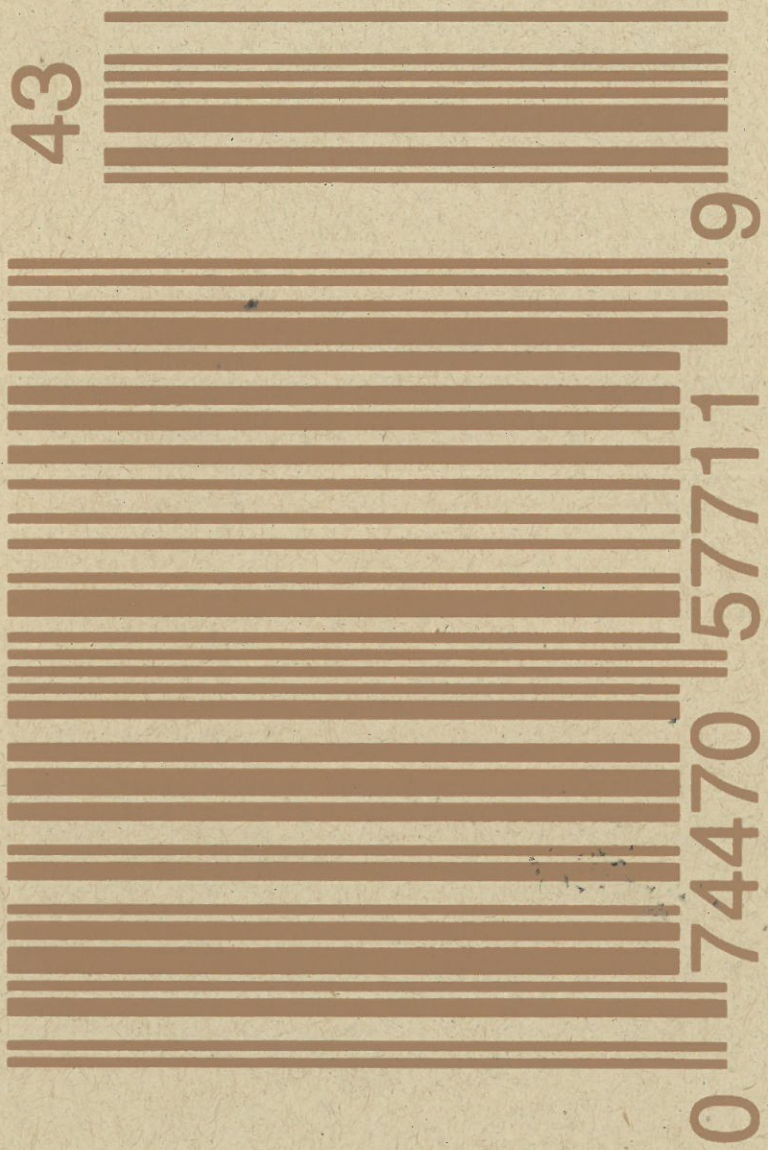
Harvard Design



Shelf Life

Magazine

No. 43 — F / W 2016

Keeping It Fresh

Daisy Tam, Tomas Holderness, Melissa Cate Christ

Left: Bread surplus outside Yamazaki Bakery, Hong Kong, 2016. Yamazaki typically donates surpluses, but like many other bakeries, their outlets are spread across Hong Kong and all close at the same time, straining volunteer coordination. An NGO reported that out of 80 bakeries that are willing to donate, only 30 or so are picked up from. Right: Discarded food on the street outside a supermarket, Hong Kong, 2012.

How do we keep a loaf of bread fresh? How do we stop it from expiring? In a supermarket, the "best before" date—a time-stamped, data-backed guarantee from the manufacturer—is the loaf's primary indicator of freshness. In practice, though, there is great variability in whether food is perceived as fresh or expired. Some consumers, regardless of the storage method, will discard food that is past its best before date, while others may transform a hardened loaf into bread pudding or breadcrumbs, substantially extending the shelf life assumed by a manufacturer. According to the United Nations Food and Agriculture Organization, approximately one third of the planet's food, roughly 1.3 billion metric tons, is lost or thrown away unnecessarily each year.

