

Strategic Analysis Paper

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The Wasteful Dragon: Food Loss and Waste in China

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Key Points

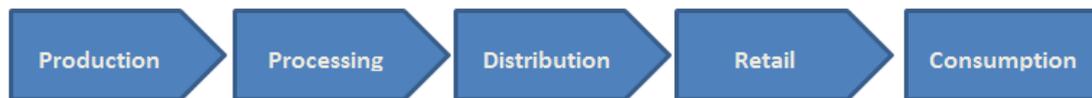
- China loses or wastes at least six per cent of the food that it produces.
- Reducing lost and wasted food would help to reduce undernourishment, generate positive economic results for retailers and consumers and ameliorate environmental pressures.
- Mechanisation, access to secure food storage facilities and improved transport logistics will help to reduce food loss, while changing cultural attitudes to food waste will help to limit the amount of food thrown away.
- Implementing modern solid waste management principles, such as the sorting of household waste, will help to ensure that unavoidable food waste is put to good use.

Summary

Food loss and waste undermines food security and addressing it can provide economic, social and environmental benefits. Food is lost or wasted at each stage of the Chinese food supply chain but, as with other middle-income countries, more food is beginning to be wasted in the consumption stage. Implementing legislative and regulatory changes will help to address food loss and waste but, more importantly, efforts to alter cultural attitudes towards food will also need to occur if food loss and waste is to be effectively minimised.

Analysis

Globally, [one-third](#) of the food produced for human consumption - approximately 1.3 billion tonnes - is lost or wasted each year. Food loss and waste occurs at various stages of the food supply chain, from harvest to the final stage of household consumption. Generally, food that gets spilled or spoilt before it reaches the retail stage of the supply chain is called food loss. Any food that is thrown away at the retail or consumption stage of the chain is referred to as waste.



The five stages of the Chinese food system. Food loss and waste occurs at each stage and during transport between stages.

Estimates suggest that China generates [17-18 million tonnes](#) of food waste each year – enough to feed 30-50 million people. Another study, which includes food loss, suggests that more than [35 million tonnes](#) of food – equal to six per cent of all the food produced in China - is lost in household and warehouse storage, transport and processing. Chinese consumers waste considerably less food than the [60 million tonnes](#) that consumers in the United States throw away. If the Chinese population continues to become wealthier, however, the amount of wasted food is also likely to increase as this has been the experience of other developing countries.

The Chinese food system shares characteristics of both high- and low-income countries. Its supply chains stretch long distances, but it continues to rely on under-resourced small-scale farmers. A small portion of food, about two per cent, is lost during the transportation stage of the food supply chain. Most food is wasted at the [consumer stage](#), outside of Chinese homes. Restaurants account for most food waste, with 19 per cent of food waste attributed to these establishments and about five to seven per cent of food wasted in homes or canteens.

While China successfully halved the number of its citizens living in extreme poverty and hunger, in line with the UN Millennium Development Goals, there are still [135 million](#) undernourished people residing there. Most of these people live in rural areas and, while they generally receive enough calories to survive, they do not have access to a wide enough range of food to obtain all the nutrients they require for a healthy life.

Reducing food loss and waste has economic, social and environmental benefits. A recent [study](#) found that for every \$1 companies invested in the reduction of food loss and waste, they saved \$14 in operating costs. As global hunger increased in 2017 and 135 million Chinese are undernourished, reducing the amount of food lost and wasted would have considerable social benefit. A reduction in the amount of agricultural inputs (water, land, labour and fertiliser, for instance) that are wasted as an extension of food loss and waste would also help to reduce environmental pressures generated by the agricultural sector. Reducing loss and waste in the Chinese agricultural sector would also help to curb greenhouse gas emissions, by as much as 200 megatonnes of CO2 equivalent per year by

some [estimates](#). Most importantly, China has [almost completely utilised](#) the 120 million hectares of arable land available to it for food production and it cannot continue to develop new agricultural land. A reduction in food loss and waste will alleviate the need to increase crop yields or develop new agricultural land.

Food Loss

Chinese agricultural production is based on small-scale production, with [184 million farms](#) growing crops on an average of 0.7 hectares of arable land. The small-scale of many farming operations contributes to postharvest loss due to inadequate infrastructure and a lack of access to robust storage facilities.

There has been some success in encouraging agricultural consolidation. Smallholder farmers have the option of transferring their land allocation rights to a co-operative, which often provides access to modern machinery, equipment repair and other agronomy services. Since 2006, [more than 40,000](#) such co-operatives have formed. These co-operatives help smallholder farmers gain access to modern farming methods, increase farm productivity and minimise crop losses.

Mechanised agriculture has become more common in China, with [60 per cent](#) of the ploughing, planting and harvesting of crops now done with machinery. Inefficient design of harvesting machinery leaves a large amount of crops – up to ten per cent by some estimates – in the ground after harvest, however, leading to significant amounts of food loss. The widespread adoption of efficient agricultural machinery will help to reduce on-farm food loss.

