



TRADE SUSTAINABILITY IMPACT ASSESSMENT FOR THE NEGOTIATIONS OF A PARTNERSHIP AND COOPERATION AGREEMENT BETWEEN THE EU AND CHINA

Sectoral Study 5 of 5:
Agriculture

August 2008



This report was commissioned and financed by the Commission of the European Communities. The views expressed herein are those of the Consultant, and do not represent any official view of the Commission.

Contributions by:

Dr Christian Fischer
Dr Cheng Guoqiang
Dr David Evans
Paul Pierrot

Table of Contents

1. Background.....	3
1.1. Global Competitive Sector Context	4
1.2. EU-China Specific Sector Context	9
2. Baseline Scenario.....	11
2.1. Economic Significance	11
2.2. Social Significance.....	22
2.3. Environmental Significance	23
2.4. Regulatory Issues.....	25
3. PCA Scenarios	27
Bibliography	32

Table of Figures

Figure 1: Global Agricultural Prices 2006-2008.....	5
Figure 2: EU27-World Agricultural Trade (billions)	5
Figure 3: EU-China Agricultural Trade (millions).....	9
Figure 4: EU Agricultural Exports to China	10
Figure 5: EU-China - Grain Trade 2006 & 2007	11
Figure 6: China Agriculture Gross Output Value by Subsector - 2006	11
Figure 7: EU-China Grain Trade (millions).....	13
Figure 8: EU-China Meat Trade (millions).....	17
Figure 9: EU-China Dairy Trade (millions)	18
Figure 10: EU Agricultural Imports from China – 2007	18
Figure 11: EU-China Fish Trade (millions)	19
Figure 11: EU Beverage Exports to China – 2007.....	20
Figure 13: EU-China Beverage Trade (millions).....	21
Figure 14: Renewable Freshwater Resources in China and Europe.....	23
Figure 15: Pesticide Regulations in China and Key Trade Partners.....	25
Figure 16: Trade Activity in Grain Sector following Modest Liberalisation (millions).....	29
Figure 17: Chinese Employees by Area (x 10,000)	29

Index of Tables

Table 1: Impacts Summary Table Legend	27
Table 2: Sector Scenario Parameters	27
Table 3: Chinese Structural Change used in Projection Scenarios.....	27
Table 4: Domestically Produced Supply under a Modest DDA	28
Table 6: PCA Summary Impacts Table – Agriculture (China)	31
Table 5: Ambitious Liberalisation Accounting for High Projected Growth in Demand and Productivity	30
Table 7: PCA Summary Impacts Table – Agriculture (EU)	31

Index of Boxes

Box 1: Human Rights Concerns	22
------------------------------------	----

1. Background

While both the EU and China are major actors in global agricultural trade, trade in agriculture between them is relatively small. This suggests that there is significant potential for growth in EU-China agricultural trade.

As of 2006, trade of agricultural goods represents 8% of global trade volume. Over the last few decades, the agriculture industry has contributed an increasingly small portion of growth over the last few decades, and China's economy is following that trend. In 2000, the agriculture industry represented about 20% of China's annual economic growth. In 2007, that number declined to 13%. In developed economies, the agricultural contribution to annual growth is consistently small.

While agriculture is no longer the engine of growth that it once was, the industry remains a key source of income for billions of people around the world and remains a topic of great importance in bilateral and multilateral trade negotiations. One of the most difficult areas of the Doha Round is finalising an agreement on agricultural and non-agricultural market access. Developed and developing countries differ significantly on how and by how much export subsidies and other barriers that distort the market should be reduced. Moreover, the agriculture sector poses unique cultural challenges to liberalisation as food remains a cherished component of cultural identity in much of the world.

Agriculture is still of critical importance to poorer countries with agrarian economies. The World Bank reports that agriculture is crucial to "overall growth, food security, and poverty reduction in agriculture-based economies."¹ Liberalisation of the agricultural sector offers real economic benefits to the global economy – especially to poorer agriculture-based economies. It allows the agriculture sector in developing countries to access new, larger international markets, and the added competition of low cost imports will also allow domestic firms to lower costs and improve product quality to remain competitive in the global market.

Ideally, as liberalisation permeates through the global market and the benefits of globalisation reach developing countries, incomes will rise and poverty rates will decline. Interestingly, recent research suggests that as incomes rise in developing countries, food preferences and tastes will become more diverse and will gravitate towards high quality produce and meat. Overall food consumption in China is rising and there are marked changes in the composition of diets. China is fast becoming one of the world's largest food markets. Its increasing population, combined with rapid economic growth and urbanisation, is bringing about profound changes in domestic demand for agricultural products and the country's for self-sufficiency. As incomes rise in the urban centres, consumers are buying more meat and dairy products. From 1999 to 2005, per capita consumption of poultry by urban citizens more than doubled; consumption of dairy products nearly quadrupled.² Similar trends have been observed in India, another large, rapidly-developing Asian

¹ The Agenda for Agriculture-based Countries of Sub-Saharan Africa - <http://go.worldbank.org/4YRDYWOJ60>

² China Statistical Yearbook 2006

economy. The increased consumption of meat and dairy products in such large markets has accelerated the development of domestic meat and livestock markets to keep up with demand. This has also had the effect of increasing demand exponentially for grains for use in livestock feed.

Recent developments in biofuel technology have resulted in a merging of food and energy markets. Driven by government subsidies, crops with biofuel potential are being planted in place of more traditional crops. Corn, for instance, of which the US is the world's largest exporter, is replacing soybeans on some farms, resulting in a decline in soybean production. Moreover, as the corn produced is being bought and converted to fuel by domestic energy companies, exports of maize have declined steeply.

This sectoral impact assessment aims to provide policymakers in both the EU and China with data outlining the potential social, economic, and environmental impact of further liberalising trade in the agricultural sector as a result of a Partnership and Cooperation Agreement (PCA). It also offers recommendations to improve commercial and trade relations between the two regions. It should be noted that, for the purpose of this assessment, the term "agricultural products" does not only cover basic agricultural commodities such as wheat, milk and live animals, but the primary-processed products derived from them such as flour, butter and meat, as well as all secondary-processed products such as ready-to-eat meals, bread, sausages, wines, spirits etc.

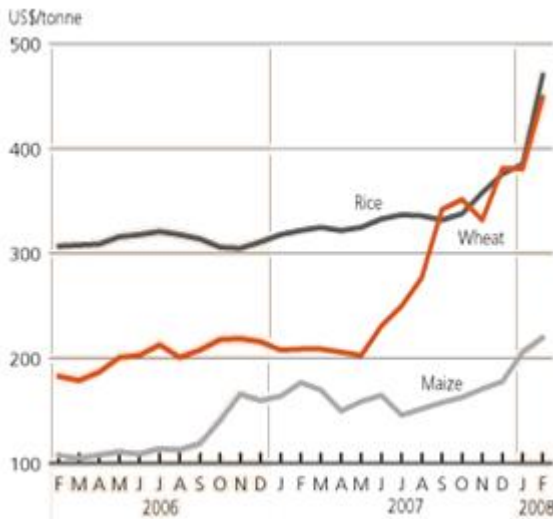
As this assessment aims to highlight the potential impact of agricultural liberalisation in China and the EU, there will be a strong focus on the fish, meat, dairy, grain, and wine & spirits sub-sectors. The first section will provide a brief overview of the major trends and competitive dynamics which are shaping the agriculture sector globally, and will briefly describe the importance of EU-China trade and investment for the sector. In **Section 2**, current trends in the three sustainability areas (economic, social, environmental), absent any PCA intervention, will be outlined. This is followed by a comparison of probable scenarios that could result from various levels of liberalisation in **Section 3**; two scenarios are developed in **Section 3** using the information analysed. Finally, **Section 4** contains policy recommendations and measures to embrace the beneficial impact of trade liberalisation and to mitigate the potentially negative consequences of trade liberalisation.

1.1. Global Competitive Sector Context

Agricultural exports grew 11%, while agricultural production increased only 1% over the previous year. This was partly a result of poor harvests in some regions, notably Australia, but could also be an indication that an increasing number of countries are looking to sectors such as manufacturing to drive their economic growth. In every region, save for South America, agriculture accounted for less than 10% of trade volume in 2006.³ Global trade volume in 2006 measured just over US\$13 trillion; agriculture exports accounted for US\$945 billion (8% of total export volume). The E.U., the US and China remained the world's largest overall importers and exporters. Intra-EU

³ WTO Trade Stats 2007

Figure 1: Global Agricultural Prices 2006-2008



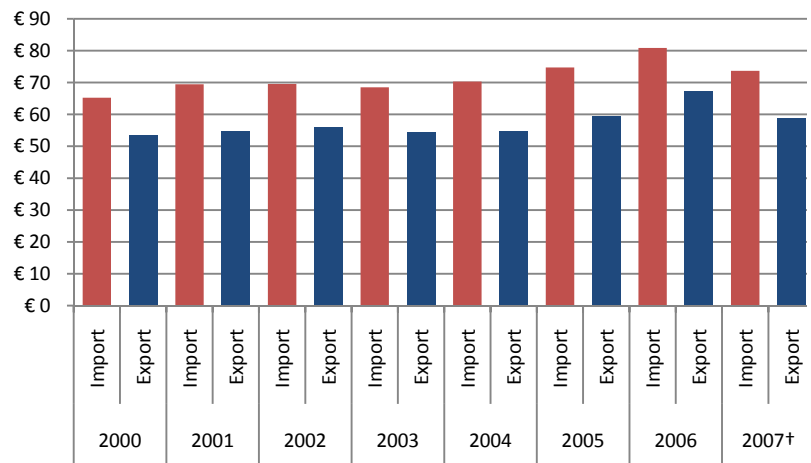
Source: FAO – Global Information and Early Warning System

agricultural trade activity accounts for the bulk of global agricultural trade volume, and most of China’s import and export activity is with its Asian neighbours. China generated just over US\$197 billion in agricultural revenues, most of which was derived from grains and sugar crops. Taken together, grains and sugar crops account for over half of China’s total agricultural revenues.

The rapid increase in food prices in 2007 received a great deal of attention from academia, government and the media. Wheat prices more than doubled between March 2007 and February 2008, as high fuel and energy prices increased transport costs for most other agricultural commodities, putting more upward pressure on prices. Freight rates increased 100% over the previous year; this is due to both longer trade routes and steadily rising fuel prices.⁴ The dual market demand for crops with biofuel potential has reduced export volume of these commodities; advanced economies such as the US and EU member states have been encouraging the production of cleaner burning biofuels, which has led some farmers to reduce land allocated to non-biofuel crops in favor of crops such as maize.

The EU and China are huge players in the global agriculture market, both as producers and consumers. The EU remains a net food importer (see **Figure 2**) and China's ability to remain self-sufficient in food production faces greater hurdles. Liberalisation on both sides could reduce prices for consumers and increase market penetration for producers in both regions. Rising incomes offer more opportunities for EU firms to expand their market presence in China, either through investment in local producers or increased exports. Such opportunities are particularly ripe in grains, dairy, meat, and wine and beverages sub-sectors.

Figure 2: EU27-World Agricultural Trade (billions)



Source: Eurostat

The impact of rising food prices in developed countries is relatively small given that food represents a small percentage of the basket of goods used to calculate the Consumer Price Index. In developing countries with agrarian economies, however, food represents not only a larger portion of household expenditure but also a large portion of the price index thus leading to greater

⁴ FAO - Food Outlook: Global Market Analysis, 2007

inflationary pressures in these regions. The increasing price of agricultural goods has the potential to reduce the gains that have been made in poverty reduction in the last decade.

