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

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ABSTRACT: Nestlé celebrates its 150th anniversary in 2016. Behind such a long history, questions of sustainability and protecting the future have always been key. With increasing water scarcity, constrained natural resources and declining biodiversity, we need to protect the future by making the right choices. We focus on continuous improvement in our environmental performance everywhere we operate, to provide products that are not only tastier and healthier but that also are better for the environment along their entire value chain. Our goal is to send zero waste to landfill from our factories globally by 2020. Over the last ten years, our focus on reducing waste for disposal has seen waste reduce by 75%, with one in five factories now generating no waste. However, we also consider waste more holistically, looking at all steps from agriculture and ingredient production, to the factory, in the supply chain and through to the consumer's home. This approach requires detailed target setting as well as an in-depth understanding of behaviours and systems in different countries, both those that lead to waste, and systems that manage waste. In addition, Nestlé is focusing strongly on reducing food loss and waste, both upstream in agriculture and through to the retailer and consumer. This is a crucial part of the journey to feed a growing global population and contribute to meeting the target of the Sustainable Development Goals to halve per capita global food waste by 2030. With 436 factories in 85 countries making products sold in 189 countries, the company aims to improve resource efficiency, quality and productivity in our operations to do more with fewer resources and less waste. The story of Nestlé's approach to waste and recovery is one of both high-level commitment and deeply detailed activity, supported by external collaboration. This reflects the breadth and complexity of its operations. This paper presents broader industry trends with respect to waste, and why this fits in with broader corporate social responsibility and sustainability issues for companies in general, while giving specific Nestlé examples.

Keywords: food losses, food waste, supermarkets

This year, Nestlé is celebrating its 150th birthday. Milestones are a time for reflection – what got us here; what made us who we are; where next? In Nestlé, we ask the same questions: How did we get here? What will take us to another 150 years? How do we protect the future? What are the right choices, now, that will give us genuine sustainability?

Nestlé is a significant business by any scale (Figure 1). The mindset that we bring to our environmental performance is more important than ever. Today,

This is the paper and some of the illustrations that Daniel Lagger presented at the conference.

Figure 1. Nestlé is a significant worldwide business that has been operating now for 150 years.

we confront issues of increasing water scarcity, constrained natural resources, declining biodiversity, and climate change, so the importance of making the right choices could not be more clear. How we think about waste is obviously a key part of this.

Of course, reducing waste should be a no-brainer for every business. Waste has a cost. Waste is things we have purchased or created that have cost us time, money and other resources. To not use them is to have invested resources in something with no return. That makes no sense. This is something the entire food and beverage industry knows.

However, it is not enough to simply say we want to reduce waste. Rather, we have to take an end-to-end look at our supply chain, upstream to basic research and agriculture and right through to the retailer and on to the consumer (Figure 2). We need to deeply understand what waste looks like, how it comes about, and how we can do better. This takes both an eye for detail, and creative thinking.

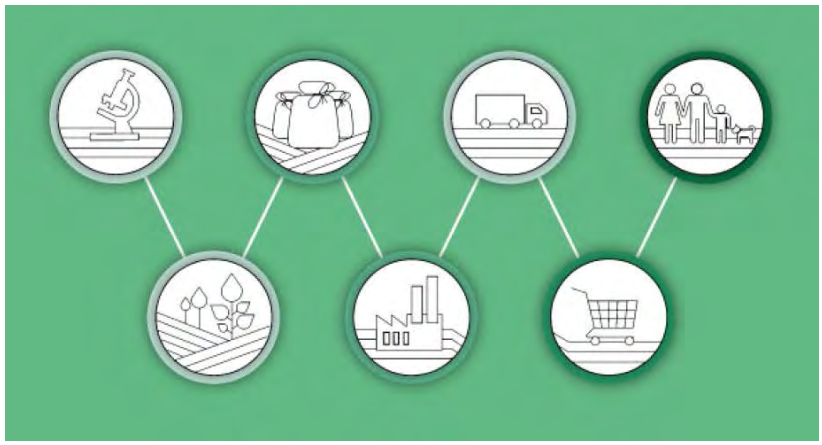

Figure 2. Planning for no waste: set targets, measure, constantly review.

