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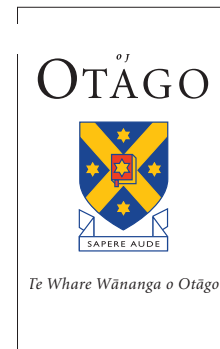
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Sustainability Trends in Emerging Markets: Market Drivers for Sustainable Consumption in China and India

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1 Executive Summary

New Zealand relies heavily on export markets for economic success. There is thus value in ensuring that New Zealand producers are aware of any likely and important trends on the global food market that may assist in maximising export value. One such trend is the recent market demand for sustainability credentials in food products, particularly in Western markets. This has been reflected at both a government and industry/retailer level as policy and legislation have been adjusted or enhanced to suit potential shifts in consumer demand for sustainability attributes in food products.

In recent times, New Zealand exporters have sought alternative markets to increase returns for their products. Currently, two major potential markets identified for New Zealand export success are inherent in two of the world's fastest-growing economies – China and India. There is also some indication that similar demands for sustainability credentials in food products may be developing amongst affluent consumers in these markets.

China represents a potential growth market for New Zealand markets, when considering rates of growth in population and economy, as well as a higher degree of urban- and Westernisation in some large cities. China is currently engaged in a free trade agreement with New Zealand, and shares many of our major trading partners, with New Zealand exporting around NZ\$977.76 million worth of dairy, eggs and honey to China in 2009.

Similarly, with high rates of population and economic growth, as well as a diversifying affluent middle-class emerging, market access to India represents a real opportunity to maximise value for New Zealand exporters. Growth in trade between India and New Zealand highlights the significance of this, with New Zealand exports of milk and cream to India increasing 4,032 per cent in 2010, and New Zealand exports of butter to India increasing by around 31.7 per cent in 2010.

Current concerns for China and India alike include the protection of environmental and other attributes, as well as a rapidly growing need to mitigate poverty. These concerns have led to increased government involvement in various schemes to assist in this, with particular emphasis on the provision of food safety and security, the development of green food production and mitigation of climate change, as well as retention of foreign trade. Similarly, retailers have adjusted or enhanced aspects of their policy environments to reflect shifts in affluent consumer consciousness in China and India.

With increases in personal income and urbanisation in these regions, combined with fast-paced economic growth, China and India are currently experiencing vast increases in consumer spending. The “consumer boom” through these regions can be seen in the increasing patronage and development of supermarket chains, including US retail giant Wal-Mart's saturation of the Chinese and Indian fast-moving consumer goods markets, wherein supermarket shares in total retail sales increased from 10.2 per cent of total retail in 2009 to 13.8 per cent in 2010.

This is significantly more prominent through cities in China, but is likely to grow throughout India. Increases in consumer income and a steadily-growing Chinese and Indian middle-class are also expected to bring about a consumer response in demand for credence attributes on food products. In anticipation of growth in this segment, retailers in these countries are now adopting environmentally-friendly supply chains, with UK-based retailer Tesco receiving the “Green Supply Chain Award” for its self-owned distribution center in Jiashan (Zhejiang Province), or French retailer Carrefour’s sourcing of local products for stocking at outlets throughout China.

While the appearance of new affluent middle-class consumers in these regions is anticipated to bring about a higher degree of environmental- or ethically-conscious consumption, this must be considered within a cultural context. Food culture is highly significant to daily life throughout China and India, with both countries exhibiting a rich heritage in cuisine. In China, food is cooked with a high degree of artistry and sensitivity, with the act of cooking likened to an artistic performance. A common greeting in China directly translates to “have you eaten yet?”, and many business relations are often preceded by delicately-prepared meals. A similar emphasis on cuisine has been exhibited in India, with many traditional schools relating nutrition as a form of medicine, particularly within Ayurvedic medicine practices. However, food choices of Indian consumers have often been revealed to be tradition-specific, and many international food retailers have had to adjust their ingredients or entire menus to suit Indian tastes. Established cultural values in cuisine may potentially inhibit market access for particular New Zealand products, and caution and creativity may be required to access higher market segments.

This being considered, the dietary approach of many Chinese and Indian consumers is changing rapidly. Increased urbanisation, as well as growth in income, has led to a higher degree of food choice and new types of consumption in major cities of China and India. China’s meat consumption is increasing as culture adapts to the incidence of westernisation in many major cities, with an increase in meat consumption of 13 per cent between 2005 and 2010. Pork is currently the highest meat product in-demand in China, with consumption levels tripling since 1980. Similarly, and converse to popular opinion, India’s consumption of dairy products is increasing rapidly - 31 per cent of all milk consumption is attributed to India, with butter consumption expected to increase by over 3 per cent between 2008 and 2017. However, India’s religious affiliations (with an approximate 80 per cent Hindu population, and 37 per cent vegetarian population) may restrict this, as meat consumption still remains low at around 5.6kg meat consumed per capita in 2010.

Consumer concerns surrounding food safety are also of relatively high importance in China and India, due in part to food safety scares in relation to domestically produced foodstuffs in each country. Chinese studies have indicated that the average affluent consumer in Beijing would be willing to pay a 5 per cent premium for foods which had been assessed and certified using food safety valuation methods, with an additional high regard for food products from New Zealand being “clean and green”. Similarly, a study of Indian consumers’ perception of domestic food safety standards confirmed that 27 per cent of consumers rated domestic food safety processes as being highly ineffective, with a similar study claiming that “fair price shops” (which provide food products to India’s impoverished) often sold tainted or adulterated food products.

Sustainability concerns amongst Chinese and Indian consumers are also coming into higher prevalence. A level of interest has been observed regarding environmental quality and degradation amongst some consumer groups in both regions, with some consumers seeking to purchase products that claim to assist in mitigating climate change and enhancing environmental protection. Studies in both China and India have found that at least half of consumers in both countries are highly concerned about the incidence and negative effects of climate change, with large majorities stating that responsibility for dealing with negative climate change-related effects should be placed on government and industry parties. However, recognition of sustainability attributes remains small in both China and India, and while some grassroots movements of concerned citizens encourage and promote the use of sustainability credentials in purchase decisions, there appears to be a limited knowledge of these attributes amongst consumers in these regions.

Specifically, some sustainability attributes have yielded higher positive consumer response than others. Such attributes include production standards that ensure good stewardship of carbon and water management, organic and genetically-modified foods, protection of biodiversity, wildlife and animal welfare, and the inclusion of properties that provide more than basic nutrition in food products.

In particular, the concept of a low-carbon diet is gaining momentum in major cities of China, and many young urban consumers vie to purchase food products with lower associated carbon and Greenhouse gas emissions. This is in combination with a few civic governments' attempts to advertise and promote a low-carbon lifestyle, as has been exhibited in Beijing. In India, however, little is currently known regarding the concept of a low-carbon lifestyle, which may warrant the need for further research.

While both China and India are two of the largest providers of organic produce internationally, consumer demand for organic products remains low, with favour given to non-organic and genetically-modified (GM) products. Across several studies in China, consumers indicated that they would pay around 40 per cent more for GM goods over non-GM, while Indian studies indicated that 68 per cent of consumers would be in favour of the introduction of GM vegetables for purchase. Residue-free products, however, gain high support in India, with consumers specifying that they would be willing to pay a further 50 per cent premium on certified "residue-free" food products.

The effective use and management of water remains a constant concern across both China and India, with water access, quality and quantity issues high on the agenda. As both markets have engaged in high levels of agricultural intensification over the last century, the incidence of pesticides and other harmful agriculture-related chemicals in groundwater supplies has rendered many water reserves dangerous or inaccessible. In response, agencies across both China and India have developed water use certification labels that are attached to products that exhibit effective and efficient water management principles in production. However, little is currently known about consumer concerns regarding water use in these markets, and further research may be needed in this area.

The assurance of protection of biodiversity and wildlife in food production in China and India has shown some positive response from consumers. A study conducted in

Southern China revealed a consumer preference for pure protection of wildlife in general (43.2 per cent), or “conditional utilisation” of wildlife (43.3 per cent), suggesting that there is some consumer concern surrounding biodiversity/wildlife protection assurance. However, little is currently known about potential consumption trends relating to this in either China or India.

Similarly, protection of animal welfare in food production varies between the two markets. Chinese legislation regarding the protection of animal welfare in production is minimal, and often overlooked, with government officials admitting a need to improve policies in this area. However, Indian animal welfare is relatively sophisticated, and upheld as a cultural and spiritual value. Many Indian consumers practice ashima, a customary discipline of showing compassion to all living things, with a multitude of animal welfare and rights NGOs active across India. This suggests that product attributes which claim protection of animal welfare in production could be of high interest to Indian consumers, but of lower interest to Chinese consumers.

Lastly, a demand for foods which provide health benefits beyond basic nutrition (also known as functional and/or fortified foods) has been observed across a range of Asian markets, and has been proven to be a growth industry. The total functional and fortified foods market of China is valued at US\$6 billion annually, with cultural nutritional practices supporting a higher degree of added nutrients. Similarly, India currently promotes a broad range of “health and wellness” products, correlating positively with traditional Ayurvedic medicinal practices, wherein a holistic approach is taken to health with the inclusion of nutrition as a key component. Products such as health food drinks have shown increases in sales of up to 25 per cent annually as popular choices for functional and fortified food products.

While a relatively low level of interest has been shown by Chinese and Indian consumers in relation to sustainability and ethical attributes in food products, there is still a distinct lack of research into these areas. A higher degree of quantitative research investigating Chinese and Indian affluent consumer demand for food products which are accompanied by assurance and/or certification of sustainability and ethical attributes is required to provide a clearer image of current and expected trends. Key areas in which this research may be warranted include the acceptance and purchase of products which enhance carbon and water management and usage, protection of biodiversity, wildlife and animal welfare, public reception of organic versus genetically-modified foods and the inclusion of properties beyond basic nutrition.

2 Introduction

New Zealand, as an agricultural nation, has always relied heavily on export markets for economic success. Therefore, New Zealand producers must be aware of any likely and important trends on the global food market to maximise value.

One of the key outputs of this research is to assist NZ companies make informed decisions on possible pathways for entering these emerging markets. This report is also included in ARGOS' integrated approach to identify and value credence attributes to increase value for New Zealand exports in emerging markets, currently being undertaken as part of ARGOS 2.2 (objectives etc).

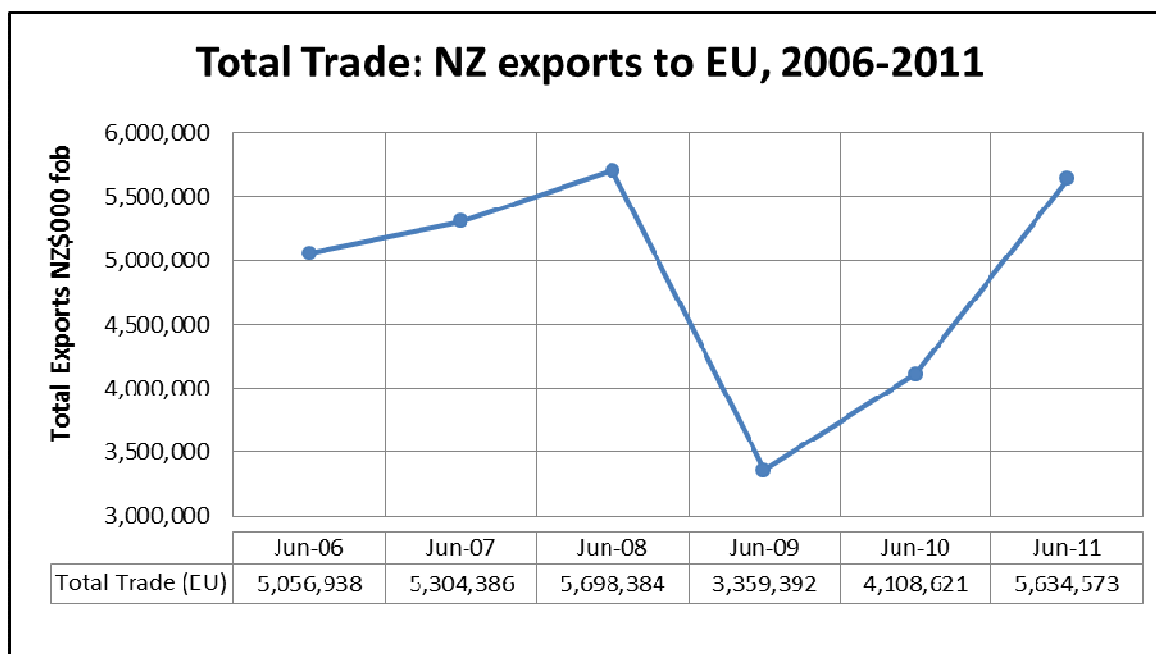
Market demands for application of environmental and social stewardship properties in production are increasing in complexity, especially when set against a broad range of attributes and issues, including those of environmental/climate change concerns (i.e. carbon footprinting, energy use, water footprinting, biodiversity) and ethical/social issues (i.e. Fair Trade, other social impacts). While consumer demands for such attributes in 1st world markets are well-established, there has been some indication that similar demands may affect the operation of developing countries, such as China and India. This is due, in part, to increases in personal income due to fast economic rates of development and growth, increasing urbanisation in many parts of these countries, and a higher degree of Westernisation, partially due to the social and cultural effects of globalisation.

To meet these demands, there has been some movement surrounding regulatory and private sector initiatives to standardise the methods by which sustainability trends are measured and described, which are now at a critical stage of development. As new information becomes available, New Zealand primary sector exporters must be informed of any potential market shifts in these emerging markets, which may significantly impact on the viability of export success. Therefore, it is crucial that a well-developed understanding of such trends and potential impacts is developed to enhance New Zealand primary industry insight, and potentially derive higher value as a result of adherence to these demands.

Traditionally, New Zealand exporters have relied upon trade to Europe (including the United Kingdom). This particular report is concerned with consumer demands for sustainability attributes in emerging markets, it is important to note that Europe is, and will continue to be, of high interest for New Zealand exports.

Interestingly, export volumes to Europe increased in late 2011 despite the European debt crisis. New Zealand's exports to the United Kingdom, Germany, the Netherlands and Italy increased by 5.3 per cent in October 2011, increasing total value for New Zealand to \$3.9 billion, with total export volumes to Europe up by 18 per cent (compared with the same period in 2010), representing around double the trade to Asia, with a higher export growth rate than China. These markets will continue to hold high importance for New Zealand exporters in creating value for New Zealand products (StatsNZ, 2011).

Table 2.1: Total Trade: NZ Exports to EU, 2006-2011



2.1 China and India

A key assumption regarding emerging markets is that importers in these regions base their economic decisions largely on price. If this is true, it is important for NZ exporters to comprehend prices, alongside other potential factors, which will provide success for NZ exports in these key markets. This report comprises one component of an integrated series approach to determining value prospects in key emerging markets for NZ exporters.

In recent times New Zealand exporters have sought alternative markets to increase value for their products. Currently two major potential markets identified for New Zealand exports are inherent in two of the world's fastest growing economies – China and India. These emerging markets are growing substantially, and represent a real value proposition for New Zealand trade. (Note: Emerging markets are defined by the World Bank as countries wherein GDP per capita is below US\$8,000 per year.) It is important to note that the attributes sought by consumers in these emerging markets do not necessarily match those of other developed economies. While the inclusion of credence attributes in products is sought on an increasing basis in the developed world, other attributes are sought highly in emerging markets.

Table 2.2: Total Trade: NZ Exports to China/India, 2006-2011

2.2 China

China is a potential growth market for New Zealand exports. The People's Republic of China currently has a population of 1.34 billion, which is expected to rise rapidly as the nation develops further. At present, the total GDP of China sits at US\$10.09 trillion (2010), with a real growth rate of 10.3 per cent. Per capita, China's GDP currently sits at \$7,600 (PPP), with agriculture making up around 10 per cent of GDP, and around 38.1 per cent of the population employed in agriculture (2008). China is also the largest export country internationally, with international trade to and from China strongly increasing (NZTE, 2010).

