

# Quantifying food waste in primary production – experiences from Nordic and Norwegian studies

Presentation in the EU Working Group on Food Waste Measurement and Monitoring, Brussel 1 February 2019

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# Nordic Food Waste Project Primary Production



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Together with a Nordic project team



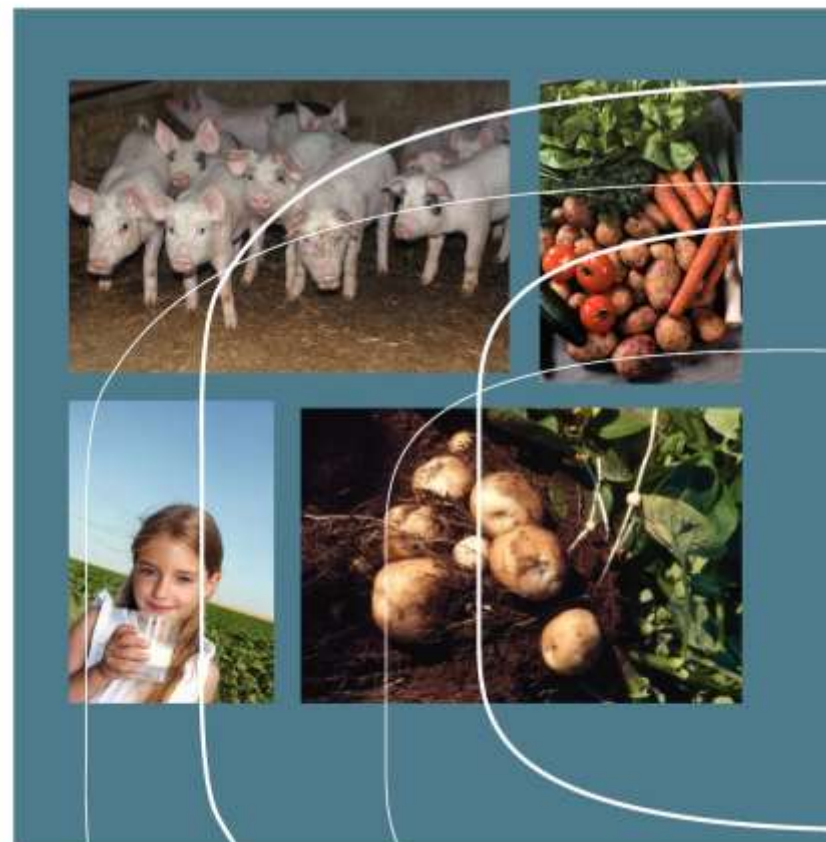
# Pre-study 2012

Kartläggning av matsvinnet  
i primärproduktionen

## Literature study

### Case studies on

- Potatoes
- Carrots
- Onions
- Milk
- Pork



# Main project 2014-2016

- Definitions, system boundaries and methodology
- Data collection in primary production

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## Primary production

Primary production in Denmark,  
Finland, Norway and Sweden

Production of agricultural and  
horticultural products as well as  
wild fruits and berries, wild game,  
fisheries and aquaculture



# Definitions: Food waste vs Side flows

Primary products intended to be consumed by humans but never enter the food chain

