



Addressing food waste reduction in Denmark



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ABSTRACT

Global food demand is driven by population and economic growth, and urbanization. One important instrument to meet this increasing demand and to decrease the pressure on food production is to minimize food losses and food waste. Food waste and loss is a major societal, economic, nutritional and environmental challenge. Using the case of Denmark, this paper analyses causes of food waste, and discusses how different stakeholders address the prevention and reuse of the €1.18 billion of annual edible food waste. Currently, the majority of food waste is still incinerated with energy recovery. However, improvements in technology have made it more efficient to utilize food waste for biogas and compost, which improves nutrient cycling through the food system. Major efforts to address food waste in Denmark have mainly been promoted through civil society groups with governmental support, as well as by industry. In order to better understand food waste and loss more research must be conducted on the total amount of food waste at every level of the food supply chain. Solutions can be found through improved communication, more efficient food packaging, and better in interpretation of food labels by consumers. Likewise, systems thinking may support an integrated agricultural and food system where food utilization is optimized and loss and waste of resources is reduced. In conclusion, sustainable solutions to the reduction of food waste in Denmark must include multi-stakeholders collaboration, especially public–private partnerships at the global level.

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Introduction

Global food demand is increasingly driven by population and economic growth, and urbanization. This trend is expected to continue over the coming decades, reaching a 60 per cent increase in the total current demand for food by 2050 (Alexandratos and Bruinsma, 2012). Additionally, emerging consumption patterns have implied a larger role for processed foods, creating new opportunities for value-added and income-generating activities. The minimization of food losses and waste can help to meet this increasing demand, and decrease pressure on food production.

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Awareness of food losses and waste has grown at the international level: acknowledgement of food loss and waste was announced at the United Nations Conference on Sustainable Development (known as Rio + 20) as a component of the Zero Hunger Challenge. Moreover, the 2013 comprehensive consultation conducted for the Post-2015 Agenda set the scene for goal identification. It contained Goal No. 5 on food and nutrition security, which included reduction of food loss and waste. Efforts are now concentrating on the identification of indicators that can be measured and monitored. In addition, the 2013 OECD/FAO Agricultural Outlook states that the expansion of agricultural production is likely to slow at least in the medium term, and that supply should keep up with demand at prices that are expected to remain relatively high (OECD/FAO, 2013).

This paper uses the case of Denmark in order to understand how food waste can be reduced through the value chain. Denmark offers an interesting case study because of the relatively high degree of potential reduction in food waste. As a small country with a high degree of social capital defined by trust, we argue that within Denmark it is easier to encourage systemic change throughout the food supply chain. Denmark can also serve as an exemplary

test-site for innovation, evaluating what innovative elements in food waste prevention can be transferred to the EU and global context. We gather knowledge not previously published in one overall article and provide a snapshot of the current situation. We discuss the roles of various actors within the food system, their contributions, consequences, and available solutions to food waste.

Terms, definitions and identification of food waste

All food systems rely upon natural resources such as water and land. Moreover, a significant amount of agricultural inputs such as fertilizers, energy, and labour are used to produce, then process, transport, distribute, store, and make food available for human consumption. Consequently, food waste is a waste of land, water, energy and inputs, as well as an unnecessary contributing factor to climate change (FAO, 2011; FAO, 2013a,b; Kummur et al., 2012). At all levels of the food supply chain greenhouse gases (GHG) are emitted (Garnett, 2011), making food consumption one of the largest direct and indirect contributors to climate change (Carlsson-Kanyama, 1998). Food losses or waste refers to the food lost or wasted along the food supply chain providing edible products for human consumption. According to the FAO Save Food initiative, food loss and waste “is measured only for products that are directed to human consumption, excluding feed and parts of products which are not edible” (FAO, 2011).

The cause of food waste

The perception of food waste depends on the definition of food waste itself. Food waste dichotomises into two categories (Fig. 1): Edible food waste and non-edible food waste.

Within the EU, food waste is generally understood to mean all of the foodstuffs discarded from the food supply chain still perfectly edible and fit for human consumption. These products are ultimately eliminated and disposed of for economic or aesthetic reasons, or because of the closeness to the ‘use by’ or ‘best before’ date. Consequently, this generates negative externalities from an environmental point of view, and causes increases in overall economic costs and a loss of revenue for businesses (European Parliament, 2011). Due to the products natural appearance and design, waste can also be a consequence of consumption habits like peeling a banana or eating a potato with the skin on.

