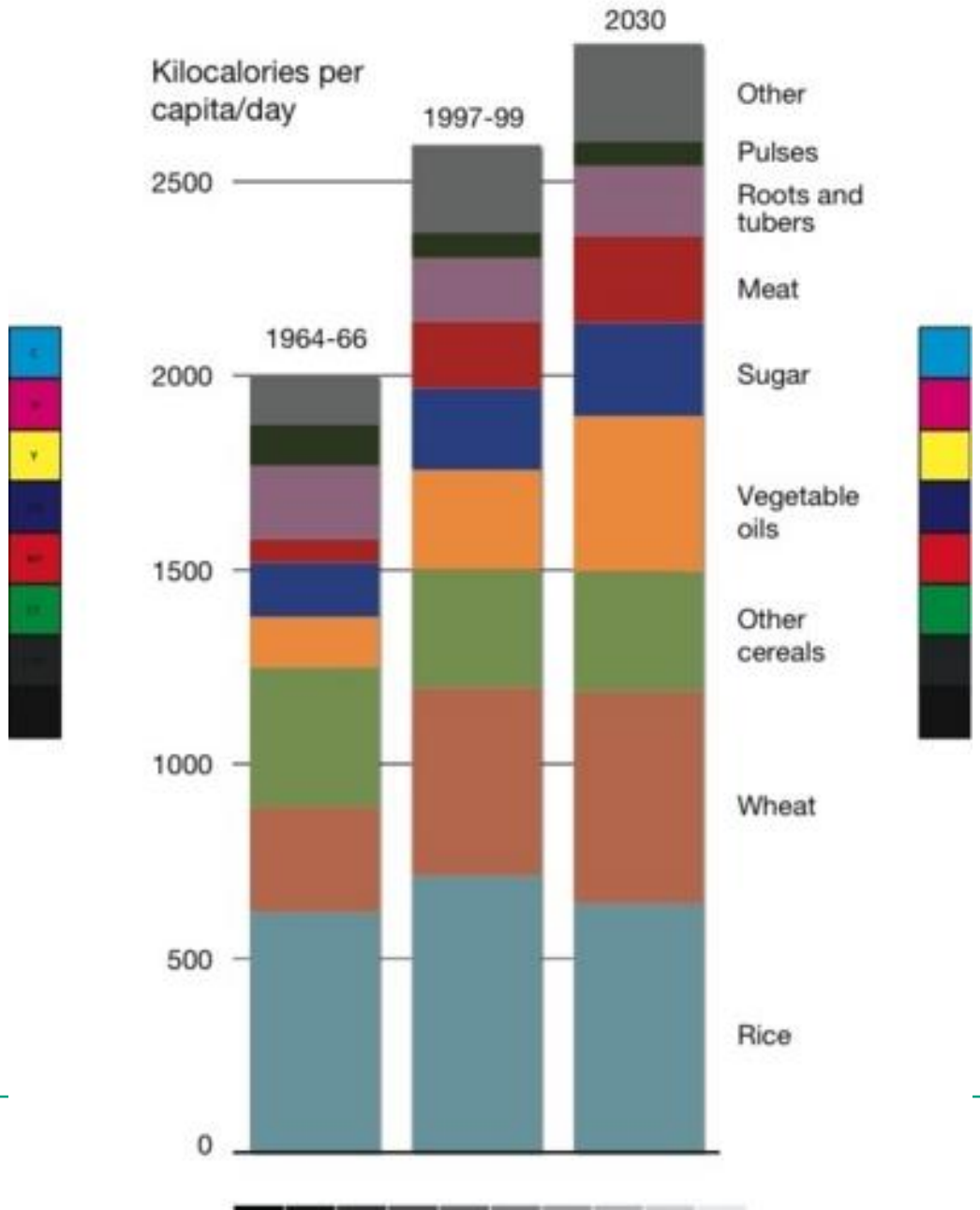
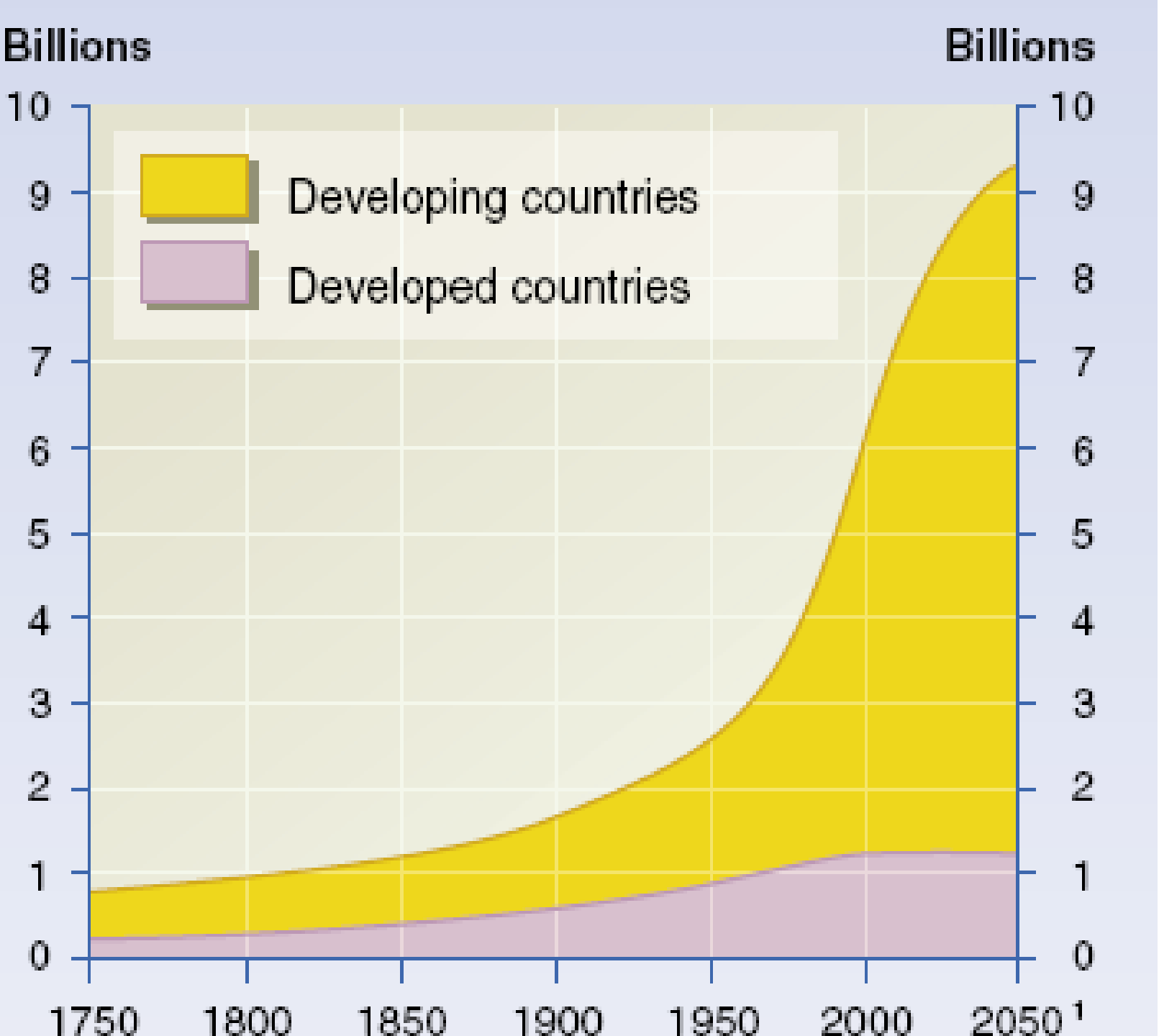
Fremtidens mat