Cereals/ Grains

The grains and cereals sub-sector consists of, but is not limited to, crops such as wheat, corn, rice, and oats. Annual grain production over the last two years has been the largest in history, in spite of record droughts and flooding that threatened crops in Australia (one of the world's biggest wheat exporters) and China. However, even after two years of bumper crops, stocks are depleting, supply is tight, and prices are rising. These recent developments in the grain and cereals industry are the result of several structural changes in the global food market.

Pressure on wheat prices can be linked to developments in the meat and livestock sub-sector. As the demand for meat in particular continues to increase, there will be elevated demand for land intensive crops such as grains and cereals for livestock feed. The production of these crops is likely to exacerbate land degradation and reduce water quality and availability in rural areas. China, the fastest developing and diversifying food market in the world is likely to see record increases in meat consumption over the next decade. Domestic production is growing to meet the new demand; however, increased demand for livestock grain has led to a serious contraction in grain stocks, making it more likely that China will need to supplement its supply with imports. A similar phenomenon is taking place in India; while meat consumption is not rising as fast, demand for dairy is increasing. Livestock used in dairy production will also increase demand for livestock feed further cutting into global grain stocks. At the root of the surge in food commodity prices is the correlation between incomes and diets. Incomes in developing countries, especially in those with transforming economies like China, are rising, mostly in urban areas, and that rise tends to correlate with an increase in demand for meat. However, meat production requires a great deal of grains to produce a relatively small amount of marketable product. According to one study, one hectare of land can produce either 5 million kilocalories of grain or 400,000 kilocalories of beef - a ratio of 12.5 to 1. The same study indicates that one hectare of land would yield 1.8 million kilocalories of milk - just 36% the caloric yield of grain crops.⁵

Another force affecting prices in the grain market is fuel costs. Large industrial farms supply most of the grain traded in the global market; increasing grain harvests means an increase in fuel consumption for the tillers, tractors, and trucks. Crude prices reached an all-time high in late February 2008.

Biofuels such as Ethanol will also be critical issue over the next decade as developed countries, such as the US and the EU seek to increase their fuel efficiency and reduce carbon emissions by looking to alternative energy sources. Biofuel production has increased rapidly in the last few years due to a glut of investment from agricultural and energy firms. New evidence is surfacing that the net energy gain from producing and using these fuels may

⁵ Bender, A. Meat and Meat Products in Human Nutrition in Developing Countries, Food and Agriculture Organization, 1992

be substantially smaller than what was initially estimated. Moreover, an unexpected side-effect of the prosperous biofuel industry is that global food stocks and food exports are decreasing while food prices are at record levels.

Compounding these trends is the recent spate of adverse weather conditions. One would expect that the reduction in stocks would push up prices; one would also expect that the increase in prices would incentivise farmers to increase production, but a series of price controls and other protectionist barriers have erected a ceiling over production pushing prices further. Towards the end of 2007, in a bid to stabilize food prices in Russia, the Russian government imposed, export taxes on wheat. Kazakhstan followed suit in February 2008 sending already record wheat prices skyward. Both Russia and Kazakhstan are critical wheat producers. By shielding domestic markets from steep price increases is exacerbating the current “agflation.” Their export barriers are preventing the natural market correction that would take place.

Dairy Products

Dairy market prices in 2007 soared to twice their levels in 2006. This is largely a result of rising incomes and increasing demand for milk and milk-based products. Milk and other dairy products are expensive to produce both in terms of money and in terms of caloric efficiency.⁶ Producing animal feed requires more land and water to produce fewer products that could be used to feed people. Moreover, transportation, storage, and sanitation are additional costs that require higher levels of investment than simple food crops. While developing countries are catching up (China and other developing countries in Asia have almost doubled their contribution to world dairy production in the last decade), developed countries continue to have a comparative advantage in this industry as milk is a capital intensive commodity.⁷ There is a great deal of potential for market growth in places like China and India where urban households are enjoying higher incomes and are incorporating more dairy into their diet. As this trend continues, producers can expect the value of the industry to increase.

There are, however, a great deal of entrenched barriers in the global milk market. The largest producers of milk and dairy products are the US, the EU, Canada, Japan, Australia, and New Zealand. Together these countries account for approximately 42% of global dairy production; they also account for most of the intervention in the global milk market. The EU and Canada, for example, impose minimum prices in the domestic market to shield local producers from dips in the global market. This is coordinated with a quota system to control production and supply. The US uses a classification system that increases prices for consumers of different classes of dairy products. Coupled with restrictive sanitary and health standards on imports, these policies are a substantial drag on global dairy trade.

Meat Products

Meat and meat-products include, bovine and ovine meat, pork, and poultry and products derived from these animals. Safety and market access have been

⁶ Cox and Zhu, Dairy: Assessing World Markets And Policy Reforms: Implications For Developing Countries

⁷ Ibid

prominent issues of late. Avian influenza remains a persistent drag on the poultry market; in February of 2008, an outbreak of the H5N1 virus in India forced the authorities to ban the sale or consumption of poultry products in the entire state of West Bengal. The estimated cost to area producers was US\$20 million.⁸ A disastrous outbreak of blue-ear disease in China in the summer of 2007, killing millions of pigs, forced pork prices to record highs and contributed to nationwide inflation. In January of 2007, the EU unexpectedly banned all Brazilian beef imports, despite vigorous objections from Brazilian farmers, due to perceived shortcomings in preventing the proliferation of Foot and Mouth Disease.

The rising demand for meat in emerging economies is a large driver of the inflation in food prices experienced in 2007. The grain that was once grown to feed growing populations is now, in large quantities, being converted into livestock feed to sustain growing cattle herds and pig farms. Both demand for meat and production capabilities are rising rapidly in places like China and India due to rising incomes. The amount of grain needed to sustain these growing industries will pose a severe challenge to China's policy of grain self-sufficiency.

Fish and Aquaculture

Europe is the world's largest importer of fish. Upwards of 60% of Europe's annual supply of fish is imported. In fact fish account for more than 25% of all of Europe's agricultural imports. The sheer size of the industry and the substantial portion it contributes to overall agricultural trade volume between the EU and China makes effective regulation of the industry of keen importance. The sustainability of the industry is also a priority for firms and regulators in both regions. Both the EU and China have established regulations and protections to curb illegal exploitation of aquatic resources. The EU has adopted the Common Fisheries policy which ensures the sustainable development of fishing activities with consideration of the economic, social, and environmental impacts. China's fishery industry is challenged by the limited resources and capacity of the fishing fleet and has adopted the *Programme of Action on Conservation of Living Resources of China*, in effect since 2006. Among the initiatives under the umbrella of this programme are arresting the decline of fisheries resources and increasing the efficiency of fisheries and overall economic benefits in the industry. Overfishing is a persistent concern, as is Illegal, Unregulated, and Unreported (IUU) fishing activities. A recent audit sponsored by the European Commission found that several member states did not have adequate systems of collecting accurate data for catch volumes nor the means to verify that data.

Wine & Spirits

The beverage sub-sector includes both alcoholic and non-alcoholic beverages. Alcoholic beverages consist of wines and spirits, distilled alcohols and beers. This sub-sector has also seen growth stemming from rising incomes. Consumption of wine and spirits is rising not only in developing economies, but also in developed economies like the US, which overtook France in overall wine consumption in 2007. While the wine market represents a relatively small proportion of the overall agricultural production and trade, this market

⁸ Indian state bans poultry trade to curb bird flu, Reuters, 5 February 2008 <http://www.alertnet.org/thenews/newsdesk/ISL165028.htm>

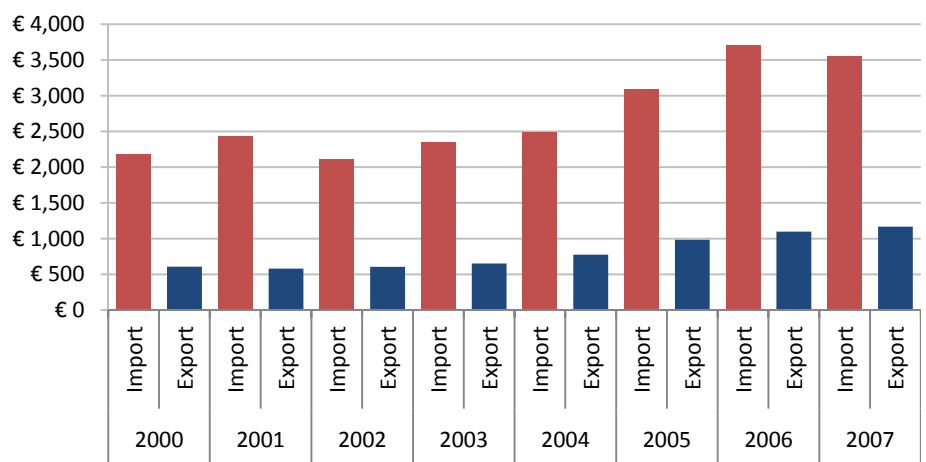
has particular importance in the EU-China agricultural trade relationship. The EU is the world's largest wine and spirits producers. Younger, more affluent Chinese are developing a taste for high quality spirits and form the base of a lucrative market for EU alcohol exports. Wine and wine derived spirits already represent almost 30% of EU agricultural exports to China. This budding market is of particular significance to the global beverage industry. Wine production continues to thrive in traditional locations – France, Spain and Italy will continue to dominate global wine production in the near future; however, wine consumption in these traditional markets has been steadily declining.⁹

1.2. EU-China Specific Sector Context

China and the European Union are both among the top five exporters and importers in the world. Total agricultural exports from the EU-27 to the rest of the world totalled €67 billion in 2006, just over 7% of global agricultural exports; agricultural trade volume between the EU and China represents just over €4 billion. The EU and China are major actors in global agricultural trade, although trade in agriculture between them is relatively small, suggesting significant potential for growth. Moreover, there is greater investment potential; rising incomes in China make it an attractive market for EU companies that want to expand their market penetration in Asia.

Agricultural exports from the EU to China have grown modestly in the last five years, and were valued at just over €1 billion in 2007. While this represents a rather small proportion of the current agricultural trade market, this translates into substantial trade potential between the two regions. In terms of overall trade activity in the agricultural industry, both imports and exports have been steadily rising since 2002 (See **Figure 3**). Trade habits in these two regions are especially important given that China is one of the biggest consumers and producers of grain in the world and the EU is one of the largest consumers of food products in the world.

