Food Efficiency: sustainability at a higher speed

Presentation of Toine Timmermans, Program manager Sustainable Food Chains at Wageningen UR Food & Biobased Research www.fbr.wur.nl/UK/

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Starting point & macro trends

In our Western society every day we get via our food 2.000 to 3.000 kcal digestible energy on our plate. The amount of energy needed to get the food on that plate is a multiplex of this: 40.000 to 50.000 kcal. Our total food system can be considered as non-efficient and careless in the use of energy. About 25% of the total energy being used in our global society is related to our food system. Our food system is responsible for about 30% of the global carbon footprint (greenhouse gas emissions).The world population is expected to grow in 2050 with about 34 percent, from 6.8 billion people currently to over 9 billion in 2050. The demand for resources from the agricultural sector is likely to grow with 70 percent. This in mainly driven by the growing consumption of high value (animal) proteins. The current production of 228 Mtonnes meat should be increased to 463 Mtonnes in 2050 (FAO, 2010).

Food security is becoming a serious and complex challenge for the future. Some major additional challenges that need to be anticipated upon:

- Climate change will probably have negative impact on production (e.g. Africa decrease of 15-30%)
- The depletion of elements and materials (e.g. Phosphate)
- Growth of metropoles will take valuable agricultural land (50% of world population lives in urban areas)

Our food chain is more and more part of a global and competitive arena. There is a continuous shift that agricultural commodities are produced and processed at the regions where the resources are favorable (land, labour, capital, infrastructure, knowledge, etc.). Every year the amount of agricultural products and foods that are exported grows, with a relapse during the last 2 year because of the financial and economic crisis. The amount of agricultural goods being exported and imported worldwide is almost at the level of 1.000 billion tonnes/year. These logistic processes cause a high contribution to the footprint of food, however on average in the energy use for logistics is estimated to be 5% of the total energy use in the food production chain. There are large differences where the amount of foodmiles and the type of transportation mode are important factors. E.g. an airplane uses almost 100 times more energy per unit of product as transport by refrigerated reefer container on a container vessel. The carbon footprint of e.g. strawberries in wintertime has a relatively high footprint (140 times as high) due to transport by air compared with local produced fruits in summertime.

One of the reasons for the inefficiency of our food system is the enormous amount of spoilage in the supply chain. 35-40% of the food-resources produced for human

consumption don't get consumed, and end up in a lower value side-stream (e.g. animal feed and bio-energy) or in the garbage bins (typical: compost, incineration or landfill).

Market & consumers
Consumers can play an important role in the process of increasing the sustainability of our food chain. The distance between consumers and the way our food is produced has literally increased in the last decades. In getting a broad change towards more sustainable consumption behaviour the relation with nature needs to be restored. Facts indicate this won't be a easy job. In the Netherlands only 13 percent of the family income is spent on foods. This is historically very low. Consumers waste about 8-13% of the food they buy, and in general also eat too much (average 15% too much). It is assumed that a group of about 5-8% of consumers are passionate about sustainability and food, are well aware of sustainability issues and prefer organic and fair trade foods. A larger group of about 30% has the intention to change to a more sustainable behaviour, and need to be facilitated by e.g. better information and a connected choice in the retail stores.

Sustainability is becoming a major driver in the positioning of retailers, mainly the retailers in the high-end of the market (e.g. Marks&Spencer). In the US retail branches like Wholefoods market and Stew Leonards farm fresh foods are successfull new retail concepts and partnerships with local growers. In the Netherlands the retail chain Marqt and MijnBoer are examples of a new retail concept with a direct-sourcing partnership, organic, local-to-local and fresh. Growth of turnover in fair-trade products in times of recession give an indicate that it looks like thing are changing slowly in the market place.

Sustainable Mobility
WageningenUR Food & Biobased Research is active in fundamental and applied research to achieve a more sustainable food chains of the future in a wide diversity of research areas. In projects together with partners, clients and other stakeholders we are active to get answers on questions like these related to the topic of sustainable mobility:

- What would be intervention strategies that will support consumers in choosing more sustainable products at the moment of choice (e.g. at the retail shelf). A study has been done on the effects on the introduction of e.g. CO_2-labels. How can new communication technology support change food choice behaviour ?
- How can ubiquitous technology support better informed decisions and desired behaviour. In WageningenUR a unique facility called "the Restaurant of the Future" is set up as a living-lab to get better consumer insights and stimulate more healthy and sustainable food choice behaviour. The research lab is set up for co-creation and open innovation projects with industrial partners (www.restaurantvandetoekomst.wur.nl/UK/)
- How can the new generation of RFID, miniaturized chips that can track the food from producer up to the retail store (or even the consumer) improve efficiency of global supply chains, and reduce the quality related spoilage ? Concept like just on time logistics producing ready to eat fruits by ripening on board become now possible.

- How can a reduction of food spoilage in the total food chain be reached, including with consumers at home. How can supply & demand supported by ICT and communication technology help consumer in better planning .
- New and more efficient cooling technologies will dramatically decrease the footprint of transportation. We already achieved a decrease of 50-60% in the amount of energy needed for refrigerated reefer containers, with neutral to positive effect on the quality of the commodities. A transition from air transport to ship transport will lead to more efficient supply chains.
- Can co-creation in joint development with consumers lead to new product innovations (e.g. sustainable protein foods) of market-place innovation models ? Will communities of consumers play a role in the transition?

Curriculum Vitae

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Job carrier at Wageningen UR Food & Biobased Research (1990 – current)
I have a position as Program manager Sustainable Food Chains at the Research Institute Food & Biobased Research, part of Wageningen University & Research Centre. I have a MSc in Agricultural Engineering from the Wageningen University, with specialisation in knowledge engineering and computer vision. Currently I am in the post-doc Business Strategy Course at the University of Groningen/Academy for Management. From 2006-2009 I held the position of Director of the Business Unit Fresh, Food & Chains. In the Business Unit around 100 researchers work on innovation in the areas of healthy & delicious food and sustainable food chains.

The focus in my work is to achieve innovations in industry and government that will impact in creating a more sustainable future. Relevant topics

- Logistics design & supply chain management
- Post-harvest technology and cold chain management
- Information management and computer vision technologies
- Prevention of food wastages throughout the food supply chain
- Sustainable protein product innovation
- Consumer behaviour and intervention strategies
- Metropolitan agriculture and agro-business parcs
- Principles & business models for sustainability