Birger Svihus
birger.svihus@nmbu.no


BIRGER SVIHUS
SPISELIG
EN FORTELLING OM
MATEN OG
MENNESKET
ASCHEHOUG


Kilocalories per capita/day
2030
1997-99
1964-66
2500
2000
1500
1000
500
0
Other
Pulses
Roots and tubers
Meat
Sugar
Vegetable oils
Other cereals
Wheat
Rice

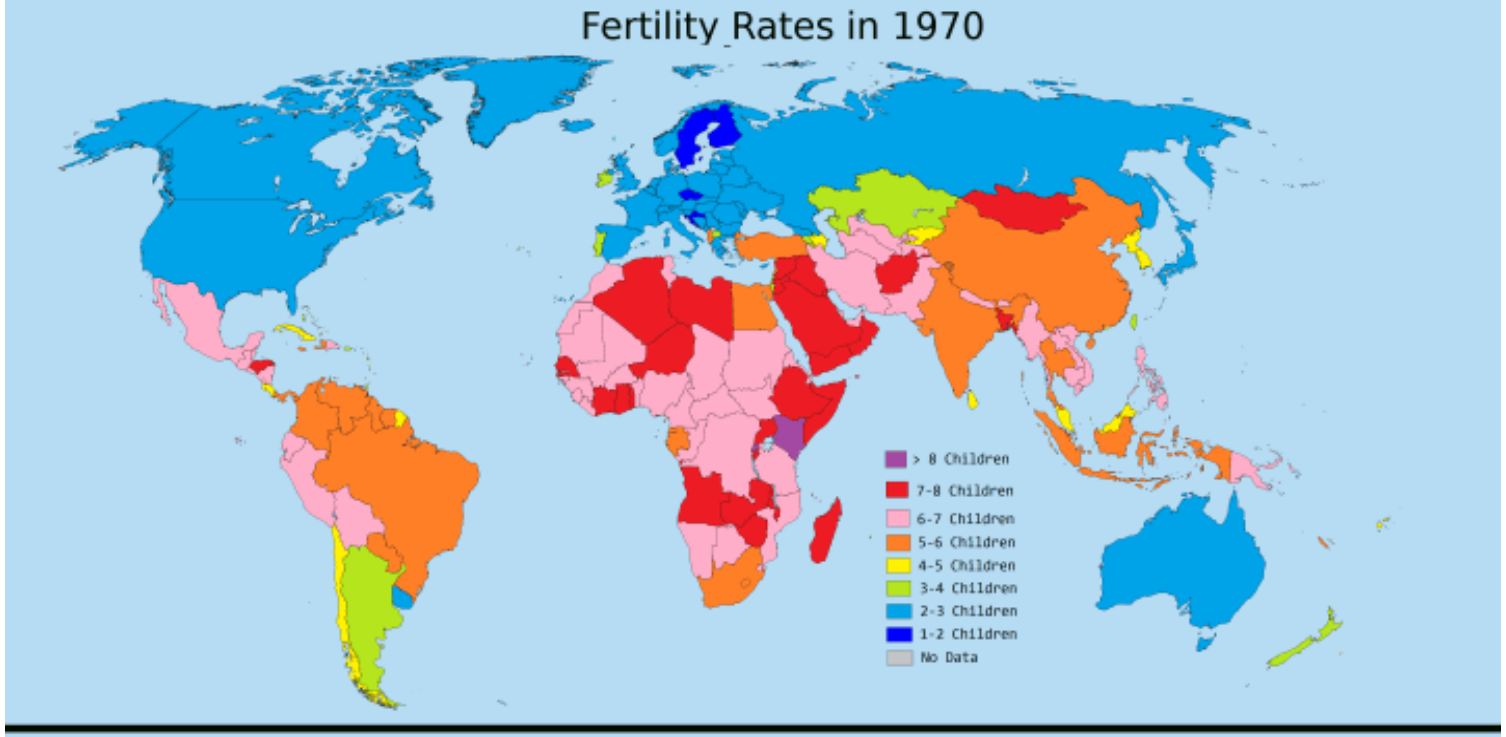

Billions
Billions
10
9
8
7
6
5
4
3
2
1
0
Developing countries
Developed countries
1750
1800
1850
1900
1950
2000
2050
1

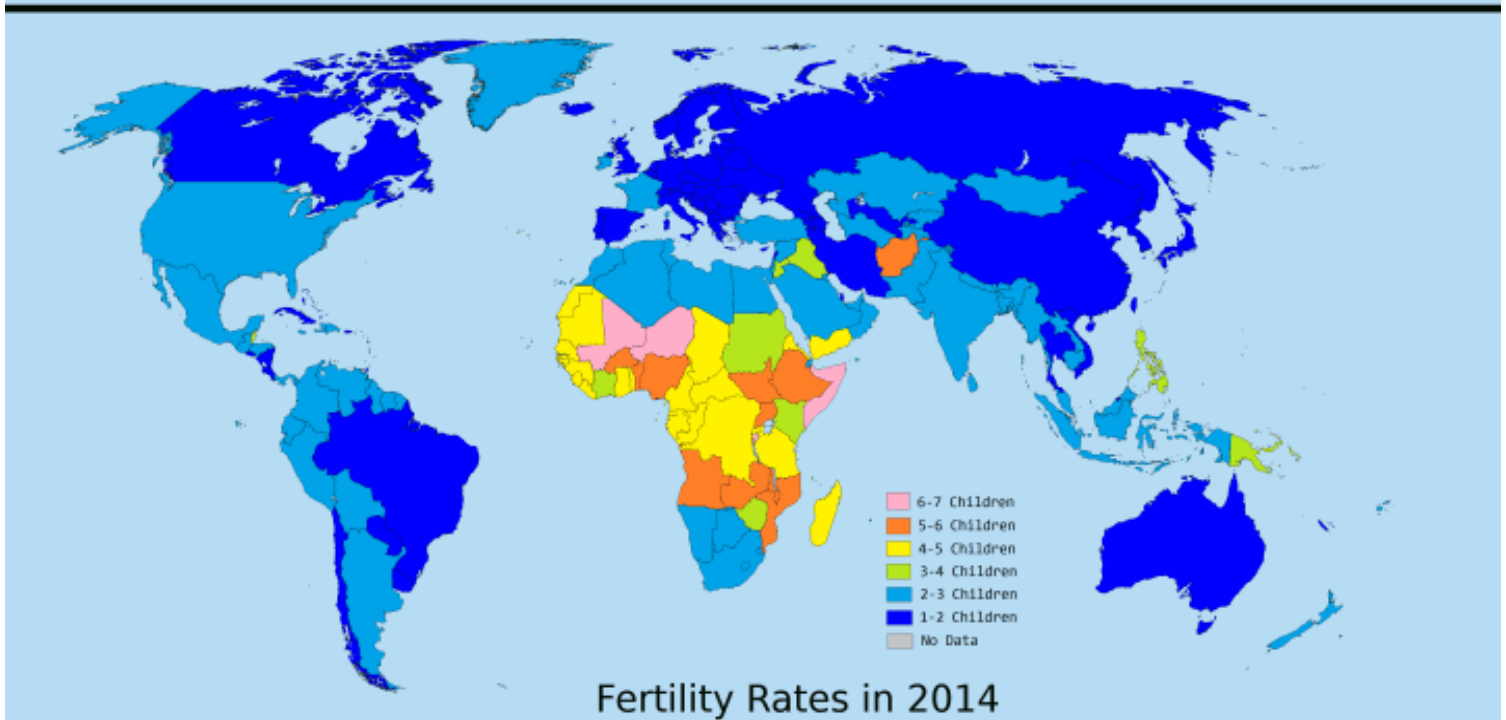
Thomas Malthus (1798): The power of population is so superior to the power of the earth to produce subsistence for man, that premature death must in some shape or other visit the human race. The vices of mankind are active and able ministers of depopulation.