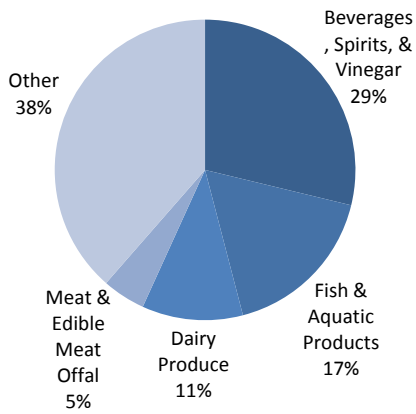
Figure 3: EU-China Agricultural Trade (millions)



Source: Eurostat

⁹ Anderson, K. "Wine's New World", Foreign Policy, No 136, 2003

Figure 4: EU Agricultural Exports to China



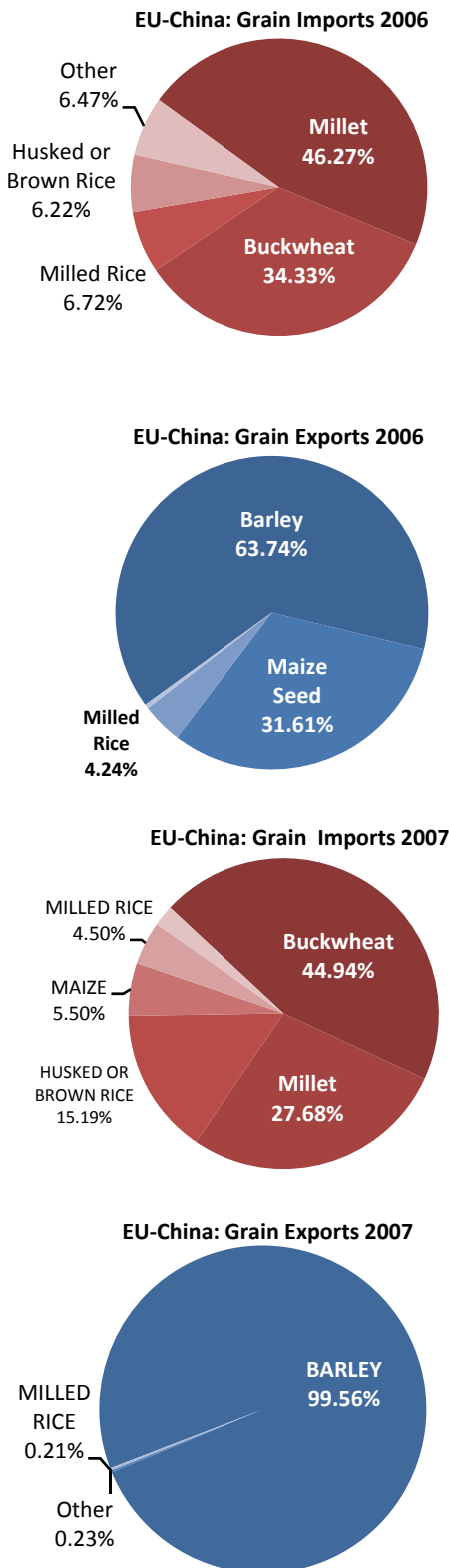
Source: Eurostat

There are five sub-sectors that play an important role in the EU-China trade relationship, and are given specific focus in this study (see **Figure 4**):

- **Fish and aquaculture** sub-sector represents the largest proportion of EU imports from China as well as a substantial proportion of agricultural exports to China.
- The **grains and cereals** trade will be of keen importance as agflation and biofuel technology persist as important policy concerns. Trade policy in this sub-sector will also have a direct impact on environmental protection issues as well as development in the rural areas.
- **Meat** and **dairy** products hold great potential for European food producers as a means of boosting investment in the Chinese food market.
- **Wines and spirits** represents an expanding market in China that offers lucrative opportunities for investment and modernisation for producers in both regions

The relationship between the two regions in the agricultural sector is also important due to the impact of trade habits on efforts to promote sustainable consumption of key resources including land, water and fish. Efforts by Europe and China are central to global efforts to reduce emissions and environmental impacts of the agricultural industry.

Figure 5: EU-China - Grain Trade 2006 & 2007



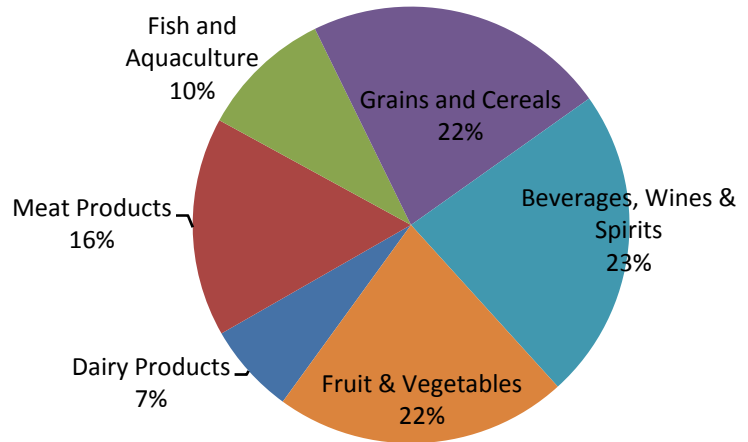
Source: Eurostat

2. Baseline Scenario

2.1. Economic Significance

With regards to Chinese production, the sector is significant, with over 168 billion in gross output value in 2006. Within this output value, fruit and vegetables and grains and cereals command relatively large shares due to their inherent necessity, while beverages, wines, and spirits command a large share due to their relatively high value per unit (see **Figure 6**). Meanwhile, newer growth sectors such as dairy and meat product remain relatively small, although with tastes changing their relative market share may change significantly.

Figure 6: China Agriculture Gross Output Value by Subsector - 2006



Source: China Yearly Industrial Data, China Data Centre

Data from the last several years' points towards the development of a number of key economic trends. First, the EU's trade surplus in the grains sector is likely to continue, however, the overall volume of trade will shrink if current factors remain unchanged. Barley will likely continue to dominate overall grain trade as the beer market will remain vibrant in the short-term. Chinese grain exports to the EU are more diverse and have grown steadily following a steep decline in 2005.

If the current trade policies remain in place for the next five years, there will be reduced trade volumes in staple foods between the EU and China as domestic demand will consume higher proportions of local production. Food prices will continue to rise, and China will likely turn to local producers to fill the supply gap as domestic industries continue to expand.

Grains/Cereals

Grains and cereals represent a highly diverse subsector, including products such as wheat, barley, oat, rice and maize. Between the EU and China, trade in grains has fluctuated substantially in the last three years, dropping from a high of €80 million in 2005 to approximately €13 million in 2007. From 2000 to 2005, the EU was, by a wide margin, a net exporter of grains. Overall grain imports from China have been rising steadily over the last three years; in 2007 grain based imports accounted for €10 million of trade activity. While the EU

imports a wide array of grain products from China, China imports just a small selection of grain products but in much larger quantities.

Millet and buckwheat have represented the bulk of grain imports from China to the EU (taken together at least 65% since 2005) (see **Figure 5**). There were peaks in grain imports from China in 2003-2004; in 2003 grain imports increased substantially across all products. The highest volume products – brown rice, milled rice, buckwheat and millet – tripled in value between 2002 and 2003. This peak continued through 2004 before dipping significantly in 2005. This dip can largely be attributed to a drop in brown and milled rice imports as well as a fall in maize imports after a year of abnormally high trade in this crop.

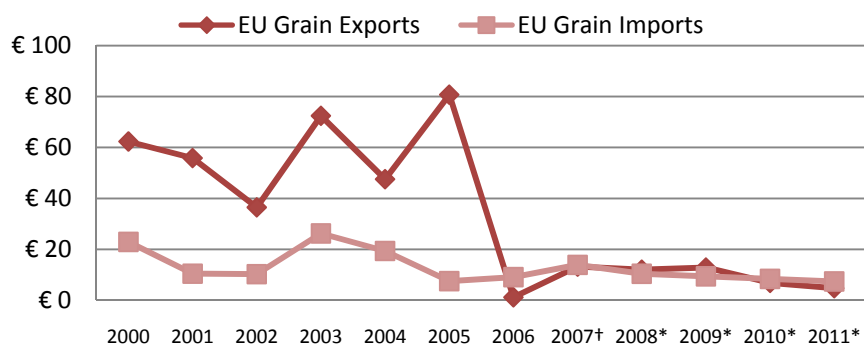
Barley has been the prominent grain exported from Europe to China. This is likely due to the booming brewery market and increasing levels of beer consumption in China. With the exception of 2004, barley has accounted for at least 65% of EU grain exports to China since 2000. The predominant exporter of barley in the EU, especially of the variety used in beer brewing, is France. France exports an average of over 2 million tons of malting barley to China every year.

In Europe, grain production is increasing while stocks are steadily decreasing. The main reason for declining grain stocks and rising food prices is the increasing intersection of the food and energy markets that has resulted from the rising interest in biofuel technology. Ethanol, made from corn and other traditional food crops, is being pursued as an alternative liquid fuel for automobiles. On the upside, engines that run on biofuels are significantly cleaner than the fossil fuel alternative; and carbon dioxide emissions are thus greatly reduced. Unfortunately, recent studies suggest that the fossil fuels burnt to produce biofuel alternatives remove much of the potential emission reduction. This further pushes up prices in this sector as speculative transactions. Prices are expected to remain high for at least another year or so (enough time to observe two full crops and replenish global stocks), and investors are aiming to secure grain supplies and farmland resulting in grain and farmland prices soaring upwards.

In China, grain prices have also seen a marked increase, though there are number of different factors at work. One factor involves increased domestic demand for meat and dairy products. Dairy farmers and livestock owners are upping herd numbers to increase output of meat and dairy products. Aong other factors impacting grain prices in 2007 include the pork shortage resulting from an unexpected outbreak of blue-ear pig disease. The outbreak decimated the pig population, leading farmers to accelerate breeding, increasing demand for feed and resulting in grain price increases. Also as grain prices began their initial rise , Chinese exports of staple grains increased substantially. Exports of corn in 2007, for instance, rose 41.4% over exports in 2006. Another factor is the decrease in grain production due to environmental issues. Encroaching deserts in the west are threatening the already scant acreage available for crops and farming; coupled with rapid urbanisation, limited water supplies, and reforestation efforts aimed at slowing desertification, China's ability to remain self-sufficient in grain production is in jeopardy. Food security is of high importance to the central government and intervention in the grain market is

likely as officials attempt to buttress farmers and encourage the continued planting of grains.

Figure 7: EU-China Grain Trade (millions)



Source: Eurostat

An additional factor was the promotion of biofuels, such as corn-based ethanol, in industry applications putting further strain on grain prices in 2007. The extent of the benefits of transitioning to biofuels is still under investigation and the future state of the grain market is tied to the fate of this burgeoning industry. In light of the recent price boom in food, especially grains, the Chinese government has already put a freeze on approving any additional biofuel development or production projects, which has been in effect since 2006.

Economists are concerned that if the current trend of protectionist policies in the grain sector goes on undisturbed, the “agflation” afflicting developing countries will likely linger and could potentially worsen.

The major impediments to growing trade in the grain sub-sector are export duties, soaring fuel prices, and increased domestic consumption due to the growth of biofuels. There has been a sudden downturn in EU exports of grain to China. Starting in 2006, exports dropped from a 10-year high of €80 million in 2005 to a 10-year low of €1 million (see **Figure 7**).¹⁰ The farms and agricultural firms in both the EU and the US have been avidly pursuing biofuel technology as a way to simultaneously reduce dependency on foreign oil and reduce greenhouse gas emissions. The European Energy Council mandated in 2008 that EU member states substitute 10% of their transport fuel supply with biofuels by the year 2020. As a result, demand for biofuel crops will likely remain high and may continue to displace other food crops further contributing to higher food prices. This impact could be short-term if the commitment to biofuels as an alternative fuel decreases. There are already some indications that the benefits of biofuels may not be as high as once thought. In January 2008, an internal EU study on the benefits of biofuels, conducted by the EU’s Joint Research Centre warned that transitioning from fossil fuels to biofuels would be very costly while its environmental benefits are not assured.¹¹ Researchers will continue to more closely scrutinise the benefits of substituting biofuels for traditional fossil fuels; however, current

¹⁰ Note: Within Section 2 all Eurostats figures provided for 2007 (marked with +) are based on preliminary Eurostats data. All figures within Section 2 for 2008-2011 (marked with *) are projections based on established trends, representing ‘business as usual’ growth.

