

Agromek 2016

Erik Fog, Organic Farming

# SUSTAINABILITY IN POULTRY PRODUCTION – BIO-REFINED GRASS PROTEIN

Den Europæiske Landbrugsfond for Udvikling af Landdistrikterne:  
Danmark og Europa investerer i landdistrikterne



Miljø- og Fødevarerministeriet  
NaturErhvervstyrelsen

**LDP 2020**



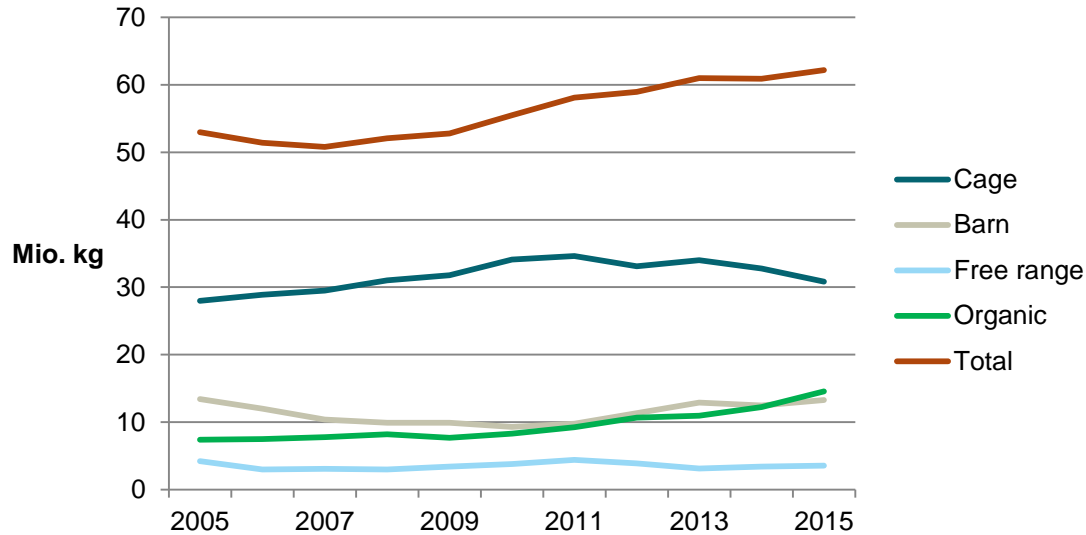
Den Europæiske Landbrugsfond  
for Udvikling af Landdistrikterne



Se EU-Kommissionen, Den Europæiske Landbrugsfond for Udvikling af Landdistrikterne