New Zealand currently has a free trade agreement with China, established in October 2008, which covers goods, services and financial flows. This agreement represents the first such free trade agreement between China and any other developed nation. China also shares some major trading partners with New Zealand, including the US (representing 18 per cent of Chinese trade), Hong Kong (13.8 per cent) and Japan (7.6 per cent). The trade relationship exhibited between New Zealand and China exemplifies the importance of the free trade agreement, with New Zealand exporting NZ\$977.76 million worth of dairy, eggs and honey to China in 2009, as well as NZ\$703.20m in wood, NZ\$140.52m in meat and NZ\$136.33m in seafood. Highlighting this is the fact that New Zealand's exports to China increased by 80 per cent between 2008 and 2009, and is expected to grow. Therefore, market access to China indicates a significant opportunity for New Zealand exporters of food products. Understanding consumer demands, as well as government policy and retailer requirements, will improve export success (NZTE, 2010).

2.3 India

By the same token, market access to the Indian food and beverage industry, as well as other food-related industries, represents a real opportunity for New Zealand exports. India's population is growing rapidly, with a current population of 1.2 billion people, with 65 per cent of residents under the age of 35. Food products which offer higher degrees of diversification, and from different countries of origin, are particularly popular among this younger generation of India's new emerging middle-class, particularly in urban areas (NZTE, 2011).

India's GDP for 2010 was around US\$1,538 billion, and is expected to grow to US\$1,777 billion in 2011. Increases in consumer incomes have led to an increase in consumer spending on consumption of meat, fish, fruit and vegetables per capita to the effect of US\$343.9 billion in 2010. In fact, India is currently the world's second-largest food-producing country, with the agriculture sector employing around 58 per cent of the population. The Indian food industry is expected to grow by US\$100 billion to US\$300 billion by 2015, and Indian organics are expected to grow five-fold by 2015, with exports ranging from US\$1.43 billion by 2014-2015, compared with US\$280 million in 2010-11 (NZTE, 2011).

In 2010, New Zealand exported an approximate NZ\$178 million of food and beverage products to India, representing a significant increase of 109 per cent from 2009. Additionally, exports of milk and cream from New Zealand to India increased by 4,032 per cent in 2010 and exports of butter increased by 31.7 per cent in 2009 (NZTE, 2011). With India's current status as the world's third largest emitter of CO₂, with this figure increasing annually (1,602 tonnes per capita in 2009 – an 8.7 per cent increase from 2008 (McCormick & Scruton, 2009), there is a greater pressure to adapt current environmental initiatives, while managing the challenge of maintaining or increasing GDP.

One of the key arguments against exporting goods to emerging markets over traditional export markets is the concern of relatively lower returns. This could be in conjunction with preconceptions of these markets only importing New Zealand "seconds" or by-products, such as mutton flaps. However, returns to be gained from increasing value for exports in these regions represent true significance for New Zealand exporters.

Table 2.3: NZ exports to China, India and EU, 2006-2009 (NZ\$/tonne)

	2006	2007	2008	2009	Total Volume (tonnes) (2009)
Kiwifruit					
China	2,786.34	2,374.24	2,612.39	3,143.40	48,838
EU	1,744.75	1,788.54	2,330.14	2,517.88	59,773
India	2,131.30	1,739.06	2,089.58	2,466.68	736
Skim Milk Powder					
China	3,289.33	4,426.83	5,312.56	3,186.32	61,871
EU	2,497.47	5,745.03	2,004.76	3,116.59	799
India	0.00	4,013.78	0.00	2,896.75	18
Whole Milk Powder					
China	3,298.24	4,301.25	5,914.45	3,661.65	202,712
EU	2,545.77	6,155.53	9,105.49	3,042.53	1,008
India	0.00	0.00	0.00	3,136.86	476
Sheepmeat					
China	2,872.12	2,729.55	3,250.46	4,163.18	51,376
EU	8,079.20	7,790.05	8,762.32	9,867.19	183,249
India	13,501.61	12,226.60	0.00	0.00	0

Source: FAOSTAT Database.

It is also important to note the impact of bilateral trade between these countries, and examine key commodities that are currently being imported into New Zealand from China and India. Bilateral trade relations between both China and India from New Zealand enjoy mutually beneficial relations, and these markets are currently experiencing a high turnover of goods and services through these channels.

Table 2.4: Imports from China/India to New Zealand (Top Commodities)(NZ\$000fob)

	2006	2007	2008	2009	2010	2011
India/NZ						
Medicine	6,717	9,739	13,678	33,960	39,630	46,755
Jewellery	5,791	7,511	11,306	12,517	21,588	24,040
Linen	8,602	9,345	8,864	10,230	11,010	13,960
China/NZ						
Computers	467,316	475,563	462,585	471,773	599,130	711,467
Telephones	83,3360	144,758	250,778	419,164	362,494	489,390
Televisions	81,090	123,811	225,818	173,671	156,195	117,612

Source: Statistics New Zealand. (June 2006-June 2011.) *Global New Zealand*.

Set against a food importation context, it is interesting to note the inherent differences between China and India. In general, bilateral trade between China/India and New

Zealand has increased (with the exception of the importation of televisions from China in the last 6 years), with distinct patterns identified in both nations' exports. While New Zealand imports a high degree of electrical products and technologies from China, imports from India adhere to a much different set of products, with medicine representing the largest relative increase in recent times. With this in mind, it is also interesting to note each country's top export products in order to derive a broad sense of the top production industries for exportation of goods (see Table 2.5 below).

Table 2.5: Top export products for China/India (US\$ million)

China (2009)		India (2007)	
Commodity	Value (US\$ million)	Commodity	Value (US\$ million)
Machinery and Transport Equipment	5,902,740	Gems and Jewellery	13,785.00
Miscellaneous Products	2,997,470	Petroleum (Crude)	16,889.83
Light Textile Industrial, Rubber, Mineral and Metallurgical Products	1,848,160	RMG Cotton	6,061.54
Chemicals and Related Products	620,170	Machinery and Instruments	5,839.53
Food and Live Animal Products	328,280	Drugs, Pharmaceuticals and Fine Chemicals	4,808.97

Source: China Statistics Press, 2009; Infodrive India, 2007.

Table 2.6: Imports of Food Products from China/India to New Zealand (NZ\$ vfd)

	2006	2007	2008	2009	2010
India/NZ					
Coffee & Tea	3,546,744	4,341,477	4,388,019	5,114,640	5,783,523
Fruit & Nuts	2,485,568	3,530,200	3,517,076	3,198,948	3,428,546
Cereals	1,822,372	3,406,227	4,736,624	4,951,244	3,888,047
China/NZ					
Nuts (Prepared)	26,311,831	37,142,312	42,131,864	36,737,735	32,543,776
Fish/Crustaceans	18,773,048	15,871,424	25,286,811	15,647,909	19,691,508
Sugars/Confectionary	10,162,512	12,564,655	19,475,099	15,469,664	18,090,427

Table 2.6 above presents the top food product imports from China and India to New Zealand. It is interesting to note that most imported food products from both China and India are either unavailable for domestic production or very small in comparison with Chinese and Indian production industries.

3 Government Food and Sustainability Policy

3.1 China

3.1.1 Food safety

The People's Republic of China's food safety policy is governed by the Ministry of Public Health, who oversee the country's main food safety regulation arbiter, the Institute of Food Safety Control and Inspection. Policies relating to quality and safety of agricultural and other food products are legislated in the Law of the People's Republic of China on Quality and Safety of Agricultural Products. This law determines that the quality and safety of China-produced agricultural products meet requirements relating to human health and safety, in alignment with State-mandated specifications.

The law prohibits the use of toxic or harmful land areas for food procurement, as well as the prohibition of discharging wastewater, exhaust gas or solid waste in areas that may be utilised for agricultural production. In addition, permission is required from the State for agricultural chemicals that may endanger the quality and safety of agricultural products, with scientific research and education institutions governing good food safety practice improvements for agricultural inputs and training. Producers are required to keep records relating to application and withdrawal of agricultural inputs, outbreaks of animal or plant diseases (including attacks from insect pests or weeds), and dates relating to harvesting, slaughter and/or fishing, which are required under law to be kept for two years after said date.

Labelling is also mandated by Chinese food safety laws, including general labelling demarking the name of the product, the place and date of production, the producer's name, expiry date, quality grade and additive information, as well as specific regulations regarding labelling for inclusion of GMOs in products. Producers may also apply for a "harm-free" label for agricultural products (HKTDC, 2009).

Despite policies regulating food safety controls, China has been at the core of major international food safety concerns for their exports. This has been observed in numerous recalls of exported food products over the last decade. The most recent of these has occurred in the incidence of tainted milk and infant-formula products manufactured by Mengniu Dairy after the fatality of a baby boy using the product (Best, 2011). Other recent examples of historical Chinese food safety scares include the EU's checks of Chinese rice imports for GM contamination (Deschamps, 2011), the fraudulently labelled "green pork" scandal across China's Wal-Mart stores (Webb, 2011b), and NGO Greenpeace's allegations that Chinese Tesco outlets have stocked products presenting illegal pesticide levels (Webb, 2011c).

Foreign food and related enterprises have attempted to counter such examples of food safety concerns by inviting outside inspection, as has been witnessed in the French outfit Carrefour opening the doors of their food testing laboratory in Shanghai to external scrutiny. The Carrefour food testing laboratory carries out examinations of pesticide residues, food additives and water levels in fruits, vegetables, eggs and meat, and the

company have invited members of the general public to carry out tests themselves (Fangqing, 2011).

3.1.2 Food security

The notion of food security also remains a major concern for China's food supply. China has historically remained a major supplier of international food stocks, feeding over one-fifth of the world's population with the use of only one-fifteenth of the world's arable land. However, as Chinese agricultural producers strive to supply food to China's growing population, fluctuations in market prices have threatened export value. As a result, the Chinese government has proceeded to implement policies to combat market stabilisation and food price inflation since in the 1980s, while maintaining a certain level of food supply self-sufficiency. In addition, international food supply rates have dwindled in comparison with population growth rates, and with predicted increases in demand for food worldwide, coupled with a large impoverished Chinese population, food supply chains may be placed under intense demand pressure (FAO, 1999).

However, recent changes in government policy relating to food security and supply have vastly improved food security implementation across the country. China has recently achieved grain self-sufficiency at a gross rate of 95 per cent, with grain reserves residing at levels that are more than double that of the recommended 17 per cent level set by the FAO. Total food reserves are currently equivalent to 40 per cent of domestic consumption – a level which is highly effective as a means of stabilising price and limit volatility (Jize and Wei, 2010).

3.1.3 Green food production

Farm subsidies were implemented recently in China on the heels of the country's attempts at achieving grain self-sufficiency. These were issued in early 2011, offering small amounts of cash payments to farmers planting wheat and corn, treating crop disease and irrigating wheat fields. In addition to this, the Chinese government have outlined a RMB\$180 million fund for farming equipment and a further RMB\$1 billion for alleviating drought, with a new adjustment of almost 40% for minimum purchase price for rice (Aredy, 2011).

These subsidies are weighted against the current backdrop of China's "eco-food" production assemblages. As of 2008, China had 34.18 million hectares dedicated to eco-food production, compared with the total world area of previously certified organic agricultural land. In addition to this, China's eco-labelled food production area equates to 28 per cent of all agricultural land across the country (122 million hectares)(Paull, 2008).

In this regard, China is currently the world's largest producer of "eco-food", with certification programmes aiding in the dissemination of this. China's eco-food certification exists in three food categories: organic, green food, and hazard-free, all of which are based upon international food certification standards. Of total food production in China, 3 per cent is organic, 8 per cent is certified as "green food", 17 per cent is certified "hazard-free", with the remaining 72 per cent of production non-certified (Paull, 2008).

The growth of certified “green food” in China has shown massive increases over the past decade. From 1997 to 2006, production value of green food in China increased from US\$2.9 billion to US\$20.7 billion, an approximate 600 per cent increase. Output also increased from 6.3 million tonnes produced across 2.14 million hectares to 72 million tonnes produced across 10 million hectares (Paull, 2008).

3.1.4 Food trade law and implications

There are several implications for NZ exporters pertaining to lawful import and export of goods to and from China and India. It is important for NZ exporters to understand these types of legislation which, due to cultural and other considerations, may differ considerably from New Zealand or other Western countries’ import/export laws.

China’s foreign trade laws should be taken into consideration. Provisions for lawful foreign trade to and from China present specific stipulations which must be adhered to in full. Article 16 of the Foreign Trade Law of the People’s Republic of China (2004) stipulates that the State may restrict or prohibit the import or export of goods and technologies either to protect State security, public interests and ethics, human health and safety, the lives or health of animals and plants, or the environment, as well as specific stipulations restricting the import or export of silver and gold. Other stipulations affirm that low domestic supplies or resource conservation, a limited market capacity at importing destination, or a necessity to restrict the import of agricultural, animal husbandry and fishery products may restrict foreign trade import and export. Similar restrictions also apply for the import/export of international trade of services (CPGPRC, 2004).

New Zealand exporters currently enjoy a preferential acceptance of New Zealand exports to the Chinese market via the NZ-China Free Trade Agreement. This is usually facilitated through the display of a Certificate of Origin (New Zealand) displayed on export goods to China, which is required to be processed through certification body channels (i.e. Independent Verification Services Ltd, New Zealand Chambers of Commerce Inc, and Wine Institute of New Zealand Inc.) (NZCS, 2008).

This considered, Chinese exports and associated stigmas still have significant implications for Chinese export value. The classic “Made in China problem” (as named by Noon, 2007) has presented issues relating to export quality, with concepts of food safety and security playing a major role in this. The historical use of high pesticide residue levels, heavy metal pollution incidence in soils and water used in agricultural procurement, and a typically fragmented supply chain wherein food safety channels present gaps between local government, regional food safety bodies and the central government in Beijing (Noon, 2007).

Furthermore, a 2007 study of product quality and safety in China revealed that close to a fifth of food and consumer products were found to not meet assessment criteria (Barboza, 2007). Incidentally, the value attributed to Chinese food products against those of other nations have shown to be typically lower. In a 2006 study, respondents diminished value for food from China by around 21 per cent against food produced in Australia (Paull, 2006). When previously discussed food safety and security issues are also taken into account, Chinese exportation of goods presents potential quality and safety issues to potential export market consumers.

3.1.5 Climate change

Government action reflecting global movements to mitigate the negative effects of climate change has been observed in the People's Republic of China and India. In early 2011, the Chinese government announced an investment of RMB 4 trillion in improving water-based systems to advance water-related sustainability practices across the nation. Stipulations of this investment included improvements in access to water resources, and sustainability measures to improve China's approach to food, economic and ecological security through improvements in efficiency and use (Yu, 2011).

Within the Government of the People's Republic of China's environmental policies, emphasis has been made on the issues of economic development and environmental protection, with stipulations made within the nation's 12th Five Year Plan to improve human adaptation to the environment. Specifically, the Plan states *"In transforming the economic development mode, the importance of building a resource-saving and environment-friendly society should be stressed to save energy, reduce greenhouse emissions and actively tackle global climate change."*

The 12th Five Year Plan also outlines multiple targets in mitigating climate change and encouraging good environmental stewardship amongst its citizens. These include the reduction of water consumption per unit of value-added industrial output (30 per cent), the increase of non-fossil fuel usage in primary energy consumption (3.1 per cent), the reduction of energy consumption per unit of GDP (16 per cent), decreases in CO₂ emissions per unit of GDP (16 per cent), and an increase in forestry stock across the nation (6 per cent). The 12th Five Year Plan also states intended targets of reduction of carbon emissions set at between 40 to 45 per cent of carbon emissions per unit of GDP by 2020. In addition to this, Chinese government officials announced in 2011 that consideration was being given to the introduction of a carbon tax to be implemented by 2013, as well as a carbon trading scheme by 2015 (APCO, 2011).

While these approaches at a government level reflect a growing international need to protect climatic interests, there are little or no stipulations in current government policy in China relating to importation of sustainability-enhanced products. However, this is not to say that consumer demands do not warrant the development of environmentally-friendly NZ exports. Changes in food demand on a consumer level in China may not necessarily reflect government policy, and must be analysed separately to produce a clearer picture for NZ exporters (see Chapter 4).

3.2 India

3.2.1 Food safety

The Indian arbiter for retaining safe consumption of food products is The Food Safety and Standards Authority of India, under direct authority of the Ministry of Health and Family Welfare, the chair of which is appointed by the Central Government of India (FSSAI, 2006).

In India, food safety concerns are high on the agenda, and are reflected in Indian law and government policy. Current food safety law in India, as documented in The Food Safety and Standards Act 2006 (revised in 2008) forbids the sale of any food products which present danger to human health or protection of consumer interests, including specifications for food risk management practices. Specifically, the law forbids the incidence of any form of contaminants, including heavy metals or other toxic substances, including pesticide, veterinary drug, antibiotic or microbiological residues in excess of legal limits. These laws also apply to the importation of foreign food sources (Gol, 2006).