¹¹ Bounds, A. Brussels’ own scientists cast doubt on EU biofuel strategy. Financial Times, p. 1. January 18 2008

trends suggest that biofuels will likely continue to be pursued as a cleaner alternative to fossil fuels. EU-China grain trade would then shrink in volume as more and more arable land is allotted to maize, soybeans and wheat for biodiesel production.

China will likely see an increase in domestic production of grains, especially wheat and maize. Domestic demand for grains will increase as the production and consumption of livestock feed continues to climb in lockstep with growing demand for dairy and meat. There will likely be a steady reduction in Chinese exports as the Chinese government continues to mandate self-sufficiency in grain production. Towards this goal, China recently initiated a 20% export tax on wheat, rye barley, and oats in addition to a 5% tax on soy beans, rice, and corn.¹² These export duties will be in effect throughout 2008; and the duties coupled with the increased consumption of grains by the meat and dairy sectors will severely dampen grain exports from China to the EU. The extended drought of 2007, persistent water shortages in the North China Plains and desertification could dampen any rapid expansion of the grain industry in the near future. In the EU, there will be greater domestic consumption of grains as energy and agricultural firms continue to explore ethanol and other biofuels as a substitute for traditional fossil fuels. To reduce the negative impact this may have on the domestic grain industry, the Chinese government, in its 11th Five-Year Plan, increased public investment in "Agriculture, rural areas, farmers allocating ¥56.25 billion to agriculture. Barring severe drought or flood in the next year, China could retain its grain independence through 2008.

Dairy and Meat

Dairy Products

The dairy sub-sector consists of the production of milk, dried milk powder, and various milk-based products including yogurt, butter and cheese. Milk consumption in China has risen substantially in the last decade. Producers in China and exporters in Europe are anxious to fill the growing demand. With improved marketing and brand imaging, companies may be able to accelerate the growth of milk consumption. Forty years ago, Chinese considered milk a nutritional supplement for children and elderly rather than a staple in the average diet.¹³ Milk was largely absent from the average citizens diet both in urban and rural areas. There were provinces where milk consumption was more common; however, milk from these areas was neither produced nor marketed for mass consumption. There was also the issue of cost. Milk was not a cheap product, and the low per-capita income at the time discouraged families from consuming these products in significant quantities.

Attitudes toward milk began to change as media became a more prominent presence in the Chinese household. Advertisements citing milk and dairy products as a healthy and tasty part of one's diet were able to reach more households. Moreover as lifestyles changed and employment became easier to find, more Chinese were eating meals outside of the home and the market for pre-packaged foods and meals expanded as time spent cooking and shopping became more costly. In combination with rising incomes, this has

¹² Anderlini, J. Beijing to tax grain exporters. Financial Times, p. 2, 31 December 2007

¹³ Fuller et al - Got milk? The rapid rise of China's dairy sector and its future prospects, Food Policy Vol 31, June 2006

contributed to the recent boom in dairy demand. This growing demand, however, is largely confined to the urban centres. This is primarily a factor of the increasing income disparity between households in urban communities and those in rural communities.

Recent data shows that milk consumption is indeed on the way up and is expected to continue for the foreseeable future. It is likely that as incomes rise and diets change, Chinese milk and dairy consumption will rise to levels similar in more affluent Asian countries such as Japan and South Korea. Most of the rise in dairy consumption has been in liquid milk and yogurt. Chinese households with incomes comparable to those in Japan or Taiwan are consuming much smaller quantities of cheese, suggesting that local producers and exporters could gain from tapping this potential.

Domestic milk production in China increased over 50% between 2000 and 2003. Herd numbers have increased substantially as well as efficiency (yield per cow). The Chinese government has also relaxed import controls to encourage imports of dairy technology. Milk production remains geographically concentrated in the northern and north western provinces.¹⁴

One of the issues that have made it difficult for local Chinese companies to thrive in the dairy sector is the costs of storage, transportation, and sanitation of milk products. Fresh milk is a highly perishable commodity and without the infrastructure to facilitate transportation and reliable refrigeration to extend the life of the product, a company, even with large production potential could not reach a market large enough to spur real growth in the industry. Recent government mandates for food safety and handling make this issue even more significant. Recent surveys suggest that Chinese consumers, mindful of recent food safety scares, rate food safety as an important consideration in their shopping habits.¹⁵ However, market studies suggest that Chinese consumers are highly price conscious. Thus it falls to domestic producers to increase production and quality while at the same time ensuring the safety of the product and keeping prices low to compete with high-quality imports. European imports already enjoy a brand image advantage in that they have a reputation for quality and safety. Studies show that consumers are only willing to absorb a moderate cost premium for state-certified milk and dairy products (less than 10%)¹⁶. As long as Chinese consumers remain confident in the safety and quality of Chinese dairy products, they will remain competitive with foreign imports, without the aid of market access barriers.

Though the EU's share of world milk production has dipped somewhat since 2000, the EU remains the world's largest producer of milk and dairy products. In the face of surging demand and vanishing stocks, there has been discussion among some EU leaders about easing the restrictive dairy quotas that have been in place for the last two decades and that are now disadvantaging production in member states. In 2007, dairy exports accounted for less than 10% of the EU's agricultural exports. Assuming the dairy quotas in their current form persist, it is unlikely that Europe will be able to capitalise on the budding dairy market in developing economies like China and India. In fact, in 2007, the EU imported close to €300 million worth of cheese. If Europe

¹⁴ Ibid

¹⁵ Wang, Z et al. "Chinese consumer demand for food safety attributes in milk products", Food Policy Vol 33, 2008

¹⁶ Ibid

does not move to allow its farmers to fill the growing demand in Asia, the US or Australia will likely fill the void.

Overall, trade volume in the dairy subsector has been rising steadily for the last five years driven by strong EU exports to China. Currently, dairy products account for approximately 11% of EU-China agricultural exports, 86% of which is whey. The remaining 14% is composed of solid milk products such as butter, cheese and powdered milk. Cheese exports have risen steadily since 2000 in line with projections based on rising income levels in the Chinese market. Solid milk exports trends have been more erratic, rising quickly between 2001 and 2004, before dipping suddenly in 2005. This decrease is likely the result of several factors but competition from domestic producers in China is certainly a contributing factor. Moreover, there are indications that income levels also factor into the type of dairy products consumed. Studies show that milk powder is consumed in relatively higher quantities by low-income households than middle and higher income households. Thus the rise in income levels would also reduce overall demand for powdered milk.¹⁷ Butter exports rose exponentially in 2004 over the previous years before reaching a peak in 2005 and have levelled off the last two years at around €3 million a year.

Chinese dairy imports to the EU have, expectedly, remained rather low. As the EU already produces a surplus of dairy products and employs price control policies to support the local producers, it is far more lucrative for Chinese dairy farmers to focus on meeting domestic demand. Exports of honey to the EU represent the overwhelming majority of Chinese exports in this sub-sector. However, the growth of this export has been held back by food safety concerns.

Meat Products

Meat and meat-products include, bovine and ovine meat, pork, and poultry and products derived from these animals. The EU and China are both large producers of meat products; however, the EU is the net exporter in the EU-China trade relationship. Trade activity in this sub-sector is relatively small. The highest volume of meat exports from the EU to China is edible swine offal valued at just over €41 million in 2007. Meat imports from China in 2007 consisted almost entirely of rabbit meat and valued approximately €13 million.

There is a substantial amount of volatility in the meat market, as illustrated recently by recent outbreaks of livestock disease and other food safety issues. The outbreak of foot-and-mouth disease in the UK, blue-ear disease in the pig industry in China, and the threat of avian influenza that threatens the poultry market in Asia are cautionary examples of safety and sanitary standards being absolutely crucial establish long-term markets for meat products.

The meat sector involves the care and maintenance of livestock as well as the production of meat and animal based products. Beef, mutton, poultry and pork products are the most highly produced and constitute the majority of trade activity between China and the EU. Close to 8 million tonnes of cattle were slaughtered for beef production in Europe in 2006.¹⁸ The biggest producers of bovine meat in the EU are France, Germany and Italy; taken together they produced close to 50% of the EU's beef output in 2006. While EU exports to China of live cattle, beef and veal were

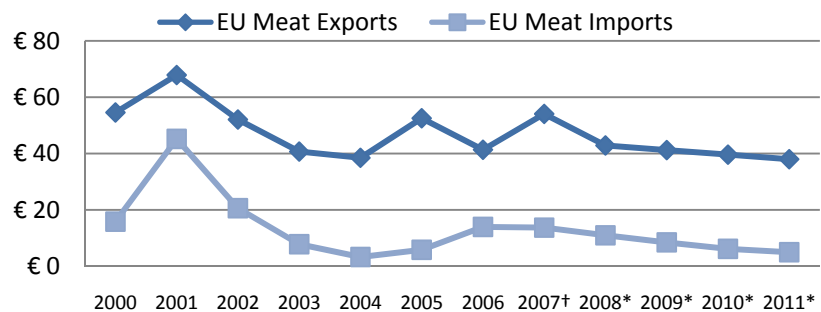
¹⁷ Zou, H & Novakovic, A, The Chinese Dairy Sector: Interregional and International Trade Patterns, IATRC Symposium, Beijing, 7-9 July 2007

¹⁸ Agriculture: Main Statistics 2005-2006. Eurostat, 2007

negligible over the last three years, exports of pig and poultry meat were quite significant. As for pigs and pig meat, France and Denmark were the only countries exporting small amounts of live swine to China (together in one year not more than 1,000 pigs), while the largest amount of European exports of pork came from Denmark. In 2003, Denmark's pig meat exports to China peaked at a level of 37,500 tonnes. However, in the following years, the export quantities declined to 17,000 tons in 2004 and 5,000 tonnes in 2005. In the case of France, French exports of pork accounted for about 500 tonnes in 2005. With regard to poultry, for the first time since 2003, in 2005 China directly imported 1,203 tonnes of French broiler meat, while the remainder were Hong Kong re-exports of French broiler meat to China (605 tonnes in 2005). Chinese imports of European by-products of broiler meat production (i.e., chicken paws) amounted to only 131 tonnes in 2005 (by France). However, most of these products were imported from the US and Brazil.

While China's beefing industry is growing it is still small compared to dynamic producers in Australia and the US; however, domestic producers are likely to continue to be able to meet demand. The looming threat of avian influenza has had a significant impact on demand and domestic consumption of poultry meat, but production and exports of poultry continues to rise. Pork prices underwent a steep climb in 2007 following an unexpected outbreak of blue-ear disease. Government intervention largely kept the disease from growing out of control, but the most conservative estimates indicate that 68,000 pigs died from the outbreak while an additional 175,000 were ordered slaughtered. The resulting pork shortage propelled the CPI upward resulting in disturbing levels of food inflation.