# DANISH EGG PRODUCTION

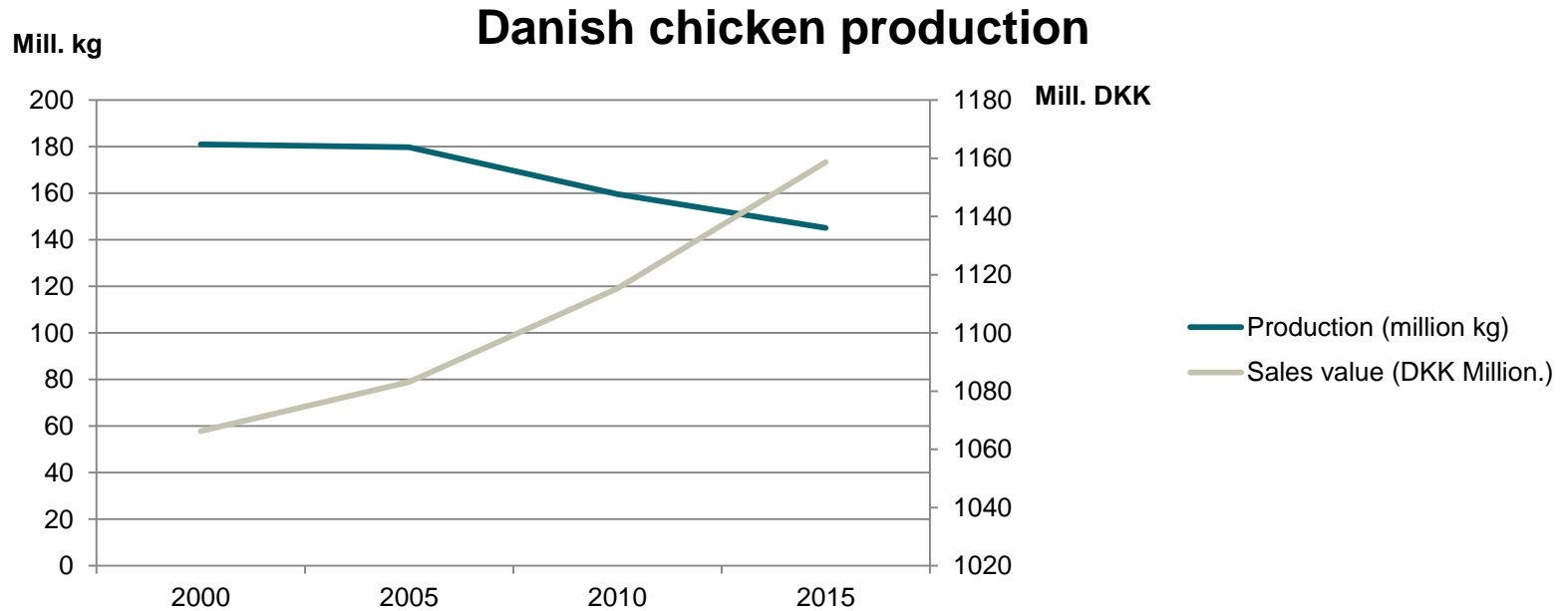
## Danish Egg Production



Trend 2015-16	
Cage	- 8.8 %
Barn	+ 34.4 %
Free range	+ 10.2 %
Organic	+ 19.4 %

(Danish Poultry Council)

# DANISH CHICKEN PRODUCTION



(Statistics Denmark)

# SUSTAINABILITY A GROWING EXPECTATION

- Sustainability has a growing consumer importance
- 64 % of consumers familiar with "sustainability"  
(international survey 2011)
- Sustainability is addressed by politicians and trend setters (not only environmentalists)
- Consumers want to act with their consumption against risks.



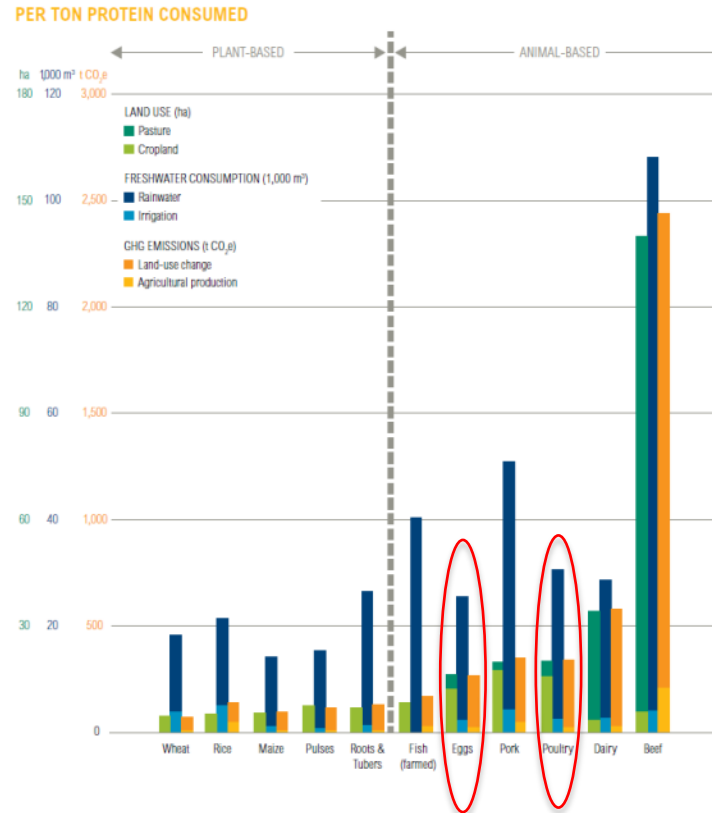
(Hartmann Group, Inc., 2011)

# POULTRY THE MOST SUSTAINABLE ANIMAL PRODUCTION

USA:

- 11 % buy sustainable "white" meat
- 33 % claim they will pay 20 % extra for sustainable white meat

(Marketing Sustainability 2010 report, Hartman Group, Inc.)



