noted earlier, this decline may be associated with consumer concerns about the safety of dairy products, which may have led to more consumption of yoghurt than liquid milk, resulting in a faster increase in yoghurt consumption during the same time period.

Tibet and Qinghai are where dairy products have traditionally formed a large part of the diet for ethnic minority groups and these populations have the highest consumption of dairy products, followed by Beijing and Shanghai, which are two regions with relatively high per capita income. Dairy products are not widely consumed in China's south, especially in rural areas.

Aquatic products

The consumption of aquatic products also increased significantly in the past ten years. The rapid growth in China's aquacultural output contributed to this increase in consumption. Fish was the major aquatic food consumed in both rural and urban areas (Table A7). The consumption of shrimp and prawns was relatively low (no separate data are available for rural areas). Fish accounted for an overwhelming proportion of aquatic product consumption, perhaps due to the ease of cooking fish at home. Possibly there was little change in the amounts of "shrimp and prawns" and "other aquatic products" purchased by urban residents because more of these products were consumed away from home as incomes increased.

Table A7 Per Capita Consumption of Aquatic Products in China (2000-10, kg)

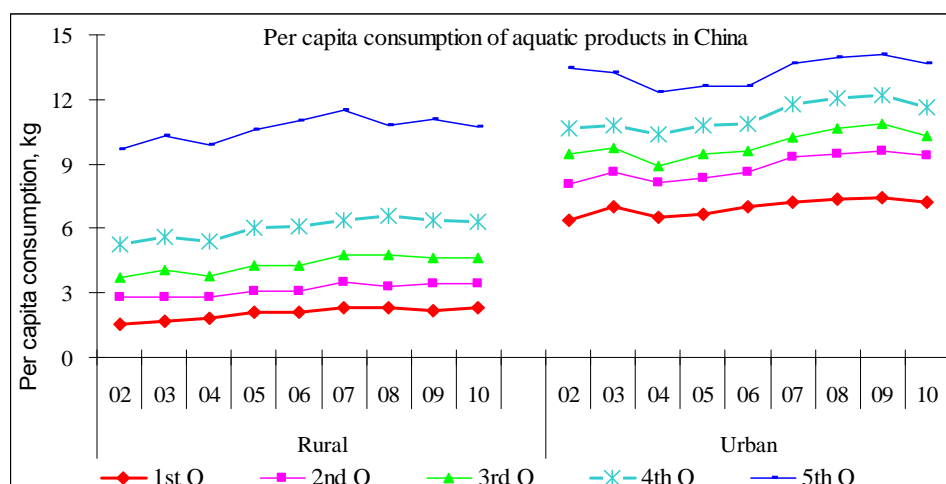
Year	Rural		Urban			
	Total aquatic products	Fish	Total aquatic products	Fish	Shrimp and prawns	Other aquatic products
2000	3.92	n.a.	11.74	4.30	0.96	6.48
2001	4.12	3.42	10.33	4.45	1.13	4.75
2002	4.36	3.64	13.20	9.60	1.32	2.28
2003	4.65	3.89	13.35	9.79	1.33	2.23
2004	4.50	3.70	12.04	8.88	1.26	1.90
2005	4.90	4.10	12.55	9.37	1.21	1.97
2006	5.00	4.10	12.95	9.56	1.29	2.10
2007	5.40	4.50	14.20	10.24	1.59	2.37
2008	5.20	4.30	14.00	10.44	1.45	2.11
2009	5.30	4.30	14.30	10.58	1.59	2.13
2010	5.15	n.a.	n.a.	10.21	1.47	n.a.

Sources: Per capita rural consumption data is from SSBb, various issues. Per capita urban consumption data is from SSBc, various issues.

In 2010, the consumption of aquatic products by the top rural income consumers (11.10 kg) was about five times higher than that of bottom income consumers (2.20 kg) (Figure A10). In urban areas, the top income consumers consumed 13.6 kg, about two times higher than that of bottom income consumers (7.45 kg) (Figure A10). The increase in consumption within each income group was small. It is likely that Chinese consumers opted to consume aquatic products on away-from-home occasions, especially those with higher incomes. However, when consumer incomes increase, the increase in consumption is significant (Figure A10).

There are very distinct patterns in the consumption of aquatic products between regions. Major consumers are in China's coastal south and southeast provinces. Aquatic products are consumed less in China's western provinces, especially in the northwest.

