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THE CRAWFORD FUND
For a Food Secure World

WASTE NOT, WANT NOT

The circular economy to food security

The Crawford Fund
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Conference overview

Dr Denis Blight AO FRSA



On the surface, the issue seems disarmingly simple: reduce food loss and waste, and the world will be a better place – more food to go around and less drag on the earth's finite resources. Right? Well, yes, no and maybe.

On average, food loss and waste are said to total about one-third of total production. Whilst estimates and the nature of losses and waste vary across locations and more precise measurements are still needed, it is generally accepted that food losses are greater in least developed and developing countries and food waste is more prevalent in the developed world.

Loss and waste occur across the whole food chain, from field to fork and from producer, processor and trader to consumer, and the costs of these losses and wastage are borne, unevenly some argue, across the same range of actors. Poor farmers in the developing world may lose crops to pests and diseases – both before harvest, and afterwards because of lack of reliable on-farm storage. The effects on their livelihoods can be devastating. For others in the value chain, long regional supply chains without adequate cold or chilled storage or safe means of transport contribute to further losses. Elsewhere, over-consumption and waste in developed countries may increase demand for food – to the delight of some farmers but to the detriment of health and global resources.

During this one-day conference we heard that to reduce losses in the food supply chain requires substantial investment in, for example, practical and policy innovations, and improvements in transport, in infrastructure, and in storage and packaging. We wondered to what extent will the cost of the investments outweigh the benefits of reduced waste? What form might the currently elusive but ultimately effective policies and practices take? The more we learnt, the more complex this matter seemed to become: everything seemed to depend on everything else.

Fortunately, as the conference progressed its pattern of overview presentations followed by practical case studies pointed to ways forward.

Want not, warm not

In her keynote presentation, Dr Karen Brooks of the International Food Policy Research Institute (IFPRI), argued that measuring food loss and waste, identifying where in the food system it occurs, and developing effective policies and affordable practices along the value chain are essential steps towards addressing the problem. Measurement and analysis help to determine who gains from a reduction in losses and who loses, and the answers are not straightforward.

Environmental impacts of waste and loss can re-balance the cost–benefit equation substantially: fewer resources are lost to wasted production; the

environmental footprint of disposal is reduced; and greenhouse gas emissions from production, marketing and disposal are lowered to global benefit. In this regard, Brooks combined the ‘want not’ and ‘warm not’ agendas and argued that food security and environmental management should underpin action. Brooks also discussed the important role of individual awareness and behaviour among consumers and as producers – a point that has also been raised in several of previous Crawford Fund conferences, such as by speakers Professor Jonathan Foley in 2012 (*The Scramble for Natural Resources*) and Dr Helen Szoke in 2014 (*Ethics, Efficiency and Food Security*) among others.

In a key conclusion for governments, donors and the private sector, Karen Brooks emphasised the importance of investment in agricultural research and increased trade to complement reduction of losses.

On-farm losses

The first overview presentation, by Brian Lipinski of the World Resources Institute’s Food Program, was on on-farm losses. Having reminded us of estimated proportions of losses and waste by geographic region and stage of the entire value chain, Lipinski pointed out challenges of addressing on-farm losses at international scale. These include their extreme context-dependence, and the dispersed nature of farms and farm loss, and the underlying lack of good data and consistent definitions of food loss and waste. An important step forward that should help clarify matters, he told us, is the Food Loss and Waste Protocol and its *Food Loss and Waste Accounting and Reporting Standard* (FLW Protocol 2016) – a set of global definitions, practices and reporting requirements that enable companies and governments to define, measure and report on food loss and waste. This global standard has resulted from a multi-stakeholder effort with FAO, UNEP, The Consumer Goods Forum, the World Business Council, FUSIONS, WRAP and the World Resources Institute. Later in the day we heard that Nestlé had been one of the companies contributing. The Protocol and standard are online.