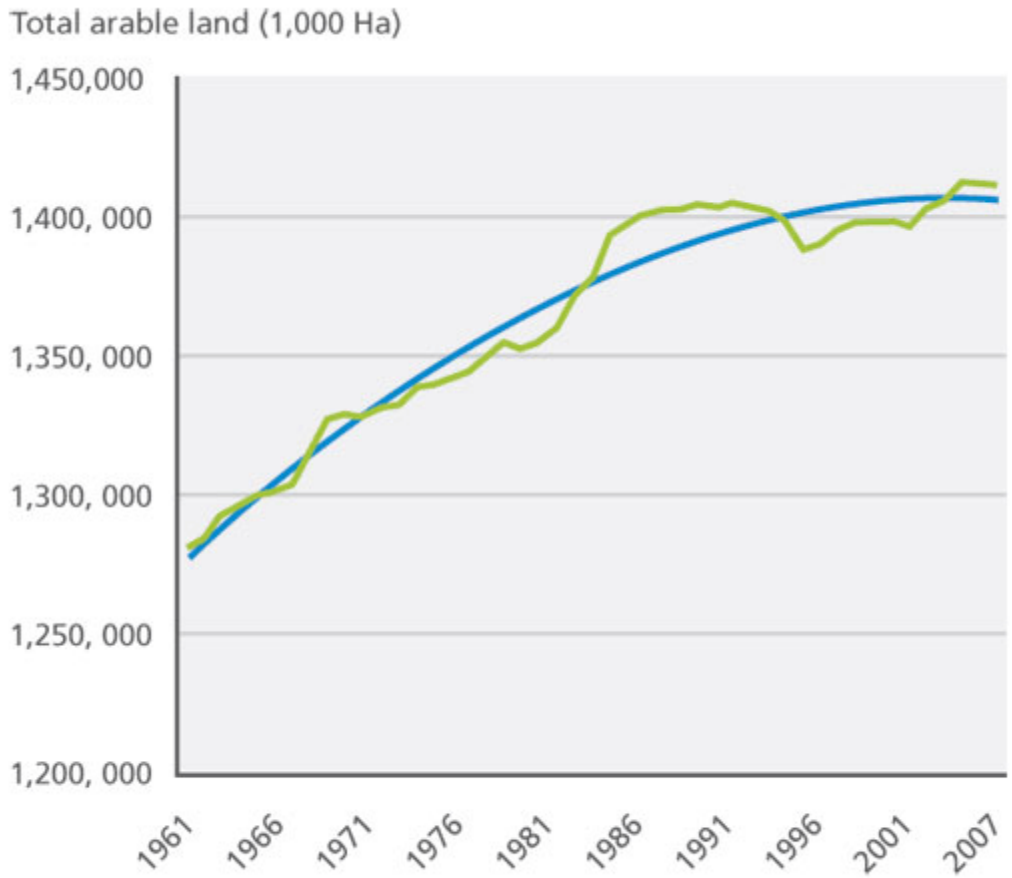
Paul Ehrlich (1968): *The battle to feed all of humanity is over. In the 1970s hundreds of millions of people will starve to death in spite of any crash programs embarked upon now. At this late date nothing can prevent a substantial increase in the world death rate*

Sir David Attenborough: If we do not control population, the natural world will

Attempting to solve famine in Africa by simply sending flour bags is "barmy", Sir David Attenborough has said, as he argued it was nature's response to too many people and not enough land.


Fertility Rates in 1970
> 8 Children
7-8 Children
6-7 Children
5-6 Children
4-5 Children
3-4 Children
2-3 Children
1-2 Children
No Data


6-7 Children
5-6 Children
4-5 Children
3-4 Children
2-3 Children
1-2 Children
No Data
Fertility Rates in 2014