(World Resources Institute, 2016)

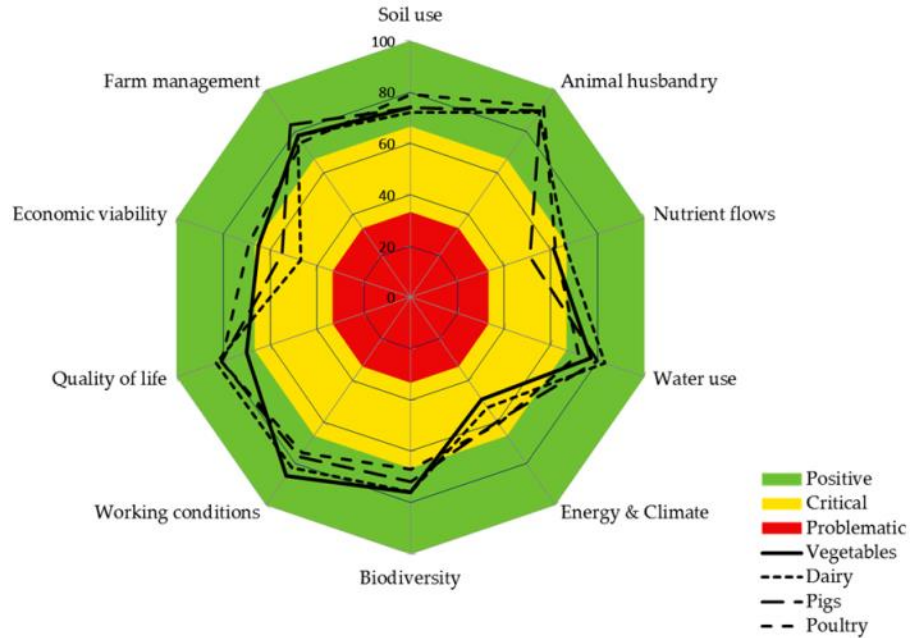
# SUSTAINABILITY AND LOCAL PRODUCTION

- Local production and feed sourcing are important sustainability parameters
- Especially GMO soya is problematic
- Waitrose (UK high-end grocer) has started import of European non-GM soya for their meat producers:  
"An important step to move towards a completely sustainable animal feed supply chain"

(Food Ingredients First, 2016)



# RISE SUSTAINABILITY CHECK – AN IMPROVEMENT TOOL



Average of 37 organic farms 2014-2015

(SEGES, 2016)

# RISE SUSTAINABILITY CHECK – HOW AND WHY?

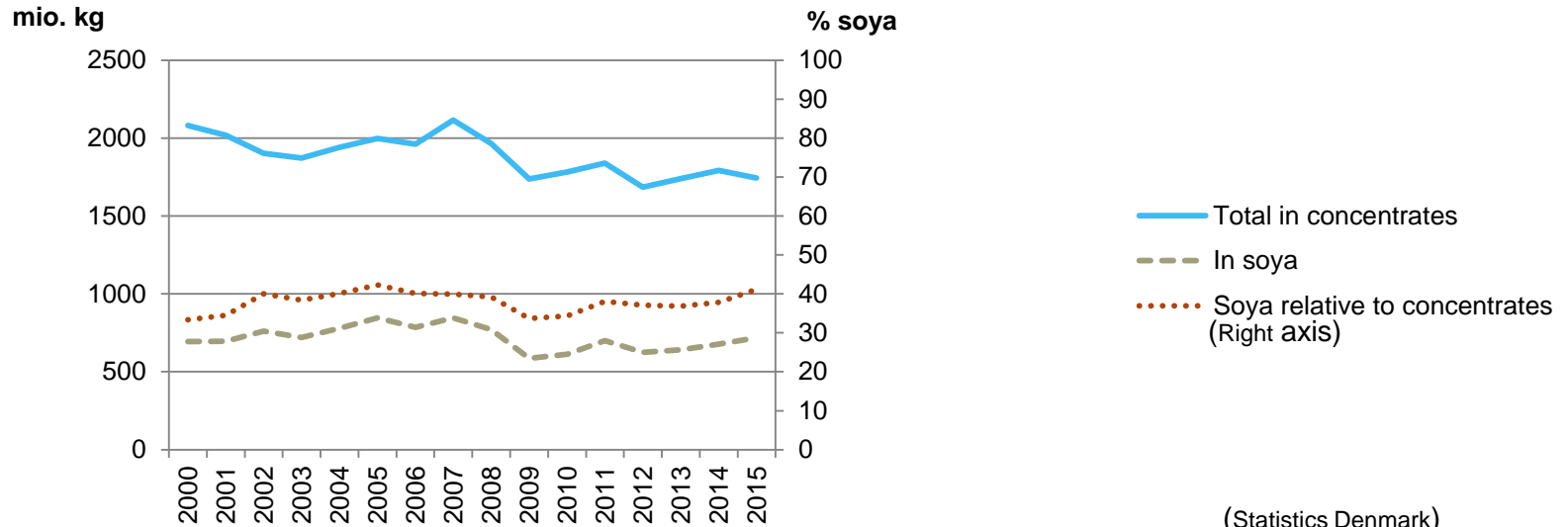
- Certified advisor makes a farm survey together with the farmer.
- Sustainability report and diagram.
- Action plan for improvements
- Prepare the farm to sustainability demands in the market
- Higher traceability and competitiveness