Among the case-study speakers, four people addressed innovative ways to tackle on-farm losses. Rodrigo Ortiz explained how AgResults is making good headway in Kenya, for example, with public funding of a prize mechanism to stimulate private sector investment in high-quality affordable storage systems. Farm livelihoods are being turned around thanks to storage solutions. This message was reinforced by Simon Costa later, as he described how he had personally succeeded in improving crop storage on African farms.

Reducing crop losses caused by pests and diseases during production is being achieved in Laos via an innovative program building diagnostic capacity in rural areas, as Madaline Healey (University of the Sunshine Coast) described. And in a similar but different way, CABI is combating plant pests and disease in Africa through its Plantwise programme. Washington Otieno outlined how CABI trains extension staff to recognise symptoms and recommend solutions to farmers coming to plant clinics, with online support from databases and advanced expertise.

Packaging, transport and processing: farm gate to fork

Losses don't stop at the farm-gate. Professor Ashok Gulati (of ICRIER¹), in his overview confirming the broad loss and waste data presented by Brooks and Lipinski, asked 'Why bother?'. He answered his own question with clear views on benefits: a combined economic value of food lost and wasted close approaching US\$1000 billion; if only a quarter of food is saved it would be enough to feed 870 million hungry people, and it would save precious resources of land, water and energy and the environment (and make for a cleaner atmosphere). Savings could, he said, deliver higher prices for farmers and lower prices for consumers. In developing countries such as India, losses occur in distribution channels and processing as well as in farm operations. Gulati outlined the potential for practical and policy innovations to improve farm equipment, packaging, storage infrastructure, transport and low levels of processing. Waste at the consumer level in the developing world is minimal, he pointed out, while summarising some causes of food waste in the developed world, including standards for the look of fresh products, and misunderstood date-marking systems. His proposals for Uber tractors and solar-powered cooling of market retailers' push carts were among practical innovations that grabbed the audience's attention, as did policy to support cooperatives aggregating small farmers' produce.

Two case studies in this session illustrated practical measures in the postharvest chain. Salesh Kumar's research, with colleagues from the University of the Sunshine Coast and elsewhere, has pinpointed physical risk factors along the tomato supply chain in Fiji, suggesting relatively easy ways to reduce the waste of damaged fruit. And in Timor-Leste, Dr Joanita Jong runs a program for the Ministry of Agriculture and Fisheries, vaccinating village chickens against Newcastle Disease, keeping them alive to scavenge protein and micronutrients to the benefit of local people who eat the chickens and eggs.

What can supermarkets do?

In a special-case presentation, the paper by Dr Arief Daryanto and Dr Sahara Sahara of Bogor Agricultural University asked what can supermarkets do to reduce food loss? They have particularly examined supermarkets in Indonesia, which are rapidly growing in number. Although food loss at the retail stage may be a relatively small share (a few per cent) of total food loss, the total loss volume remains significant in kilograms per person per year, according to FAO figures. Supermarkets are located close to the end of the food chain and are increasingly significant in developing countries.

Their study of the fresh product department of one leading supermarket chain in Indonesia has shown that fresh fruits and vegetables are most susceptible to loss, reducing supermarket profits, and they have recommended eight ways of reducing losses.

Management and re-use of waste

Professor Alice Woodhead (University of Southern Queensland) overviewed the exploding problem of food waste in Asia. She highlighted the global shift

¹ Indian Council for Research on International Relations

to an urbanised world of megacities with 10 million people or more: Tokyo 33 million people; Manila, Mumbai, Delhi and Jakarta 14 million and growing. Asian people now have busy urban lifestyles, and are increasingly middle-class, eating western-type diets that are protein-rich, chilled and packaged, and sold through supermarkets and, increasingly, e-commerce. Megacities have grown too fast to develop waste-management systems at scales needed for the population density, leading to mega waste. Delivery of fresh produce – whether over the ‘last mile’ into city centre supermarkets or across regional areas and national borders in rural areas – is challenged by a lack of understanding of chilling needs and cold chain infrastructure. Food waste is a common consequence.

