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The mega cities, mega waste ‘last mile’ challenge

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ABSTRACT: Across Asia, rapid growth of mega cities is driving change in retail outlets and consumer purchasing. Mega city economies are increasing the purchasing power of millions of people, creating the middle class of Asia. Many Asian consumers are internationally educated and are adopting the food habits of western consumers. Increasingly, shelf-ready packaged meats, cheese and imported fruit and vegetables are now purchased from supermarkets rather than local wet markets. In the past, most of Asian food wastage occurred post-harvest, during distribution to wet markets. Congested mega cities have limited cold storage systems and most food continues to be transported in non-refrigerated trucks. Travel times have increased along congested roads and much imported and local food has lost its freshness long before it reaches the consumer. This results in very short shelf life and increased waste. The systemic failures across food distribution and waste management systems are resulting in mega waste. Unsorted waste, from the ‘last mile’ (distribution centre to consumption), ends up in open landfills on the edges of cities. The challenge is immense. This and the next four presentations explore some of the technology and policy drivers that can help us to understand the problem, including creating energy from waste, and helping consumers make informed choices.

Keywords: Asia, regional value chain, chilled food, food quality

This overview focuses on the stage of the food supply chain just before the supermarket stage that we heard about from Dr Daryanto (this Proceedings). My presentation is particularly about the issues common to the ‘last mile’ – the mile between the food reaching the city and its arrival at the retail environment.

The growth of mega cities is exponential. In the 1950s, the world had half a dozen large cities and they were mainly in Europe. By 2015, there had been a shift and Asia has become the epicentre of growth. There are cities of over 35 million people across Asia and they are constantly growing.

To get a feel of what that mega city is like, imagine we bring an extra 500 people into this room, and we turn off the air conditioning and we bring in a few trucks and waitresses and we all try and grab food. As well, we have only got one or two fridges, and the electricity has just gone off because a monsoon has occurred so we have an ‘on-off’ state of infrastructure to deal with.

That is the type of complexity and chaos that is defining the ‘mega city’ experience in many of these emerging countries. It is a long way from the organised environment of Canberra. Keep that in mind, because we need to

This is an edited transcript of the presentation, with some of the powerpoint slides shown.



Figure 1. Australians need to understand developing food trends and challenges in Asia.

think in a different paradigm when we are considering some of the issues around food waste (Figure 1).

The other trend that is happening in Asia is that food is changing. People are becoming busier – becoming like us, with Western-style jobs in these cities. They are taking on our lifestyles, urbanisation, skyscrapers ... and our types of food. That is, food that is emanating from other parts of the world rather than locally: particularly protein, chilled packaged foods, milk, cheese, and so on. Supermarkets are replacing wet markets.

The food-buying environment, the way people buy food, has changed also. E-commerce is rapidly becoming a way of buying food, because of the congestion. In Western cities the big supermarket chains have put their supermarkets at the outside edges of the cities, on the assumption that everybody has a car. That model failed quickly in Asia, and is being replaced by a new model of how people live and buy food in these condensed cities.

This is resulting in mega waste. These cities are the entry points for numerous supply chains – regional, rural, and global supply chains – and the cities are developing so quickly that they do not have the cold chain and food storage infrastructure that large Western cities have developed incrementally over the last 50 years as those cities have slowly expanded.

Types of supply chains

To explore the functioning of supply chains we looked at fresh food coming into Thailand from, say, Australia. We looked at grapes. They came in refrigerated containers by ship, were off-loaded, kept refrigerated, went into an Australian-owned cold-store chain and then either went straight to high-end supermarkets in Bangkok, or to Bangkok’s regional wholesale market. This market occupies 80 hectares. It is under cover, but is otherwise in the open air with no air conditioning.

From the wholesale market the grapes were shipped out either to local wet markets (Figure 2) or to somewhere else across that Asian region. The bottom



Figure 2. Aspects of supply chains for fresh food, observed in Thailand.

photo in Figure 2 shows the type of truck that would carry these grapes, which had arrived by first class delivery from Australia. This truck was probably going to take them to Cambodia – hundreds of kilometres in tropical heat.

The ASEAN regional value chain is the third type of supply chain involved here, apart from the global and rural supply chains. Massive amounts of food and animals – live or dead – and various grains are being transported across continents on regional supply chains. These continents have highly variable infrastructure, and numerous logistics providers: from large corporates such as LinFox, Toll, DB Schenker, through to small family businesses and single providers, through to people who borrow somebody’s car and shove the food in the back to take it to the market.

The consequence of this is huge differences in quality, all the way across the supply chains, and there is also a lot of waste across these chains (Figure 3). You can imagine the condition of those grapes after they had gone from Bangkok to Cambodia on a bumpy road. They would have been sold, but probably half of that truckload would have been squashed.