In a world facing increasing constraints on natural resources, Nestlé has set this simple but ambitious long-term goal: zero waste for disposal. We are making progress against a number of interim targets by preventing and minimising the waste we generate in the first place, by avoiding food wastage and improving resource efficiency along the value chain, and where possible we try to reuse materials and create value from them. It is not one project but hundreds, even thousands, across Nestlé's 436 factories, and out to the ends of our supply chain.

Nestlé thinking globally

According to the Food and Agriculture Organization of the United Nations (FAO), about one-third of global food production is wasted worldwide each year (Figure 3). Either perfectly edible food is thrown in the bin, or food is lost when it spills, spoils, bruises or wilts before it reaches the consumer.

In an age where 800 million people go hungry, the significance of that waste is extraordinary; the challenge for our industry no less so.

Food waste causes 8% of human-produced greenhouse gas emissions. If it was a country, this wasted food would be the world's third highest emitter of greenhouse gases, behind China and USA, and the water needed to grow this food would fill Sydney Harbour 475 times.

The United Nations' 2030 Sustainable Development Goals acknowledge the seriousness of this problem. We particularly note Goal 12.3:

> 'By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.'

In response, in January 2016, our CEO Paul Bulcke joined a new coalition, Champions 12.3, to accelerate progress towards fulfilling this goal. Subsequently, we, together with our peers in the Consumer Goods Forum – a coalition of more than 400 of the world's largest manufacturers, retailers and service providers – resolved that forum members should halve food waste from their own operations by 2025.

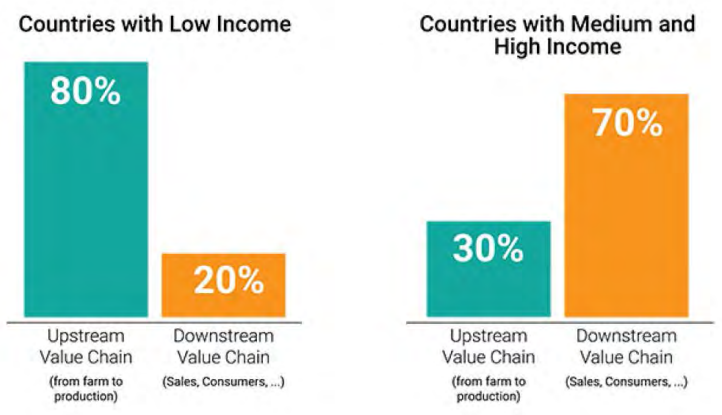

Figure 3. Worldwide, food waste is an issue: resources invested for no return.

One major hurdle to progress for both industry and government has been a lack of consistent guidance on how to reduce food waste. For that reason, Nestlé, as a company already measuring food waste, played a key role in developing the first global standard to help companies and governments reduce food loss and waste (see also Lipinski, this voume). Members of this partnership include the Consumer Goods Forum, the FAO and the World Resources Institute.

This standard, the *Food Loss and Waste Accounting and Reporting Standard* (FLW Protocol 2016), was launched in June at the 3GF Global Green Growth Forum in Copenhagen. It provides the first-ever set of global definitions and reporting requirements for companies, countries and others to consistently and credibly measure, report on and manage food loss and waste. It has been hailed as a real breakthrough because, for the first time, countries and companies will be able to quantify how much food is lost and wasted and where it occurs. Not only can they then report on it credibly and consistently, but identifying hotspots will be the first step towards developing new strategies and monitoring progress.

This serious problem will require a great deal of focus at global and local levels, and for this reason, we are actively involved in a number of other multi-stakeholder initiatives to reduce food loss and waste.

Nestlé acting locally

Internally, Nestlé's Zero Food Wastage Taskforce coordinates our efforts to drive our food wastage initiatives across our value chain, share good practice and guide multi-stakeholder initiatives. Last year, this Taskforce launched our commitment to reduce food loss and waste, which addresses food loss and waste through responsible sourcing, zero waste for disposal in our sites, educating consumers and employees on reducing food waste, and engaging with key stakeholders – such as regulators and scientists – to develop and implement solutions.

Worldwide, 54% of this lost and wasted food comes from the upstream value chain – in production, handling, post-harvesting, and storage – and 46% comes from the downstream – in transformation, distribution and at consumption. In developing countries, this skews more strongly towards production at the farm. These are also the countries where hunger is more likely to be a concern.