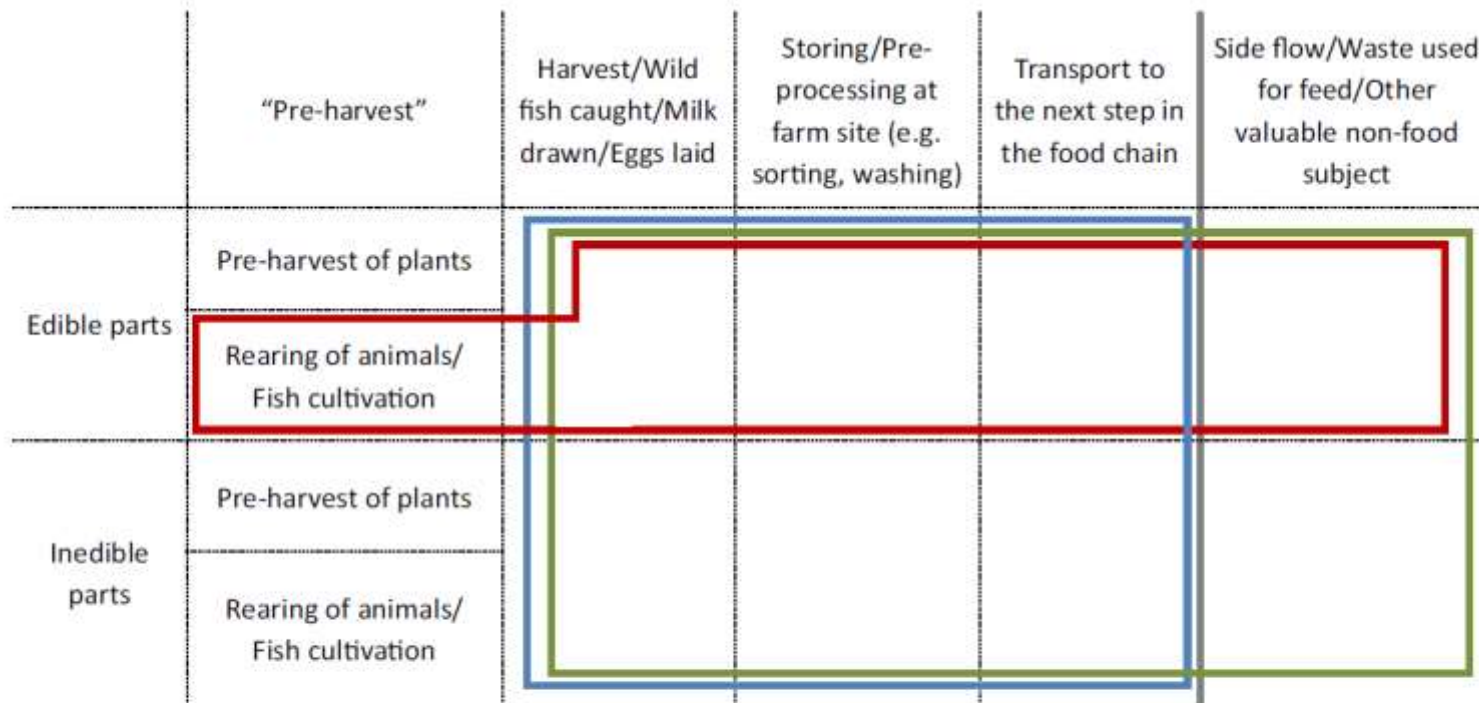
The whole sector including rearing of animals

Planned feed production for animals excluded, but food that ends up as animal feed included

Unedible parts of the products - peels and bones - are excluded



# System boundaries



- SF (present study)
- FFW (FUSIONS project)
- FLW Standard

# Calculation of side flows

Estimated total volumes of side flows for Nordic countries by

- Literature study followed up by interviews
- Over 6 000 questionnaires to Nordic farmers – 2500 respondents - 21 different questionnaires
- Statistical data analyses





# Case studies

Different methods were test to collect data for

- Carrots
- Onions
- Cereals
- Field peas
- Green peas
- Farmed fish

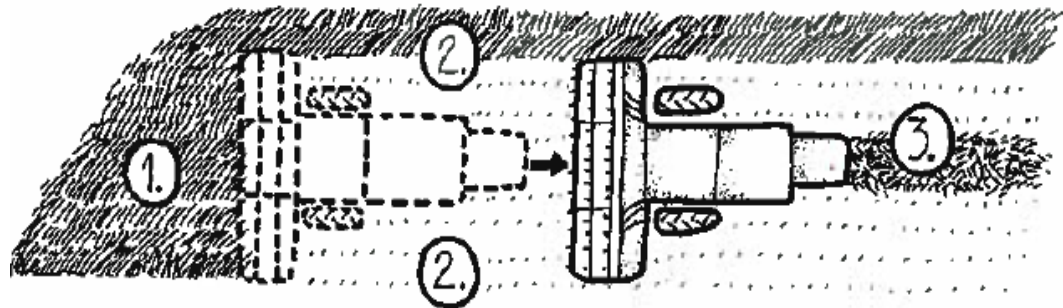


# Field study – onions



## Field study - cereals

1. Pre-harvest losses, caused by shattering and lodging, and loss of dry matter due to wildlife, birds, weather and other natural causes.
2. Harvest/machine losses, caused by the combine and harvesting.
3. Total field loss by counting seeds and spikes behind the combine.