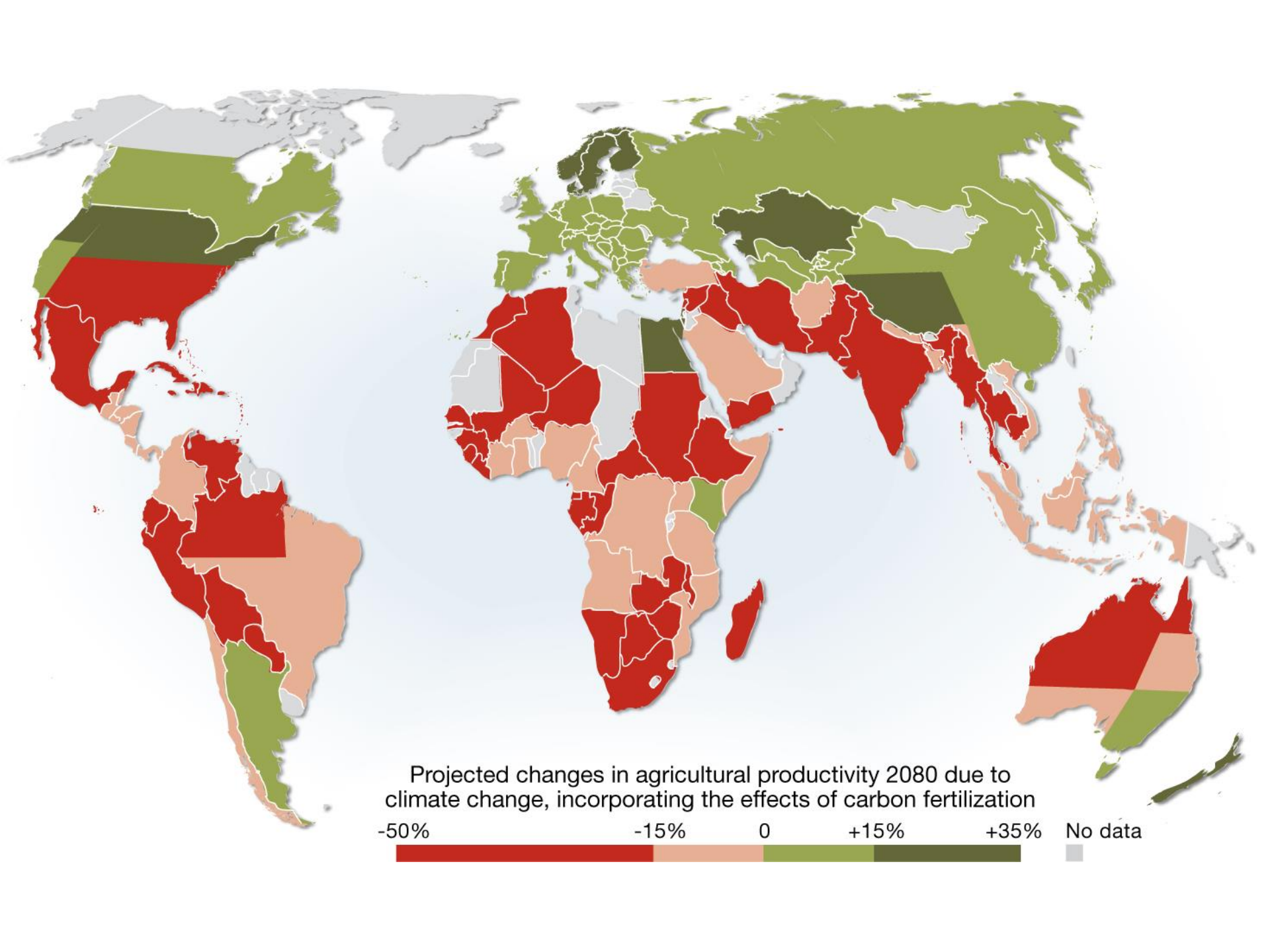
Source: Land Commodities Research

UNEP

THE ENVIRONMENTAL FOOD CRISIS

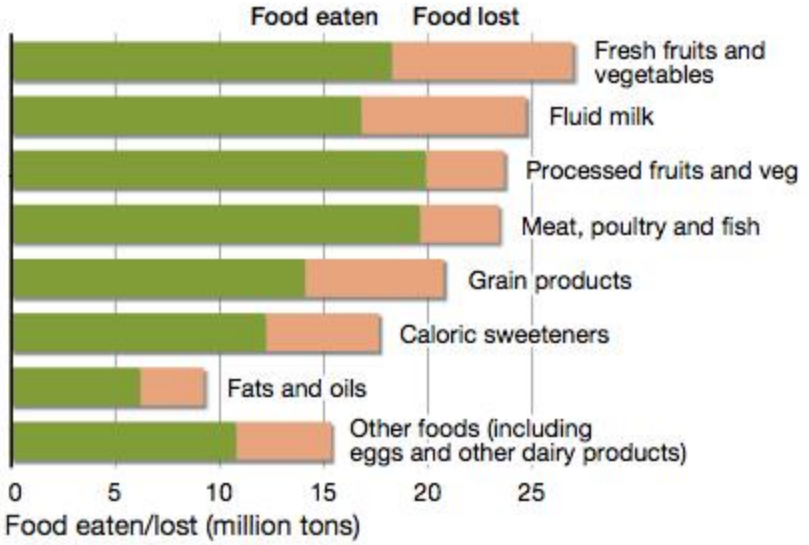
THE ENVIRONMENT'S ROLE IN AVERTING FUTURE FOOD CRISES

A UNEP RAPID RESPONSE ASSESSMENT

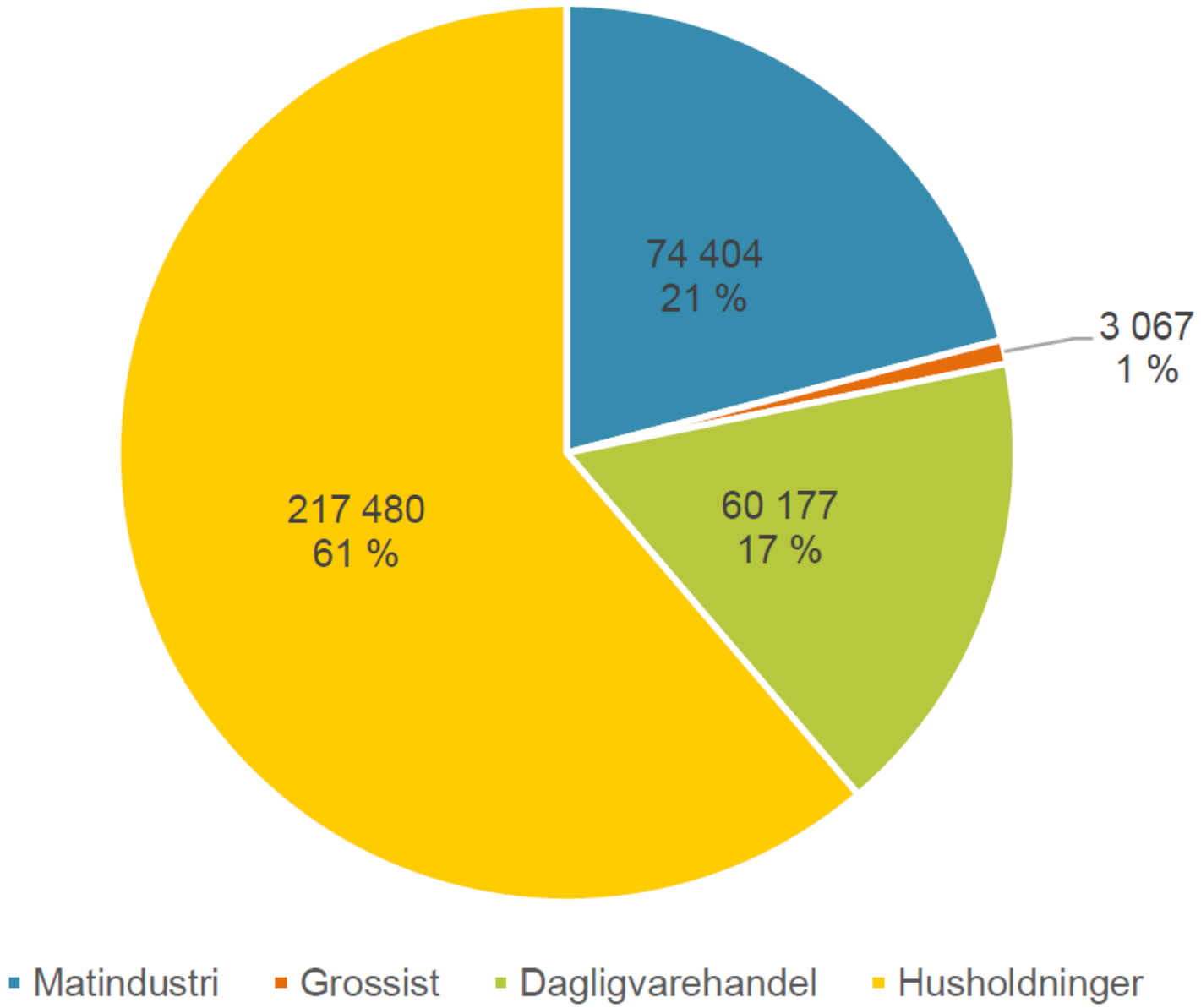

Projected changes in agricultural productivity 2080 due to climate change, incorporating the effects of carbon fertilization
-50%
-15%
0
+15%
+35%
No data