At the farm

As a buyer of raw materials grown by more than 4,000,000 farmers, and with direct buying relationships with 760,000 farmers, we have an extraordinary capacity to support change. We can help reduce on-farm losses by helping farmers to farm more productively. For instance:

- in Vietnam, by helping coffee farmers to use the right amount of water – not too much, not too little, and to water at the right time to maximise their productivity without wasting water;
- in the Ivory Coast, by training cocoa farmers to harvest cocoa pods and ferment and dry the cocoa in a way that preserves the cocoa and keeps the quality high – while teaching them to compost the waste for the future of their trees;

- and in farming globally, by continuing to contribute to farm capacity-building – from propagation to post-harvest storage, farm animal health, care and welfare, breeding better plants more fit for purpose, farm management and record keeping, and water conservation, irrigation and soil fertility.

By contributing to the efficiency of their farms and a path to market, not only do we help secure supplies of the agricultural raw materials we need, but we also positively impact society by supporting rural development, water conservation and food security and reducing food waste and farm losses at that critical stage.

Storage, handling and transport

As food moves from the farm towards the factory, food companies are able to help farmers decrease post-harvesting food loss.

To do this, Nestlé has created a new initiative called Vital First Mile, which brings our colleagues with experience and expertise in transportation and storage to Nestlé teams around the work to optimise that First Mile and minimise losses between the farm gate and the factory gate.

Reducing these post-harvest losses in our upstream value chain helps us ensure supply of agricultural raw materials, and also supports rural development, water conservation, and food security. For our suppliers, the Vital First Mile initiative will help farmers, raw material pre-processing suppliers and logistics providers to reduce post-harvest and storage losses and thereby save costs.

Our first Vital First Mile project in Qingdao, China, enabled Nestlé to successfully transform dairy farming operations to dramatically decrease milk loss. Having collected milk in the area for 20 years, Nestlé decided to transform its model with a streamlined approach to milk collection which would reduce milk loss and collection costs while increasing quality and improving dairy farming sustainability. Nestlé provided financial support to help farmers buy equipment to improve cow productivity and milk quality and decrease waste milk production, then backed this up with regular training and technical support for farmers on topics such as reducing milk loss and improving quality.

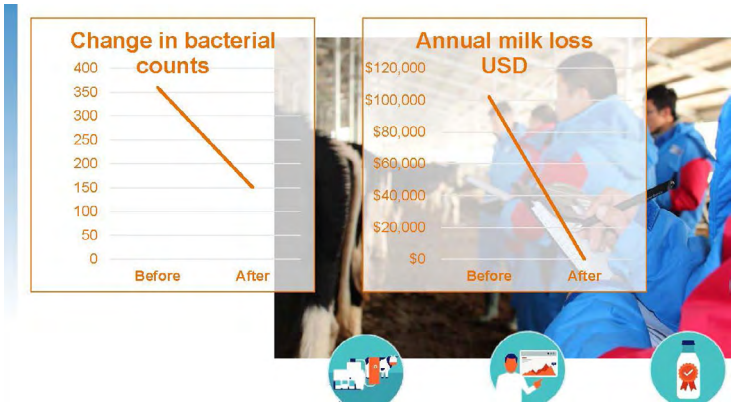

Figure 4. Better milk quality and less annual loss resulting from the Vital First Mile project at Qingdao, China.

The outcomes have been significant. Bacteria counts in milk have dropped by over 50%, and the amount of milk lost to poor quality or because of antibiotic use has gone from US$102,000 worth of milk to no loss at all (Figure 4).

This is a new project for us, but early signs are promising.

In the factory

Clearly, the part of the supply chain at which food companies have most control over waste is in our own factories. Nestlé has set itself the objective of zero waste for disposal across all our 436 factories by 2020, across all forms of waste. Waste for disposal is any material that leaves our factory for final disposal with no economic or ecological value such as landfilling and incineration without energy recovery (Figure 5).

We are well on the way: by the end of last year, 105 factories – that is 22% – had achieved zero waste for disposal.