# Key findings

- 922 000 tonnes of SF +
- 119 000 tonnes from rearing of fish and animals
- 330 000 tonnes of food waste according to FUSIONS (and EU) definition
- Lack of data and uncertainties in existing data

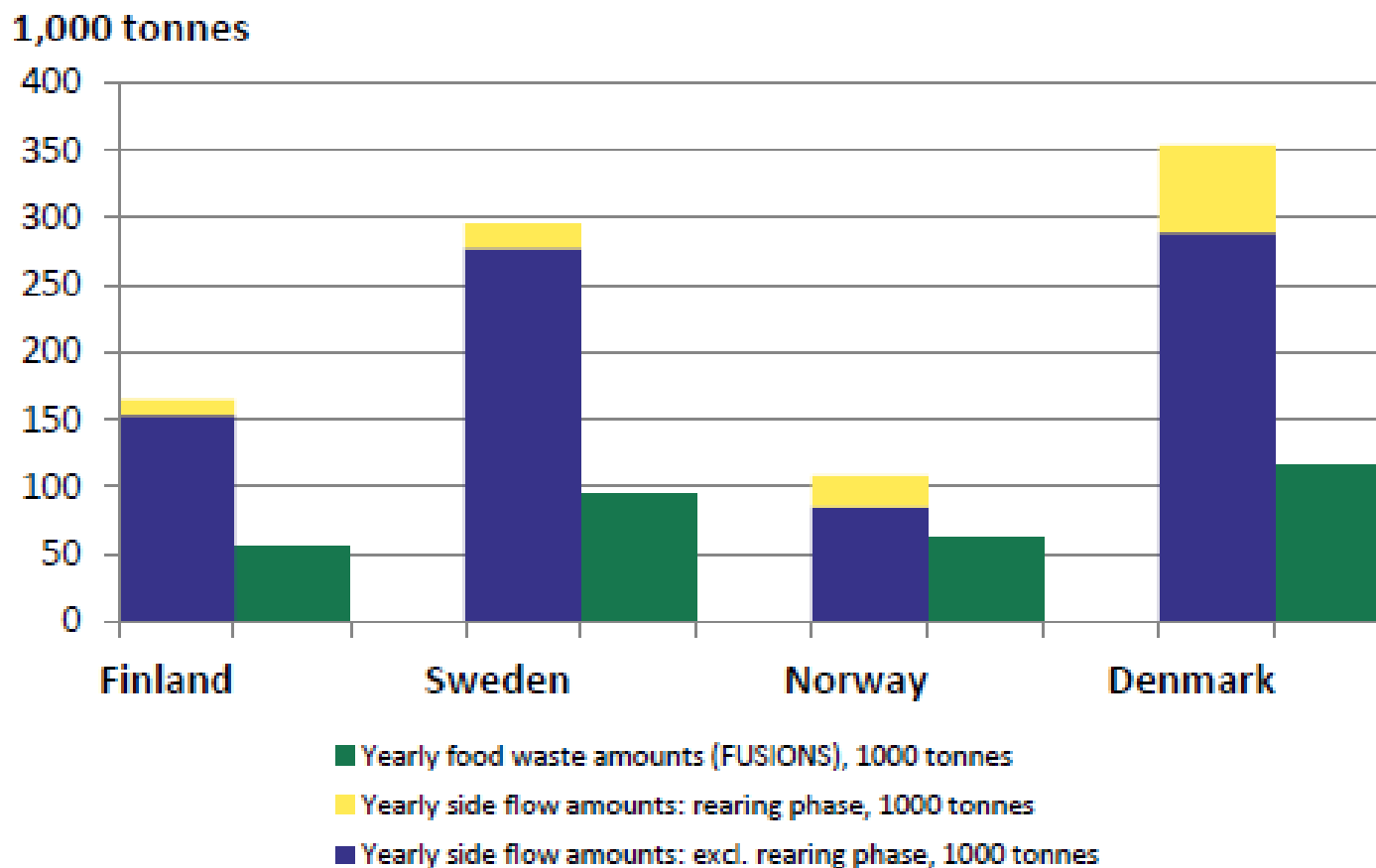


# Total figures for different cultures

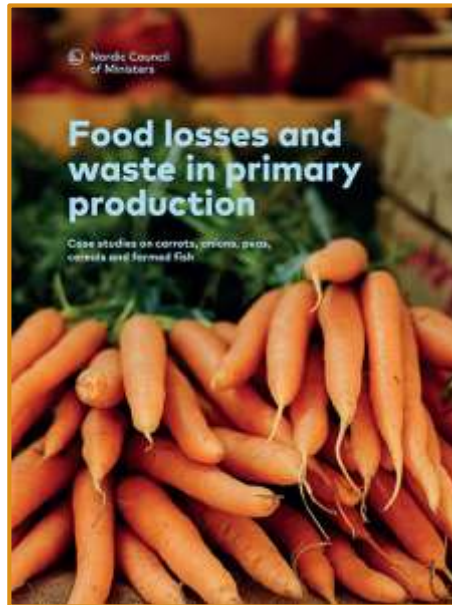
Table 5: Side flow and food waste (1,000 tonnes) in Finland, Sweden, Norway and Denmark. Yearly averages from 2010–2013

	Finland		Sweden		Norway		Denmark	
	Thousand tonnes, 2010–2013 (avg.)							
	Side flow +rearing phase	Food waste	Side flow +rearing phase	Food waste	Side flow +rearing phase	Food waste	Side flow +rearing phase	Food waste
TOTAL	153 + 13	60	277 + 18	98	85 + 23	61	288 + 65	117
Wheat	42	4	95	9	15	1	35	3
Rye	2	1	4	2	0	0	10	2
Barley	10	5	10	5	0	0	11	5
Oats	4	2	2	1	0	0	1	0
Starchy Roots	37	11	50	15	23	7	109	33
Sugar Crops	6	0	24	0	0	0	27	0
Pulses	2	1	9	2	1	0	6	1
Oil crops	1	0	2	0	0	0	3	0
Vegetables	35	21	57	42	25	16	49	33
Fruits	3	2	5	2	3	1	7	3
Meat	2 + 11	3	2 + 15	4	2 + 9	2	5 + 46	8
Offal	0 + 1	0	0 + 1	0	0 + 0	0	2 + 9	2
Animal fats	0 + 1	0	1 + 2	1	0 + 1	0	2 + 10	2
Eggs	2	2	4	4	2	2	3	3
Milk	7	7	9	9	5	5	16	15
Fish, Seafood	0 + 0	0	0 + 0	2	10 + 13	26	2 + 0	6