Figure A10 Per Capita Consumption of Aquatic Products by Income Group in China, 2002-10



Note: Aquatic products in urban China refer to fish only.

Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

Cooking oil

In recent years, China imported large quantities of rapeseed (1.6 mt in 2010), soybeans (55 mt in 2010), and cooking oils (8.3 mt in 2010). As shown in Table A8 there is no marked increase in cooking oil use at home in both rural and urban areas. It is likely that imported cooking oil has been used in catering industries and food processing industries rather than consumed directly at home. Also shown in Table A8, consumption of animal oil is decreasing and is less used than vegetable oils. In urban areas, the use of animal oil is low and declining. In rural areas, the consumption is slightly higher but decreasing rapidly.

Table A8 Per Capita Consumption of Cooking Oil in China (2000-10, kg)

Year	Rural			Urban		
	Total	Vegetable Oil	Animal Oil	Total	Vegetable Oil	Animal Oil
2000	7.06	5.45	1.61	8.61	8.16	0.45
2001	7.03	5.51	1.52	8.47	8.08	0.39
2002	7.53	5.77	1.76	9.00	8.52	0.48
2003	6.30	5.30	1.00	9.59	9.20	0.39
2004	5.30	4.30	1.00	9.70	9.40	0.30
2005	6.00	4.90	1.10	9.61	9.25	0.36
2006	5.80	4.70	1.10	9.67	9.38	0.29
2007	6.00	5.10	0.90	9.63	9.63	n.a.
2008	6.20	5.40	0.90	10.27	10.27	n.a.
2009	6.25	5.42	0.83	9.67	9.67	n.a.
2010	6.31	5.52	0.79	8.84	8.84	n.a.

Vegetable oil only in urban China from 2007 to 2010.

Sources: Per capita rural consumption data is from SSBb, various issues. Per capita urban consumption data is from SSBc, various issues.

Alcoholic drinks

By total volume, China has become the world's largest beer market. Beer consumption is generally expected to increase when consumer incomes increase. This is the case for rural residents (Table A9). However, the data for urban dwellers contradicts this result. The reason may be that urban residents consumed more beer away from home. China's total beer output has increased rapidly from 22.3 billion litres in 2000 to 44.9 billion litres in 2010 (SSBa 2002, p. 478, and SSBa 2011, p. 499). In

2010, its total beer exports were 0.194 billion litres (beer import data are not available). The SSB data on beer consumption cannot explain the gap between production and consumption, implying that much beer is consumed away from home.

Table A9 Per Capita Consumption of Alcoholic Drinks in China (2000-10, kg)

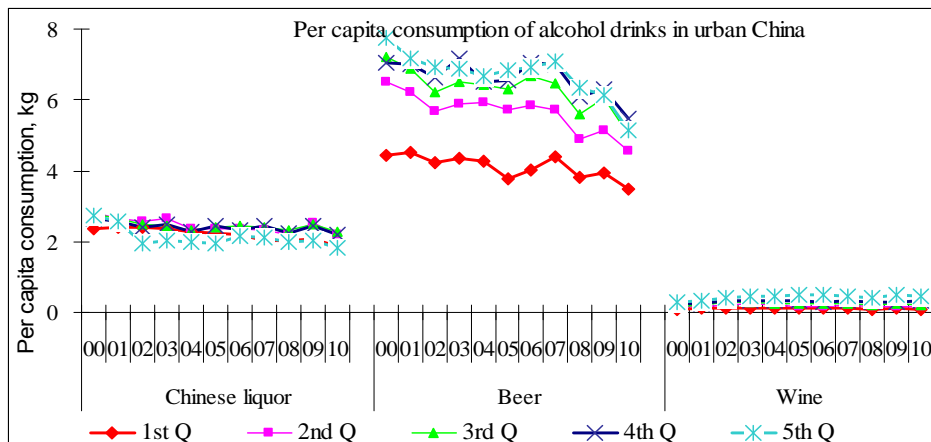
Year	Rural			Urban				
	Total	Chinese Liquor	Beer	Total	Chinese Liquor	Beer	Wine	Other Alcoholic Drinks
2000	7.02	n.a.	n.a.	10.01	2.66	6.51	0.18	0.66
2001	7.10	3.43	n.a.	9.69	2.57	6.29	0.20	0.63
2002	7.50	n.a.	n.a.	9.14	2.40	5.90	0.24	0.60
2003	7.10	3.43	4.00	9.39	2.40	6.12	0.29	0.58
2004	7.80	3.10	4.30	8.94	2.25	5.91	0.26	0.52
2005	9.60	3.50	5.50	8.85	2.28	5.75	0.26	0.56
2006	10.00	3.40	6.10	9.12	2.29	6.01	0.25	0.56
2007	10.20	3.30	6.30	n.a.	2.27	6.05	0.25	n.a.
2008	9.70	3.10	6.00	n.a.	2.15	5.25	0.22	n.a.
2009	10.08	3.20	6.40	n.a.	2.31	5.43	0.25	n.a.
2010	9.74	n.a.	n.a.	7.02	2.08	4.66	0.24	0.04