However, even with the introduction of this bill, food safety concerns do still exist in India. A study carried out by the Food Safety and Standards Authority of India in early 2012 confirmed that milk products were commonly boosted in volume with the addition of water to liquid milk products. This practice degrades the nutritional value of the milk therein, and also presents considerable risk through the possible use of contaminated water. Similar findings indicated the use of reconstitution of milk powders to meet consumer milk demand, as well as, in some cases, the incidence of detergent in some milk products, suggesting a lack of hygiene and sanitation in production (FSSAI, 2012).

3.2.2 Food security

India's food security and self-sufficiency in certain commodity types closely mimics that of China. During the Green Food Revolution of the 1960s, India was able to make vast improvements in agricultural efficiency and intensity, avoiding mass famine and achieving grain self-sufficiency. From 1965 to 1980, massive increases of grain yields (typically rice and wheat in high yield varieties) were recorded, and by 1980 almost 75 per cent of the total cropped area of India was producing wheat, with growth steadily increasing at a slower pace in the years ahead (Heitzman and Worden, 1995). In December 2011, grains stored in government stock houses had reached a quantity of 27.6 million tonnes, far ahead of the government target of 11 million tonnes set for 2011 (Reuters, 2011).

While the Green Food Revolution assisted India in providing food for a rapidly growing population, it produced many negative lasting effects on the quality of India's food-producing land, and widespread environmental degradation. Chemical-based agricultural practices caused by the excessive use of fertiliser and pesticides resulted in the pollution of waterways, loss of beneficial insects and other loss of biodiversity, as well as presenting serious health risk to agricultural workers. Farmers in India are still rectifying these issues for food production with good agrarian practice, including the use of some pest-resistant varieties of plants, crop diversification, precision farming and biological pest control techniques (IFPRI, 2003).

3.2.3 Green food production

With reference to dwindling groundwater supplies due to the effects of intensive agriculture in India, NGOs have promoted some subsidy incentives for water conservation. Fears for the quantity and quality of groundwater surfaced in 2009 when satellite data indicated a net loss of 109^2 of groundwater depletion across the entire subcontinent of India (Schiermeier, 2009). These losses are particularly apparent in the region of Gujarat in Western India, in which groundwater depletion has caused the

incidence of deep drilling for groundwater sourcing which carries a high risk of saltwater intrusion into groundwater reserves in this region. Under current government policy, there is no extra cost to farmers for deeper drilling in sourcing groundwater, which is typically delivered to farmers at a fixed cost. The rate of removal of groundwater from deep aquifers has caused groundwater table levels to drop at a rate of around 3 metres per year – a rate which presents serious issues regarding aquifer refreshment. As a result, many farmers throughout this region have been forced to abandon their land due to a lack of usable groundwater for agricultural production. In response to this, NGO Columbia Water Center (established by PepsiCo for the study of water sustainability) has provided monetary incentives to producers who conserve their water supplies to avoid groundwater depletion in this region. The involvement in subsidy programmes by Columbia Water Center reflects an outdated policy issue presented by the Government of India in which policy does not reflect the necessities of Indian farmers (CWC, 2010; Bailey, 2010). However, this is not to say that government incentive schemes do not exist in India. Current government incentives reflecting policy-driven conservation and environmental improvement are discussed in Chapter 2.2.5.

India's current "green food" production represents a very small percentage of total food production. There are, however, some cases documented in which experimental production of "green" food products has taken place across the subcontinent. These include India's latest forays into biofuel production. Increasing international dependence on fossil fuels has caused concern for the sustainability of fuel use, leading to the development of alternative fuel sources to maintain current stocks of petroleum and other fossil fuels, and also in alignment with environmental concerns. As a result, the Government of India launched a programme called the National Mission on Biofuels, with the express intent of an indicative, non-mandated 20 per cent blending of fuels with biofuel products by 2012 (Rajagopal, 2008).

However, the procurement of biofuel products in India presents even greater challenges to food security across the nation. As biofuel production increases, greater areas of land normally set aside for agricultural production is used in order to increase crop yields for biofuel utilisation, changing the composition of agricultural structure and adjusting sources, levels and variability of farmer income (Rajagopal et al, 2007). In addition, as is currently practiced, producers rely on the cultivation of one or two crops for biofuel production, which presents the risk of scarcity of biofuel due to drought or pest incidence which could potentially result in crop failure (Rajagopal, 2008). While the ethos of biofuel protection essentially reflects a two-fold intention to produce high-return agricultural products set against improvement of environmental quality, the risks may outweigh the benefits in this scenario.

3.2.4 Food trade law

Food policy in India, however, presents some issues to New Zealand exporters. India's current foreign trade policy (effective 2009-2014) includes provisions for new export incentive schemes. These include the Focus Product Scheme (FPS), which rewards the export of high employment intensity products in rural and semi-urban areas, including the export of "green products" (Ganatra, 2009), as well as the introduction of a "single window system" to facilitate agricultural produce export (GoI, 2009).

India's import regulations present several implications for New Zealand exporters, with common ingredients in NZ exported products prohibited in Indian import regulations. All imports to India under current import regulations fall into four categories: freely importable goods, licensed imports, canalised items and prohibited items. Most capital goods fall into the category of freely importable goods, and do not require any form of import license, and can be imported by any person or entity. Licensed imports are consumer goods which require specific users to acquire a license for importation, spanning a broad range of items, including (but not limited to) seeds, plants and animals, certain insecticides, pharmaceuticals and chemicals, and particular goods relating to production by the small-scale sector. In April 1993, the Indian government removed licensing requirements in this category for a number of agricultural items, including prawns, shrimp and poultry feed. Canalised items are those which can only be imported by specified public-sector agencies, and are mainly comprised of chemical goods, but include oils and seeds (which are imported by the State Trading Corporations and Hindustan Vegetable Oils) and cereals (imported by the Food Corporation of India). Prohibited items of importation hold the highest significance for NZ exporters, as only three items exist in this category – tallow fat, animal rennet and unprocessed ivory, which are completely banned from importation to India (IndiaMart, 2012a). These first two items hold the highest significance for NZ exporters, as producers may need to modify production methods to export to the Indian market.

The prohibition of particular items under Indian export policy is also worth noting with reference to Indian trade law. Indian export regulations currently prohibit the exportation of 10 goods types due to religious and environmental considerations. These goods include beef and tallow fat/oils of any animal origin, as well as several types of wood products and wildlife. Canalised items of export include many chemical products, mineral ores and mica waste, but also include onions and seeds. Restrictions also apply regarding the exportation of cattle, chemical fertilisers, fodder (including wheat and rice straw), hides and skins (particularly leather products), milk products, pulses (of all kinds), a wide variety of seeds, vegetable oils in consumer packages above 5kg, and other items (IndiaMart, 2012b).

3.2.5 Climate change

Sustainability initiatives from government are occurring throughout India on an individual urban centre basis, with local governments implementing their own plans to promote and improve environmental stewardship among industry and the general public, particularly with reference to clean technology and energy efficiency.

Reflecting a growing drive on a government level in India to improve environmental policy and action, US President Barack Obama's visit to India in November 2009 saw him engage in talks with Indian Prime Minister Manmohan Singh, releasing a joint statement of cooperation. This statement included mention of concepts such as a "Green Partnership" and a "Clean Energy and Climate Change Initiative", which to two hoped to "improve the lives of people in both countries by developing and improving access to technologies that make energy cleaner, affordable and more efficient. The initiative will include cooperation in wind and solar energy, second-generation biofuels, unconventional gas, energy efficiency and clean coal technologies, including carbon capture and storage" (Kraemer, 2009).

In response to this, for example, India's vast information and communication technology (ICT) industry is adopting a green IT and sustainability solution initiative to mitigate negative environmental attributes associated with the expanding industry. It has been predicted that by 2015, India's investment in this initiative will double from US\$35 billion in 2010 to US\$70 billion in 2015 (eGov Innovation Editors, 2011).

The central Indian government is currently involved with various schemes for the implementation of cleaner energy, such as small hydro power or solar power. The Ministry of New & Renewable Energy/Indian Renewable Energy Development Agency (IREDA)'s "Accelerated Development and Deployment of Solar Water Heating Systems in Domestic, Industrial and Co." Plan, which was implemented between July 2005 and March 2010, constituted an incentivised initiative that rewarded loans and interest subsidies to individuals who implemented solar water heating units in the public and private sectors. Currently, a project called the Scheme for Watermills and Micro Hydel Projects rewards financial assistance to those interested in developing watermill and micro hydel installations (up to 100 Watt) to assist in electricity generation and supply to be implemented by state government bodies, such as the State Nodal Agency, as well as other co-operatives and NGOs (MNRE, 2010). In addition to the promotion of clean energies throughout developing India, there are a number of current initiatives that promote other aspects of environmental stewardship. Including in this is an initiative titled Jawahar Lal Nehru Urban Renewal Mission, governed by the Ministry of Urban Development. This scheme is intended to improve infrastructural development within the major urban centres of the country to promote environmentally-sound behaviours amongst general public, as well as reduce pollution through bans on the burning of substances such as charcoal and polythene (MUD, 2011). India is also registered as a participant in the United Nations Environment Programme (UNEP) and the South Asia Cooperative Environment Programme (SACEP), which is participated in by partners at a government level.

4 Retail Policy

Retailers throughout emerging markets internationally represent a huge opportunity for New Zealand exports. As emerging markets develop more sophisticated retail systems, such as the development of supermarket chains and other outlets for retail consumption, there lies an opportunity for developed producers and exporters to increase value for their products in these markets, wherein there now exists a 1 billion-strong middle class.

This revolution in supermarket development throughout markets such as China, Vietnam, Russia and India occurred in the late 1990s/early 2000s with the introduction of larger chain retailers throughout these countries. Growth rates in sales for supermarkets throughout these regions is booming, with growth rates strong in categories extending to processed foods (i.e. dry, canned and packaged items), semi-processed foods with minimal processing/packaging (i.e. meat and dairy products, fruit), and produce (i.e. vegetables), particularly leafy and bulk vegetables).

Another growth area for this retail revolution in emerging markets resides with the development of more sophisticated procurement systems, wherein emerging market retailers will often source products from other emerging market producers. This movement has increased competition for produce volume sales to these retailers, especially among emerging market suppliers internationally. With a sales growth rate in China of around 40 per cent per year, compared with China's income growth of 10 per cent per year, this represents a massive opportunity and challenge for developed producer countries such as New Zealand to meet consumer demands in these emerging markets (Reardon, 2007).

The retail market of China is growing at an astonishing rate. China's "consumer boom" is expected to project sales of over RMB 30 trillion by the year 2015, surpassing total US consumption by 2016 (Hua, 2011). The Chinese retail market is currently highly saturated with major foreign retail outlets, including Carrefour, Tesco and Wal-Mart, with the latter holding a majority share of retail holdings. The US-based Wal-Mart currently holds 338 outlets across 124 Chinese cities, employing 90,000 people and earning annual sales of US\$7 billion (The Economist Online, 2011). Fast moving consumer goods (FMCG) retailers, in particular supermarket chains, have increased total sales from 10.2 per cent in 2009 to 13.8 per cent in 2010, suggesting a massive shift in consumer activity to this area. Similarly, online retail is also booming in China. Of the top 100 retailers in the region, 34 of these initiated web-based marketplaces in 2010, with combined annual online sales reaching RMB 3 billion, equating to approximately NZ\$600 million (2011 values)(CCFA, 2011a). Total online sales for Chinese retailers in the third quarter of 2011 reached a total of RMB 211.77 billion, representing a growth of over 50 per cent since the start of 2011, and an increase of 25 per cent from the previous Quarter (CCFA, 2011b).

Retailer policy is also adapting internationally to accommodate the incidence of potential conscious consumption. This set of conscious consumers wish to be informed of the various attributes associated with products they purchase, due to the potential impacts

that their own purchasing behaviours may have on social, ethical, ecological and environmental spheres.

Foreign retailers in China have implemented various sustainability schemes. UK-based retailer Tesco was recently granted the “Green Supply Chain Award” for the establishment of its self-owned distribution center in Jiashan, Zhejiang Province – the first of its kind in South China. The proviso of this award recognises improvements in energy-efficiency standards, environmental protection and green concept in operation (CCFA, 2011c). Similarly, French retailer Carrefour is involved in sourcing local foods for sale in their Chinese outlets, such as their sourcing of local grapes in Xinjiang for sale at the retailer’s Gubei Branch in Shanghai (CCFA, 2011d).

The closest local competitor to Wal-Mart in China is Beijing-based Chinese retail chain, Wumart. This chain currently holds more than 469 outlets in the form of hypermarkets, supermarkets and convenience stores across China, and earns around US\$2 billion annually. While Wumart does not explicitly state environmental stewardship as part of their mission statement, the group’s corporate responsibilities include the provision of “social responsibility” in “providing stable employment opportunities, creating a harmonic shopping environment and introducing community concept” (Wumart, 2011).

In contrast, India houses very few foreign retailers within its borders. However, this is potentially set to change within the next few years, as India’s Parliament has recently (November-December 2011) debated the possibility of reforming Foreign Direct Investment policy and legislation. The passing of this legislation would open India up to the establishment of a higher degree of foreign retailer and other commercial entity presence on the sub-continent, but has thus far seen wide-spread opposition from many members of Parliament, necessitating a hold on the passing of this policy into law. While it is not yet known how long this hold will last, it is important to consider the potential passing of this legislation as this will heavily affect the operations of foreign retail, and thus is of interest to New Zealand exporters (Webb, 2011).

This considered, retailer policy in India is also rapidly developing to include commitments relating to sustainability best practice. Major retailers across India now include sustainability principles in their operational guidelines, potentially reflecting, or capitalising on, the Indian middle-class’s new approach to environmental stewardship. However, there seems to be a distinct lack of specificity in many stated pro-environmental intentions.

India’s leading retailer group, Future Group, have included various sustainability guidelines in their mission statements and strategy documents, stating these to be “at the heart of Future Group’s ethos”. Their Environmental Stewardship statements assert the promotion of eco-friendly products, and a raising of awareness on environmental issues both internally and externally. Their listed activities in encouraging good environmental stewardship include: Reducing the environmental impact of store construction and operations; improving energy efficiency for important environmental benefits and reducing operating costs; strengthening environmental considerations in the design of green products and packaging; developing green product lines that respect environmental concerns, and; reinforcing environmental considerations in logistics (Future Group, 2011). This represents a relatively new approach to the environment by

major Indian retailers, and potentially reflects demands held by the growing middle class of India. The chain stores that Future Group own and operate include some of India's major retail players, including Pantaloons (fashion), Big Bazaar (hypermarket) and eZone (electronics) (NZTE, 2011a).

Another of India's major retail operations, Bharti-Walmart – a merger between India's Bharti Enterprises and US superstore Walmart, also list environmental initiatives as one of their key values in retail. In this sense, and aligned with the US company's major goals, is that of improving supply chain efficiency in an effort to reduce waste and improve value for their consumers. In a back-end supply chain infrastructure, working with already-existing supply chain infrastructure, this operation supports farmers and small manufacturers while improving efficiency in supply chain management (Walmart, 2011).

5 Consumer Concerns

Increases in consumer income and a steadily growing Chinese and Indian middle class are expected to bring about a consumer response in demand for credence attributes in food products.

5.1 Cultural considerations

Before ascertaining Indian and Chinese consumer attitudes and preferences towards sustainability credentials, it is important to understand that there exist fundamental cultural differences in approach to cuisine and nutrition from Western food culture.

5.1.1 China

In China, cuisine has been developed to the highest possible level of sophistication, and food is not only considered important for nutritional satisfaction, but also psychological satisfaction. Food is cooked with a high degree of artistry and sensitivity, with the act of cooking (and subsequently eating) in China likened to the observation of an artistic or musical performance, with food equating highly with the Chinese expression to “live fully” (Nam et al., 2010).

To illustrate this more succinctly, a traditional and common Chinese greeting, “*niche bao la*”, directly translates into English as the question “have you eaten yet?” Business relations are also typically preceded by a delicately-created meal, and Chinese consumers have been estimated to spend around 50 per cent of personal income on food-related purchases (Noon, 2007). This is important to note when considering New Zealand exports, as these cultural leanings may cause Chinese consumers to exhibit different consumption behaviour towards food choices than Western consumers.