Figure 8: EU-China Meat Trade (millions)

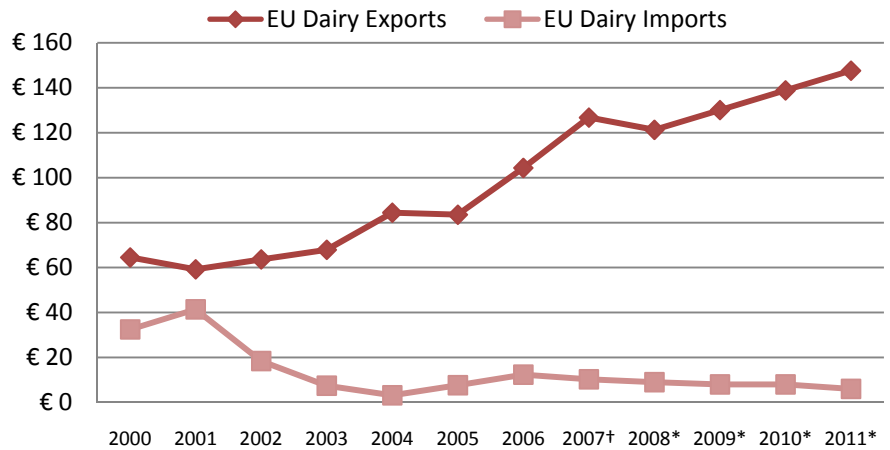


Source: Eurostat

Domestic dairy and meat production in China will continue to increase to meet growing demand. Exports of meat from China to the EU will follow a downward trend as the gap between domestic supply and demand begins to shrink (see **Figure 8**). The pace of domestic consumption could slow in the short-run, however, as high levels of "agflation" are likely to cut into gains in annual income. This could have a positive impact on meat exports overall. The dairy sub-sector should experience an overall increase both in trade volume as well as foreign investment (see **Figure 9**). The capital intensive nature of milk production, along with the quality and variety of dairy products available for export in the EU, makes it likely that EU producers will find a growing market for their dairy imports in China. Moreover, given the relatively underdeveloped state of dairy production in China, it is likely that foreign investment will also increase as foreign firms bid to enter China's domestic dairy market. Given that dairy producers in the EU have been producing below capacity for years due to

milk production quotas that have tamped down dairy prices, dairy imports from China will likely consist almost entirely of honey and limited quantities of indigenous edible animal products.

Figure 9: EU-China Dairy Trade (millions)



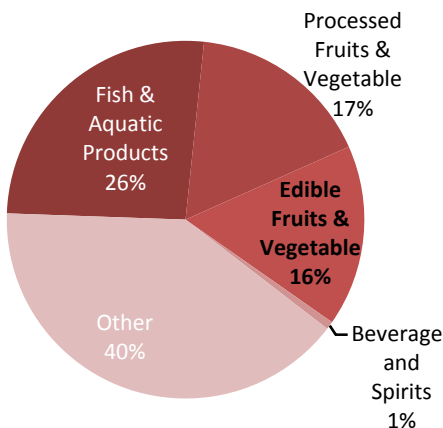
Source: Eurostat

Fish & Aquaculture

China is the world’s largest exporter of seafood. In 2005, China produced over 45 million tonnes of fish, and, in 2004, was the source of close to 70% of total worldwide aquaculture production¹⁹. Consequently, China has the largest fishing fleet in the world, boasting a marine fishing fleet of close to 514,000 vessels as of 2005, and employs 13 million people in its aquaculture and fishing industry. China’s capture fisheries produced over 16.9 million tonnes in 2004 valued at approximately US\$46 million²⁰. The seafood market is exceptionally broad with marine capture fisheries targeting over 100 species for consumption and export including hairtail, anchovy, and mackerel. In addition to capture fisheries, the aquaculture industry contributes an even greater proportion to overall tonnage of seafood output; aquaculture firms produced over 30 million tonnes of seafood in 2004. Though overall output is significantly less, fisheries and aquaculture represents an important part of the EU’s agricultural sector. In 2005, the EU’s capture fishery output topped 5.6 million tonnes.²¹ The European Union’s combined marine fishing fleet is approximately one third the size of the Chinese fleet.

Seafood represents the largest portion of the agricultural trade volume between the EU and China (See **Figure 11**). In 2007, fish, molluscs and other aquatic products represented 26% of Chinese agricultural exports to the EU. Of those aquatic exports, 69% consisted of frozen fish fillets. Overall, fish fillets represent 18% of agricultural imports from China. The demand for Chinese fish products contribute to the EU trade deficit.

Figure 10: EU Agricultural Imports from China – 2007



Source: Eurostat

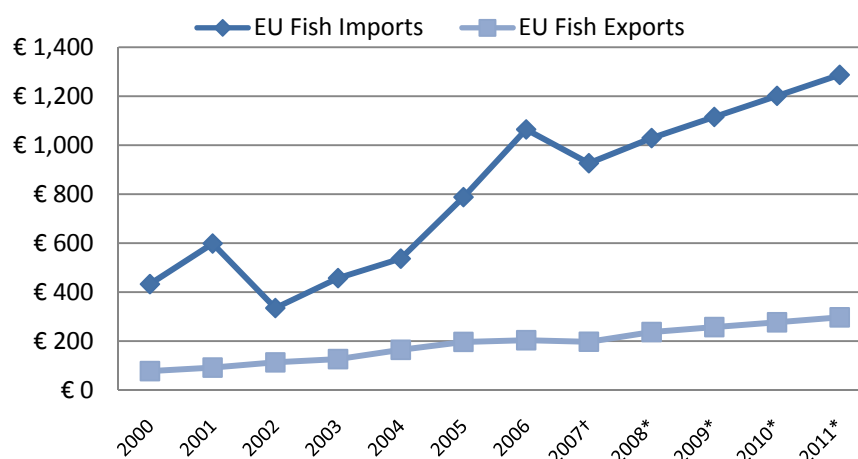
¹⁹ FAO - Fisheries and Aquaculture Department. The State of World Fisheries and Aquaculture - 2006. Rome: Food and Agriculture Organization of the United Nations, 2006.

²⁰ Food and Agriculture Organization of the United Nations. "Fishery and Aquaculture Country Profile - China." www.fao.org. 03 June 2008 <http://www.fao.org/fishery/countrysector/FI-CP_CN/en>.

²¹ Ibid

Fish products represent the largest portion of the agricultural trade volume between the EU and China (see **Figure 11**). Europe’s demand for seafood has spurred a rapid increase in fish imports over the last three years. In 2003, just over €450 million of fish and aquatic products were imported from China; in 2006 that number spiked to over €1 billion. The overwhelming majority of that volume is represented by frozen fish filets. In fact, 18% of agricultural imports from China to the EU are frozen fish filets.²²

Figure 11: EU-China Fish Trade (millions)



Source: Eurostat

Contributing to the EU’s large appetite for fish imports is the fatigued state of Europe’s domestic waters. The lakes and oceans of the European continent have suffered from overfishing and low fish populations. Commercial fishing fleets have had to venture further and further to gather profitable catches. These factors alone would indicate an impending downturn in the domestic fishing industry. However, improvements in international transportation technology and efficiency, namely cheaper air freight rates, have essentially globalised the fish trade.²³ Fish of almost any species from almost any ocean can be transported at competitive rates to almost any market in the world. In this market environment, sustainability has become an issue of great interest to EU policy-makers and environmental organisations. There are instances where African leaders have oversold fishing rights to their coastal waters threatening the long-term survival of local fishing populations.²⁴

The European Commission is making strident efforts to curb illegal fish imports. Most of the illegal fish that enter Europe come through the Canary Islands customs facilities where the inspection process is more lax. Once an illegal catch has entered the Canary Islands, they can be shipped anywhere throughout the EU without further scrutiny. A report by the EU’s Court of Auditors confirms that some member states are not doing enough to ensure that the documentation reporting the origin of imported fish is accurate.²⁵

²² Eurostat, 2007

²³ Lafranier, S. Europe Takes Africa's Fish, and Migrants Follow. New York Times, 14 January 2008

²⁴ Ibid

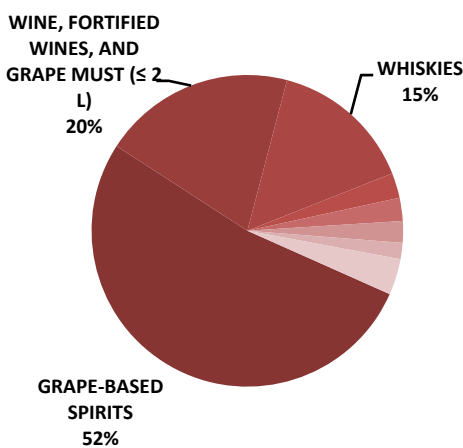
²⁵ Special Report No 7/2007 on the control, inspection and sanction systems relating to the rules on conservation of Community fisheries resources together with the Commission’s replies. Official Journal of the European Union, Court of Auditors

Despite recent scrutiny China has faced concerning food safety, seafood is likely to remain a lucrative export for China. Moreover, demand is likely to remain high in Europe, as EC regulators encourage greater vigilance from member states to curb illegal fish imports. Prices are likely to increase as illegal supplies dwindle.

Current trends suggest that European demand for fish is unlikely to subside; however, greater scrutiny of catch origins and stricter enforcement of member state import quotas is likely, which may have a significant impact on EU fish imports. Fish fillets will continue as China’s biggest agricultural export to the EU.

In terms of non-tariff barriers, SPS and TBT persist as serious challenges in the agricultural sector. The biggest concerns for producers and consumers, both domestic and international, are safety and sanitation. SPS and TBT persist as serious challenges in the agricultural sector. Fisheries in Fujian province are suffering from water shortages and water contamination from sewage and agricultural runoff. The pollutants in the water the fish farms occupy pose a serious threat to the fish and could potentially reduce the output of these farms. To counteract the risks of the tainted water, fish farmers are known to add veterinary drugs and pesticides. This extends the life of the fish, but these additives remain in the fish even after they have reached the market. These chemicals are known carcinogens and can cause serious liver damage. In 2007, the US banned several species of fish imports from China after discovering trace elements of these chemicals in shipments. While the Chinese government is making strident efforts to curb these threats, European exporters complain of an excessively long and complex customs process and an excessive and inconsistent SPS process that does not take into account safety approval from exporting countries. Moreover, EU exporters consistently cite irrational health and certification standards that slow the entry of European products into the Chinese market. A corollary of this concern is that these same standards will not apply to domestic firms and producers. Chinese producers complain of stringent technical barriers that disproportionately impact Chinese goods. China’s Ministry of Commerce estimated, after an extensive study, that approximately 90% of China’s food and agricultural exports were negatively impacted by technical trade barriers resulting in losses of over US\$9 billion in 2002 for Chinese producers.²⁶

Figure 12: EU Beverage Exports to China – 2007



Source: Eurostat

Wine & Spirits

The alcoholic beverages market in China, on the other hand, is valued at approximately US\$44 billion as of 2007. According to sales, demand is highest for beers, ciders and other flavoured alcoholic beverages. Wines, which represent a substantially smaller portion of the market, are nonetheless valued at to US\$4.5 billion dollars for 2006.²⁷ Fortified wines represent the EU’s biggest export in this sub-sector. Production of wine and spirits in China is increasing; however, tastes and preferences in the market are changing. Domestic wine production in China is catching up with international producers, having grown by 81% between 1994 and 2005 while production in France

²⁶ Yan, M. Ministry sounds warning on trade barriers against China. China Daily, 11 June 2003

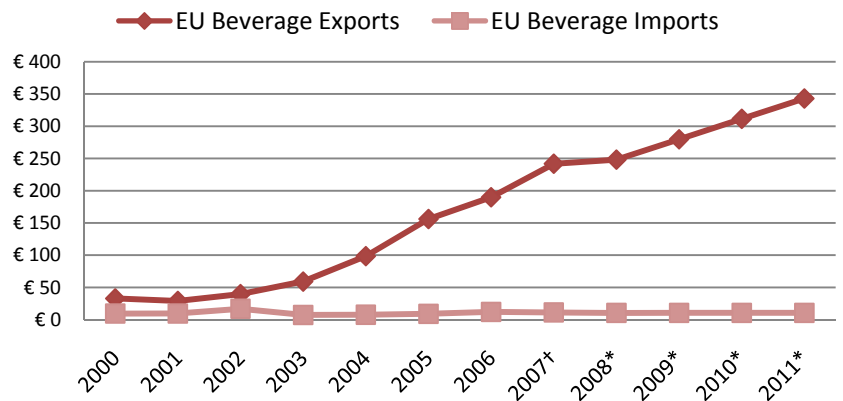
²⁷ Industry Profile: Wine Market in China 2007, Datamonitor, November 2007

(Europe’s largest producer) grew by less than 1%. Notably, however, absolute production in France exceeded China’s in 2005 by nearly 10 to 1.²⁸ Flavoured and non-flavoured natural and mineral waters represent only a negligible proportion of the beverage trade between the EU and China.