Chilled food chains

The other mega-trend that is taking off in Asia is chilled food. Asian customers are moving from wet markets to supermarkets, with shelved packaged meats and dairy, and all the things that we have in our supermarkets; those long counters where we have grown accustomed to choosing a product, reading its use-by date, and taking it home to our fridge.

Disruptions across regional value chains

- Variable infrastructure, roads, rail
- Numerous logistics providers
- Variable quality control at farm, market and retail
- Consequence; waste

Figure 3. Some characteristics of regional value chains inland in Asia.

These are temperature sensitive foods (Figure 4) and they are different to frozen foods. Frozen foods, a carcass or a block of ice, can take hours to defrost. However, when chilled foods are transported over large distances, the temperature should only vary by one or two degrees. If drivers and local people in regional areas are not familiar with these types of foods, they turn off the truck when they stop for a coffee break and a smoko, and that will also turn off the refrigeration around the chilled food. We had discussions in Vietnam and Thailand about our suspicions about chilled foods and supermarkets. People are not sure how to handle the chilled foods, so there is a great deal of education to do for this new trend. Yet at the same time, just one chain is starting 10,000 new supermarkets in Vietnam in the next five years. The growth is exponential.

2. Chilled packaged food

- Shelf ready meat and dairy
- Temperature sensitive products
- Requires a high level of quality control
- Drivers, retail managers and consumers uninformed about chilled and frozen handling requirements
- Consequence: short shelf life, contamination, food poisoning and waste



Figure 4. Availability of chilled packaged food is another new mega-trend in Asia.



Figure 5. In Asian mega cities, the last mile looks like this.

The last mile

In Asian mega cities, the last mile looks like Figure 5. Compare it to Australia and our comfortable highways. Some countries, such as Thailand, have fairly good highways, but the cities are so huge that the traffic gets very congested at the end of the journey. Other countries have virtually no infrastructure: perhaps only one or two cold rooms in the whole country, and the rest of the road network looks like Figure 5. This has problems because it is very hard to manage food quality in this very complex and diverse environment. That is why understanding food distribution and trade is very important for our region, because, speaking as an Australian, it is very hard for us to export products into many of these countries. We cannot control how the food will end up by the time it gets to the supermarket.

On the other hand, the Vietnamese farmer, say, cannot export food products because they do not have the infrastructure to get the produce to the port in the premium condition that the export market requires. This is why our research is focusing on this particular area of understanding: how to manage food distribution for importing and exporting, to deal with this new trend.

Challenges

Challenges arise because development is rapid, chaotic and uneven, and it is causing systemic failures in food distribution. The waste that is produced from these food chains is packaged; it contains inorganic materials including plastics; it is unsorted; and many of these mega cities do not have the facilities that we have in Australia to deal with that type of waste.

Another challenge is that we tend to talk mainly about either the high-end consumer with the fridge, or else about the farm waste, on-farm and that early supply-chain stage. We need to think about this middle area – this pre-supermarket space, this very crowded room – before we start sending goods into that space (Figure 1). These mega cities are growing without the infrastructure to deal with their own growth and so this waste problem is just going to be exacerbated.

Policy challenges

From the policy point of view, there needs to be a focus on structures that can be set up to deal with the problems. Among these will be cold chain logistics and infrastructure. Education can play a huge role: education about food quality and management; the requirements of chilled food; why chilled food is different.

Other policy areas will be how to separate waste; how to regulate for that. Most of the local government areas in Asia do not charge rates. A lot of these people are at a different point in the socio-economic scale. Consider how Australian cities’ rates have crept up as we have moved along a 20-year trajectory of managing waste. For many of these cities which do not have that type of infrastructure, private partnerships will be really important. The logistics companies, the supermarkets, they have an interest in this space. Waste is costly for them. Food loss is huge and they cannot grow their businesses without growing in the way they manage their products. There is a huge role here for R&D.

Alice Woodhead is a member of the Australian-ASEAN Council which aims to increase knowledge and promote Australia’s interests in South East Asia. She is an award-winning agricultural social systems scientist, and has been Professor of Value Chains and Food Systems at the University of Southern Queensland since February 2015. She leads a research team at the Australian Centre for Sustainable Business and Development that specialises in developing value-added agricultural products for export to Asia. Alice works closely with industry and government on product innovation and managing the complexity of value-adding to agricultural commodities in rural Australia and in developing countries. Previously, she was an independent consultant providing advice for industry on natural resources, supply chains, corporate social responsibility and sustainability practices. Alice also has extensive policy experience in both the public and private sectors. For nearly 20 years Alice occupied strategic research positions in agriculture for the New South Wales and Commonwealth Governments.

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