Problems of produce management in Australia and Asia are different, Professor Woodhead said, and Australia needs to understand the Asian situation if we are to export fresh produce there successfully. From the policy point of view, there needs to be a focus on cold chain logistics and infrastructure. Education is important – about food quality and management; the requirements of chilled food; why chilled food is different; and about waste management. There is a huge role here for R&D.

The final four case-study speakers showed us how much we can gain by reuse of food waste. First Dr Steven Lapidge (SARDI²) reminded delegates that ‘every nutrient is sacred’. He said the world needs a nutrient retention paradigm. That thought was then amplified by Dr Cedric Simon (CSIRO), Dr Bernadette McCabe (University of Southern Queensland) and Dr Dana Cordell (University of Technology Sydney).

CSIRO, we heard, has found a way to add nutrients to crop wastes and create a commercial ‘wonder food’ called Novacq™ for raising fish in aquaculture, replacing the need to feed them on fishmeal made from real fish. Dr McCabe focused on biogas which can be produced from abattoir wastes and household food scraps, for example, as a community resource for cooking, light and heating in developing countries. And Dr Cordell explained how phosphate can be recycled from all organic sources in the food system, including human sewage.

Nestlé’s war on waste: a journey through the supply chain

The final keynote was delivered by a representative from the private sector, Daniel Lagger, Executive Director, Technical and Production, Nestlé Oceania.

Nestlé claims it has been ‘providing safe and nutritious food for 150 years’, and now has around 335,000 employees and 436 factories in 85 countries producing around 2000 brands for sale in around 189 countries. Corporately Nestlé has set a long-term goal of zero waste for disposal. Lagger gave us some encouraging examples to show how the company is working towards that goal by avoiding food waste and improving resource efficiency along the value chain: for instance, in water usage for growing coffee in Vietnam; in harvesting of cocoa and composting of cocoa waste in Ivory Coast; in reducing milk loss and lifting quality and sustainability on dairy farms in China; in tailoring trucks to the products

² South Australian Research & Development Institute

they carry for maximum efficiency; and in visualising and aiming for ‘dream’ packaging. Where possible, he said, they try to reuse materials and create value from them, at any and all points along their supply chains. His concluding words, while spoken in relation to Nestlé, are globally applicable:

‘There is no single silver bullet for waste. Good waste-reduction starts with drive from the top, plus extensive external collaboration, plus an eye for opportunities that can enable thousands of small and large projects to eliminate, reduce, reuse and recycle. ... Those who measure waste can better manage it; those who commit to a path can effect true change. That is good news for people, business and the planet.’

Overall

From the Sir John Crawford Memorial Address by Professor Louise Fresco (of Wageningen University) on Monday evening 29 August, to its conclusion in the evening of Tuesday 30 August, this conference succeeded in putting forward practical and potential ways in which food loss and waste should be conquerable, globally. It attracted over 280 delegates from across Australia and the world (pp. 150–57), and gained considerable media attention (pp. 158–68).

Professor Fresco’s address, titled ‘The Future of our Food’, while not recorded for publication in this Proceedings, resonated strongly with the dinner guests and was often referred to during the presentations during the main conference. Professor Fresco also joined keynote speakers Dr Karen Brooks and Mr Daniel Lager in the closing Panel Discussion (pages 135–44) – a session that maintained and rounded out the upbeat messages of the day.

I join our Board in sincerely thanking all who have been involved in this conference, and particularly our sponsors (pp. iv–v) for their support.

Reference

FLW Protocol (2016). *Food Loss and Waste Accounting and Reporting Standard*. World Resources Institute, Washington, D.C., USA. 160 pages. www.flwprotocol.org.

Dr Denis Blight AO FRSA, the Chief Executive of the Crawford Fund, has had a career including positions as an Australian diplomat, public servant and chief executive. His association with international agricultural research began in earnest some 25 years ago. Prior to working for the Crawford Fund, he was Director-General of CAB International, an intergovernmental body in research, training and publishing in the life sciences, and had 15 years with IDP Education Australia, the international development program of Australian universities and colleges, including the position of Chief Executive.

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