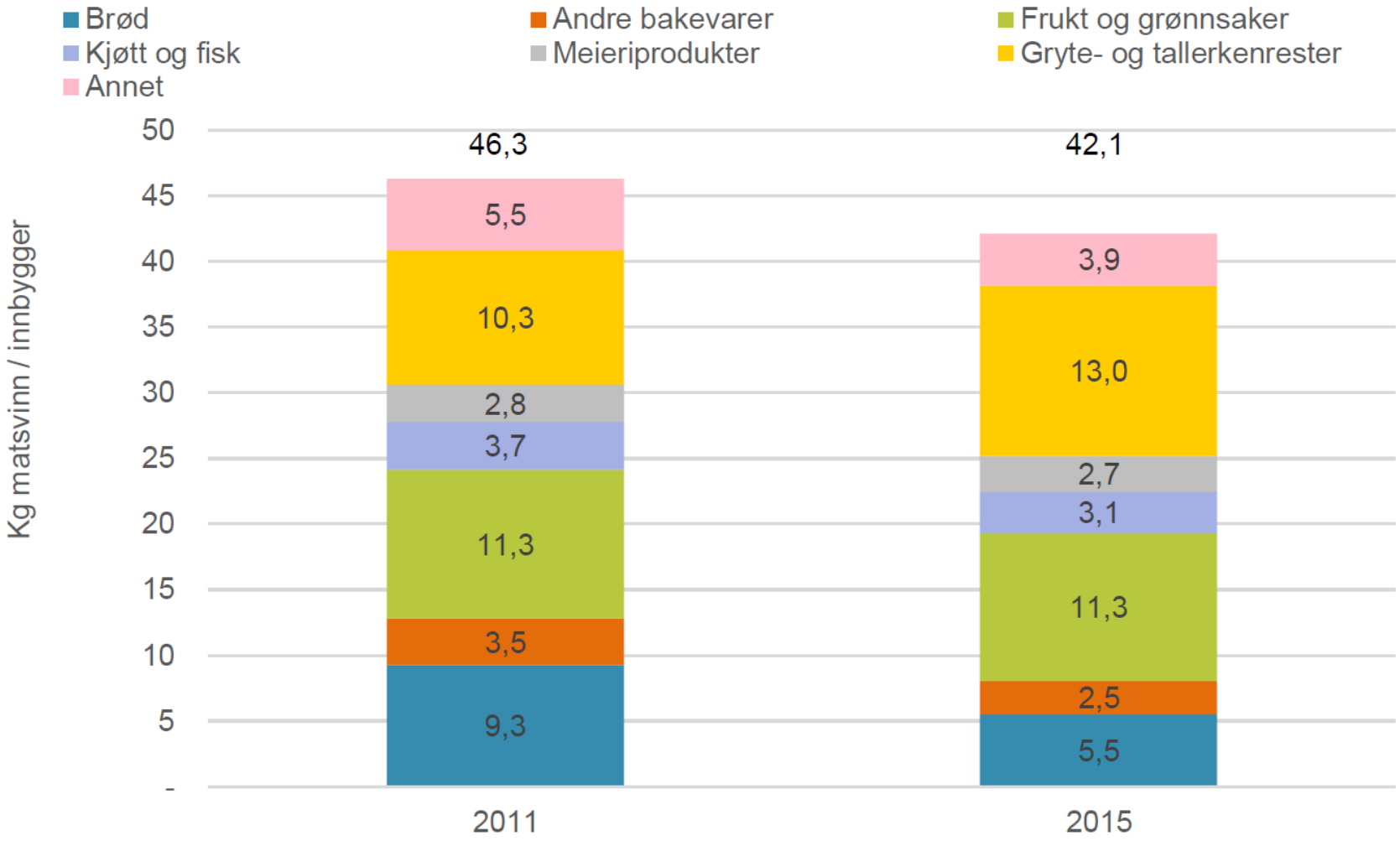
Realistiske løsninger for mer matsikkerhet

1. Redusert matkasting



Matkasting i Norge 2015 (ForMat-prosjektet)

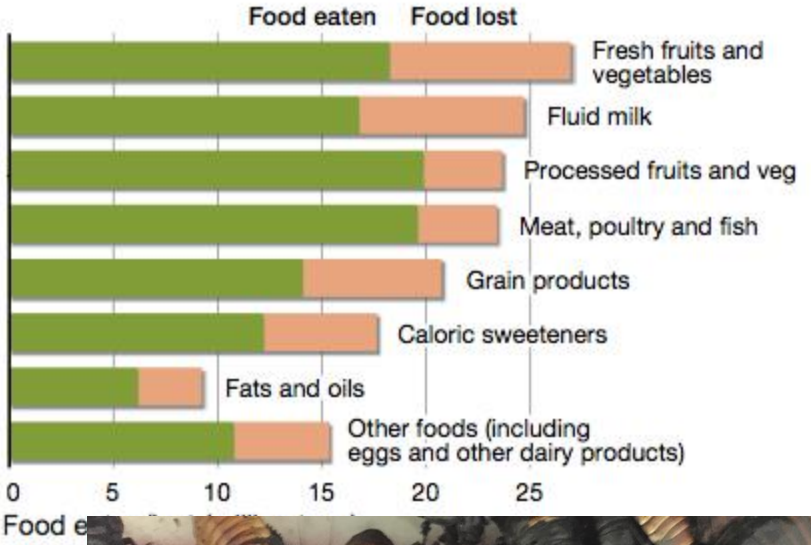




Figur 4-4 **Kg matsvinn per innbygger for forbrukerleddet, 2011 og 2015 - fordelt på varegruppe.**

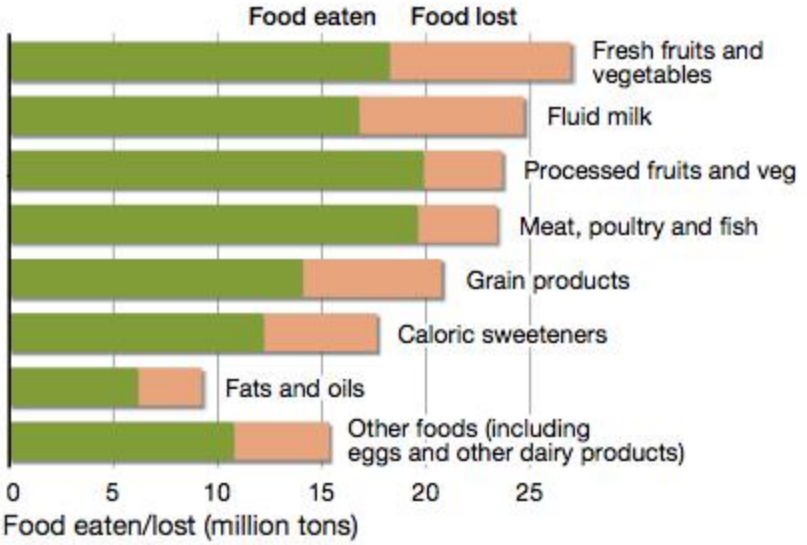
Realistiske løsninger for mer matsikkerhet