What we call "waste" is in fact a classification system that industries use to designate liability, and that we in turn absorb and act upon, often unconsciously. As the anthropologist Mary Douglas writes in her 1966 book *Purity and Danger: An Analysis of the Concepts of Pollution and Taboo*, "there is no such thing as dirt; no single item is dirty apart from a particular system of classification in which it does not fit." Revealing the structuring capacities of our culture, Douglas allows us to challenge waste as an inherent, fixed category and focus instead on the structural process by which food becomes waste. By reclassifying waste in the (dis)organization of our food system, we can address the conditions necessary to prolong shelf life.

Hong Kong, with a population of 7.2 million people where one in six lives below the poverty line, imports over 90 percent of its food. In 2015, the city spent $20.9 billion to import 7.3 million metric tons of food, of which 1.4 million metric tons ended up as waste. Food is the single largest category of municipal solid waste, accounting for 35 percent of the city's landfill space. Unlike other cities that have implemented food and organic waste recovery programs, Hong Kong's organic waste reduction policy is only in its infancy. This leaves much of the burden of food rescue to NGOs and charities, which are challenged by the time-sensitive nature of reusing fresh food, legal and bureaucratic hurdles, and the closed nature of the food supply chain (according to the USDA, two supermarket chains account for 75 percent of all supermarket turnover in Hong Kong).

Similar to food expiration, the enclosure of data and software in "closed source" systems that control food supply chains leads to data and code degradation, and eventually to digital, or bit, rot. Even when data and software are placed in "cold storage" (i.e., offline), decay in physical media and rapid technological changes mean that over time data becomes unreadable and software unusable.

To minimize food waste, increase food security, and reduce hunger we need to disrupt and reconfigure supply chain topologies. Open protocols must be established to share information and enable new configurations for supply chain structures that include residents, NGOs, governments, and the private sector. Whether food or data, methods of maintaining freshness require a counterintuitive mode of preservation. Instead of preventing decay or contamination through environmental isolation, keeping things fresh and "alive" requires open environments that facilitate constant circulation.

To address these challenges, we are developing free and open-source strategies. Our project, HKFoodworks, aims to crowdsource the logistical challenges of surplus food collection—namely the small window of time for collection across disparate geographical locations. We are working with two NGOs to improve the efficiency and coverage of their bread rescue programs. Our web application maps bakery locations where bread donations are available and determines the most efficient collection routes. Critically, this application is powered by open and transparent data integration: routing from OpenStreetMap, addresses of bakeries supplied by the NGOs, and the locations of volunteers via location-enabled smartphones.

In recent years, both NGOs have collected shop-level food rescue data from their donor bakeries. By sharing this data, donors have been able to tailor production and distribution according to proven demand, reducing food waste at a fine-grained spatial resolution not previously captured by proprietary supply chain technologies. The challenge now is to convince donors to integrate their data into our open-source software to further optimize food rescue operations. In this configuration, the system would facilitate real-time intervention—for instance, by alerting volunteers as to how much bread is available for collection after closing time. In this manner, harnessing the data as a resource, we can more effectively crowdsource collections so that the amount of "expired" bread thrown away by the retailer is reduced.

Through the development of this application we have demonstrated that the shelf life of food and data is linked to proprietorship—closed data systems that enforce possession via arbitrary metadata classification structures. These closed systems can be compared to supermarkets that throw bleach over expired food to discourage dumpster diving, maintain optimum pricing, or avoid liability if someone falls ill. Such practices willfully poison food to claim ownership over the waste and restrict access. These acts of privatization, although supposedly intended to preserve and safeguard information, market share, or food health and safety, in fact contribute directly to the decay of resources.

By disrupting linear and closed food networks, our project aims to open up practices that allow for the sharing of food and data. The principle of "use it or lose it" drives our efforts to examine the ways in which objects become waste and challenge the classification systems that render them useless or unusable. By creating a system where we deploy open data to recirculate existing food, we circumvent the very need for food rescue, thereby preventing fresh and edible food from being transformed into, and stored as, waste.

Daisy Tam is assistant professor at Hong Kong Baptist University where she teaches and does research on urban food systems and practices with a particular focus on food security.

Tomas Holderness is a chartered geographer and research scientist at the MIT Urban Risk Lab. As a geomatics specialist he investigates the use of geospatial technologies as infrastructure for climate adaptation, specifically mapping the response of cities to extreme weather events.

Melissa Cate Christ is a landscape architect, a research assistant professor of design at Hong Kong Polytechnic University, and founding director of transverse studio, a collaborative practice that intersects trajectories of landscape, culture, urbanism, and infrastructure through a documentary process of investigation, design, and activism.