By comparison, in nearby Japan, food is also presented in an artistic fashion, comprising seasonal ingredients of a largely vegetarian nature. Japanese cuisine also boasts a complex set of generally locally-sourced natural ingredients, which are used to create a great multitude of primarily rice-based dishes (WebJapan, 2011). Korean food culture is also composed of primarily rice-based meals, with the Korean word “bahp” being synonymous with food in the country. Similarly with China, a common greeting in Korea translates to the English equivalent “have you had bahp today?”, with the answer “yes” indicating that the respondent is fine. Korean food culture also boasts a wide spectrum of ingredients and dishes as inherent in that of Japan and Korea (Sheen, 2011).

5.2 India

India is the world’s largest democratic country with a rapidly-growing middle-class. The urban-dwelling middle-class percentile of India in 2010 was 73.2 per cent (Mishra and Joe, 2010), and this number is expected to grow as the country’s developing economy improves. The values of Indian citizens, particularly urbanised citizens, are also changing. However, strong cultural values continue to influence and govern Indian consumer behaviour, even those who have been affected by Western values, and are of very high importance when considering consumer attitudes to product attributes.

Indian cuisine and nutritional approach is highly variable due to the size and disparity of different cultural practices across the subcontinent. Generally speaking, Indian culture dictates a close correlation between the merits of a good diet with good health. This can be seen in elements of the ancient traditional Indian practice of Ayurvedic medicine, wherein it is important to control one's biological and spiritual health through a healthy diet (Sen, 2004).

Indian consumer preferences in terms of taste also tend to be very specific, and this has seen foreign producers drastically alter the ingredients or production methods of their products to suit the Indian food market. The impact of "glocalisation" initiatives has been conducive to this, with foreign investors adapting their products to suit local tastes. An example of this, with particular reference to Indian consumers, is that of international restaurant chain McDonald's India, which has adapted its menu to suit local tastes and concerns. Included on the McDonald's India are high levels of vegetarian options to meet local dietary demand, alongside reduced beef-based meals. Vegetarian options served in these outlets are also cooked in segregated areas with specific staff and equipment dedicated to cooking these meals (McDonald's India, 2011). The result of this endeavour has allowed McDonald's to be accepted and produce increased demand amongst Indian consumers (NZTE, 2011a).

The consumer concerns surrounding food choice in China are changing. As personal income increases in China, so too does the amount of middle-class and affluent Chinese consumers. In 2008, a survey was conducted which showed Chinese consumers' preference in brand selection, with 48 per cent of participants claiming that the environmentally-friendly status of a product determined brand choice. This is of particularly high importance when compared with the 36.3 per cent of respondents who claimed that they prefer to purchase foreign branded products (compared to 11.2 per cent who preferred domestic products) (MasterCard, 2008).

India is a highly collectivist nation, and socio-cultural affiliation with family and other in-group settings are tantamount in product purchasing behaviours. Indian consumers give high credence to family values and traditional inputs when purchasing products, as many consumption choices are based on social and/or familial approval. It has also been revealed that Indian youths identify these products with reference to quality, self-identity, status and personal values (Khare, 2011). Other cultural elements of Indian consumers are of importance, including those of religion. It has been observed that Indian citizens who adhere to a belief in the spiritual concept of karma tend to set different expectations with reference to product choice than those who do not (Kopalle et al., 2006). This suggests that the lifestyle and religious affiliations of many Indian middle-class consumers may affect purchasing behaviours, and presumably those with sustainability credence attributes. In communicating with this type of consumer, it may be necessary to enhance claims of animal welfare value.

5.3 Dietary change: meat and dairy consumption

Food consumption increases globally and is mainly driven by a growing world population, urbanization and rising incomes in developing countries. The growth in food consumption is accompanied by a shift in dietary patterns away from staples such as roots and tubers towards more livestock products and vegetable oils. Particularly, in

developing countries, it has been observed that the share of energy derived from cereals (i.e. wheat and rice) has fallen from 60 per cent to 54 per cent in only 10 years. They have been replaced by the more preferred livestock products in middle-income countries such as China, India and Brazil (WHO/ FAO 2003).

Table 5.1: Per capita meat and milk consumption by region, 1983 and 1997

Region	Meat		Milk	
	1983	1997	1983	1997
China	16	43	3	8
India	4	4	46	62
World	30	36	76	77

Source: Values are 3-year moving average centered on the year shown, calculated from data in the United Nations Food and Agriculture Organization (FAO) database, 2002 (11).

Increased household income, urbanization, privatization of food production, procurement, foreign investment, and marketing are changing the dietary patterns of food consumption in China and India (Steinfeld, 2006; Dong & Fuller, 2007). The increased availability of food in urban China, enhancing new consumption opportunities. The growth the Chinese market for dairy products in urban areas is driven by a combination of technology improvements and adoption, changes in retail supply chains, consumer trends, income growth, and government policies (Fuller, 2007).

Table 5.2: Change in food consumption quantity, ratios 2005/1990

Type	India	China	Brazil	Kenya	Nigeria
Cereals	1	0.8	1.2	1.1	1
Oil crops	1.7	2.4	1.1	0.8	1.1
Meat	1.2	2.4	1.7	0.9	1
Milk	1.2	3	1.2	0.9	1.3
Fish	1.2	2.3	0.9	0.4	0.8
Fruits	1.3	3.5	0.8	1	1.1
Vegetables	1.3	2.9	1.3	1	1.3

Source: Data from FAO, 2007

Table 5.3: Projected trends in meat and milk consumption, 1993-2020

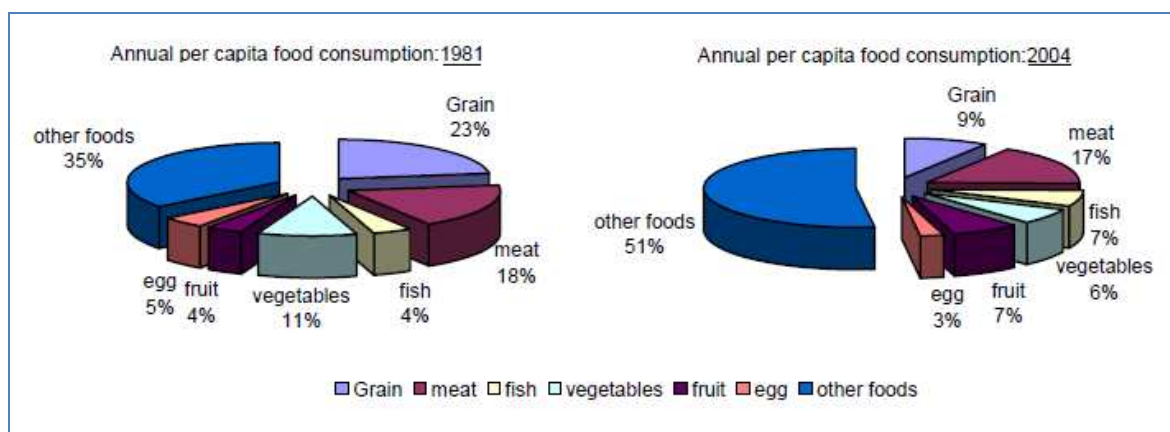
Region	Projected annual growth of total consumption, 1993-2020		Total consumption in 2020		Per capita consumption in 2020	
	Meat	Milk	Meat	Milk	Meat	Milk
	(per cent)		(million metric tons)		(kilograms)	
China	3.0	2.8	85	17	60	12
India	2.9	4.3	8	160	6	125
Developing World	2.8	3.3	188	391	30	62
World	1.8	1.7	303	654	39	85

Source: Projections are updated figures following the same format as that reported in Rosegrant et al. 1997.

Historically, meat consumption was very rare among China's rural population/ peasants until the last quarter of the 20th century. Statistics show that annual meat intakes as low as 1.7 kg per family in the early 1920s (i.e., less than 300 g a year per capita) and as high as just over 30 kg per family (or about 5 kg/capita) in Jiangsu (Buck, 1930; Smil, 2002) In the mid-1960, before China started its great economic reforms, on average, people lived on a diet of rice, wheat, and starchy roots, with rare servings of vegetables and meat or fish.

Shifting diets in China are leading to higher levels of meat consumption per capita against a traditional cuisine basis of vegetarianism. Meat products in China are traditionally served on special occasions or to people of high esteem. However, due to the increased Westernisation of many Chinese cities, higher degrees of meat are in demand, especially among youth. General meat consumption per capita in China has increased by approximately 13 per cent between 2005 and 2010, with dairy consumption increasing by a significant approximate 40 per cent. Meats that have increased in consumption, and presumably popularity, over the last five years are poultry meat (increased 24.52 per cent) and sheepmeat (increased 13.04 per cent) (FAO, 2011; OECD, 2011).

Figure 5.1: Structure of food consumption in urban China, 1981 versus 2004



Source: Fuller, 2007.

Pork is currently in high demand among Chinese consumers as a preferred meat product, with consumption levels tripling since 1980, and Chinese demand for pork products is currently complementary to US consumption. Pork production in China also shows high levels of local procurement, as 80 per cent of Chinese pork is raised in local "backyards". Chinese pork consumers have also shown concern over additives in imported pork products, such as ractopamine (RAC), highlighting a significant lack of consumer confidence in the Chinese food inspection system (Ortega et al., 2009).

Similarly, in India's culture which was always coined by the Buddhist-derived emphasis on *ahimsa* (compassion toward all living things) characterized there is a more vegetarian based diet. In the 18th century the per capita meat consumption was less than 1 kg/year is a very non-representative national mean, as large shares of both the poorest peasantry and the social elites never ate any meat. 11 Until the late 1980s Food

balance sheets demonstrate per capita meat consumption levels less than 5 kg per year (carcass weight including offal) until the late (FAO 2002; Smil, 2002).

Changes in dietary consumption patterns among Indian citizens have been observed over a number of years. Significant shifts in livestock food demand, combined with increases in consumption of milk products over time have led to a general increase in meat and dairy consumption in India in recent years. Aggregate milk consumption in India has almost doubled between the early 1980s and the late 1990s, which, in 2006, represented 13 per cent of the world's total milk consumption, and 31 per cent of milk consumption in all developing countries (Delgado, 2003). In addition to this, butter consumption is expected to increase by over 3 per cent in India from 2008 to 2017 (Saunders, 2009). Changes in urbanisation, income growth and secularisation also represent possible indicators of change in meat consumption by Indian consumers over time. General meat consumption in India has increased by 13 per cent between 2005 and 2010, with dairy consumption increasing by only 2.3 per cent (FAO, 2011; OECD, 2011). However, average annual meat consumption per capita in India is generally low, with 5.6kg meat consumed per capita in 2010 (NZTE, 2011b).

However, the influence of India's religious affiliations (with an approximate 80 per cent Hindu population) means that Indian consumers have never typically exhibited evidence of high meat or dairy consumption of particular commodity types. This is also highlighted by a strong Buddhist-influenced culture which practises *ahisma* (compassion towards all living things), which is characterised by a vegetarian diet. In fact, market access research in previous years has led producers in foreign countries to cater their own already-established products specifically to the Indian market, both to suit cultural tastes in cuisine, as well as support a high percentage of vegetarian consumers in India (NZTE, 2010).

By comparison, meat and dairy consumption in Singapore may provide insight into potential future consumption patterns in this area in China and India. Currently, demographic spreads in Singapore closely resemble both China and India due to a large representation of both national groups in this state. In 2011, people of Chinese descent represented 74.1 per cent of the total Singapore population, with a further 9.2 per cent representing people of Indian descent (DoSS, 2011). As Singapore is considered to be a mature market with a high degree of urbanised affluent consumers, growth in the broad food market is very slow, with general increases of between 0 and 3 per cent per annum. Current consumption of meat and dairy products in Singapore is high, with New Zealand exports of milk and cream in 2010 representing NZ\$248 million, butter at NZ\$43 million, and fresh and frozen bovine meat at NZ\$43 million. Growth rates in these product segments are also high, with consumer demand for butter increasing by 76 per cent between 2009 and 2010, milk and cream demand increasing by 46 per cent, and natural milk products experiencing 101 per cent growth from 2009 to 2010. The exportation of milk and cream products to Singapore currently represents 45 per cent of total export to Singapore, and is expected to increase (NZTE, 2011c).

5.3 Food security

With reference to increasing consumption of non-staple meat and dairy products throughout emerging markets, food security has become a major issue for the increasing population of affluent Chinese and Indian consumers.

As The People's Republic of China strives to increase food supply and storage to maintain a growing population, focus has been heavily placed on storage of basic food types, such as grains. The emphasis placed on supply of basic foodstuffs is based on basic supply requirements of 400kg of raw grain per individual, requiring the nation to produce at least 580 million tonnes of grain by 2020 (Ash, 2011).

India's current legislation regarding food security issues is that of the National Food Security Bill, introduced December 22nd 2011, with this law applying to the whole of India. India's food minister K.V. Thomas has stated that this law is introduced with the intention to "provide for food and nutritional security...by ensuring access to adequate quantity of quality food at affordable prices, for people to live a life with dignity" (NDTV, 2011). This law provides that every person belonging to priority and general households will be entitled to receive a monthly quantity of foodgrains at subsidised prices under the Targeted Public Distribution System. This law identifies special entitlement of free meals for pregnant or lactating mothers during pregnancy and six months after childbirth, as well as free meals for children between the age of 6 months and 6 years. Similarly, children aged between six and fourteen years old are entitled to receive a free lunch (with the exception of school holidays), with all schools providing appropriate facilities for cooking meals and drinking water. These laws also apply to children suffering from malnutrition, through which the government will provide adequate nutritional supplementation. Other stipulations of this law include provision of one free daily meal for the destitute and heavily subsidised meal provision for the homeless (Gol, 2011). In this sense, India has attempted to provide Government-subsidised nutritional services to its citizens, increasing food security and attempting to mitigate malnutrition and starvation across the country.

5.4 Food safety

The safety of imported foods has shown high concern amongst Chinese consumers. Due to a high emphasis on personal health that exists amongst Chinese consumers, products which indicate associated values have been valued highly amongst this group. Many Chinese food retailers currently sell products which are catered to more affluent consumers demanding higher food quality, safety and health attributes, yet this still does not represent the majority of Chinese consumers, who typically purchase higher quantities of generic food items (Gale and Huang, 2007).

With reference to food safety, producers in China have subscribed to the food quality management system (used to assess and reduce food safety risk) known as Hazard Analysis Critical Control Point (HACCP) management. A 2007 survey of Beijing consumers yielded that around 20 per cent of consumers had heard of HACCP management, and when told of this system, almost all respondents indicated a WTP of a 5 per cent increase for products which had been assessed using this method (Wang et al, 2007). This indicates a growing demand amongst Chinese consumers for quality and safety standards to be implemented in food production.

Reflecting this, in premium segments throughout Hong Kong, value-added New Zealand products are achieving high patronage. Affluent Hong Kong consumers have shown high interest in such products, with a six-pack of organic New Zealand-produced eggs selling for the equivalent of NZ\$10, and other organic products presenting consumer

appeal. A large part of this appeal is highly linked to food safety concerns for affluent Chinese consumers, wherein these consumer groups dissatisfied with the potential safety and quality of Chinese food products. Such concerns stem from historical food safety concerns, such as the incidence of arsenic traces in coffee products, and the presence of lead in toothpaste and toy paint. This suggests a high sensitivity amongst affluent Chinese consumers towards food products grown, produced or manufactured in “clean, green” New Zealand (Gibson, 2012).

Concerns surrounding food safety are of reasonable importation to Indian consumers. In a 2008 study, Indian consumers rated their perceived effectiveness of Indian food safety authorities. A majority of respondents (32.71 per cent) commented positively on these authorities, perceiving them to be highly effective at mitigating harmful properties in food products, with an additional 27.13 per cent claiming a perception of ineffectiveness of Indian food safety authorities. Around 29 per cent of consumers claimed only moderate effectiveness, with a further 12 per cent of consumers claiming that they had no idea of the effectiveness of food safety authorities. Incidentally, those consumers who have placed no trust in the public food safety arbiters of India are less likely to accept purchase of GM foods, indicating a distinct consumer group who are food safety-conscious (Krishna and Qaim, 2008).