1. Redusert matkasting



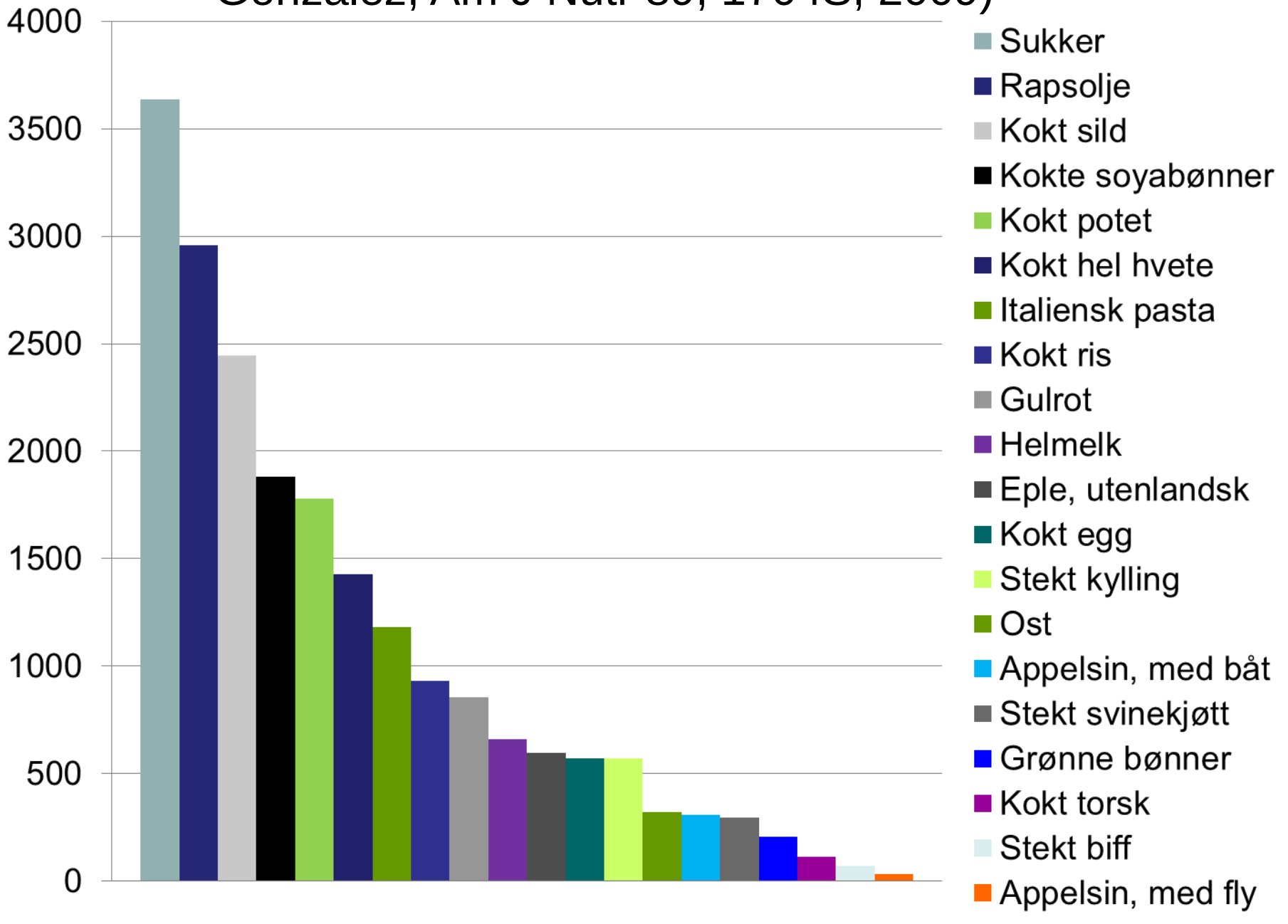
Realistiske løsninger for mer matsikkerhet

1. Redusert matkasting



2. En mer bærekraftig matproduksjon

Kcal per kg CO_2-ekvivalenter for mat (Carlssen-Kanyama og Gonzalez, Am J Nutr 89, 1704S, 2009)

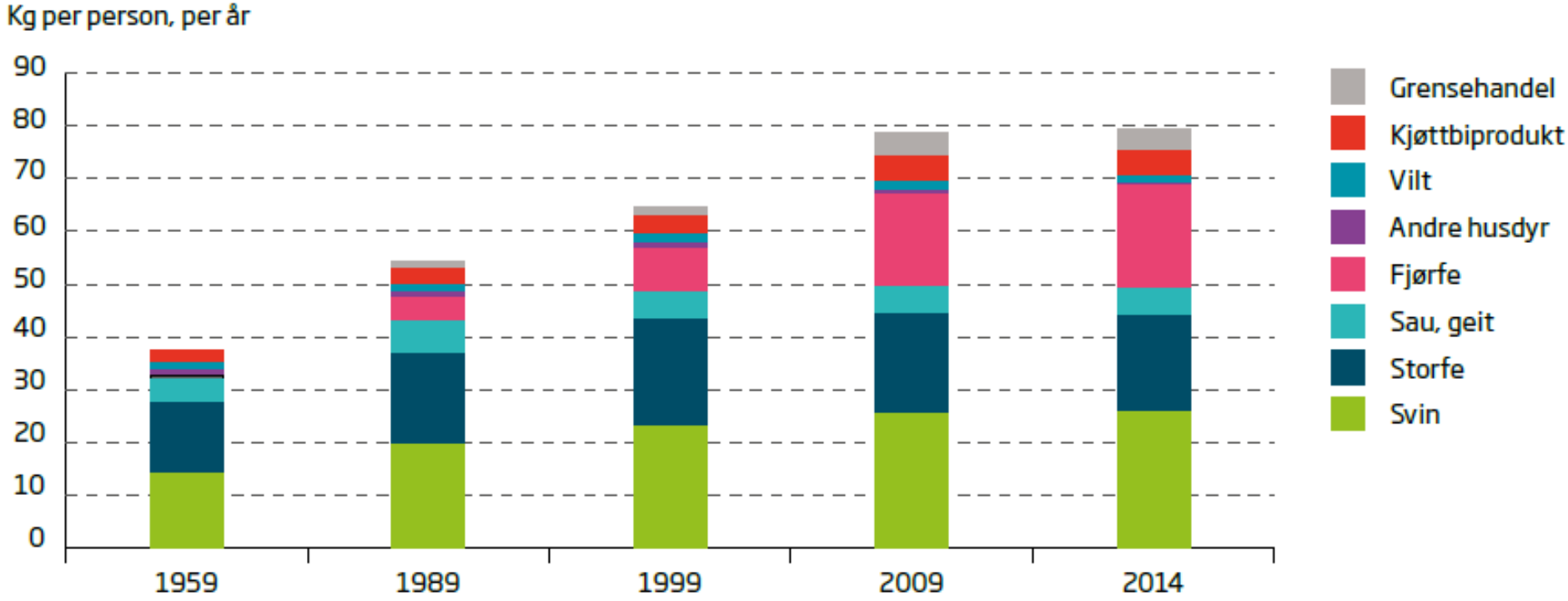


Tabell 1. **MATVAREFORBRUK PÅ ENGROSNIVÅ. KG PER PERSON, PER ÅR.** [1]