Using best practice from those factories, we have developed a Zero Waste for Disposal Guideline. We recognise that every factory is different, every factory has different forms of waste and different challenges, and every location has different waste management opportunities. This guideline helps each site to understand the challenge they may face in their journey towards zero waste for disposal; discover the recycling, recovery and reuse destinations of different materials such as coffee grounds, tea leaves and coffee capsules; compare economic costs and benefits of achieving zero waste for disposal; and share tools and examples of best practice implemented across the company globally to help all our sites prevent, reuse and recover waste for disposal and by-products. As a result, every Nestlé factory has projects to reduce waste, with the goal of zero in mind.

As manager of 12 very different factories across three countries, with many forms of waste, I can confidently say that there is no one-size-fits-all approach. But I am impressed by the power that setting a hard target can have on the

Figure 5. Nestlé's objective is zero waste for disposal from all 436 factories by 2020.

capacity of a factory team to grapple in a meaningful way with the waste generated within a factory.

A few local examples will give a sense of the diversity of both the problem and the solutions.

- At our factory in Gympie, Queensland, which makes instant coffee, spent coffee grounds go into a biomass boiler – providing 65% of the energy used at that factory. Not only is it an effective way to use waste, but it has reduced carbon emissions, disposal to landfill, and meant significant cost savings. The same model is used today in 22 Nescafé factories worldwide.
- At the Uncle Tobys snacks and cereals factory on the Murray River between NSW and Victoria, setting a challenging goal led to 46% reductions of waste for disposal, and a further 44% in successive years; the range of approaches include recovering by-products, recycling, and selling oat hulls as animal feed.

I am also inspired by what can happen when people become genuinely engaged with the problem.

- At our Blacktown factory in western Sydney, we worked with the TAFE (technical college) to provide training for staff to encourage them to grapple with the problem of waste. Engagement was so high that our factory workers were using their own personal time to make contact with businesses and local government to try and find better paths for the factory's waste. This very motivated and fired-up group has not only transformed waste at this factory but also the project to manage waste has refired the factory's entire culture.
- At our Milo factory, at Smithtown on the NSW mid-north coast, we are actually using waste from another industry! We take sawdust from the local timber industry and use it as an energy source. As a result, 85% of the energy we use in that factory is not only from a renewable source but is part of ensuring another industry has a stream for its waste. But why stop there? The resulting ash from the biomass boiler then goes to a gardening company for composting.

Chocolate to biogas

There are a dizzying array of innovative different approaches outside Oceania as well. For example, in the UK we have developed an anaerobic digestion system at a confectionery factory which turns confectionery waste into renewable energy and clean water.

Essentially, a 'chocolate soup' of waste is fed into an airtight tank, where bacteria break it down. The biogas that is a by-product of this process produces enough heat and power to meet about 10% of the site's energy needs. While the technique has been used in agriculture and industry for centuries, what makes this factory's process unusual is that it has been designed to handle a high volume of solid and liquid waste within a short time. The system is converting about 4 tonnes of solid waste and 200,000 litres of liquid waste every day. It is also improving the quality of water discharged from the factory so that it is now virtually clean on release from the site.

While the system was expensive to set up, the reduction in the waste-disposal costs and energy bills means it should pay for itself in four years.

There are some challenges we have not solved – particularly in locations around the world where the infrastructure to manage waste is not sufficiently developed. Nonetheless, having met some targets already, we remain committed to our 2020 goal.

Transport and supply

Food and beverage companies have further opportunities to manage and reduce waste as we look beyond the factory gates to the downstream supply chain that takes finished products to warehouses and retailers before consumers buy it.

In Nestlé, we need to be sure that our trucks are fit for purpose. For example, we have purpose-designed trucks (Figure 6) to carry breakfast cereals which are large volume and lightweight. Cereal boxes have different needs to, say, glass jars of Nescafé. Clearly, a truck that is not full is wasting fuel and resources. We plan truck movements to ensure trucks are fully loaded, and partner with others to make sure we are not moving empty trucks. For example, working with CHEP we have redesigned our trucking so that after offloading our products the empty truck is loaded with CHEP pallets to bring to the factory. It is a cost effective arrangement for us both, which has saved 20,000 litres of fuel in a year and significantly reduced the kilometres travelled and greenhouse gases emitted.