With India’s status as a food-producing country, many growers produce and consume their own goods, with the remainder of goods sold locally or marked for export [reference]. Therefore, it is important to consider public perceptions of food safety as an indicator of potential consumption behaviour. A case study carried out in Hyderabad amongst Indian mothers revealed several implications for food safety concerns. In this region, around 90 per cent of respondents cooked food in the home. A further 60 per cent sourced drinking water from the tap, with a further 30 per cent sourcing groundwater, and 10 per cent sourcing surface water. Only 42.1 per cent of these purified water for drinking, with 57.9 per cent drinking non-purified water. With reference to the sourcing of food products, around 95 per cent procured their own milk, with 92 per cent boiling this directly after procurement. In addition, non-vegetarian foods were consumed by 94 per cent of respondents, 68 per cent of which stored this at room temperature. Interestingly, just under half (48 per cent) of respondents typically buy packaged foods, with the majority (78 per cent) not recognising symbols on food labels. Most participants have also ridiculed the government’s use of fair price shops in curbing food adulteration and poisoning, claiming that they sold a high degree of adulterated food (Sudershan).

5.4 Sustainability

Chinese consumers do hold awareness of some sustainability attributes in consumption, and increasing trends in sustainable practice and purchase can be observed. Concerns over environmental quality and degradation are high among some consumer groups, whereas other elements of sustainable production and thus consumption are not as well-recognised. However, recognition of attributes such as carbon and water footprinting are relatively new to the Chinese public (Betts et al., 2010).

Chinese consumer concern over climate change conversely remains high, with 58 per cent of Chinese consumers asserting that they are very concerned about climate change in 2010 – an increase of 32 per cent from 2007). In addition, 98 per cent of Chinese consumers believe that companies hold the highest level of responsibility with regards to mitigating climate change, with perceived personal responsibilities of the general public regarding climate change mitigation being that of saving electricity (93 per cent), reduction of water consumption (96 per cent), reductions in packaging material for products (93 per cent) and the use of smaller and more efficient vehicles (47 per cent) (Synovate, 2010).

While Chinese recognition of sustainability attributes is small, trends towards purchase of sustainable goods are growing in momentum. However, there is still very little known about the value that Chinese consumers place on potential sustainability-related attributes of food products. Research conducted on desired sustainability attributes of New Zealand kiwifruit revealed that Chinese consumers are less concerned with elements such as carbon offsetting and water efficiency, but show high regard for country-of-origin properties, as well as residue and pollution-free production. Other elements that showed no concern to participants included the use of biodegradable packaging, wherein only an average of 20 per cent of participants indicated even a 10 per cent increase in willingness-to-pay for this attribute. In addition, approximately 40 per cent of these consumers indicated that they would purchase environmentally-friendly food products at least once a week, fortnight or month. Furthermore, participants in focus group meetings concerned with the dissemination of environmentally-friendly attributes in fruit products indicated a need for government certification if high prices were to be accepted. Concern was also noted over a lack of trust of the validity of graphical product claims, due to a high level of label counterfeiting inherent in markets in major Chinese cities (Betts et al., 2010).

Similarly, Indian citizens are very concerned with the notion of climate change. A 2007 survey conducted by HSBC Bank shows levels of concern among nations towards climate change, with results indicating climate change as the second-highest global issue concern among Indian citizens, with around one-fifth of respondents indicating this, representing the highest concern among participating countries. A further 27 per cent of Indian respondents indicated a belief that “individuals should take the lead in reducing climate change”, compared with a world average of 16 per cent to this effect. However, a strong majority of 59 per cent believed that government should take the initiative in dealing with climate change, followed by a further 70 per cent who indicated a belief that developed economics should take the lead in this. Promisingly, Indian participants showed the highest response rate in agreement with the statement “I am prepared to do my bit regardless of whether other businesses and organisations do theirs”, revealing the strong commitment and optimism of Indian participants to help mitigate climate change (HSBC, 2007). In addition, around 40 per cent of Indians believe that India is the most responsible country for climate change (Synovate, 2007).

With reference to the level of knowledge held by Indian citizens regarding climate change, media representations of the science of climate change have shown a staggeringly collective message of understanding. Of the climate change-related media coverage produced during 2007, all 247 articles covering global warming concluded that this process of rapid, unusual climate change does exist. Ninety-eight per cent of those

articles also argued that this process was due to anthropogenic causes (Billet, 2009). This is in contrast with media representation of climate change in other countries, such as those recorded by Swedish environmental journalists, who in a 2008 survey found that 81% of respondents agreed with the basis of cause for climate change (Sundblad et al., 2008).

There are also many “grassroots” movements of environmentally-conscious Indian citizens currently operating in the country. Such organisations include the Centre for Science and Environment (established 1980), a public-interest research and advocacy organisation based in New Delhi, which is engaged in research and communication of sustainable development and environmental policy implementation. The CSE currently employ resources in education and training for environmental stewardship, an independent analytical laboratory for pollution monitoring, as well as a vast wealth of information on sustainable development issues. The group also frequently comments on policy and other political matters aligned with sustainable development in India. Also involved in environmental awareness are The Energy and Resources Institute (TERI) and the Environment Protection Training and Research Institute (EPTRI). Movements such as these may assist the general public in their awareness of climate change-related principles, as well as inform policymakers and other political figures in environmental stewardship. However, in terms of the current knowledge held by Indian consumers towards sustainability attributes in food products, there is a distinct lack of salient research and information available.

A clear comparison can be made between Chinese and Indian consumer attitudes towards environmental considerations in purchasing behaviour in the analysis of these consumers’ attitudes towards environmentally-friendly cars. In a study conducted amongst Chinese students, most respondents indicated high levels of awareness of, and positive attitudes towards “green” technologies, with a very high positive response indicated with regards to the Electric Car and its association with the environment (Penev & Ivan, 2011).

Similarly, a study was conducted in the Indian state of Maharashtra with regards to consumer awareness of the Environmentally-Friendly Car. This study showed a distinct difference in awareness levels for this technology between metro and non-urban citizens, as well as those respondents who were over or under the age of 35. Non-metro and older respondents tended to have less knowledge regarding green transport technologies, compared with higher awareness and knowledge of younger metro respondents (Joshi & Mishra, 2011).

While these results do indicate a certain level on environmental concern amongst Indian consumers, there is still very little known about Indian consumers’ attitudes towards the sustainability attributes of food products. Further research will be required to shed light on this.

These findings are also open to subjectivity, as similar studies yielded that in both China and India, 70 to 90 per cent of consumers have previously stated that they trust petroleum companies to act in the best interests of society (Bonini, 2008). The distinct difference in consumer awareness and appreciation of green technologies between

China and India marks a fundamental deviation of knowledge and behaviours between the two nations.

5.5 Carbon

The reduction of carbon emissions in industrial processes as a means of mitigating climate change are high on the global agenda, but represent a pivotal challenge for developing nations such as China and India. The inherent difficulties of this reduction of carbon emissions is at odds with national growth agendas, and development processes often require high output levels of carbon.

China is currently the world's fastest developing country, and as such, produces high levels of carbon emissions related to activities in development. In 2009, China produced 7,711 million tonnes of carbon emissions, representing the world's largest emitter of carbon. In fact, since 2000, China has increased its own carbon emissions by 170.6 per cent (McCormick and Scruton, 2009).

Public concerns over climate change in China are also noted as being of high import, and as a serious problem that needs immediate action. The Chinese public have also shown strong support over CO₂-efficient technologies, such as clean energy options, including wind, solar and nuclear technologies, in addition to carbon capture and storage solutions (Duan, 2010). However, very little is known regarding Chinese consumers' attitudes to carbon mitigation in the purchase of sustainable products, and further research may be required in this area.

India, as a developing nation, is currently the third-highest emitter of carbon dioxide globally, with a recent carbon footprint of 1.33 tonnes per capita in 2008, and a total output of 1,602 million tonnes of carbon dioxide in 2009. Reflecting this, the need for carbon reduction in mitigating climate change is highly necessary in India, while still propagating the growth of a developed economy (McCormick and Scruton, 2009).

Indian carbon reduction schemes are currently in their infancy, but these schemes are rapidly being implemented into government and public policy. India is currently understood to have roughly 750 verified carbon reduction projects, which could include installations such as hydroelectric power and/or wind farms, accounting for around 120 million tonnes of carbon credits under the Kyoto Protocol's Clean Development Mechanism (CDM). Included in these schemes are those designed to implement low-carbon transport systems, as well as the design and operation of low-carbon mobility plans within four major cities in India, which has received a fund of 2.49 million Euros from the German International Climate Initiative (ICI) and the United Nations Environment Programme (UNEP)(Buono, 2010)

Current actions towards mitigation of climate change from a consumer perspective are still unknown for India. While initiatives are in place on a government and industry level to combat the adverse negative effects of carbon consumption, there has been no conclusive research conducted in this field to indicate Indian consumer attitudes to carbon reduction, suggesting that there is sufficient scope to investigate this further.

5.5.1 Carbon labelling

One process which has grown in consumer awareness over the past decade is that of carbon labelling. A carbon label presents to the consumer the weight value of carbon dioxide released in the process of production or manufacture of a particular item, incorporating attributes of the product's entire life-cycle.

In 2008, Chinese government officials contacted the UK's Carbon Trust requesting consultancy regarding the process and nature of carbon labelling and certification. Resulting from this consultancy was the establishment of the China UK Low Carbon Enterprises Company (CULCEC) – an organisation with the express intent of developing clean, low-carbon technologies in China based on a £10 million investment. This organisation is also partnered with the China Energy Conservation and Environmental Protection group – a state-owned energy-efficiency and environmental-protection consultancy aimed at improving industrial processes. CULCEC have also improved efficiency in Chinese cities through consultation with city governments and affiliated industrial and state entities. In March 2011, the organisation calculated the carbon footprint of the city of Nanchang (Jiangxi), incorporating carbon reduction strategies into the city's Five-Year Plan (Carbon Trust, 2011).

There still exists very little literature on consumer attitudes towards displayed carbon information on products, especially amongst the specific Chinese and Indian markets. There may be proficient scope to suggest that further research in this area would be highly beneficial.

There is, however, a current initiative, launched on October 22nd 2010, to label low-carbon-intensive products for commercial sale in China. SGS, global assessor and certifier of goods and services, has implemented a low-carbon-intensive certification programme aimed at labelling products wherein improvements have been made to lower carbon emissions inherent in the production process. The SGS assessment requires producers to undergo full inspection and improvement of energy mechanisms and carbon dioxide emissions over the entire life cycle of the product (SGS, 2010).

Aside from carbon labelling, there does exist a form of state-endorsed environmental labelling in the form of the HUAN label. This labelling scheme was launched by the Chinese government in 1993, and assures consumers of the use of good environmental stewardship in production. The label itself is the form of a circle, with the images of a sun, hill and water in the centre, around the outside of which sit 10 rings, representing the public's ability to participate in environmental protection. By November 2003, fifty-one official product categories existed, with 9145 categorised products and 751 enterprises included in the labelling scheme (SEPA, 2004).

At this point very little is known of India's potential intentions towards carbon footprint labelling of products. However, speaking at Indian chapter meet of Climate Savers Computing Initiative 2010, Minister of State for Environment and Forests Jairam Ramesh stated that from January 2010 it would become mandatory for certain computing products to carry a low-carbon eco-label. However, very little information is available as to the progress of this concept (COD, 2010).

India also boasts a similar scheme intended to label environmentally-friendly products. EcoMark, introduced in 1991, allows consumers to easily identify products which adhere to good environmental stewardship and practice, and is depicted as a white circle containing a small clay pot. The standards required for EcoMark certification of products are stringent, following a “cradle-to-grave” assessment schedule, which assesses the products environmental impacts from processes such as raw mineral extraction through to disposal. (EcoLabel Index (a), 2011). The scheme currently identifies products in 16 categories, with 192 industries involved in the certification process of their own products (MPPCB, 1998).

There also currently exists very little information regarding Indian consumers’ attitudes and preferences surrounding carbon footprint labelling - this may be of interest for future research.

5.6 Low-carbon diet

The concept of the “low-carbon diet” has grown in popularity amongst certain consumer groups in an attempt to mitigate carbon emissions. The low-carbon diet is typically defined as the act of engaging in food choices which show a concerted effort to reduce one’s personal carbon footprint in choosing products which require less emissions of carbon in production, but can be used in a broader sense to appeal to all lifestyle choices.

Consumers’ food choices may influence their impact on the environment. Therefore, a change of dietary patterns may be an important consideration for obtaining sustainable lifestyles in the developed countries.

There is already an interest to reduce the consumption of animal products.

Vegetarianism and its various forms is practiced already by 3–7 per cent of Western population (Smil, 2002). An American study showed that 3.2 per cent of U.S. adults, or 7.3 million people, follow a vegetarian-based diet and roughly 0.5 per cent, or 1 million, of those are vegans who consume any animal products. Ten per cent of U.S. adults, or 22.8 million people, say they largely follow a vegetarian-inclined diet (Vegetarian Times, 2008). In the UK a survey conducted by the Food Standards Agency in 2009 pointed out that 3 per cent respondents were found to be ‘completely vegetarian’, with an additional 5 per cent ‘partly vegetarian’ (GfK Social Research, 2009).

Devotees to a complete vegetarian diet have existed in China for 2000 years due to the influence of Buddhism and Taoism – two popular religions that promote vegetarianism and a general low-impact lifestyle. Furthermore, vegetarianism is growing in popularity in China. Chinese Premier Wen Jiabao has recently promoted the adoption of a vegetarian diet for one day per week across the general Chinese populace. Jiabao has suggested several reasons for the promotion of this; to promote a low-carbon life, to improve personal health and to improve the quality of animal husbandry by reducing meat consumption. In addition, Jiabao has asserted that if every Chinese citizen was to consume a vegetarian diet one day per week, this would lead to an immediate 51 per cent reduction of greenhouse gas emissions (The Buddhist Network, 2010). Elements of traditional Chinese food culture show a leaning towards vegetarianism, with a typical Chinese diet allowing for 90 per cent of protein sourced from plants, with the remaining 10 per cent sourced from animals (Campbell and Campbell, 2006).

Vegetarianism has always been of high importance in Indian food culture. One key assumption regarding the nature of Hinduism is that its adherents typically following a strictly vegetarian diet. A survey was conducted in 2006 which determined that around 31 per cent of Indians align themselves with a totally vegetarian lifestyle, negating the popular image of India as a largely vegetarian country (Yadav and Kumar, 2006). However, per capita meat consumption remains low, with an approximate 5.2 kg of any type of meat product consumed per capita in 2002 – an increase from 3.7 kg per capita in 1961 (FAO, 2011).

In China, the concept of the low-carbon diet is gaining popularity amongst consumers in the city of Beijing, with many younger consumers opting for food options that reduce their own impact on the environment (CCTV, 2010). The Beijing City Government is currently engaged in a campaign entitled “Beijing Changxindian Low Carbon Community Concept Plan”, which promotes low-carbon diets as part of a more sustainable lifestyle in mitigating carbon emissions, and therefore, climate change (Arup/BMICPD, 2010). As part of this project, the Beijing city government has commissioned a series of advertisements in promotion of low-carbon choices, suggesting such alternatives of reducing alcohol consumption to save 0.2kg per beer, saving 8.65kg of CO₂ by using an energy-efficient electric cooker, or saving 0.46kg of CO₂ by eating 0.5kg less food (Barclay, 2010). At this point, however, it is difficult to ascertain the exact scope of popularity of a low-carbon lifestyle in major cities of China. A further investigation of this may be warranted.

This being stated, there are many examples of low-carbon consumption in certain regions of China with regards to local food consumption. Local foods systems are inherently those in which consumers purchase food products either directly from the producer, or from a local retailer. Within the municipality of Beijing, covering 16,411km², only 2,317km² of land is arable. As a result of limited arable land resources, most land-based crop production in this region is supplied to local consumers. However, this local production model is not sufficient to meet demands of the 17.6 million fixed population of the region, as well as a large transient population in this region (Huang et al., 2011). This system presents high levels of sustainable production inherent in the low levels of food miles required in distribution.

Little is currently known about the promotion or practice of low-carbon diets and lifestyles in India - this may warrant future research.

5.7 GM and organic foods

With concerns over the safety and quality of genetically-modified foods shown by consumers in western countries, consumers internationally are opting for organic foods. However, there is still some divergence from this trend in emerging markets.

Chinese consumers, however, indicate different preferences with regards to GM foods. In a 2011 study, it was shown that Chinese consumers were willing to pay a premium of 38 per cent for GM rice over non-GM rice, as well as a premium of 16.3 per cent for GM soybean oil over non-GM soybean oil (McCluskey & Loureiro, 2003). These findings indicate that Chinese consumer attitudes to genetically modified foods are inherently

contrary to those of typical Western consumers, and may be of consideration when selecting food types for export.