Sources: Per capita rural consumption data is from SSBb, various issues. Per capita urban consumption data is from SSBc, various issues.

Consumption of Chinese liquor (with high alcohol volumes, ranging between 36 per cent to 65 per cent) seems to have been steadily declining in both rural and urban areas, reflecting changes in people’s tastes and preferences – moving away from high- to low-volume alcohol drinks. The consumption of wine is comparatively low but on the increase (and would be higher if away-from-home consumption is included). If consumers continue to move away from high volume Chinese liquor to other alcoholic beverages, the potential market for wine is substantial (Table A9).

In urban China, the purchase of Chinese liquor declined among all income groups (Figure A11), suggesting changes in tastes and preferences for lower alcohol drinks. Between income groups, higher income consumers bought more beer and wine for consumption at home. Within the same income group, it is interesting to note that the amount of beer purchased declined for all income groups over time. As noted earlier, given that the supply of beer has been increasing in the past decade, the likely explanation would be that urban Chinese consumed more beer at away-from-home occasions. The only alcoholic drink that experienced an increase within the same income group over time is wine (Figure A11). Although the increase in the amount of wine consumed was small, it shows the potential for wine sales in China. Wine is seen as a premium beverage and is increasingly preferred by wealthier consumers.

Figure A11 Per Capita Consumption of Alcohol Drinks by Income Group in Urban China, 2000-10



Source: based on data from SSBc, various issues.

Data on the consumption of alcoholic drinks by income groups are not available for rural areas. Per capita consumption of Chinese liquor could be higher in rural areas as generally lower income consumers tend to drink higher alcoholic drinks. While the consumption of beer may also be increasing in rural China, the consumption of wine would be low because of its cost.

Vegetables and fruits

There have been no major changes in consumption of vegetables, fruits, melons and their processed products. The quantity consumed is stable in both rural and urban areas. The difference in the level of vegetable consumption between rural and urban areas is relatively small. However, twice as much fresh fruit is consumed in urban areas than in rural areas (see Table A10).

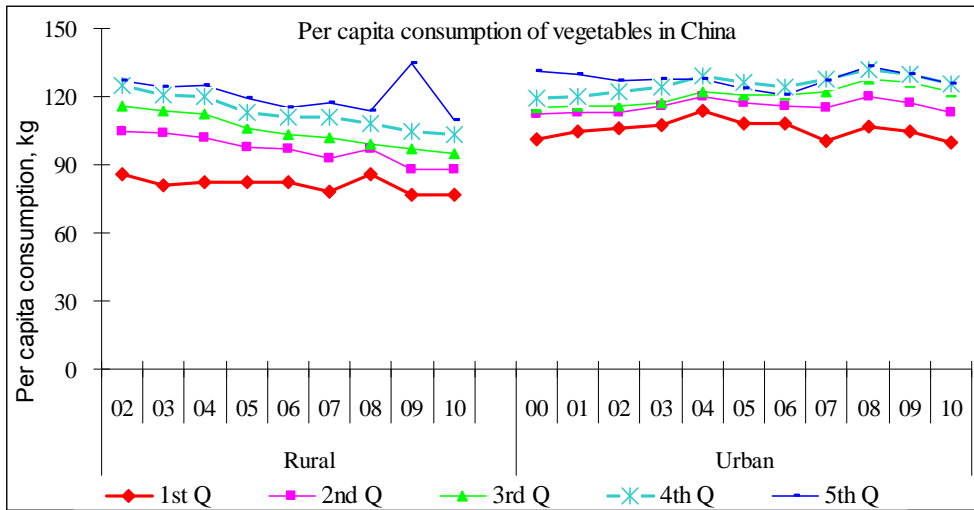
Consumption of vegetables (not including potatoes and sweet potatoes) increases from low income to high income groups (Figure A12). The level of vegetable consumption between rural and urban rich was largely comparable, around 130 kg per person per annum. This level, however, was about 30-40 kg higher than that of the bottom income consumers. It would be expected that because vegetables are relatively low value foods compared to animal products that lower income people would consume more of them. There are a couple of explanations as to why this might not be the case. It may be that some of those poor do not have refrigerators and when they are not close to markets, they may not buy vegetables every day. Further, vegetable production requires water but water is scarce in the north-west region. Thus, vegetables may have to be imported from other regions, increasing the price and reducing affordability for lower income groups (Zhang, L.X, per. comm. 1 December 2011).