Food waste occurs at all levels of the food system in the form of edible crops left in the field, losses through transport, food discarded in packaging or poor stock management (Parfitt et al., 2010). While much of this waste is inevitable, the majority of food waste is preventable. On a per-capita basis, much more food is wasted in the industrialized world than in developing countries. It is estimated that the per capita food waste by consumers in Europe and North-America is 95–115 kg/year, while this figure in Sub-Saharan Africa or in South/Southeast Asia is only 6–11 kg/year. Food waste in developed countries, like Denmark, is generally related to consumer behaviour, as well as to policies and regulations that address

priorities in other sectors (FAO, 2011). Kjær and Werge (2010) note that food wasted in Denmark is largely avoidable or partially avoidable. In other words they acknowledge some food waste will always occur and 100 per cent utilization is unrealistic.

Actors and trends that influence food losses

Until recently, food waste has been largely ignored due to the abundance of food. This has led to major amounts of waste, mainly at primary production and consumer levels (European Parliament, 2011). Food consumption has been identified as one of the most resource demanding and polluting activities within a household (Carlsson-Kanyama, 1998). Even with substantial technological improvements to keep food lasting longer over the course of the food supply chain an unnecessary amount of food is still wasted. Moreover, a clear understanding of the actual scale of food waste at both global and at national levels is lacking (Parfitt et al., 2010).

A variety of supply chain actors influence the decision-making processes of other actors in the supply chain making food loss a dynamic flow. Consequently, actors’ flow-related decisions become interdependent and by that the network structure influence food losses. The structure of the food supply chain in Denmark has in last decade of the twentieth century been characterized by consolidations in the primary sector and a reduction of enterprises in the processing industry. This consolidation is characterized by a reduction in the numbers of firms on each level in the supply chain, and with minor reduction in the number of links in the chain (Baker, 2003). Besides fruits and vegetables, the wholesale link in the food supply chain has been made redundant and has become embedded in a retailers’ business strategy or producers’ business strategy. Kadiyali et al. (2000) also found this tendency emphasizing the significant increase of power at the retail level. The question of who holds the bargaining power is more a matter of economy and having exclusive access to information (Nijs et al., 2014).

FAO (2011) find food losses as a direct cause of lack of coordination between actors within the food system together with cultural, social and economic factors. Moreover, a clear understanding of the actual scale of food waste at both global and at national levels is lacking (Parfitt et al., 2010). We discuss the aspects of knowledge sharing further in relation to actors in food waste, the contributing factors to food waste, and the consequences associated with these factors. Fig. 2 provides an overview of the types of wasted food products at different levels in the value chain.

Beyond the direct reason for food waste several actors within the food supply chain contribute indirectly to food waste by influencing consumer behaviour for example through packaging sizes, sale promotions or discounts. A lack of systemic evidence blurs the image of what actually causes food waste and prevent significant national and global changes, as well as potential to measure reductions (Parfitt et al., 2010). Moreover, knowledge of how to prevent food waste throughout the food system is relatively limited.

Worldwide 30 per cent of cereals, 40–50 per cent of root crops and fruits & vegetables, 20 per cent of oilseeds and meat & dairy, and 30 per cent of fish end up lost or wasted along the food supply chain (FAO, 2011). Farm to fork losses have an €1.1 billion annual economic cost in Denmark, which is in line with the European average. Sixty-six per cent of food is wasted from farm to retail (Jensen, 2011; Mogensen et al., 2011). When converted into food waste per person, each European wastes 280 kg/year, 185 kg of which derives from farm to retail and 95 kg from households (FAO, 2011).

Primary sector – food producers

The primary sector contains producers of basic food products. These producers range from large-scale commercial producers to

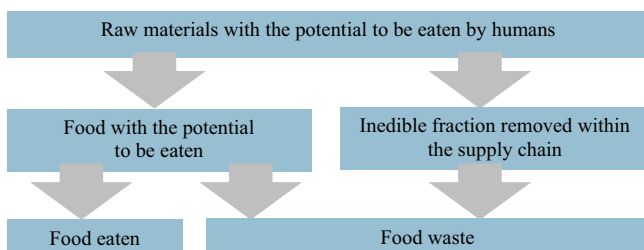


Fig. 1. Wasted resources in the food production system.

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