Beers, ciders and other flavoured alcoholic beverages represent 75% of the alcoholic market’s value in terms of revenues. Market consumption volumes of wine in China increased at a rate of 7% per year for the period between 2002 and 2006.²⁹

Beverages, spirits and vinegar represent the largest portion of European exports to China in 2007 which continues a promising trend of rapid growth in Chinese demand in this subsector. Fortified wines are an increasingly popular import and trade increased by 35% over the previous year. In just three years, the value of beverage exports has tripled to its current level of €250 million (See **Figure 13**). The growth in EU beverage exports to China is largely buoyed by strong demand for European wines and grape-based spirits, which together accounted for 72% of beverage exports to China in 2007. While China’s demand for European brand wines and spirits is likely to remain strong in the long-term, it is steadily building its wine production capacity. In the alcohol sub-sector, brand carries a great deal of value. As there are few barriers to entry for new companies or wineries, there is a great deal of fragmentation in the market. One of the ways to distinguish a product is to build a reputation with retailers and customers. As quality and brand imaging improves, Chinese wines could capture a greater share of the domestic market, reducing import demand.

Figure 13: EU-China Beverage Trade (millions)



Source: Eurostat, EMG Analysis

²⁸ Winefacts, World Wine Production, Australian Wine and Brandy Corporation, July 2007

²⁹ Ibid

2.2. Social Significance

The social implications of agricultural policy in China are manifold. Regionally, developments in the agricultural sector affect farm income disparities. The broader repercussions of these changes are felt in off-farm employment, migration and rural poverty. Urbanisation in previously agricultural areas has also led to conflicts between farmers, developers, and government which have raised concerns about farmer's basic rights (see **Box 1**).

Box 1: Human Rights Concerns

The agricultural sector intersects with a number of human rights issues. In December 2007, 10,000 peasants in Shanxi province signed an open letter denouncing the government's policy of collective land ownership. Their chief complaint being that land allocation process implemented by local government officials suffers from extensive corruption and that farmers deprived of their land are not given proper compensation. Government response to the letter was swift and 3 of the farmers who signed the document were detained and charged with subversion. The land ownership issue raises concerns with regards to free speech and the ability of citizens to petition the government to redress grievances with government policies.

Collective land ownership further impacts biodiversity and food safety as much of the land claimed by the government is cleared for new factory construction; this exacerbates the trend of land degradation and diminishing crop yields.

Source: The Christian Science Monitor, Reuters, E.C. Economy

China's agricultural sector has assumed a different structure from that which existed over two decades ago, with the introduction of a commercialisation and market-oriented settings. Developments, as a result of policy changes to liberalise the sector, have an effect on migration, which in turn, influences demand. The impact on social welfare from changes in demand, supply and trade in the agricultural sector, which previously solely focused on producing enough for local consumption, is of major social significance.

At the current rate of economic growth in China, rising income inequality between the rural and urban populations is certain to increase. Typically, under competitive market economy conditions, the gap in income between various sectors is the major cause of labour movement. The current challenge facing China relates to shifting its huge surplus of rural labour to the non-agricultural and industrial sector. This policy has contributed to the increasing urban-rural income divide and exacerbated by the family registration system.

As the movement of labour from rural to urban areas increases, these migration patterns have had significant implications for income redistribution. The shift of labour from the agricultural sector to the non-agricultural sector can boost the income levels of surplus labour, boosting further growth, especially in light of China's priorities in the industrial sector. Population movement between regions will not be uniform, and the typical destinations of rural workers have been to Shanghai, Beijing and Guangdong Provinces. The areas that are witnessing a decline in workforce are increasingly diverse, but commonly dominated by the agricultural sector. To encourage and facilitate this migration process, the Chinese government has implemented the "Sunshine Project" which will offer job training to farmers to help them transition to positions in non-agricultural sectors.

The movement of labour, while beneficial to industrial productivity during a 'boom' period, cannot be decoupled when the urban and non-agricultural sectors face increasing unemployment. Economic development leads to the structural movement of labour between industries and regions, but the Chinese government needs to ensure sufficient social safety nets to mitigate the ill-effects of mass movement within a large country, which is still adjusting to a new economic and social landscape.

In addition to changes in employment trends and the growing rural-urban divide, rising food prices in China, as a result of inflation is a particular concern. For instance, pork prices increased by 63.4% in February 2008, whereas overall

consumer inflation went up by 8.7% in the same month.³⁰ Household income growth has not grown correspondingly, resulting in downward pressure on those whose real wages have remained stagnant. As part of China's 11th Five-Year Plan for agricultural development, Chinese Premier Wen Jiabao has reiterated the importance of farming, and has asked local governments to put into effect the minimum-price policy with the intention of protecting farmers' incomes. As part of the Five-Year Plan, the following initiatives are intended:³¹

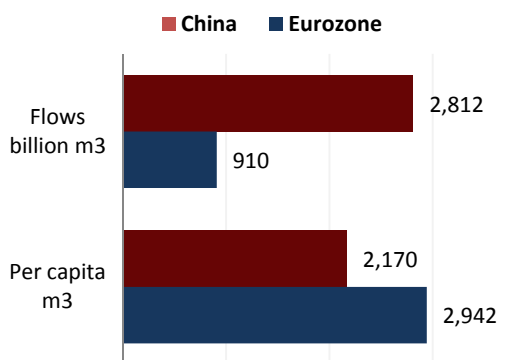
1. Plans to increase annual grain production to 500 million tons and keep farm incomes growing at an annual rate of five percent over the next five years.
2. Goals of efficient distribution for continued increase in farm incomes and harmonious rural development.
3. Emphasis on curbing the widening disparity between rural and urban areas by developing commercial farming and urban migration.
4. Aims to create 2.5 million jobs annually in rural enterprises, and five million farmers will find new jobs in cities.
5. China's cropland is expected to be at least 103.33 million hectares.
6. The output of cotton is predicted to reach 6.8 million tons, oil 32 million tons and sugar crops 120 million tons.
7. Steady growth is also expected in the other major products, including vegetables, fruit, meat, eggs and milk.

2.3. Environmental Significance

The accelerating growth in production in the agricultural sector, driven by the expanding meat and dairy sub-sector, and an increased demand for grain, is putting a serious strain on China's water supply, especially in the north-eastern provinces where most grain production is centralised. The government's insistence on grain self-sufficiency has pushed some areas of China to the verge of a water crisis, driven both by excessive overall water use as well as inefficient use of agro-chemicals such as fertilisers and pesticides.

Growing water use in the sector further exacerbates an already serious water shortage in China. At 2,170 cubic meters per capita, water resources in China are less than 28% of the world average, and are expected to decline to 1,760 cubic meters per capita by 2030, driven both by growing water use and a burgeoning population. Notably, this is dangerously close to the internationally recognised "water-shortage benchmark" of 1,700 cubic meters per capita.³² Further exacerbating China's water dilemma is the uneven distribution of water resources, with 25% located in the "Humid South" despite the North's 60% claim of total Chinese cropland, with high risk areas concentrated along the middle and lower Huang River (Yellow River) and the Huai and Hai watersheds.³³ Approximately 169 million Chinese depend on the Huai River, 122 million on the Hai River, and 107 million on the Huang River for

Figure 14: Renewable Freshwater Resources in China and Europe



Source: World Bank

³⁰ 'Breath-taking Inflation', China Daily, 12 March 2008

³¹ China's 11th Five-Year Plan, 3 August 2006, http://www.gov.cn/english/2006-08/03/content_353947.htm

³² 'Water Resources Set to Reach Critical Levels', People's Daily, 5 June 2002

³³ China Water Resources Bulletin, Ministry of Water Resources, Beijing, 2002

their water needs.³⁴ For comparison, in the Euro zone, water resources are estimated at approximately 2,942 cubic meters per capita, and are more equitably distributed in Europe than in China (see **Figure 14**).

In a bid to confront the water scarcity problem proactively, the government approved and is currently constructing a vast South-North Water Transfer project that, once completed, will pump in excess of 12 trillion gallons of water from the Yangtze River Delta to Northern provinces. However, this project is not expected to be completed until 2050 and has also received criticism regarding environment cleanup and displacement of large populations and does not address key water policy reforms regarding the improvement in the efficiency of water deliver; increasing water reuse (including better pollution control and large scale investment in water treatment facilities); and raising the price of water to its approximate true economic value. Growing grain requires a great deal of water compared with other crops. Turning to the world market to meet some of its grain needs would go a long way towards slowing the water depletion in Northern provinces. If grain production continues at its current pace, some provinces, especially in the North China Plain, will have to contend with decreasing levels of underground water.

Complicating the problems inherent in China's current and expected water shortages are the consequences of ongoing global climate change as a result of sustained CO₂ emissions. Studies have indicated that as temperatures rise across China and the world, current regions of arable land will shift in unpredictable ways, creating both winners and losers in agriculture. Modelling suggests that climate change without CO₂ fertilization could reduce yields of rice, maize, and wheat in China by up to 37% in the next 20 to 80 years.³⁵ By 2100 temperatures are expected to rise by up to 4°C across China, while increased CO₂ in the atmosphere is expected to have a conflicting effect on agricultural output.³⁶ The amount of CO₂ which plants have available in the atmosphere is a key determinant in overall fertility in growth, leading to uncertainty from experts as to whether climate change via CO₂ emissions will in fact bolster or reduce crop yields globally and in China. Under a potential positive scenario, wherein the CO₂ fertilization effects exceed the loss of arable land, wheat crops are expected to grow by 40.3%, cotton yields by 55.6%, and rice yields by 7.8%. Under a scenario wherein CO₂ fertilization effects do not exceed the loss of arable land, crop yields in wheat may decline by as much as 21.7% and rice by 21.5%. Notably cotton yields are again expected to grow by 46.9%.³⁷ Within these scenarios provinces such as Hubei, Sichuan, Hunan and Jiangxi are expected to experience strong growth while the North China Plain and Shanxi are expected to experience output declines. These findings highlight that the impacts of climate change will create both difficulties and opportunities for farmers in China, and require holistic preparation and adjustment mechanisms to ensure that issues such as rural

³⁴ Huanghe Water Resource Protection Bureau, Ministry of Water Resource, 1997;

Hai River Commission, Ministry of Water Resource, 1998;

Huai He River Commission, Ministry of Water Resource, 2004;

Note: Due to the relatively close proximity of the Hai and Huang Rivers their dependent populations may not be mutually exclusive

³⁵ Investigating the impacts of climate change on Chinese agriculture, China-UK Collaboration Project, 2004

³⁶ Ibid

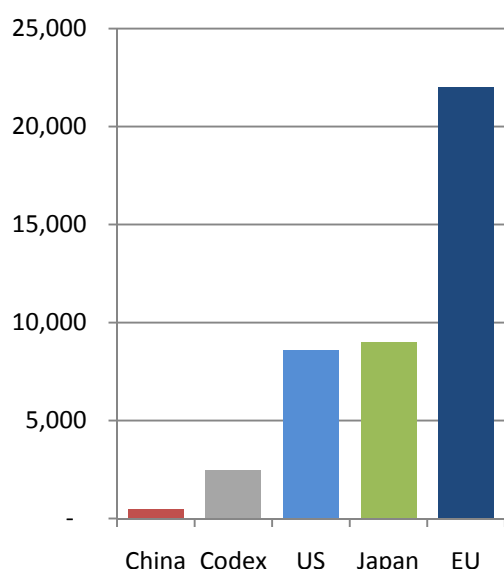
³⁷ Ibid

poverty, food security, income distribution and agricultural management are enhanced rather than diminished by climate change.