	1953-55 [1)]	1979	1989	1999	2005	2009	2010	2011	2012	2013	2014*
Korn, som mel (ekskl. ris)	97,2	75,1	76,4	82,9	84,2	81,6	81,1	78,7	77,6	77,7	77,0
Ris, gryn og mel	1,5	2,5	3,1	3,5	4,3	4,8	4,8	4,6	4,4	4,4	4,5
Poteter, friske [2]	92,5	62,5	52,0	32,1	22,8	21,8	23,0	20,8	27,5	24,4	24,8
Potetprodukter [2]		11,5	19,2	29,6	31,1	30,4	32,8	29,6	28,1	27,6	27,8
Poteter til potetmel [2]	14,6	8,1	8,8	7,8	9,9	7,3	6,9	8,6	7,7	8,0	10,5
Sukker, honning o.l.	40,1	44,6	40,5	43,8	35,2	31,9	30,9	30,1	29,0	27,7	27,9
Erter, nøtter o.l. [3]			4,7	6,1	6,8	8,1	7,4	7,5	7,5	7,3	7,7
Kakao og kakaoprodukter			3,9	3,1	5,6	6,0	6,3	6,4	6,3	6,5	6,2
Grønnsaker	35,4	46,4	53,2	60,9	64,2	68,4	71,3	75,9	73,3	75,5	79,7
Frukt og bær	41,2	75,6	77,8	68,7	82,5	89,4	88,0	87,1	88,8	90,8	92,0
Kjøtt [4]	33,3	51,1	49,7	59,5	66,2	69,3	68,6	70,1	70,5	72,0	70,7
Kjøttbiprodukter	2,4	3,2	3,1	3,3	5,1	5,0	5,1	4,9	4,7	4,6	4,7
Egg	7,4	10,8	11,5	10,8	10,8	11,9	11,9	12,0	12,6	12,4	12,5
Helmelk	194,5	160,1	63,6	32,4	24,8	19,5	19,1	18,5	18,1	17,7	17,3
Lettmelk			79,2	72,6	59,0	53,6	51,9	50,1	48,4	46,4	44,0
Mager melk	10,0	26,3	32,2	22,2	27,4	28,7	28,5	28,1	27,8	27,9	28,6
Yoghurt				6,7	7,8	9,2	9,1	9,2	9,1	9,1	9,3
Konserverte melkeprodukter	3,2	14,5	18,5	23,3	30,9	30,8	32,4	31,0	31,7	27,6	24,9
Fløte inkl. rømme som 38 % fett	5,0	6,6	6,9	6,7	7,5	6,8	6,9	7,8	7,7	7,5	7,3
Ost	8,0	12,0	13,3	14,5	16,7	16,8	16,9	17,0	17,1	17,7	17,9
Smør, inkl. smør i margarin	3,8	5,4	3,3	3,3	3,3	2,9	3,0	3,3	3,6	3,3	3,3
Margarin	24,2	15,2	13,0	12,1	9,9	9,9	9,7	9,4	9,1	9,5	8,8
herav lettmargarin		0,2	1,9	2,5	2,5	2,4	2,4	2,3	2,0	2,0	2,0
Annet fett	3,8	4,9	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0
Folkemengde											
1000 stk	3394	4073	4227	4462	4623	4829	4889	4953	5019	5080	5137

Utviklingen i norsk kosthold 2015. Rapport IS-2382. Helsedirektoratet, 2016

Figur 8. **KJØTTFORBRUK ETTER DYRESLAG SAMT GRENSEHANDEL**



Utviklingen i norsk kosthold 2015. Rapport IS-2382. Helsedirektoratet, 2016

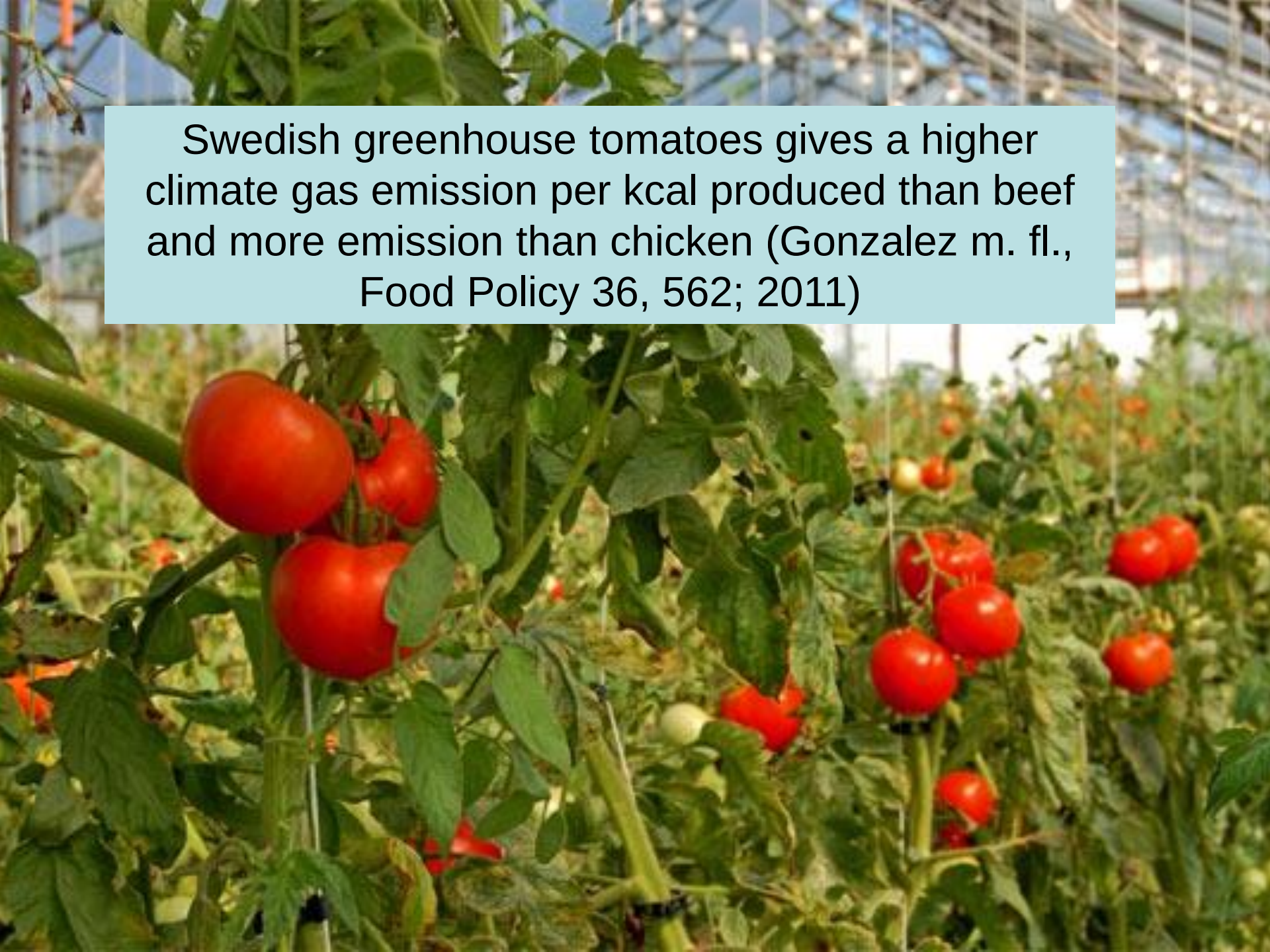
Table 25.4 Meat and milk consumption in selected countries (kg/head/year) (FAO)