We have even found a home for excess pallets by partnering with a charity which uses our excess pallets to transport donations to those in need. Last year, that was 4000 pallets.

We also have systems in place to give unsold food a second chance. In Australia, Nestlé and many other companies donate this food to Foodbank (a not-for-profit food-relief organisation). Foodbank has developed an efficient model to distribute this food to people who need it, via a network of charities around rural and urban Australia. We are told that the food is taken up as soon as it reaches the Foodbank warehouse!

Figure 6. Nestlé has purpose-designed trucks, including those that carry breakfast cereals which are large volume and lightweight.

In packaging

Packaging of food and beverages is crucial to prevent food waste, guarantee quality and make sure consumers are informed about what they have bought. For the food and beverage industry, improving how we design our packaging, the materials we use and the impact on the environment can make an important contribution to environmental performance across the product lifecycle.

The 'dream package' needs to:

- ensure food is safe from bacterial contamination;
- keep food fresh and present it well;
- use as little material as possible, with minimal environmental impact in making the packaging itself;
- run smoothly through machinery in a factory;
- be readily printable, so consumers can read the labels, and so it is easy to add batch and date codes;
- be low in weight, and maximise the amount of product that can be packed on a pallet – affecting the efficiency of transport;
- be made of recycled materials;
- be recyclable or, if that is not possible, add as little as possible to landfill.

And finally,

- consumers have to like it.

I wish all this were possible! However, the length of this list highlights that packaging must have sound science behind it in order for proper evaluations to be made of a package's true impact, and the right choices made. For that reason, since 2007, every pack we have designed has gone through a rigorous lifecycle assessment program.

Figure 7. In Nestlé, we assess the overall environmental performance of our packaging, and set targets to measure and minimise its use.

We can now assess the overall environmental performance of packaging from component sourcing to consumer use and disposal. This is critical for making good choices, and for improving. We also set targets to measure how much packing we can avoid (Figure 7). Industry collaborations such as the Australian Packaging Covenant help improve packaging across industry as a whole.

Here is one example to show you the difference this detailed approach makes. In the last two years in Oceania, we increased sales of our 'KitKat' chocolate bar but reduced the total packaging we used by 138 tonnes. As this packaging is not recyclable, that meant 138 tonnes less to landfill.

We also support initiatives to recycle or recover energy from used packaging. For instance, we have a partnership with TerraCycle who have developed recycling streams for Nescafé Dolce Gusto and Nespresso capsules.

Waste in retail and in homes

I started out by saying that food waste in the developing world happens in agriculture. In the developed world food waste happens much closer to the consumer: in the retail environment, in food service, and in the home.

Let me encourage you to look in a different way at the role of a company in the packaged food and beverage business. The very nature of what we do – that is, taking perishable ingredients such as milk, coffee beans and cocoa and transforming them into safe value-added food products with a better shelf life – means that we have increased the likelihood the food will be consumed before it goes bad. We have reduced the likelihood of food loss. For example, more than 75 years ago we invented a way to use up food that was going to go to waste: namely, an oversupply of coffee beans sitting unsold in warehouses in Brazil. Ironically, that product, Nescafé, is now one of our biggest global brands.

We also design packaging so it can help reduce waste at the consumer's home. For example, we put thought into portion sizes, so that consumers are more likely to eat the whole contents of a package, rather than using some and throwing out the rest.

It's an endless war

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. We couple all that with a focus on measuring and tracking – and long-term goals.

Although we face a world with so much food waste and loss, we can turn that tide through ongoing collaboration and commitment.

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.

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Daniel Lagger has been in his role as Executive Director, Technical & Production (formerly Operations), since 1 March, 2016. In the preceding three and a half years he was Technical Manager at Nestlé Japan. Daniel began his Nestlé career in 1984 as a Project Engineer in Switzerland. Throughout his 32-year career, Daniel has held different positions in the group, in the Philippines, Thailand and Switzerland. He holds a Masters degree in Mechanical Engineering from the EPFL (École Polytechnique Fédérale de Lausanne) in Lausanne, Switzerland. Daniel believes that the most important part of any role is working as one team to deliver results. Outside of work, Daniel likes sailing, diving and skiing, and discovering new countries.