



## The carbon footprint of food

### Summary

#### **Greenhouse gases (GHG) from food contributes to global warming**

*There is a significant potential to cut emissions from food. In order to achieve the Norwegian Government's ambition to move towards a low carbon society, GHG emissions from the food industry must be reduced. Such efforts need to be part of a broader political strategy that secures a stable food supply.*

#### **A carbon footprint can stimulate emissions reduction in the food sector**

*Accurate knowledge about emissions from food is important in order to (1) ensure efficient policy instruments at the governmental level, (2) assess the food industry's potential for GHG reduction and to document emissions reduction, and (3) provide consumers with reliable information about the carbon footprint of the food they consume.*

#### **There is a need for further knowledge about emissions from food and how to reduce these**

*The production of food involves complex biological processes – many of which are hard to quantify. There is a need to strengthen knowledge about emissions throughout the life cycle of food products. Moreover, there is a need to develop a common international method that calculates emissions at the various stages in the production process, and provides the carbon footprint for the entire life cycle.*

#### **From carbon footprinting to consumer change – carbon labelling is part of the solution**

*To foster a low carbon food production, Norwegian authorities can utilise regulatory and economic policies, and the food industry can reduce emissions in the value chain. Together with such initiatives, there is a need for carbon labelling to guide consumers. The Government, together with the food industry, should immediately develop an award label for food products that satisfy emission requirements. The long term goal should be an emission label, given it is possible to obtain reliable and accurate data.*

#### **The Norwegian Government should establish a low carbon task force in the food sector**

*There is a need for an advisory body that can help consumers and producers to map and reduce emissions. Tasks should also include to promote the creation of knowledge and methodology, and to support low emission initiatives in the food sector.*

### Why carbon footprinting?

The global food industry faces a two-fold challenge: to secure a stable food supply while reducing emissions from food production. To achieve these goals, a broad range of solutions is required. The focus here is on carbon footprinting – a method to measure the GHG emissions from a product through its life cycle.

Mapping the carbon footprint of food products can have utility for different actors:

- *A tool for authorities:* A holistic analysis is important to develop efficient policies and to document change in emissions over time.
- *A guide to GHG reduction in the food sector:* Producers can guide their own cost and emission efficiency, and document this to gain competitive edge in the market.
- *Information to consumers:* Consumers need knowledge and guidance to make informed climate decisions about food consumption.

## Demand for further knowledge

There is significant uncertainty around GHG emissions from food. Uncertainties tied to natural processes, and variations dependent on season or what happens to the food after the point of sale, creates challenges for a carbon footprint. Moreover, the application of different methodologies makes it difficult to compare results from different studies.

There is a need for knowledge at different levels. Firstly, it is necessary to strengthen knowledge about emissions from the various activities in the value chain. Secondly, there is a need for knowledge about the whole life cycle of a product to identify critical factors, and to make sure efforts at one level do not mean increased emissions at another – a so-called leakage.

In order to compare the carbon footprints of different products, there is a need for a common methodology. This method should describe how to calculate and document emissions at each level in the life cycle, and how to synthesise this information into a carbon footprint.

## A common methodology

There are various methods and tools to calculate a carbon footprint – ranging from simple internet-based calculators for emissions from individuals, to input-output analysis that looks at organisations or sectors.

An accurate analysis of emissions from products requires a life cycle analysis. Such an analysis should answer methodological questions such as: What processes and activities should be included in the analysis' system boundary? And what level of accuracy is required for the data input?

The system boundary of the analysis should ensure that all significant emissions are included and prevent leakage. An analysis should tackle variation over time by the use of relevant categories and estimates. The analysis should be accurate enough to stimulate incremental change, easy to use, and credible for third parties:

- *Manageable*: Time and resources used to gather data must be optimised. Data gathering should be coordinated with other reporting and documentation procedures.
- *Useful*: A carbon footprint should be beneficial for authorities, industry and consumers. Pinpointing potential reductions, documenting reductions and giving incentive for low carbon decisions are examples of use areas.
- *Credible*: A carbon footprint should give accurate information that is reliable and accessible to third parties.

## Footprint across borders

50 % of Norway's food consumption, measured in energy, is imported. Norway is also an exporter of food – with fish as an important export commodity. The international trading of food creates a need for a common methodology that allows for comparison between products of different origin. Without a common methodology, claims about GHG reductions based on different calculations methods can lead to confusion and distrust.

Norwegian authorities and the Norwegian food industry should prepare for an increasingly importance of global warming in the international trade of goods and services. They should therefore take an active role in the development of a methodology for a carbon footprint, and contribute to the knowledge generation required for such an analysis to be accurate. The international ISO standards for life cycle analysis are good starting points, but they need to be adapted and developed to measure GHG emissions from products based on biological processes.

In the UK, the work to adapt and develop the ISO standards is already taking place. The British open standard PAS 2050 is a possible first step in the development of an international standard for the carbon footprinting of products.

## Low carbon consumption?

Promoting low carbon food consumption requires a broad set of efforts. *Norwegian authorities* can stimulate the production and consumption of low carbon food through regulatory action and economic policies. *Actors in the food industry* can improve their efficiency and offer more low carbon products. *Consumers* can lower their CO<sub>2</sub>-impact through making changes in how they use, transport and dispose of food – and though the kind of food they consume.