2.4. Regulatory Issues

Within the agricultural sector regulatory issues have been of particular importance in recent years of growing global food trade. These issues have been particularly pertinent with regards to sanitary and phytosanitary (SPS). Article 20 of the World Trade Organisation’s General Agreement on Tariffs and Trade allows governments to enforce health and safety related standards in order to ensure the protection of human, animal or plant health.³⁸ The WTO’s Sanitary and Phytosanitary Measures Agreement further defines a framework of basic rules to guide nations in forming their SPS standards and regulations. This framework stipulates that while trade may be limited on the grounds of safety and health, the criteria which is used must be based on scientific justification and may not be applied in a discriminatory way to different countries.³⁹ Notably, the agreement does allow countries to apply their own individual set of standards; however, it does require that importing countries recognise the exporting countries standards and certification where there is a demonstrable equivalence of de facto standards. According to Dr. Cheng, Deputy Director General of the Institute of Market Economy at the Development Research Centre (DRC) of the State Council, China is intensifying efforts to strengthen the communication and cooperation with international certification organisations to promote a universally recognized international certification of agricultural products. Furthermore, advanced notice is required prior to a change in standards, to be provided by a designated national entry point.

Figure 15: Pesticide Regulations in China and Key Trade Partners



Source: Dong, Fengxia; Jensen, Helen, Challenges for China’s Agricultural Exports: Compliance with Sanitary and Phytosanitary Measures, Choices Magazine, 1st Quarter 2007

Following ascension into the WTO in 2001, Chinese farmers expected significant growth in their export potential. While exports from China have grown in absolute terms, as much as 90% of China’s agricultural exports are adversely affected by SPS or similar export barriers, at an estimate annual cost of US\$9 billion.⁴⁰ Generally, the application of stringent SPS standards, which can include costly certification and traceability programs, is more frequent in developed nations as opposed to developing nations.⁴¹ While the European Union (41%) accounted for the majority Chinese trade losses due to SPS issues in 2002 (as estimated by the Chinese Ministry of Commerce), Japan (30%) and the United States (24%) also constituted significant portions of total trade losses in this area.⁴² In 2007 Chinese sectors especially susceptible to SPS issues included seafood, vegetables and fruits, tea, honey, poultry meats, and red meats, primarily due to excessive pesticide use, low hygienic standards, contamination by heavy metals and other hazardous substances, and misuse of additives and veterinary drugs.⁴³ In 2001, pesticide use in China averaged 14 kilograms per hectare, twice the developed country average, with 1/3 of

³⁸ Understanding the WTO: Standards and Safety, World Trade Organisation, Available at: http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm4_e.htm

³⁹ Ibid

⁴⁰ Dong, Fengxia; Jensen, Helen, Challenges for China’s Agricultural Exports: Compliance with Sanitary and Phytosanitary Measures, Choices Magazine, 1st Quarter 2007, Available at: <http://www.choicesmagazine.org/2007-1/foodchains/2007-1-04.htm>

⁴¹ Ibid

⁴² Ibid

⁴³ Ibid

sampled agricultural products exceeding pesticide residue limits.⁴⁴ Meanwhile, up to 10% of crops in 2000 were contaminated with excessive levels of heavy metals. In various studies in 2002, between 10% and 14% of sampled additives and feed were substandard, with 2% to 5% containing prohibited veterinary drugs.⁴⁵

SPS issues in China partly stem from a regulatory environment which still has not grown in step with China's rapid economic expansion. Agricultural standards in China are determined through an opaque cooperation between 10 government ministries, with managerial and technical capacity limited, particularly in the area of compliance and enforcement. Limited managerial capacity and manpower at local levels impedes on enforcement and compliance measures. The high cost of SPS compliance is viewed as a significant barrier which low income farmers are unlikely to invest in without regulatory oversight and guidance. As a result China only has far fewer SPS standards than developed nations. Low technical capacity limits the government's ability in crafting new and appropriate regulations. For example, China is estimated to only maintain approximately 500 pesticide-use standards, approximately 2% of the EU's 22,000 (see **Figure 15**). Furthermore, of these 500 standards, less than 20% meet standards set out by the Food and Agricultural Organisation's Codex Alimentarius Commission (Codex).

Meanwhile, European agricultural exporters also face barriers in bringing their products to market in China. Although mandated within the general WTO framework, China generally does not recognise competent export authorities based on demonstrable equivalence of applied SPS standards, rather requiring approval on a case by case basis. This increases the cost of certification significantly, and long lag times before first inspection visits can greatly limit exporters potential.⁴⁶ Furthermore, Chinese authorities are quick to impose new restrictions and regulations following disease outbreaks in trade partners, including the EU. While this response is within China's rights, reduction of these trade barriers often occurs long after reasonable safety and health standards have been re-established.⁴⁷ Finally, the lack of cohesion within AQSIQ's national office and provincial and county based authorities creates an environment of inconsistent application of standards, causing uncertainty on the part of European exporters in regard to the standards against which their products will be inspected.⁴⁸

⁴⁴ Dong, Fengxia; Jensen, Helen, The Challenge of Conforming to Sanitary and Phytosanitary Measures for China's Agricultural Exports, MATRIC Working Paper 04-MWP 8, March 2004

⁴⁵ Ibid

⁴⁶ China SPS Export Discussion Paper, European Commission Directorate-General for Trade, 10 July 2006

⁴⁷ Ibid

⁴⁸ Ibid

Table 1: Impacts Summary Table Legend

(↑)↑	(Strong) positive impact
□	Negligible impact
(↓)↓	(Strong) negative impact
↓↑	Mixed impacts
(+)+	(Strongly) positive existing conditions
0	Neutral existing conditions
(-)-	(Strongly) negative conditions
⊕	Localised impacts
⊙	Moderately diffuse impacts
⊗	Highly diffuse impacts
L	Low capacity to change via policy
M	Moderate capacity to change via policy
H	High capacity to change via policy

Table 2: Sector Scenario Parameters

	Tariffs and NTBs reductions	Exchange Rate
	Multilateral	
Baseline with DDA	10%	-
DDA Modest	25%	-
DDA Ambitious	75%	-
Structural Change only	-	-
DDA Modest with Structural Change	25%	10%
DDA Ambitious with Structural Change	75%	10%

Table 3: Chinese Structural Change used in Projection Scenarios

Agriculture	Supply	Demand
Dairy Products	38%	37%
Meat Products	20%	20%
Fish and Aquaculture	15%	18%
Grains and Cereals	0%	0%
Fruit & Vegetables	9%	11%
Beverages, Wines & Spirits	23%	23%

3. PCA Scenarios

The studies in this section utilise quantitative modelling results, which are then used to qualitatively assess the impacts of a PCA between the EU and China within the themes of economics, society and environment. Finally, summary tables are provided which provide a visual guide to the overall economic, social, and environmental impacts of liberalisation specific to each sector and should be read using the legend provided in **Table 1**. These impacts are addressed in the **Final Report** with an early provision of possible flanking measures, i.e. policy recommendations, which provide negotiators and stakeholders alike with a number of potential options to address both positive and negative impacts.

Liberalisation Scenarios

While the PCA is not designed to be a means of traditional trade liberalisation, i.e. of bilateral or multilateral tariff reductions, it is possible that it may include provisions which assist with the reduction of behind the border barriers, with benefits accruing multilaterally similar to the possibility of a successful Doha Development Agenda. To simulate the impacts of this liberalisation six scenarios have been devised and applied to each sector.

Three types of medium-run experiments were run. Medium-run is taken to be a three year period during which the assumed structural changes take place and the effects of changes in the policy environment on protection and the real exchange rate apply. The first three experiments relate to shallow integration under the DDA with an unchanged real exchange rate. The three experiments shown in **Table 2** were DDA Baseline (10% cut), DDA Modest (25% cut), and DDA Ambitious (75% cut). Second, and more speculatively, a set of medium run projections of domestic demand growth and possible supply curve shift for import competing production and export production were run to obtain a consistent set of projections of imports, domestic production and domestic demand. The same supply curve shifts were applied on the export side.

Economic Impact

Overall, the results indicate that the agricultural sector in both the EU and China would receive a substantial boost from a PCA that deepens trade liberalisation. Liberalisation in the agriculture sector, specifically in the EU and in China, would entail the reduction or elimination of production quotas and export taxes as well as more transparent SPS and product certification enforcement. This would have an overall positive impact on both the economies of the EU and China. Economic gains would be made from liberalisation of trade between the EU and China, with demand rising for agricultural products even under a modest liberalisation scenario. Chinese production in the five key sub-sectors would see a nominal decline (less than 1%); however, there would be a substantial increase in EU-China trade activity following modest trade liberalisation. Chinese imports of EU products would increase an average of 15%, with the bulk of those gains would favour the dairy subsector. Export trends in the EU

Table 4: Domestically Produced Supply under a Modest DDA

% Δ Domestically Produced Supply	
Dairy Products	-0.414
Meat Products	-0.061
Fish and Aquaculture	-0.302
Grains and Cereals	-0.342
Fruit & Vegetables	-0.035
Beverages, Wines & Spirits	-0.037

suggest that farmers in France and the Netherlands would see the biggest proportion of those gains. EU imports of Chinese products would increase an average of 4.30% with the biggest increase being in the fruits and vegetables and grains subsectors.

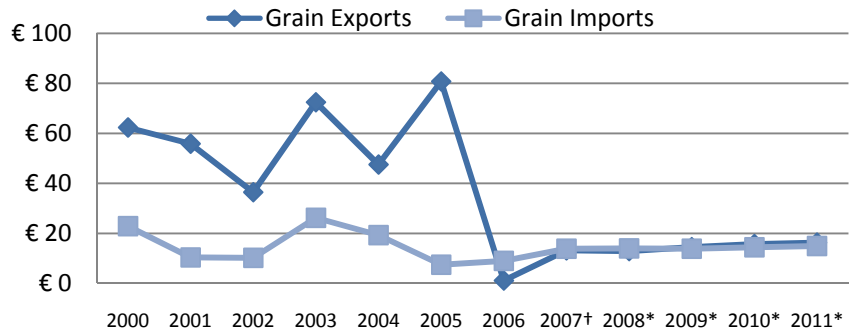
If progress on the Doha Development Agenda continues as projected (this scenario is defined as a 10% reduction in tariffs and other non-tariff barriers), exports to the EU would increase across all agriculture sub-sectors by an average of 1.66%. However, a modest liberalisation of trade (which in the model is defined as a 25% reduction in tariffs and non-tariff barriers) would, in almost every sub-sector, triple these potential gains. Imports of EU agricultural goods would see similar gains in trade. Dairy, fruits and vegetables, and wines and spirits would all see double digit growth with modest liberalisation; an ambitious liberalisation would more than double these gains. Dairy imports from the EU would see the most substantial improvement in this scenario. The meat and seafood subsectors would experience more modest gains but would still benefit from double digit growth in exports with ambitious liberalisation. EU exports under a modest liberalisation scenario would see the biggest share of growth. With the reduction in trade barriers, EU goods would be more competitive with domestically produced goods in China. This scenario could yield two potential outcomes: increased imports could pose stiff competition to domestically produced goods which could lead to a modest contraction in domestic production of agricultural goods (see **Table 4**); the increased competition might also spur producers to adopt more efficient and cost-effective production and might lead to an acceleration in foreign investment and technology transfer. Lower trade barriers would mean that Chinese food companies would have access to not only to the domestic market but wider international markets.