This considered, China still represents the largest Asian country involved in production of organic produce. Chinese produce was first certified as organic with the development of the first Chinese organic tea in 1990, with certified Chinese organic production in 2011 occupying 1.9 million hectares of almost exclusively export-oriented wild food collection and agricultural land (FiBL and IFOAM, 2011). China also currently houses several organic certification agencies, qualified to certify four major international organic production standards, including EC 2092/91, NOP, JAS and the China Organic Standard (EcoCert, 2011).

By comparison, consumer behaviour relating to the purchase of organic food products in neighbouring Hong Kong and Taiwan closely resemble trends in China. The incidence of organic producer establishment for domestic consumption/distribution in Hong Kong has increased rapidly in recent years, with the Hong Kong Organic Resource Centre certifying 85 farms for organic production, and a further marked increase in the number of certified organic processors/retailers – from 88 to 135 between 2009 and 2010. However, in a 2008 survey regarding frequency of purchase and willingness-to-pay for organic produce among Hong Kong consumers, only 2.4 per cent of respondents indicated regular purchase of organic products. Respondents generally indicated that a major barrier to frequent purchase of organics in Hong Kong resided in price concerns, with 95.8 per cent agreeing that organic products were more expensive than other produce (Chan and Wong, 2008).

However, the Taiwanese organics market is disproportionately small in comparison with mainland China and Hong Kong, with this sector representing only 0.38 per cent of total agricultural production. A study attempting to establish demand elasticities for organic market growth in Taiwan revealed that the organics market can be expected to grow stably with increases in personal income, and with the provision of an increase of organic product availability to increase consumer access to these products (Huang-Tzeng and Lin, 2010). A similar study of Taiwanese consumer preference for organic products revealed a perception of these foods as being more healthy, natural, nutritious and sustainable than non-organic foods, indicating a positive attitude towards these products. In addition, this study identified that Taiwanese consumers found difficulty in interpreting organic food certification labels, and that aspects of food “neophobia” (the reluctance to try unfamiliar food types) had some effect on consumer purchase choice (Chen, 2007).

Similarly, India is considered to be the second-largest organic producer internationally, with 1.2 million hectares of agricultural land designated for export-driven organic production. India also houses several certification labels for organic produce, and is home to the second-largest number of producers involved in the Participatory Guarantee Systems initiative – an organic production verification scheme (FiBL and IFOAM, 2011).

There have been several studies conducted which investigate Indian consumer attitudes to GM food or other environmental factors. A study conducted in 2008 with regards to consumer attitudes towards GM food and pesticide residues revealed that Indian consumers held sound knowledge of the risks of pesticide residues in foods, and

demonstrated a mean willingness-to-pay for residue-free vegetables at more than 50 per cent above 2008 market prices. Conversely, 68 per cent of participants indicated a positive response to the introduction of GM vegetables for purchase, with only 17 per cent exhibiting a mild or strong opposition to this technology. This suggests that Indian consumers are more concerned with the purchase of pesticide-free foods than those that have utilised GM technology. [reference]

5.8 Water

Water supply and use issues are high on the global agenda as a concern for many consumers. As world populations increase, demand for freshwater resources is set to increase exponentially. The global population has tripled over the course of the 20th Century, with which use of renewable water resources has increased by 600 per cent. As the world population is expected to increase by 40-50 per cent of the next 50 years, water demand is expected to rise in a similar fashion (WWC, 2010).

On a global scale, most utilisation of water resources are taken up by agriculture, and often polluted or contaminated with industrial processes. In this way, water use has a direct link to production and consumption, which is expected to increase with population shift and higher levels of industrialisation across the developing world (Hoekstra et al., 2011).

5.8.1 Water scarcity and quality

Water scarcity represents a substantial concern for China. While China's renewable water resources represent the sixth largest internationally, amounting to approximately 2,841km³/year, the per capita availability of this resource is only estimated to be 2,156m³/year, showing disparity, equating to only a fourth of the international average for a large country. Lessening rates of rainfall and precipitation patterns, and low water productivity exacerbate this issue, especially with regard to agricultural water productivity, which currently represents 65 per cent of total water withdrawals (Xie, J., 2008).

Similarly, water resource issues in India represent a major issue. Pollution of water resources has increased over time, largely due to intensification of agricultural and industrial production. Incidences of arsenic contamination currently affects around 6 million people in the region of West Bengal, as well as saline water intrusion into groundwater resources around many coastal areas of India (Schwarzenbach et al., 2010). Pesticide contamination of groundwater due to residual intrusion has occurred frequently throughout regions such as the Ganga and Yamuna Rivers, with incidences of water resource pollution occurring on a highly regular basis (Agrawal et al., 2009).

High demand for water, tied with multiple water pollution issues, has meant that water resources are being depleted much faster than they can be replenished, with this trend expected to increase. When combined with adverse changes in precipitation patterns, increasing temperatures, and increases in the frequency and intensity of heat-waves through the region, this represents a serious issue around water strategy (HSBC/WRI, 2010).

5.8.2 Water footprinting

The concept of water footprinting, first introduced in 2002, has recently been gaining momentum as an indicator of water use for sustainable development. This is partially due to the efforts of a new initiative known as the Water Footprint Network, who operate as a research and consultancy network driven by assessment and implementation of sustainability credentials to water use on a local, national and global level.

A recent Water Footprint Network publication is a reference for interested parties to quantify their own water footprints, whether this be at a personal, industry or government level – The Water Footprint Assessment Manual (Hoekstra et al., 2011). This manual outlines methods of water footprint accounting, such as defining water release types (blue water = , green water = , grey water = polluted), methods for calculation of associated water use in crop or tree growth, consumer or group of consumers, businesses, geographical area (i.e. national water footprint accounting), as well as further methods for equating these values with an overarching level of “sustainability”. While the WFN’s methods have not yet been universally adopted on a national or global level to quantify associated water use, or as well-recognised globally as the concept of carbon footprinting, this may be an indication of a growing awareness of the concept.

There is also a further standard for water footprinting under consideration by ISO. This standard, which has been labelled ISO 14046, *Water Footprint – Requirements and guidelines* – is being drafted to assist already-used standards on life-cycle assessment (LCA) as well as ongoing carbon footprint metrics devised by ISO technical committee ISO/TC 207, *Environmental management*. At the first meeting of the ISO standard workgroup WG 8, it was stated that this standard would, if adopted, “deliver principles, requirements and guidelines for a water footprint metric of products, processes and organizations, based on the guidance of impact assessment as given in ISO 14044.” Additionally, the standard would define different types of water (i.e. groundwater) or methods of water release (i.e. *grey water* = polluted water (as defined by Hoekstra et al.)), address communication issues linked to water footprinting, as well as show high compatibility with the ISO 14000 series of environmental management standards.

There are currently several labels available for products which adhere to sustainable methods of water procurement and use in the production process. Much like carbon labelling, water footprint labelling provides sustainably-driver producers to voluntarily display the amount of water associated with the product, allowing consumers to compare associated water use of different products and assess their own impact on the environment through purchase decisions. These labels include the governmental China Water Conservation Certificate, which currently categorises products in 62 different categories based on the water efficiency utilised in the development and production process (EcoLabel Index(b), 2011).

The concept of national water footprints is also steadily gaining momentum. The current arbiter of knowledge relating to water footprints of nations is the Water Footprint Network, who provide key details and statistics on national water use, as well as several case studies on this concept. A case study conducted in 2008 attempted to quantify India’s total water footprint and general water usage. India’s total water consumption in the period 1997-2001 was 987 billion m³ per year, translating to 980m³/year per capita.

For example, the UK's current water footprint equates to the use of 1258m³ of water per year per capita, with 75.2 per cent of this water footprint falling outside of the country. By comparison, China's current water footprint equates to 1071m³/year per capita with 10 per cent falling outside the country, and India's current water footprint equates to 1,089 m³ per year per capita with 2.5 per cent of this falling outside the country. This is particularly significant in real terms when the population of each nation is taken into account, as China and India are currently the two most highly-populated countries internationally, wherein consumption is set to increase due to population changes (WFN, 2011).

There are currently significantly scarce resources relating to consumer attitudes to water footprinting and water footprint labels on products, especially amongst the specific Chinese and Indian markets.

5.9 Biodiversity and wildlife

Consumer concerns in relation to the retention of protection of wildlife and biodiversity in food production have shown some response among consumers in emerging markets such as China and India.

Chinese consumer attitudes to the protection of biodiversity and wildlife conservation have important implications concerning purchasing behaviour, with wildlife representing an important source of food. However, food procurement in particular provinces outweighs that of others, and does not represent consumption habits of China as a whole. In addition to this, the practice of illegal wildlife capture, trade and consumption has been indicated as a major cause of species endangerment in these regions.

In a study conducted in Southern China examining consumer attitudes to wildlife conservation and consumption as food products, 60 per cent of respondents indicated that they had consumed wildlife products in the previous two years, with reptiles and mammals being the most prevalent in wildlife trade. Respondents also suggested that the occurrence of illegal wildlife trade was due to insufficient policy and regulation regarding biodiversity and wildlife conservation in China. Wildlife consumption is, in fact, so common in these regions of China that among the highest purchasers of wildlife were Chinese urban residents (41 per cent), and common and high-grade restaurants and hotels (34 per cent). However, a majority of consumers agreed with either the "pure protection" of wildlife (43.2 per cent), or "conditional utilisation" of wildlife (43.3 per cent), suggesting that concern does exist surrounding current levels of wildlife consumption in this region of China (Zhang et al., 2008). However, this may not necessarily reflect a consumer demand for biodiversity and wildlife protection attributes in food products, and more research may be warranted.

Policy governing biodiversity and wildlife protection in India is currently housed within two key policy documents – the Biological Diversity Act (BDA) (2002) and the Biological Rules (BR) (2004). The Biological Diversity Act oversees the protection of some 19,625 native species of flora and fauna present in India, including 172 species which are considered globally threatened, from habitat loss and degradation, invasion of alien species, over-exploitation of natural resources by humans, pollution, diseases, and elements of anthropogenic climate change.

Specifically, the Act ensures government approval for export of native species, measures set to conserve and maintain sustainability of biological resources (incorporating habitat and species protection, integration of biodiversity into plans, programmes and policies of government and other departments, and the necessity of environmental impact assessments of projects), regulation for the use of genetically-modified organisms (GMOs), the establishment of local, state and national biodiversity funds for conservation projects, and the establishment of biodiversity management committees from a local village level to a National Biodiversity Authority (NBA). The document states that its purpose is for the “conservation of biological diversity, sustainable use of its components and for the equitable sharing of the benefits arising out of the use of biological resources” (Gol, 2003).

At this point it is difficult to verify Indian consumers’ attitudes towards food products which ensure protection of biodiversity and wildlife. However, several studies have revealed a general preference among Indian consumers to tolerate, and even revere, wildlife in many forms. For example, adherents to Hindu teachings revere many different species of both wildlife and domestic animals, regarding certain species as sacred and highly valued. In 1995 the world’s largest translocation of rhesus monkeys was undertaken in the Indian region of Vrindaban, which saw the movement of 1,338 of these animals to a new location in an attempt to ease human-animal conflict between the species.

The interactional nature of human activities with particular animal species has been caused in part with the conversion of native forest areas throughout India into agricultural land, which has threatened biodiversity and, in turn, generated much higher degrees of human-animal conflict (Imam and Malik, 2002). In relation to this, losses to agriculture in India caused by human-animal conflict have been highly documented. In the interior villages of the Bhadra Tiger Reserve in South India, between 1996 and 1999 each household recorded losses of approximately 12 per cent of total holdings to large felines (i.e. tigers and other species), with an additional 11 per cent loss of annual grain production (around 0.82 tonne per family) to elephant-caused damages (Madhusudan, 2003).

While such incidences contain many implications related to biodiversity and wildlife protection and its integration with human activities (including agriculture), indications cannot be given for a broad-spectrum approach of Indian consumers’ demand for products which ensure this protection. While cultural elements serve to present a natural predisposition to the protection of species in India, further research may be warranted to illuminate potential demands in these types of attributes in food products.

5.10 Animal welfare

Concerns for the welfare of production-based animals have generally shown low response from Chinese consumers. Animal welfare standards in food procurement and production have often been seen to be ineffective or ignored in mainland China, with the drafting of a proposed animal welfare bill banning the consumption of dog- and cat-derived meat illegal being met by a high level of public opposition. This is due to China’s traditional palette for dog and cat meat, with dog-based restaurants a common sight in Beijing, and cats being a popular dish in Southern China. In addition, laws ensuring the

protection of animals from cruelty are minimal, and often overlooked, with China's National Congress admitting that improvements were needed in this area of legislation (The Economist, 2010). In fact, no laws existed in the country prior to 2006 protecting the welfare of animals used in food production for cruel human interaction (Spencer, 2006). Furthermore, there are no government-supported animal charity organisations such as the RSPCA in the People's Republic of China, suggesting a general disregard for animal welfare and safety. This is at odds with neighbouring Taiwan, wherein high animal welfare standards (alongside environmental protection and religion) have been shown to be of perceived benefit in consumption of organic foods (Chen, 2007).

Traditionally in India, animal welfare has always been upheld as a cultural value. Many of the spiritual values held by Hindus, Buddhists or Jainists stem from adherence to doctrines which prohibit exploitation or mistreatment of animals. As a result, policy regarding good stewardship in animal protection, care and use has been prevalent in India for a number of years. The first such document to govern animal rights and welfare in India was the The Prevention of Cruelty to Animals Act, 1960, amended by Central Act 26 of 1982 (Gol (b), 1982).

There is currently a draft proposal called The Animal Welfare Act 2011 which aims to strengthen India's general efforts to protect and ensure better conditions for animals in food procurement and scientific research. The proposal outlines the roles of the Animal Welfare Board of India, as well as animal welfare boards at a state and local level, and outlines regulations relating to general cruelty to animals, animals used in experimentation and performance, as well as miscellaneous rules for animal treatment. However, it is not yet known when this will be implemented into Indian law (MoEF, 2011).

While India has always classically (and somewhat anecdotally) practised good stewardship of animal welfare, this does not necessarily reflect the nation's economic priorities. In past meetings with the World Trade Organisation, Indian officials, among many other official delegates, have stressed the importance of alleviating human poverty over adhering to strict animal welfare, as well as suggesting the right of countries to set their own standards in animal welfare (WTO, 2000). Similarly, Indian officials have rejected the proposal of an overarching labelling system in international trade for good animal stewardship, regarding these as "disguised barriers to trade" (Hobbs et al., 2002). More recently, however, animal welfare standards vary across Indian producers. For example, India is now the world's fifth-largest producer of eggs, with approximately 60 per cent of production still occurs in cage-based systems (Fraser, 2008).

India currently has a number of animal welfare awareness groups working on dissemination of information to consumers. *People for Animals* is India's largest animal welfare organisation (NGO), with key strategies including creation of animal welfare infrastructure (i.e. facilities for animal rescue and rehabilitation), influencing policy, and taking action against animal cruelty offenders. Perhaps the most salient aim of the organisation is the promotion of vegetarianism as an alternative diet, through which the organisation hopes to "source and promote animal-free alternatives", "educate on health, environment and economic costs of animal-based choices" and "enrol celebrity spokespeople to popularise cruelty-free choices". So far the movement has the support of a nationwide network of 26 hospitals, 165 units and 250,000 members, representing a

fair degree of concern over animal welfare issues in the country (PFA, 2011). Other groups contributing to animal welfare awareness in India include the Animal Welfare Board of India and In Defense of Animals India.

One such group, Brooke India, an off-shoot organisation of the London-based animal welfare improvement firm The Brooke UK, has offered an entirely different system for improvement of animal welfare conditions, in which animal owners themselves create animal care assessment programmes. These programmes are initially simple, but as knowledge and consideration of animal welfare increases, evolve into highly complex systems, with outside information facilitating programme development and maintenance (Pritchard, 2011).

5.11 Functional and fortified foods

Across many parts of Asia, demand for functional and fortified foods is increasing on a yearly basis. Functional/fortified foods are defined as food products which provide more than basic nutrition to the consumer. This already represents a strong market in Japan with its own regulatory process recognising these foods and 400 new foods being launched each year. There is also interest from other developed countries especially as populations' age. Already a number of products such as cholesterol reducing margarine have appeared. These foods are generally based on "natural" products or ingredients and thus do not raise the suspicion that new technologies do. In fact these products frequently emphasise their 'naturalness' and sustainability credentials, that is the minimum use of inputs and are often organic.