According to one [study](#), poor storage is the second-largest cause of food loss and waste in China. The Chinese State Administration of Grain believes that [one-third](#) of the country's grain storage facilities are old and in poor condition. More than half of China's total grain production of 609 million tonnes is stored in farmer households. These facilities are generally in poor condition, leading to the loss of more than [20 million tonnes](#) of food, mainly due to insects, moulds and birds. Central storage systems operated by the Chinese Government are generally better at minimising food loss than household storage facilities and, with the 2015 launch of the [Purchasing and Storage of Food Supply Security and Construction Plan](#), efforts are underway to provide farmers with greater access to these facilities.

Improved supply chain logistics will become more important in China as food imports continue to rise. A lack of cold storage is believed to have resulted in [failed contracts of direct beef supplies](#), highlighting the importance international suppliers need to attach to Chinese logistics. Australian produce is currently held in high regard in China due to its safe and clean image, but this could very quickly change if temperature-sensitive foods are not handled with care in the supply chain.

Food Waste

Despite experiencing one of the most severe famines of the twentieth century, Chinese society appears to be generally unconcerned by food waste. The amount of [control that the](#)

[state](#) retains over the historical record could partly explain this attitude. It would seem, however, that culture also affects general attitudes towards the wastage of food. The Uighurs of western China abhor food waste, whereas the Han Chinese, which make up most of the population, are generally unperturbed by leaving food-laden plates uneaten at the end of a meal.¹ To some extent these attitudes could be explained by the climatic differences of the regions in which these communities live. In eastern China, where the climate is more conducive to food production and the population is wealthier, waste is more likely to be tolerated. Providing abundant food to guests is an important part of conveying hospitality in Han Chinese culture and ordering more food than you can eat is a signifier of social status. In the west, where the dry and arid climate is less conducive to agriculture, food waste is more likely to be frowned upon.

A grassroots campaign that encouraged Chinese consumers to “Empty Your Plate” was launched in Beijing in 2013. The campaign encouraged people to [spread the message via Weibo](#), a Chinese social media site. The widespread attention that it received caught the attention of the central government, which later launched a series of policies to reduce food wastage. One such policy, which was linked to President Xi Jinping’s wider anti-corruption drive, [called for an end to lavish banquets](#) hosted by government officials. The China Consumers’ Association also asked restaurants to abolish minimum fees, which often result in customers ordering more food than they could eat to avoid an additional service charge. While the Empty Your Plate campaign has begun to change Chinese attitudes towards food waste, there is still much work to be done.

Closing the Loop: Recycling Food Waste

While it is more desirable to reduce and redistribute food, some of it will inevitably be wasted, either because it has spoiled or is otherwise inedible. Most of this unavoidable waste could safely be recycled for animal feed, soil enrichment or energy generation but, as is the case worldwide to varying degrees, most Chinese food waste is sent to landfill or waste incinerators on the periphery of cities.

Food waste makes up [56 per cent](#) of 300 million tons of municipal solid waste (MSW) that China produces each year, compared to less than 30 per cent in many developed countries that have well-established waste sorting processes. China is producing MSW at a [faster rate](#) than the rest of the world, it surpassed the US as the world’s largest producer in 2004 and it is predicted that by 2030 China will produce twice as much MSW as the US.

In many Chinese cities, the infrastructure that encourages the sorting of waste does not exist or is underdeveloped. Household infrastructure for waste separation exists in many Chinese cities, but once the waste is collected it is [mixed together](#), making the whole separation process pointless. Beijing implemented garbage sorting in 2000, and in 2012 it encouraged households to participate in kitchen waste recycling. Reviews of these initiatives, however, suggest that waste separation remains low, with approximately [15 per cent](#) of the waste stream being accurately sorted.

¹ Tristram Stuart, *Waste: Uncovering the Global Food Scandal*, (Penguin: London, 2009), pp. 199-201.

Beijing has [ten food waste treatment centres](#) which are able to process two thousand tonnes of food waste per day. The centres grind food waste into water, carbon dioxide and organic solids that are further refined into fertiliser. The city is building five more waste treatment centres as existing ones are unable to process the 2,600 tonnes of food waste produced by the 40,000 restaurants and dining halls across the city each day.

Food waste recycling could become a significant industry for China, particularly as it continues to urbanise and waste streams become more concentrated in urban areas. Improving waste sorting, at the household and waste processing facility level will be integral to the development of this industry.

Conclusion

A considerable amount of food is lost and wasted in China, perhaps enough to feed upwards of 100 million people. Reducing food loss and waste will be essential to ensuring Chinese food security. Promoting the adoption of mechanised agriculture, and improving the design of farm machinery to ensure that crops are harvested efficiently, will help to reduce on-farm food loss. Increasing access to modern storage facilities will help to reduce the amount of food lost in storage. Where increased access is not possible, education and access to pest management tools will assist farmers in managing their on-farm storage facilities. Reducing food waste in retail and household settings will require legislative and regulatory change. While the central government has begun to make these changes, altering popular attitudes towards food waste will be a far more challenging, and very necessary, task.

Any opinions or views expressed in this paper are those of the individual author, unless stated to be those of Future Directions International.