Table A10 Per Capita Consumption of Vegetables, Fruits and Melons in China (2000-10, kg)

Year	Rural		Urban					
	Vegetables	Fruits	Vegetables	Fresh Fruits	Fresh Melons	Dried Fruits	Processed Fruits and Melons	Nuts
2000	112	18.31	117	36.90	20.57	0.57	8.35	3.30
2001	109	20.33	118	37.26	22.63	0.54	9.02	3.37
2002	111	18.77	117	37.80	18.72	0.72	0.48	2.76
2003	107	17.50	118	37.99	18.58	0.78	0.44	2.70
2004	107	17.00	122	38.81	17.64	0.72	0.42	2.94
2005	102	17.10	119	37.50	19.19	0.71	0.42	2.97
2006	101	19.10	118	38.01	22.16	0.75	0.44	3.03
2007	99	19.50	118	41.10	18.44	n.a.	n.a.	n.a.
2008	100	19.40	123	38.19	16.29	n.a.	n.a.	n.a.
2009	98	20.54	120	38.94	17.61	n.a.	n.a.	n.a.
2010	93	19.64	116	36.93	17.30	n.a.	n.a.	n.a.

Sources: Per capita rural consumption data is from SSBb, various issues. Per capita urban consumption data is from SSBc, various issues.

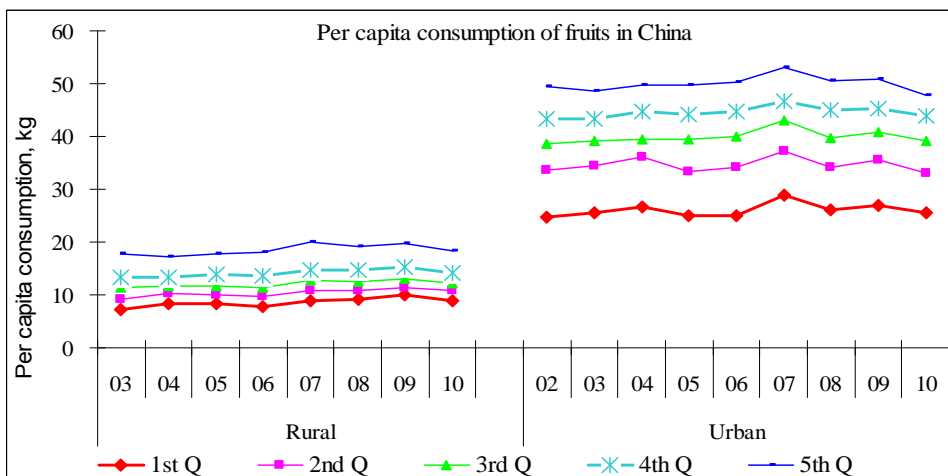
Figure A12 Per Capita Consumption of Vegetables by Income Group in China, 2000-10



Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.

During the past decade, the increase in fruit consumption in rural areas was small, with a relatively large increase in urban areas. Higher income groups consumed twice as much fruit as lower income groups in both rural and urban areas (Figure A13). However, rural consumption of fruits was much lower compared to their urban counterparts. For example, the amount of fruit consumed by the top rural income group was lower than that by the urban bottom income group. In 2010, the top rural income group consumed just below 20 kg per person while the bottom urban income group purchased 27 kg. On the other hand, the top urban income group consumed over 52 kg of fruits. The large gap between rural-urban fruit consumption points to significant scope for increased rural consumption as rural income increases.

Figure A13 Per Capita Consumption of Fruits by Income Group in China, 2000-10



Sources: rural: based on data from SSBb, various issues; urban: based on data from SSBc, various issues.