## Country-wise data on SF and FFW

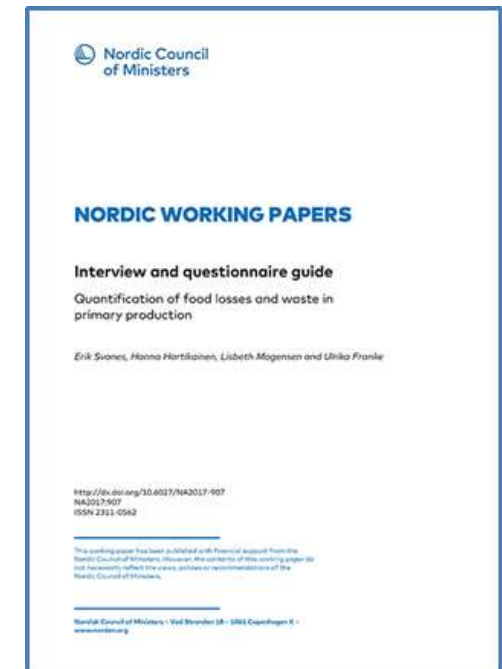


# More information



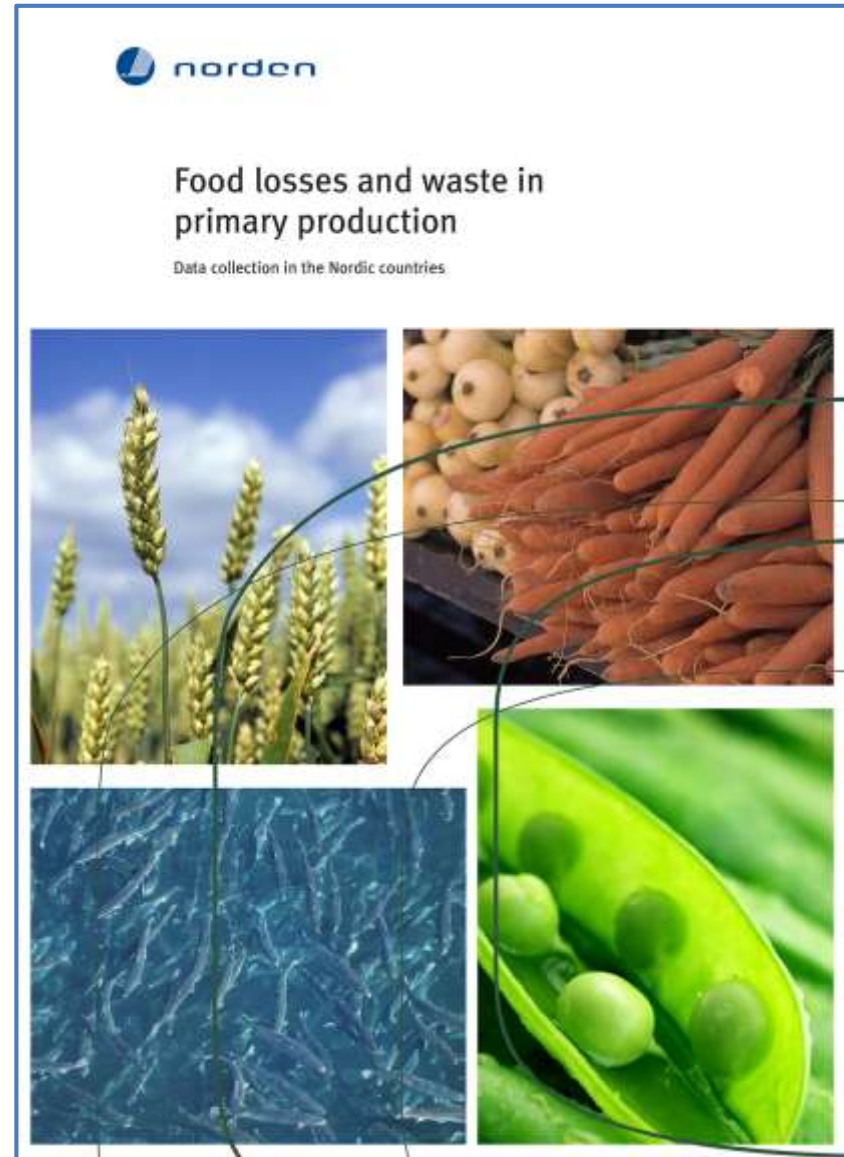
[Food losses and waste in primary production: Case studies on carrots, onions, peas, cereals and farmed fish](#)

[Interview and questionnaire guide: Quantification of food losses and waste in primary production](#)



# Final report

## Food losses and waste in primary production: Data collection in the Nordic countries







### Food waste quantification in primary production – The Nordic countries as a case study



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#### ARTICLE INFO

##### Article history:

Received 4 April 2017

Revised 12 October 2017

Accepted 20 October 2017

##### Keywords:

Food waste

Food loss

Primary production

Agriculture

Methodological framework

Harmonization

#### ABSTRACT

Our understanding of food waste in the food supply chain has increased, but very few studies have been published on food waste in primary production. The overall aims of this study were to quantify the total amount of food waste in primary production in Finland, Sweden, Norway and Denmark, and to create a framework for how to define and quantify food waste in primary production. The quantification of food waste was based on case studies conducted in the present study and estimates published in scientific literature.

The chosen scope of the study was to quantify the amount of edible food (excluding inedible parts like peels and bones) produced for human consumption that did not end up as food. As a result, the quantification was different from the existing guidelines. One of the main differences is that food that ends up as animal feed is included in the present study, whereas this is not the case for the recently launched food waste definition of the FUSIONS project.