# SOYA DEPENDENCY

Danish consumption of crude protein in concentrates



# SOYA DOMINANT IN POULTRY FEED

- Total annual feed consumption in Danish poultry:  
640 mill. kg
- Total annual soya consumption in Danish poultry:  
118 mill. kg ~ 18 %



# GRASS PROTEIN – A NEW ALTERNATIVE

Grass harvest



Juice pressing



Press cake



Cattle feed



Protein separation

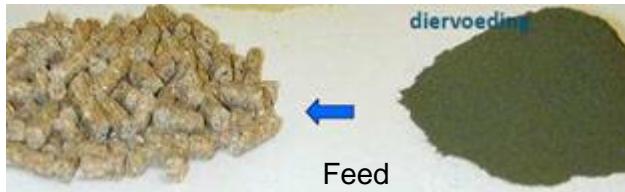


Fermentation



Biogas

Fertilizer



# VALUABLE GRASS PROTEIN

	Demand layers	Soya cake	Grass Clover concentrate	Faba beans
Protein, % of dry matter				
	<b>18.5</b>	40	40	29
Amino acids, % of protein				
Cystine	<b>2.0</b>	1,5	0,6	1,2
Lysine	<b>4.4</b>	6,2	5,9	6,3
Methionine	<b>2.0</b>	1,4	2,0	0,8

# THE ORGANOFINERY PROCESS

- Harvest



- Direct grass harvest without crushing

# THE ORGANOFINERY PROCESS

- Juice pressing



- High capacity screw press
- 50 % juice / 50 % press cake

# THE ORGANOFINERY PROCESS

- Fermentation



- Lactic acid bacteria fermentation
- Quick pH drop below 4
- Protein precipitate

# THE ORGANOFINERY PROCESS

- Separation

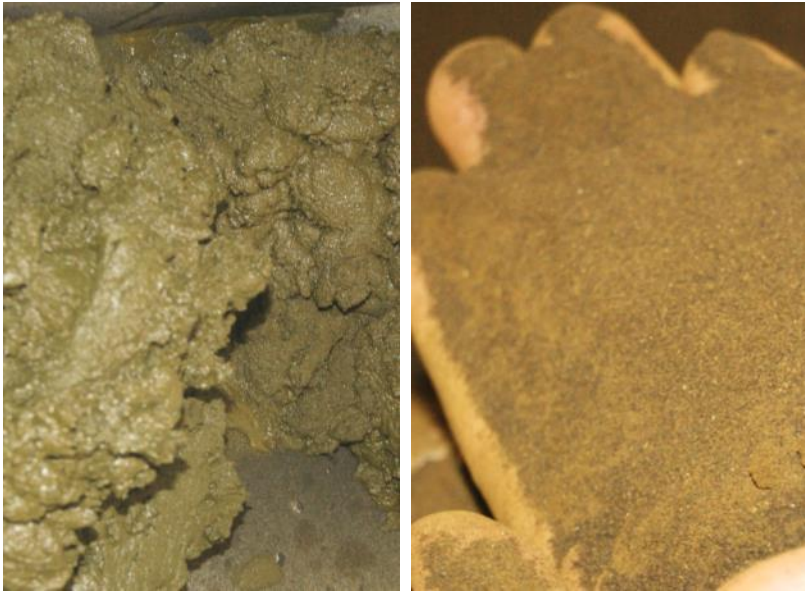


- Decanter centrifuge separate the juice into protein concentrate (paste) and a rest juice



# THE ORGANOFINERY PROCESS

- Drying



- Paste (25-30 % DM)
- Spin flash dryer
- Powder (85 % DM)
- 35 – 45 % crude protein
- Use of paste in wet-feeding systems

# FEEDING TRIALS



- Test feeding with 4, 8 and 12 % grass-protein concentrate.
- 6 replicates of 10 hens
- Test-period December 2016 to February 2017.
- Egg production, feed consumption, shell quality, yolk colour, protein digestibility

# ECONOMY AND IMPLEMENTATION

- Concentrate / ha: ~ 5 ton
- Product price concentrate: 2,5 DKK conv. / 6 DKK eco.
- Cooperation with biogas
- Value of residues and fertilizer
- Production company under preparation