A poll done by the Norwegian Board of Technology shows that 76 % of Norwegian consumers want information about the carbon footprint of the food they buy. Together with general information about how to reduce emissions in their everyday lives, a labelling scheme would give consumers valuable guidance in stores.

A carbon label can also stimulate reduction efforts in the value chain – it should function as a guarantee for low emissions, and be used by business to gain advantages in the market. A label should set clear reduction and documentation requirements. Labelling should be a voluntary measure.

## A carbon label

Carbon labelling is being implemented in countries such as Japan, the UK and Sweden. Japanese authorities are developing an international carbon footprint method. In the UK, the government sponsored Carbon Trust has developed a label that provides emission data for each product. Emission labels enable comparison across product categories such as an apple and a pizza, and within product categories such as different types of beef.

An emission label should be a long term goal, as it makes possible comparisons between different food products. However, an emission label requires calculation of a carbon footprint for each product. Such an endeavour is resource demanding and the knowledge base for such an analysis is not satisfactory as of today. It is important that such a label is based on reliable and accurate information that meets the demands of Norwegian marketing legislation.

## Facts: Food and GHG emissions

According to the Food and Agricultural Organisation of the UN, the global livestock industry emits more GHG than all forms of transport.

Emissions from agriculture contribute around 9 % of Norway's total emissions. Fishery accounts for 2,5 %. Agriculture and fishery only represent part of the value chain for food. Emissions also occur at the production of fertilisers and other inputs, and during manufacture, transport and cooking.

90 % of the emissions from **agricultural products** occur in primary production. Methane emissions from livestock, nitrous oxide from manure and fertilizer, and fossil fuel use at farms, are significant sources.

Fuel use during fishing is a dominant emission factor in **fisheries**. Different fishing methods and tools have different energy requirements, and the amount of emissions per kilogram caught fish varies accordingly.

Around 90 % of the emissions from **farmed fish** occur in the production of feed. The size of the feed's carbon footprint depends on whether it is based on vegetable or animal origin.

The carbon footprint of the **manufacturing** stage is in large part dependent on energy use and wastage. According to Enova, the potential for energy saving in the Norwegian food industry is 50 000 tons CO<sub>2</sub> per year.

The emissions from **transport** generally constitute a relatively small part of the carbon footprint – but the reduction potential is still significant. Emissions depend on distance travelled and means of transportation. Air freight is emission intensive, while containerships seem to be the most energy efficient form of transport.

The size of individual **consumers'** carbon footprint depends on what type of food s/he buys. Other important factors are how the consumer transports the food. Transporting the food by car from the store is the largest direct emission source at the consumer level. Energy use in preparation of food is another emission source.

Source: FAO and SIK

Swedish KRAV and Svenskt Sigill are developing an "award" label that guarantees that products have met requirements regarding production methods and thresholds for GHG emissions. An advantage with this type of label is that as long as one can agree on the requirements, the implementation is relatively straight forward. However, it makes comparisons across product types difficult. Label requirements are set within product categories – meaning that the label can differentiate between different types of meat, but does not allow comparison between different categories such as meat and vegetables.

While working towards an emission label, it is important to give the food industry a possibility to demonstrate their carbon reduction efforts, and to improve consumers' ability to make climate friendly choices in the grocery store. An award label will help close in on these goals, and can be applied within a short time frame.

## Carbon advice in food sector

In light of the national goal to be carbon neutral within 2030, the Norwegian Government has an important task to promote knowledge about global warming and encourage businesses and citizens to reduce their emissions.

To make sure carbon footprinting is effective, the food industry needs information and guidance on how to cut emissions. The British Government has established the Carbon Trust to accelerate the move towards a low carbon economy. In addition to giving businesses advice, Carbon Trust invests in low carbon businesses and funds research projects.

In Norway, a similar role can be added to an existing institution, such as Enova or KSL Matmerk, or a new entity could be established. This entity should act as a resource centre that offers guidance to carbon footprinting and reduction measures. In addition, it should promote the generation of knowledge, and support low emission initiatives in the food sector. The focus here is food, but it is important to point out that carbon footprinting and reduction guidance is also necessary for other products and services.

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## Recommendations

In close cooperation with the food industry and researchers, the Norwegian Government should undertake the following tasks:

- Strengthen and systematise knowledge about emissions in the life cycle of food.
- Develop a standard method for carbon footprinting in cooperation with international initiatives.
- Initiate pilot projects to identify knowledge gaps, and to test the carbon footprint methodology for a group of products.
- Develop a carbon award label that can be implemented within a short time span.
- Contribute to the development and testing of an emission label based on international standards.
- Establish a low carbon task force whose mandate is to help the food sector map and reduce their emissions.

The Norwegian Board of Technology's group of experts for this project consists of: Mekonnen Germiso, The Future in our hands; Thomas Angervall, SIK, The Swedish Institute for Food and Biotechnology; Eivind Jacobsen, National Institute for Consumer Research; Jakob Simonhjell, The Federation for Norwegian Agricultural Cooperatives; Roy Robertsen, The Norwegian Seafood Federation; Jens Strøm, Bama; Knut Lutnæs, Coop Norway; Edel Elvevoll, Norwegian College of Fishery Science and the Board of Technology; Kari Laumann, the Board of Technology (project manager).

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