To distinguish the 'food waste' definition of the present study from the existing definitions and to avoid confusion with established usage of the term, a new term 'side flow' (SF) was introduced as a synonym for food waste in primary production. A rough estimate of the total amount of food waste in primary production in Finland, Sweden, Norway and Denmark was made using SF and 'FUSIONS Food Waste' (FFW) definitions. The SFs in primary production in the four Nordic countries were an estimated 800,000 tonnes per year with an additional 100,000 tonnes per year from the rearing phase of animals. The 900,000 tonnes per year of SF corresponds to 3.7% of the total production of 24,000,000 tonnes per year of edible primary products. When using the FFW definition proposed by the FUSIONS project, the FFW amount was estimated at 330,000 tonnes per year, or 1% of the total production.

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# Following up study in Norway in 2017 and 2018

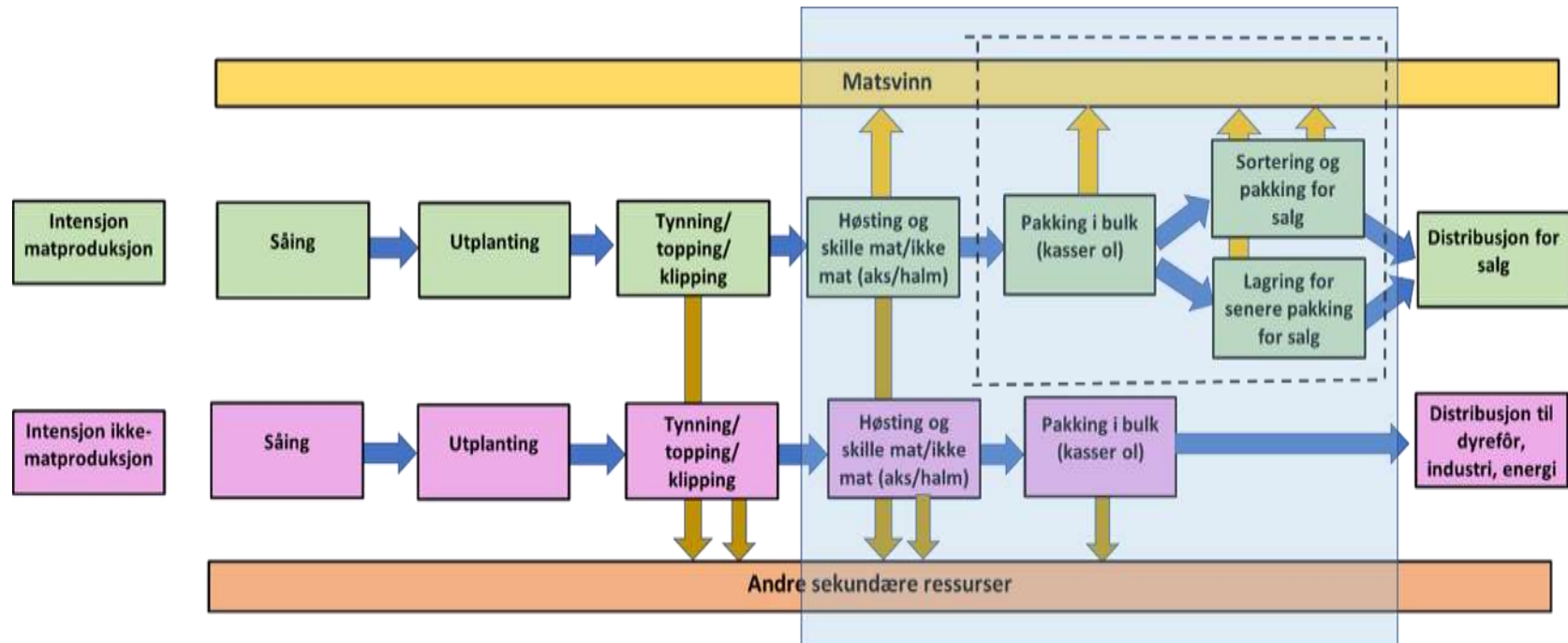
- Pilot study carried out for the Ministry of Food and Agriculture under the negotiated agreement between the government and the food sector
- Research project on substrate potentially available for biogas production

# Definition of edible food waste (EFW) and secondary resources (SR)

Edible food waste include all edible parts of food produced with the intention to be food for human beings, and which ends as waste (including animal feed and byproducts), originating after animals have been slaughtered or plants have been harvested

Secondary resources are all types of waste flows from primary production both intended and unintended for human consumption, both in the rearing/growing phase, before and after harvesting (except EFW).