A large portion of global functional foods sales are attributed to Japan's growing functional food market, as the Asia-Pacific represents the second largest market. As food has an important role in Japanese culture for curing illness and treating general health concerns, the functional foods market has been growing in Japan at a fast rate. The market value of functional foods in 2007 was valued at US\$6.7 billion, up slightly from US\$6 billion in 2005 (NZTE, 2008).

China has shown high degrees of demand for functional and fortified foods over the past decade, with this trend expected to increase. This is particularly prevalent in urban areas, with the total Chinese functional foods market worth an approximate US\$6 billion annually (Kotilainen et al, 2006). Aspects of Chinese culture support this growth, with traditional Chinese medicine heavily supported by nutritional practices (i.e. food therapy)(Tang et al, 2008).

This industry experienced fast growth between the late 1980s and the late 1990s - this is aligned with increasing incomes and rapid rates of urbanisation. By late 2005, around 7000 domestic and 500 imported products had been approved by the Chinese government for commercial sale. Of these products, the majority encouraged improvement of the immune system (34 per cent), with other products promoting increases of energy (18 per cent) and adjusting cholesterol levels (16 per cent) (Kotilainen et al, 2006).

With reference to fortified foods, there has been some discussion at a government level in China of the possibility of the inclusion of micronutrients across a wide variety of

currently available food products to improve nutritional health of Chinese consumers. The Government of China has recently conveyed a desire to increase the level of micronutrients in foods to improve general health, and have indicated support for research into the biofortification of major grain crops (Pray and Huang, 2007).

India already boasts a well-developed and secure domestic market for “health and wellness” foods across several categories. This market correlates positively with traditional Indian Ayurvedic medicinal practices, wherein specific nutrition is encouraged as part of a holistic medicinal approach (Nichter, 1980). These include food products with reduced fats/sugars (i.e. “better for you” foodstuffs), natural products (i.e. 100% natural fruit juice) and functional/fortified foods (i.e. added mineral content). The increase in demand for these products across India can be attributed to rising incomes and increasing urbanisation, which has brought with it a desire to improve personal health via nutrition. Projections of demand for health and wellness products in India have shown a potential increase of 30 per cent between 2008 and 2015 (Tata, 2008).

Currently, products which have shown increased demand and incidental market presence in India include health food drinks (25 per cent of all F/F foods), iodised salt (20 per cent), biscuits (17 per cent) and edible oils (6 per cent). The more popular F/F food products on the Indian market are relatively new to the subcontinent, and have shown rapid growth since 2005, and are now worth an average \$20million per day on the Indian market. Edible oils are a staple part of the traditional Indian diet, and typically present concerns related to heart health. As a result, many of these products have adapted to “pro-health” formulae, with high acceptance recorded amongst Indian consumers (Tata, 2008).

Milk products currently experience a low market share of all available “health and wellness” products available in India, with around 80 per cent of milk sold as skim or toned milk. However, India’s largest food company Gujarat Cooperative Milk Marketing Federation has made a number of health and wellness products available, including 0% fat-content and calcium-fortified milk, probiotic curd products and low-fat ice creams. Other producers, such as Nestle India, Britannia and Marico are also adapting their products to meet this potential health and wellness demand in India (Tata, 2008).

There has also been some encouragement from experts for the inclusion of micronutrients across a range of food products to promote better nutritional health in Indian consumers. Nutritionists have asserted that there currently exists a broad-spectrum Vitamin D deficiency across the general populace of India, which has led to the recommendation of an increase in daily Vitamin D intake. Vitamin D is synthesised by the human body through adequate exposure to sunlight, however, due to the India’s increases in modernisation, with the inclusion of increased working hours indoors, pollution and other factors, exposure to natural sunlight is inadequate for many. A lack of Vitamin D in human biology can lead to the incidence of bone disorders, including osteoporosis, osteomalacia in adults, and the formations of rickets and other bone deformities in children. As a result, it has been recommended by Babu and Calvo (2010) that policies should be implemented which produce guidelines for the fortification or supplementation of food or other products with required levels of Vitamin D to combat this (Babu and Calvo, 2010).

References

Note: All electronic references sourced between October 29th 2011 and March 13th 2012.

- Agrawal, A. Pandey, R.S. Sharma, B. (2010.) *Water Pollution with Special Reference to Pesticide Contamination in India*. Journal of Water Resource and Protection: 2010 (2), pg 432-448.
- APCO Worldwide. (2010.) *China's 12th Five-Year Plan: How it actually works and what's in store for the next five years*. Retrieved from http://www.apcoworldwide.com/content/pdfs/chinas_12th_five-year_plan.pdf
- Aredy, J.T. (2011.) *China Lifts Farm Subsidies*. The Wall Street Journal Online. Sourced from <http://online.wsj.com/article/SB10001424052748703716904576133961987047574.html>
- Arup/Beijing Municipal Institute of City Planning and Design (BMICPD). (2010.) *Beijing hangxindian Low Carbon Community Concept Plan*. ISOCARP: Review 06.
- Ash, R.F. (2011.) *Feeding Billions: Food Security in China*. ISN Insights. Retrieved from <http://www.isn.ethz.ch/isn/Current-Affairs/ISN-Insights/Detail?lng=en&id=128073&contextid734=128073&contextid735=127105&tabid=127105>
- Babu, U.S. Calvo, M.S. (2010.) *Modern India and the vitamin D dilemma: Evidence for the need of a national food fortification program*. Molecular Nutrition and Food Research: 2010 (54), pages 1134-1147.
- Bailey, E-A. (2010.) *Incentives for Water Conservation in Gujarat*. Retrieved from <http://www.waterwideweb.org/incentives-for-water-conservation-in-guajarat.html>
- Barboza, D. (2007.) *China reveals deep consumer product quality problems*. The New York Times: Business. Retrieved from <http://www.nytimes.com/2007/07/04/business/worldbusiness/04iht-food.5.6497264.html>
- Barclay, E. (2010.) *Promoting the low-carbon life (and food choices) in Beijing*. Center for a Livable Future. Retrieved from <http://www.livablefutureblog.com/2010/07/promoting-the-low-carbon-life-and-food-choices-in-beijing>
- Best, D. (2012.) *Fresh concerns over food safety in China*. BRICS and Beyond. Retrieved from http://www.just-food.com/analysis/fresh-concerns-over-food-safety-in-china_id117983.aspx
- Betts, E. Christensen, L. Klein, C. Mura, N. Sturgess, B. (2010.) *Chinese Consumer Behaviour Towards Sustainable Kiwifruit Production*. Report for Zespri International Limited.
- Billett, S. (2009). *Dividing Climate Change: global warming in the Indian mass media*. Climatic Change: DOI 10.1007/s10584-009-9605-3.
- Bonini, S.M.J. Hintz, G. Mendonca, L.T. (2008.) *Addressing consumer concerns about climate change*. The McKinsey Quarterly; Strategy – March 2008.
- The Buddhist Network. (2010.) *Premier Wen: Low-carbon life, every Monday prime*. Retrieved from http://translate.google.com/translate?sl=auto&tl=en&js=n&prev=t&hl=en&ie=UTF-8&layout=2&eotf=1&u=http%3A%2F%2Fbig5.xuefo.net%2Fshow1_29344.htm
- Buono, L.D. (2010.) *Approaching COP16, India focuses on reducing carbon emissions*. ClimateAction (UNEP). Retrieved from http://www.climateactionprogramme.org/news/approaching_cop16_india_focuses_on_reducing_carbon_emissions/
- Campbell, T.C. Campbell, T.M. (2006.) *The China Study: The most comprehensive study of nutrition ever conducted and the startling implications for diet, weight loss and long-term health*. BenBella Books: Dallas, TX, USA. ISBN 1-932100-66-0.

- Carbon Offsets Daily (COD). (2009.) *Govt Moots Eco Label to Reduce Carbon Emission*. Originally sourced from Cxotoday.com. Retrieved from <http://www.carbonoffsetsdaily.com/news-channels/india-carbonmarketnews/govt-moots-eco-label-to-reduce-carbon-emission-10279.htm>
- Carbon Trust. (2011.) *China*. Retrieved from <http://www.carbontrust.com/about-us/china/pages/default.aspx>
- CCTV. (2010.) *Eating for a low-carbon world*. Retrieved from <http://english.cctv.com/program/newshour/20100121/103665.shtml>
- The Central People's Government of The People's Republic of China (CPGPRC). (2004.) *Foreign Trade Law of the People's Republic of China*.
- Chan, S.C.H. Wong, J.J.W. (2010.) *Consumer Behaviour on Organic Products in Hong Kong*. Hong Kong Organic Resource Centre: Hong Kong Baptist University, Kowloon Tong, Hong Kong SAR, People's Republic of China.
- Chen, M-F. (2007.) *Consumer attitudes and purchase intentions in relation to organic foods in Taiwan: Moderating effects of food-related personality traits*. *Food Quality and Preference*: 2007 (18), pg 1008-1021.
- China Chain Store and Franchise Association (CCFA). (2011a.) *2010 China Top 100 Chain Retailers Unveiled*. Retrieved from <http://www.chinaretail.org/shownews.asp?id=1986>
- China Chain Store and Franchise Association (CCFA). (2011b.) *China's Online Retail Sales Reaches 211.8b in Q3*. Retrieved from <http://www.chinaretail.org/shownews.asp?id=2269>
- China Chain Store and Franchise Association (CCFA). (2011c.) *Tesco Wins "Green Supply Chain Award"*. Retrieved from <http://www.chinaretail.org/shownews.asp?id=2290>
- China Chain Store and Franchise Association (CCFA). (2011d.) *Carrefour in Shanghai Procures Grapes Directly From Xinjiang*. Retrieved from <http://www.chinaretail.org/shownews.asp?id=2190>
- China Statistical Press. (2010.) *China Statistical Yearbook: 6.4 Exports Value by Category of Commodities*. Sourced from <http://www.stats.gov.cn/tjsj/ndsj/2010/indexeh.htm>
- Columbia Water Center. (2010.) *The work of Columbia Water Center in Gujarat, India*. Retrieved from <http://www.youtube.com/watch?v=p6f0ytmMEdM>
- Delgado, C.L. (2003.) *Rising Consumption of Meat and Milk in Developing Countries Has Created a New Food Revolution*. *Journal of Nutrition*: 2003 (133).
- Delgado, C. Rosegrant, M. Steinfeld, H. Ehui, S. Courbois, C. (1999.) *Livestock to 2020: The Next Food Revolution*. Food, Agricultural and the Environment Discussion Paper 28, International Food Policy Research Institute, Washington D.C.
- Department of Statistics Singapore (DoSS). (2011.) *Population Trends 2011*. Sourced from <http://www.singstat.gov.sg/pubn/demo.html>
- Deschamps, M.J. (2011.) *EU set to check Chinese rice for GM contamination*. Retrieved from http://www.just-food.com/news/eu-set-to-check-chinese-rice-for-gm-contamination_id117180.aspx
- Dong, F. Fuller, F.H. (2007.) *Dietary Change in China's Cities: Empirical Fact or Urban Legend?* *Iowa Agriculture Review*: Winter 2007, 3 (1). Retrieved from http://www.card.iastate.edu/iowa_ag_review/winter_07/article2.aspx
- Duan, H. (2010.) *The public perspective of carbon capture and storage for CO₂ emission reductions in China*. *Energy Policy*: 2010 (38), pg 5281-5289.
- EcoCert. (2007.) *China organic certification*. Retrieved from http://www.ecocert.cn/english/page_show.asp?id=2&idshow=593&lvid=2
- EcoLabel Index (a). (2011.) *Ecomark: India*. Retrieved from <http://www.ecolabelindex.com/ecolabel/ecomark-india>

- EcoLabel Index (b). (2011.) *China Water Conservation Certification*. Retrieved from <http://www.ecolabelindex.com/ecolabel/china-water-conservation-certification>
- The Economist. (2010.) *Animal welfare in China: Off the menu*. Sourced from <http://www.economist.com/node/15580840>
- The Economist Online. (2011.) *Walmart v Wumart*. The Economist Online. Retrieved from http://www.economist.com/blogs/schumpeter/2011/05/retailing_china
- eGov Innovation Editors. (2011.) *India's green IT spending to double in 2015*. Enterprise Innovation. Retrieved from <http://www.enterpriseinnovation.net/content/indias-green-it-spending-double-2015>
- Environmental Leader. (July 2010.) *Global GHG Emissions Remained Stable in 2009*. Retrieved from <http://www.environmentalleader.com/2010/07/02/global-ghg-emissions-fell-7-in-2009/?graph=full&id=1>
- Fangqing, W. (2011.) *Public access to Carrefour's food testing lab*. Retrieved from http://www.just-food.com/news/public-access-to-carrefours-food-testing-lab_id116847.aspx
- Food and Agriculture Organization of the United Nations (FAO). (2006.) *World Agriculture: Towards 2030/2050 – Prospects for Food, Nutrition, Agriculture and Major Commodity Groups*. Food and Agriculture Organization of the United Nations, Global Perspective Studies Unit, Rome. Retrieved from <http://www.fao.org/english/newsroom/news/2003/14640-en.html>
- Food and Agriculture Organization of the United Nations (FAO). (2011.) *FAOSTAT Database*. Retrieved from <http://faostat.fao.org/>
- Food and Agriculture Organization of the United Nations (FAO). (1999.) *Poverty alleviation and food security in Asia: lessons and challenges*. Retrieved from <http://www.fao.org/docrep/004/ab981e/ab981e00.htm>
- Food Safety and Standards Authority of India (FSSAI). (2006.) *Food Safety and Standards Authority of India (FSSAI)*. Retrieved from <http://www.fssai.gov.in/AboutFSSAI/introduction.aspx>
- Food Safety and Standards Authority of India (FSSAI). (2012.) *National Survey on Adulteration of Milk – An Overview*. Retrieved from <http://www.fssai.gov.in/Outreach/SurveysStudiesRD.aspx>
- Fraser, D. (2008.) *Toward a global perspective on farm animal welfare*. Applied Animal Behaviour Science: 2008 (113), pg 330-339.
- Fuller. (2004.) *China's growing market for dairy products*. Center for Agricultural and Rural Development. Iowa Agriculture Review: Summer 2004, 10 (3). Retrieved from http://www.card.iastate.edu/iowa_ag_review/summer_04/article5.aspx
- Future Group. (2011.) *Encouraging Environmental Stewardship*. Retrieved from <http://www.futuregroup.in/sustainability/environment-stewardship.html>
- Gale, F. Huang, K. (2007.) *Demand for Food Quantity and Quality in China*. United States Department of Agriculture: Economic Research Report No. 32, January 2007.
- GfK Social Research. (2009.) *Public Attitudes to Food*. A Report for the Food Standards Agency, United Kingdom.
- Gibson, E. (2012.) *Made in NZ to win Chinese hearts*. Sourced from <http://www.stuff.co.nz/business/industries/6401050/Made-in-NZ-to-win-Chinese-hearts>
- Government of India (GoI). (2009.) *Foreign Trade Policy 2009-2014: Highlights*. Retrieved from <http://164.100.9.245/exim/2000/dn/ftpdnl/high0910-eng.pdf>
- Government of India (GoI). (2002.) *The Biological Diversity Act, 2002*. Retrieved from <http://www.genecampaign.org/home/Biological%20Diversity%20Act%202002.pdf>
- Government of India (GoI). (2006.) *The Food Safety and Standards Act, 2006*.
- Government of India (GoI). (2011.) *The National Food Security Bill, 2011*. Retrieved from http://fcamin.nic.in/dfpd_html/Draft_National_Food_Security_Bill.pdf