Under the ambitious liberalisation scenario (defined in the model as a 75% reduction in tariff and non-tariff barriers) there would be a much stronger impact on trade activity. EU exports in the dairy and fruits and vegetables sectors would again enjoy most of the benefit. There will likely be some friction between economic policy and environmental protection in the medium-term, constraining trade expansion in the grain sector. Grain crops are particularly demanding on arable land and water resources and China faces potential shortages in both. In order to feed the expansion of the meat and dairy sectors, which are closely tied to developments in the grain sector, China will likely have to increase the amount and types of grains imported.

Ambitious liberalisation will have a substantial impact on China's dairy and grains imports; dairy imports would jump by 149% while grains and cereal imports would increase by over 300% will also have a significant impact on meat and dairy food prices. Demand for livestock feed will remain high, thus pushing up dairy and meat prices (see **Figure 16**). This will extend the recent trend of food price inflation in China.

On the EU side, Member States with strong dairy sectors stand to gain the most. Thus curbing dairy production quotas in France, for instance, coupled with more transparent SPS regulations in China, would fuel a stronger trade relationship within the dairy sector. Lowering production quotas would allow farmers to take advantage of rising global food prices and to export greater quantities of whey and cheese to China. China is already a global leader in honey production and exports; and it will continue to be a resilient export

Figure 16: Trade Activity in Grain Sector following Modest Liberalisation (millions)

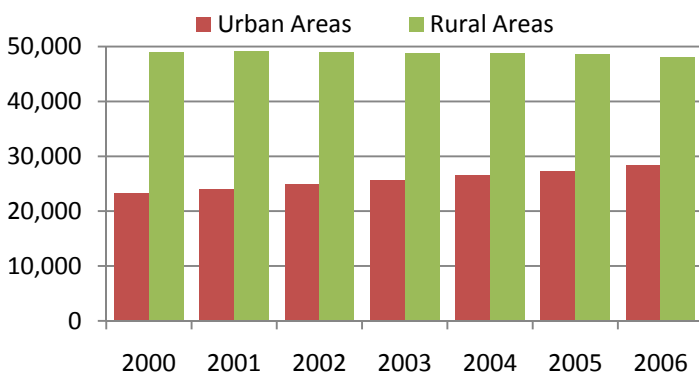


Source: EMG Analysis

Social Impact

Liberalisation will likely have nationwide and region-wide impacts in China and the EU. Some provinces in China and member states of the EU will enjoy a greater share of the benefits while others will carry a larger share of the negative impacts. In the grains sector for example, China’s northeast provinces produce over 50% of the wheat consumed and exported by China. Policy changes that impact water supply or export limits may have positive impacts on the overall economy, but could have disproportionate consequences for farmers in these provinces. In the EU, member states with particular interests in the dairy sector, who have trade barriers in place to protect the industry, will likely reap benefits in the short term from opening up the market and relieving production quotas, but would expose themselves to price volatility in the global market.

Figure 17: Chinese Employees by Area (x 10,000)



In terms of labour in the agricultural sector, modest liberalisation would, in the short run, likely reduce demand for labour in the rural areas as agriculture production would see a modest decline. Labour migration is a high priority for Chinese policy makers as a high proportion of labour is employed in rural areas (see Figure 17). The Chinese government is already implementing initiatives such as the “Sunshine Project” to spur the movement of labour from the rural areas to the urban centres. The data suggests that the pace of

this labour transition could be accelerated by trade liberalisation.

Rural employment will steadily decline as global food prices stabilise and foreign investment and technology transfers increase efficiency in the agricultural sectors. If the surplus labour created by the decline in agricultural productivity is not absorbed quickly enough by other sectors, there could be a negative impact on efforts to improve income distribution. This problem is compounded by rising food prices. If “agflation” trends continue, the real income gap will likely widen as lower-income households will be spending a greater proportion of earnings on food. There is the potential, however, if consumption and productivity projections prove accurate, that the agricultural sector could actually see an expansion in the medium term (see **Table 5**).

Table 5: Ambitious Liberalisation Accounting for High Projected Growth in Demand and Productivity

Domestically Produced Supply	
Dairy Products	33.656
Meat Products	19.353
Fish and Aquaculture	13.136
Grains and Cereals	-2.613
Fruit & Vegetables	9.374
Beverages, Wines & Spirits	-32.208

Environmental Impact

On the environmental side, there is friction between policy and economic drivers. Data from the model suggests that any level of liberalisation would increase imports and reduce domestically produced supply in all subsectors. Grain production, however, remains the most stable of all the subsectors. Even under an ambitious liberalisation scenario, production of grains and cereals would fall by only .095%. As barriers to trade are reduced, there will be more incentive for grain producers to increase output to sell more to the global market. However, water scarcity and land degradation, regardless of the extent of trade barriers, will remain a serious long-term concern for the Chinese government. There will likely be limits on the amount of land that can be cultivated for farming and some land could be transitioned from farm to forest land to reduce soil erosion and slow desertification.

Reduced production and allocation of land for farming is a prudent course of action under the modest and ambitious liberalisation scenarios, however, historical trends in consumption and productivity growth in China suggest that this may not be feasible. The model scenario is based on the assumption that consumption and productivity in China will increase by 60%. Under this assumption, production in an ambitious liberalisation scenario (scenario 6) rather than decreasing modestly increases rather dramatically (see **Table 5**). This has serious implications for Chinese government’s efforts to confront the water scarcity and land degradation issues.

Table 6: PCA Summary Impacts Table – Agriculture (China)

Indicator	Existing Conditions	Scenario Impacts		Policy Options	
		Overall Direction Magnitude	Equity	Reversibility	Capacity to change
Economic	0	↑	⊙		H
Imports	-	↑↑	⊙	N	H
Exports	++	↑	⊙	N	H
Production	+	↓	⊕	N	H
Demand	0	↑	⊕	Y	M
Social	0	↓	⊙		M
Employment in Ag Sector	+	↓	⊙	Y	M
Self-Sufficient food production	+	↓	⊙	Y	H
Income Distribution	-	↑	⊕	Y	M
Environment	-	↓↑	⊙		H
Water Supply	-	↓↑	⊙	Y	H
Drinking Water	0	↓↑	⊙	Y	H
Land Degradation	-	↓↑	⊙	Y	H

Table 7: PCA Summary Impacts Table – Agriculture (EU)

Indicator	Existing Conditions	Scenario Impacts		Policy Options	
		Overall Direction Magnitude	Equity	Reversibility	Capacity to change
Economic	+	↑	⊙		H
Imports	+	↑	⊙	N	M
Exports	++	↑↑	⊕	N	H
Production	+	↑↑	⊕	N	H
Demand	+	↓↑	⊙	Y	L
Social	+	↑	⊙		M
Employment in Ag Sector	+	↑	⊙	Y	M

Bibliography

- Agriculture: Main Statistics 2005-2006. Eurostat, 2007
- Anderlini, J. Beijing to tax grain exporters. *Financial Times*, p. 2, 31 December 2007
- Anderson, K. "Wine's New World", *Foreign Policy*, No 136, 2003
- The Agenda for Agriculture-based Countries of Sub-Saharan Africa - <http://go.worldbank.org/4YRDYW0J60>
- Bender, A. Meat and Meat Products in Human Nutrition in Developing Countries, Food and Agriculture Organization, 1992
- Bounds, A. Brussels' own scientists cast doubt on EU biofuel strategy. *Financial Times*, p. 1. January 18 2008
- 'Breath-taking Inflation', *China Daily*, 12 March 2008
- China SPS Export Discussion Paper, European Commission Directorate-General for Trade, 10 July 2006
- China Statistical Yearbook 2006
- China's 11th Five-Year Plan, 3 August 2006, http://www.gov.cn/english/2006-08/03/content_353947.htm
- China Water Resources Bulletin, Ministry of Water Resources, Beijing, 2002
- Cox and Zhu, Dairy: Assessing World Markets And Policy Reforms: Implications For Developing Countries
- Dong, Fengxia; Jensen, Helen, Challenges for China's Agricultural Exports: Compliance with Sanitary and Phytosanitary Measures, *Choices Magazine*, 1st Quarter 2007, Available at: <http://www.choicesmagazine.org/2007-1/foodchains/2007-1-04.htm>
- Dong, Fengxia; Jensen, Helen, The Challenge of Conforming to Sanitary and Phytosanitary Measures for China's Agricultural Exports, MATRIC Working Paper 04-MWP 8, March 2004
- Economy, E. C. The Great Leap Backward? *Foreign Affairs*, September/October 2007
- FAO - Food Outlook: Global Market Analysis, 2007
- Fuller et al - Got milk? The rapid rise of China's dairy sector and its future prospects, *Food Policy* Vol 31, June 2006
- Ford, P. *China's Farmers Protest a Key Mao Tenet*. *The Christian Science Monitor*, 22 January 2008
- Hai River Commission, Ministry of Water Resource, 1998;
- Huai He River Commission, Ministry of Water Resource, 2004

Huanghe Water Resource Protection Bureau, Ministry of Water Resource, 1997

Indian state bans poultry trade to curb bird flu, Reuters, 5 February 2008 <http://www.alertnet.org/thenews/newsdesk/ISL165028.htm>

Industry Profile: Wine Market in China 2007, Datamonitor, November 2007

Investigating the impacts of climate change on Chinese agriculture, China-UK Collaboration Project, 2004

Lafranier, S. Europe Takes Africa's Fish, and Migrants Follow. New York Times, 14 January 2008

Reuters. China detains farmers urging land privatization. 24 December 2007

Ryan, M, "Ocean Advocates Hopeful WTO Cut in Fishing Support", Reuters, 15 February 2008

Special Report No 7/2007 on the control, inspection and sanction systems relating to the rules on conservation of Community fisheries resources together with the Commission's replies. Official Journal of the European Union, Court of Auditors

Sustaining and increasing fish supply in Asia with unique multimarket model, World Fish Center, 2007

Understanding the WTO: Standards and Safety, World Trade Organisation, Available at: http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm4_e.htm

'Water Resources Set to Reach Critical Levels', People's Daily, 5 June 2002

Wang, Z et al. "Chinese consumer demand for food safety attributes in milk products", Food Policy Vol 33, 2008

WTO Trade Stats 2007

Yan, M. Ministry sounds warning on trade barriers against China. China Daily, 11 June 2003

Zou, H & Novakovic, A, The Chinese Dairy Sector: Interregional and International Trade Patterns, IATRC Symposium, Beijing, 7-9 July 2007