# Edible food waste and secondary resource from primary production – system boundaries in plant production



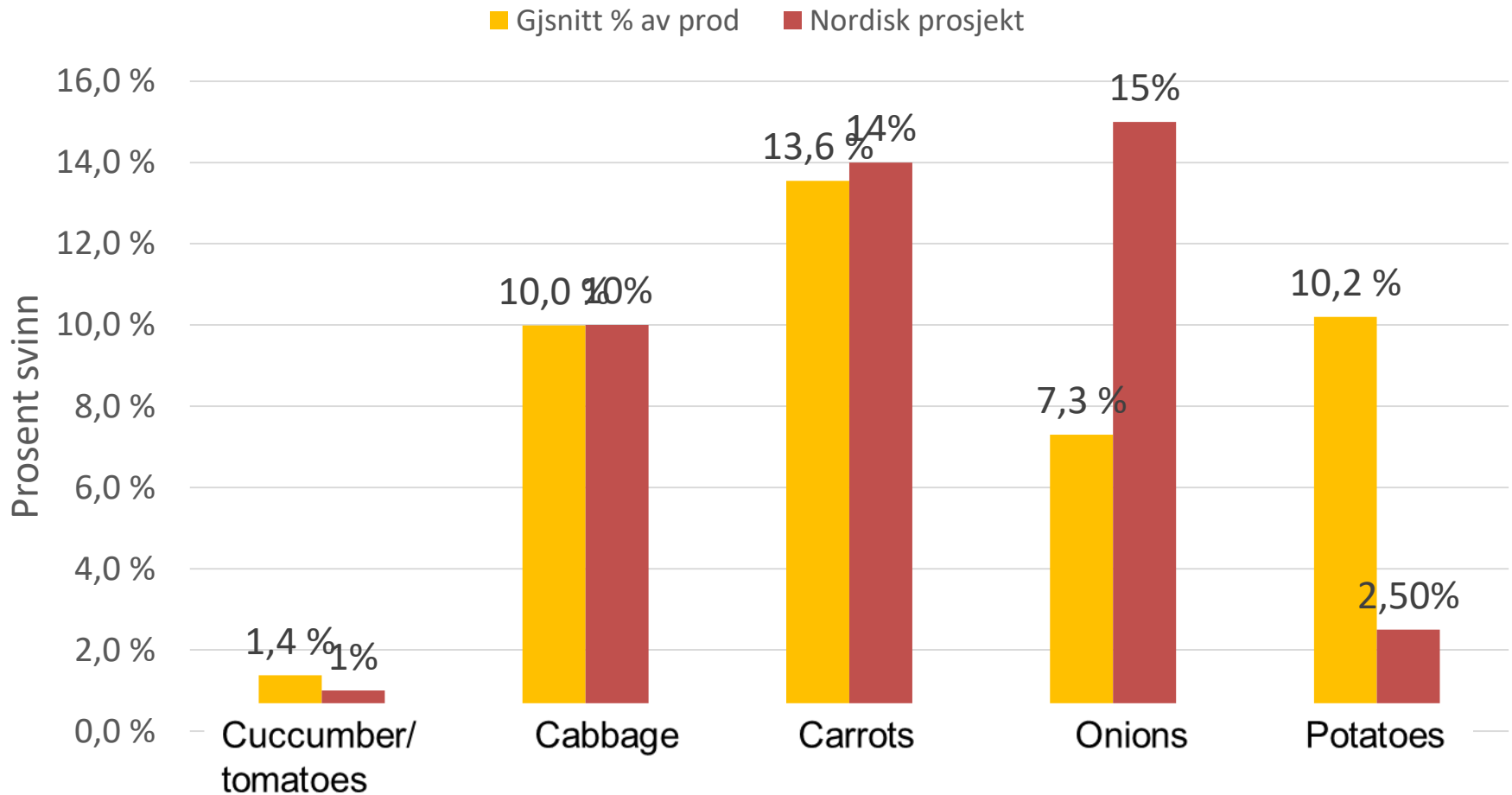
# Methods applied to measure and monitor EFW and SR in primary production