- Government of India (GoI). (1982.) *The Prevention of Cruelty to Animals Act, 1960 (59 of 1960), as amended by Central Act 26 of 1982.*
- Heitzman, J., Worden, R.L (Ed.). (1995.) *India: A Country Study.* GPO for the Library of Congress: Washington, USA (1995).
- Hobbs, A.L. Hobbs, J.E. Isaac, G.E. Kerr, W.A. (2002.) *Ethics, domestic food policy and trade law: assessing the EU animal welfare proposal to the WTO.* Food Policy: 2002 (27), pg 437-454.
- Hoekstra, A.Y. Chapagain, A.K. Aldaya, M.M. Mekonnen, M.M. (2011.) *The Water Footprint Assessment Manual: Setting the Global Standard.* Retrieved from <http://www.waterfootprint.org/?page=files/WaterFootprintAssessmentManual>
- Hong Kong Trade Development Council (HKTDC). (2009.) *Guide To Selling In China: 6.2 Regulations on Food Labelling.* Retrieved from <http://www.hktdc.com/info/mi/a/bgdscn/en/1X05W400/1/Guide-To-Selling-In-China/6-2-Regulations-On-Food-Labelling.htm>
- HSBC. (2007.) *HSBC Climate Confidence Index 2007: Country Profile – India.* HSBC Holdings: London, UK.
- HSBC Climate Change/World Resources Institute (HSBC/WRI). (2010.) *Weeding Risk: Financial Impacts of Climate Change and Water Scarcity on Asia’s Food and Beverage Sector.*
- Hua, B. (2011.) *China Retail Sales to Surpass US in 2016, Official Says.* Business Forum China. Retrieved from http://www.businessforum-china.com/news_details/items/china-retail-sales-to-surpass-us-in-2016-official-says.html
- Huang, J. Zhang, H-L. Tong, W-J. Chen, F. (2011.) *The impact of local crops consumption on the water resources in Beijing.* Journal of Cleaner Production: 2012 (21), pg 45-50.
- Huang-Tzeng, C-J. Lin, Y-T. (2010.) *Demand elasticities of organic vegetables in Taiwan.* Organic Centre: National I-Lan University, No. 1, Sec. 1, Sheng-Nung Road, 260 I-Lan City, Taiwan.
- Imam, E. Malik, I. (2002.) *A successful mass translocation of commensal rhesus monkeys Macaca mulatta in Vrindaban, India.* Oryx: 36 (1), January 2002.
- IndiaMart. (2012a.) *Importing to India: Regulations and Procedures.* Retrieved from http://finance.indiamart.com/exports_imports/importing_india/regulations/index.html
- IndiaMart. (2012b.) *Export from India: Negative List of Exports.* Retrieved from http://finance.indiamart.com/exports_imports/exports_from_india/negative_list/index.html
- InfoDrive India. (2007.) *India Export Data and Statistics 2011: Top Export Products (Apr-2006 to Feb-2007).* Sourced from <http://www.infodriveindia.com/export-import/trade-statistics/top-products.aspx>
- International Food Policy Research Institute (IFPRI). (2003.) *Green Revolution: Curse or Blessing?* Retrieved from <http://www.ifpri.org/sites/default/files/pubs/pubs/ib/ib11.pdf>
- Jize, Q. Wei, H. (2010.) *UN hails China’s food policies.* ChinaDaily. Retrieved from http://www.chinadaily.com.cn/china/2010-12/24/content_11748462.htm
- Joshi, N. Mishra, D.P. (2011.) *Environment Friendly Car: A study of Consumer Awareness with special reference to Maharashtra State.* Information Management and Business Review: 2 (2), pg 92-98.
- Khare, A. (2011.) *Impact of Indian Cultural Values and Lifestyles on Meaning of Branded Products: Study on University Students in India.* Journal of International Consumer Marketing: 23 (5), pg 365-379.
- Kopalle, P.K. Lehmann, D.R. Farley, J.U. (2006.) *Consumer Expectations and Culture: The Effect of Belief in Karma in India.* Journal of Consumer Research (Forthcoming).
- Kotilainen, L. Rajalahti, R. Ragasa, C. Pehu, E. (2006.) *Health Enhancing Foods: Opportunities for Strengthening the Sector in Developing Countries.* The World Bank: Agriculture and Rural Development, Discussion Paper 30.

- Kraemer, S. (2009.) *President Obama Launches Secret Green Partnership With India to Cut Greenhouse Gas Emissions Despite Senate Boycott*. Scientific American. Retrieved from <http://www.scientificamerican.com/article.cfm?id=president-obama-launches-secret-gre-2009-12>
- Madhya Pradesh Pollution Control Board (MPPCB). (1998.) *Ecomark*. Retrieved from <http://www.mppcb.nic.in/ecomark.htm>
- MasterCard Worldwide. (2008.) *Brand Preference of the China Affluent*. MasterCard Worldwide Insights.
- McCluskey, J.J. Loureiro, M.L. (2003.) *Consumer Preferences and Willingness to Pay For Food Labelling: A Discussion of Empirical Studies*. Food Distribution Research Society: 3, pg 96-102.
- McCormick, M. Scurton, P/EIA. (2009.) *An Atlas of Pollution: The World in Carbon Dioxide Emissions*. Retrieved 26th October 2011 from <http://image.guardian.co.uk/sys-files/Guardian/documents/2011/02/10/CarbonWeb.pdf>
- McDonald's India. (2011.) *100% Vegetarian*. Retrieved October 27th 2011 from <http://www.mcdonaldsindia.net/menu/vegetarian.aspx>
- Ministry of Environment and Forests (MoEF). (2011.) *The Animal Welfare Act, 2011*. Retrieved from <http://moef.nic.in/downloads/public-information/draft-animal-welfare-act-2011.pdf>
- Ministry of New and Renewable Energy India (MNRE). (2010.) *Scheme for Watermills and Micro Hydel Projects (up to 100kW)*. Retrieved from <http://india.gov.in/govt/viewscheme.php?schemeid=264>
- Ministry of Urban Development India (MUD). (2011.) *Jawahar Lal Nehru Urban Renewal Mission*. Retrieved from <http://india.gov.in/govt/viewscheme.php?schemeid=1025>
- Mishram, U.S. Joe, W. (2010.) *Defining poor to defining rich: Gauging the middle class in India*. Economics Bulletin: 30 (4), pg 3321-3328.
- Nam, K-C. Jo, C. Lee, M. (2010.) *Meat products and consumption culture in the East*. Meat Science: 86 (2010), pg 95-201.
- NDTV. (2011.) *Government introduces Food Security Bill in Lok Sabha*. Retrieved from <http://www.ndtv.com/article/india/government-introduces-food-security-bill-in-lok-sabha-159887>
- Netherlands Environmental Assessment Agency. (2010.) *No growth in total global CO₂ emissions in 2009*. Retrieved from <http://www.pbl.nl/en/publications/2010/No-growth-in-total-global-CO2-emissions-in-2009>
- New Zealand Customs Service (NZCS). (2008.) *Exports to China – Certification and Trade Facilitation*. Customs Fact Sheet. Available from <http://www.chinafta.govt.nz/2-For-businesses/1-Doing-business-with-China/2-Exporting-goods-to-China/FactSheet38.pdf>
- New Zealand Trade and Enterprise (NZTE). (2009.) *Market Profile for Food Processing in India*.
- New Zealand Trade and Enterprise (NZTE). (2011a.) *Exporter Guide: Food and Beverage in India*.
- New Zealand Trade and Enterprise (NZTE). (2011b.) *Exporter Guide: India – Country Brief*.
- New Zealand Trade and Enterprise (NZTE). (2011c.) *Exporter Guide: Food and Beverage Market in Singapore, July 2011*.
- New Zealand Trade and Enterprise (NZTE). (2010.) *China – Country Brief*.
- Nichter, M. (1980.) *The layperson's perception of medicine as perspective into the utilization of multiple therapy systems in the Indian context*. Social Science & Medicine, Part B: Medical Anthropology: Volume 14, Issue 1 (pages 225-233).
- Noon, L. (2007.) *Dining with the Dragon*. Presented at the Anuga __, October 16th 2007. Retrieved from <http://www.noon-intl.com/blog/anuga-speech-by-lily-noon-oct-16-2007-presented-at-crystal-ice-awards/>
- Organisation for Economic Co-operation and Development (OECD). (2011.) *OECD Stat Extracts Database*. Retrieved from <http://stats.oecd.org/Index.aspx>

- Ortega, D.L. Wang, H.H. Wu, L. (2009.) *Assessing Consumer Preferences and Attitudes toward Imported Pork in Urban China*. Contributed Paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China; August 16-22, 2009.
- Paull, J. (2006.) *Provenance, Purity and Price Premiums: Consumer Valuations of Organic and Place-of-Origin Labelling*. Thesis, University of Tasmania. Available from <http://eprints.utas.edu.au/690/>
- Paull, J. (2008.) *The Greening of China's Food – Green Food, Organic Food, and Eco-Labelling*. Presented at the Sustainable Consumption and Alternative Agri-Food Systems Conference, Liege University, Alron, Belgium, 27-30 May 2008.
- Penev, A. Ivan, C. (2011.) *Chinese Consumer Attitudes towards the Electric Vehicle*. Master of Science in Business Administration/Strategy and Management in International Organisations: Linköping Universitet.
- People For Animals India. (2011.) *About PFA*. Retrieved from <http://www.peopleforanimalsindia.org/about-pfa.html>
- Pray, C. Huang, J. (2007.) *Biofortification for China: Political Responses to Food Fortification and GM Technology, Interest Groups and Possible Strategies*. AgBioForum: 10 (3), Article 5.
- Reardon, T. (2007.) *The Supermarket Revolution in Emerging Markets: Implications for the Produce Industry*. Michigan State University: Brief prepared for the Produce Marketing Association.
- Research Institute of Organic Agriculture (FiBL)/The International Federation of Organic Agriculture Movements (IFOAM). (2011.) *The World of Organic Agriculture: Statistics and Emerging Trends 2011*.
- Reuters. (2011.) *India's Dec 1 grain stocks sharply higher than targets*. Retrieved from <http://economictimes.indiatimes.com/news/economy/agriculture/indias-dec-1-grain-stocks-sharply-higher-than-targets/articleshow/11080749.cms>
- Saunders, C. Kaye-Blake, W. Cagatay, S. (2009.) *Analyzing Drivers of World Food Prices: Weather, Growth and Biofuels*. Contributed Paper prepared for presentation at the 27th Conference of the International Association of Agricultural Economists, Beijing, PRC: 16-22 August 2009.
- Schiermeier, Q. (2009). *Satellite data show Indian water stocks shrinking*. Nature: 460; 789 (2009) DOI: 10.1038/460789a.
- Schwarzenbach, R.P. Egli, T. Hofstetter, T.B. von Gunten, U. Wehrli, B. (2010.) *Global Water Pollution and Human Health*. Annual Review of Environment and Resources (2010).
- Sen, C.T. (2004.) *Food Culture in India*. Greenwood Publishing Group: Westport, CT, USA.
- Sethi, S. (2008.) *The Indian Food Industry; Opportunities Abound*. Retrieved from <http://www.technopak.com/02596116-1EF8-4FB0-9DF4-68760DDE33B5/FinalDownload/DownloadId-B70E86C87D5270B46FF09FEADF74FDAE/02596116-1EF8-4FB0-9DF4-68760DDE33B5/resources/Food/SIAL.pdf>
- SGS Group. (2010.) *First SGS Product Carbon Footprint (PCF) Label issued to Chinese Fishery*. Retrieved from <http://www.prlog.org/11149393-first-sgs-product-carbon-footprint-pcf-label-issued-to-chinese-fishery.html>
- Sheen, B. (2011.) *Foods of Korea*. KidHaven Press: Detroit, USA. Gale Virtual Reference Library.
- Smil, V. (2002.) *Eating Meat: Evolution, Patterns, and Consequences*. Population Development and Review: 28 (4), pg 599-639.
- Spencer, R. (2006.) *Just who is the glamorous kitten killer of Hangzhou?* The Telegraph Online. Retrieved from <http://www.telegraph.co.uk/news/worldnews/asia/china/1512082/Just-who-is-the-glamorous-kitten-killer-of-Hangzhou.html>

- State Environmental Protection Administration of China (SEPA). (2004.) *General Introduction to the Environmental Labelling Program in China*. Retrieved from http://www.sepacec.com/cecen/labelling/introduction/200406/t20040629_94143.htm
- Statistics New Zealand (StatsNZ). (2011.) *Global New Zealand: International Trade, Investment, and Travel Profile – Year ended June 2011*. Sourced from
- Steinfeld, H. Gerber, P. Wassenaar, T. Castel, V. Rosales, M. de Haan, C. (2006.) *Livestock's long shadow: environmental issues and options*. Food and Agriculture Organization of the United Nations: Rome, Italy.
- Sudershan, R.V. Subba Rao, G.M. Partima, R. Vishnuvardhan, R.M. Kalpagam, P. (Unknown.) *Perceptions of women on food safety – A case study in Hyderabad, India*.
- Sundblad, E-L. Biel, A. Garling, T. (2009.) *Knowledge and Confidence in Knowledge About Climate Change Among Experts, Journalists, Politicians, and Laypersons*. *Environment and Behavior*: 41 (2), pg 281-302.
- Synovate. (2007.) *Climate change and consumer behaviour*. Retrieved from http://www.synovate.com/changeagent/index.php/site/full_story/climate_change_and_consumer_behaviour
- Synovate. (2010.) *Climate change concern remains high across the globe, says Synovate and Deutsche Welle global study*. Retrieved from <http://www.synovate.com/consumer-insights/infact/issues/201005/>
- Tait, P. Miller, S. Abell, W. Kaye-Blake, W. Guenther, M. Saunders, C. (2011.) *Consumer Attitudes towards Sustainability Attributes on Food Labels*. Paper presented at the 55th Annual AARES National Conference, Melbourne, 2011.
- Tang, J-L. Liu, B-Y. Ma, K-W. (2008.) *Traditional Chinese Medicine*. *The Lancet*: 372 (9654), page 1938.
- Tata Strategic Management Group (Tata). (2008.) *The Health and Wellness Foods Industry in India: An Overview*. Retrieved from http://www.ibpcosaka.or.jp/network/e_abg/e_india_abg_annual_report_Health.pdf
- Vegetarian Times. (2008.) *Vegetarianism in America*. Retrieved from http://www.vegetariantimes.com/features/archive_of_editorial/667
- Wang, Z. Mao, T. Gale, F. (2007.) *Chinese consumer demand for food safety attributes in milk products*. *Food Policy*: 33 (2008), pages 27-36.
- Walmart. (2011.) *India Fact Sheet*. Retrieved from <http://walmartstores.com/download/1996.pdf>
- Water Footprint Network (WFN). (2011.) *National Water Footprints: Your country*. Retrieved from http://www.waterfootprint.org/?page=cal/waterfootprintcalculator_national
- Webb, S. (2011a.) *India: Retail reform “put on hold”*. Retrieved from http://www.just-food.com/news/retail-reform-put-on-hold_id117568.aspx?lk=dm
- Webb, S. (2011b.) *Wal-Mart outlets close over “green pork” scandal*. Retrieved from http://www.just-food.com/news/wal-mart-outlets-close-over-green-pork-scandal_id116943.aspx
- Webb, S. (2011c.) *Greenpeace accuses Tesco of illegal pesticide levels in China stores*. Retrieved from http://www.just-food.com/news/greenpeace-accuses-tesco-of-illegal-pesticide-levels-in-china-stores_id116625.aspx
- WebJapan. (2011.) *Japanese Food Culture*. Retrieved from http://web-japan.org/factsheet/en/pdf/e36_food.pdf
- WHO/FAO. (2003.) *Diet, nutrition and the prevention of chronic diseases – global and regional food consumption patterns and trends*.
- World Trade Organisation (WTO). (2000.) *Summary Report on the Third Meeting of the Special Session Held on 28-29 September 2000*. World Trade Organisation: Committee on Agriculture, Special Session. G/AG/NG/R/3, 10th November 2000. (00-4774)

- World Water Council (WWC). (2010.) *Water Crisis*. Retrieved from <http://www.worldwatercouncil.org/index.php?id=25>
- Wumart. (2011.) *Philosophy and Corporate Culture*. Retrieved from <http://www.wumart.com/html/en/About3.html>
- Xie, J. (2008.) *Addressing China's Water Scarcity: A Synthesis of Recommendations for Selected Water Resource Management Issues*. World Bank Publications: Herndon, VA, USA.
- Yadav, Y. Kumar, S. (2006.) *The food habits of a nation*. The Hindu Online. Retrieved from <http://hindu.com/2006/08/14/stories/2006081403771200.htm>
- Yu, C. (2011.) *China's water crisis needs more than words*. *Nature*: 470 (307). Retrieved from <http://www.nature.com/news/2011/110216/full/470307a.html>
- Zhang, L. Hua, N. Sun, S. (2008.) *Wildlife trade, consumption and conservation awareness in southwest China*. *Biodiversity Conservation*: 2008 (17), pg 1493-1516.