- Main methods used at present by primary production:
  - Direct measurements through weighing (applied by many packers of fruits and vegetables)
  - Volume measurements or counting of larger vegetables
  - Scanning of packed products (applied by some packers)
  - Estimates based in experiences from own production
  - Mass balances based in expected or planned production and what is finally harvested

# Questionnaire distributed to primary producers of fruits, vegetables, potatoes and berries 2017/2018

- Number of producers who have received the questionnaire was 150 in 2017 and 650 in 2018.
- Number of respondents were 80 in 2017 and 290 in 2018
- Type of question asked and answered:
  - Type of cultures produced
  - Production area and mass of production
  - If production was organic or conventional
  - Tonnes of EFW and SR originating from own production and/or from packing/storing
  - How EFW and SR have been treated
  - Which methods for measuring EFW and SR have been applied

# Main results from 2017 – estimates compared with data from Nordic study



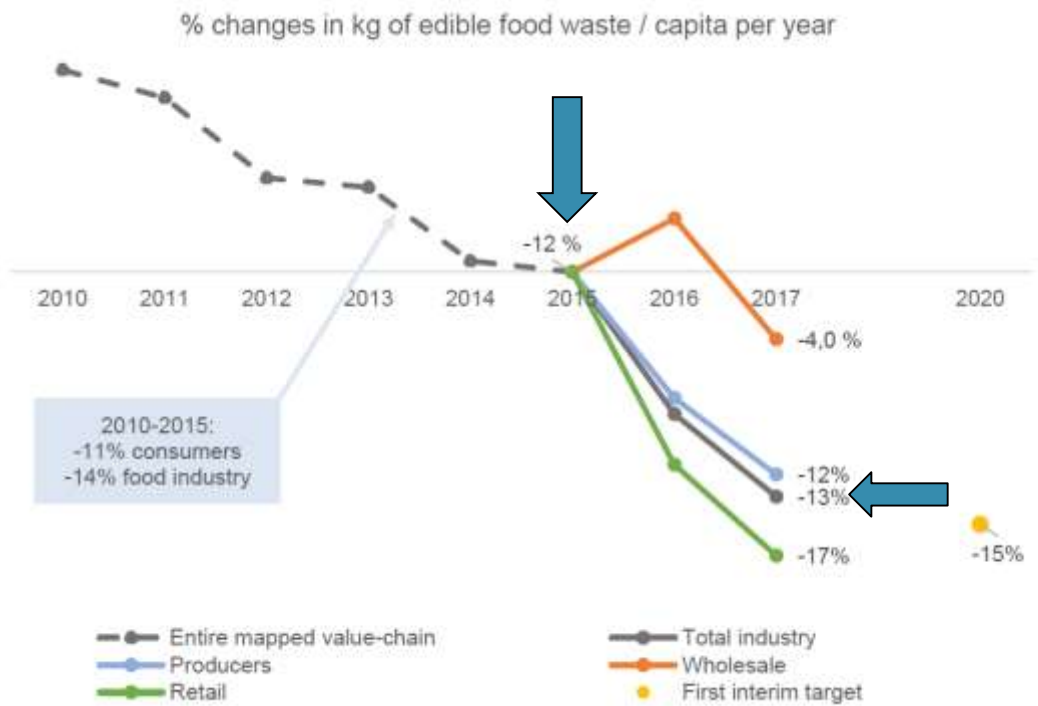
# Main experiences

- It is important to have very clear and transparent definitions of EFW and SR for those who generate primary data
- There is a need for better methods to measure SR in primary production, especially from the preharvesting phase
- Percentages of EFW and SR varies significantly between cultures, farms/sites and years
- Important to study root causes for why EFW and SR are generated in primary production, and develop measures to prevent loss
- How should EFW and SR be treated to prevent spreading of plant diseases and optimize resource effectiveness
- A national research project will be proposed



The last report from the Norwegian Edible Food Waste monitoring is available from Matvett in English last week:

<https://www.matvett.no/uploads/documents/OR.28.18-Edible-food-waste-in-Norway-Report-on-key-figures-2015-2017.pdf>



Thank you for listening!



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