Country or region	Meat	Milk
USA	125.6	257.6
Argentina	86.1	164.2
France	93.4	290.2
UK	84.3	243.5
Burundi	3.7	3.6
Bangladesh	3.3	15.0
India	5.7	63.5
Sri Lanka	6.9	32.8

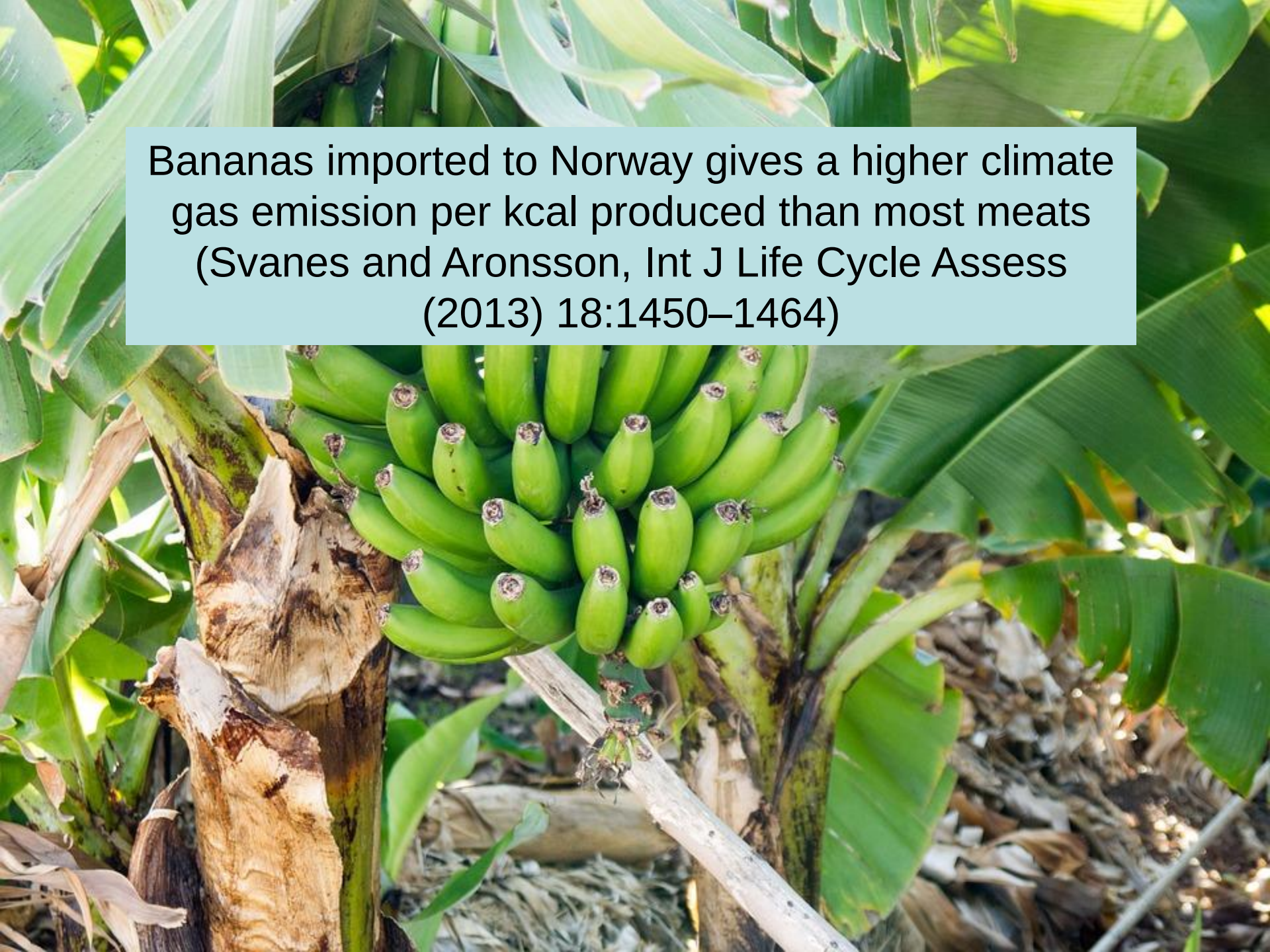
Table 25.5 Contribution of animal products to human diets (FAO, 2008)

	Energy (MJ/day)				Protein (g/day)
	Meat and offal	Milk and eggs	Animal fats	Total animal	Total animal[a]
World	0.96	0.60	0.25	1.81	29
France	2.07	1.69	1.12	4.88	74
Spain	1.89	1.27	0.30	3.46	70
UK	1.96	1.52	0.64	4.12	59
USA	1.92	1.71	0.46	4.09	74
Australia	2.12	1.15	0.96	4.23	70
Argentina	2.12	1.01	0.30	3.43	57
China	1.96	0.48	0.19	2.63	37
Japan	0.74	0.72	0.15	1.61	51
India	0.09	0.31	0.24	0.64	10
Kenya	0.33	0.60	0.03	0.96	15
Nigeria	0.15	0.08	0.02	0.25	8

[a]Includes fish.



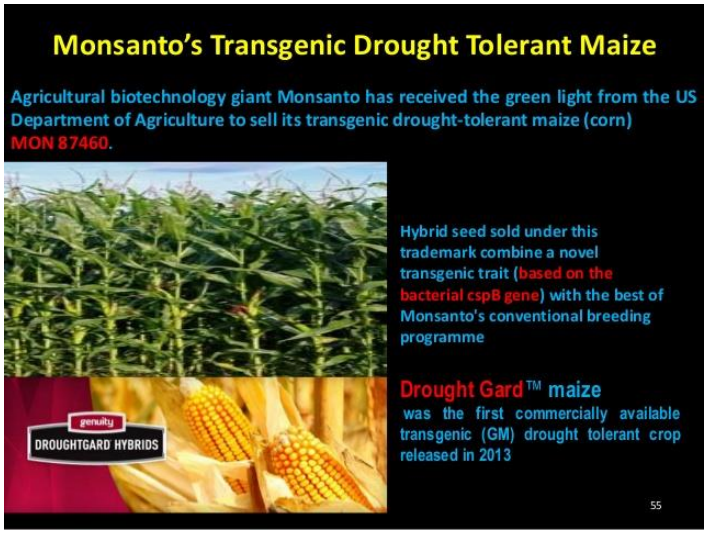
Swedish greenhouse tomatoes gives a higher climate gas emission per kcal produced than beef and more emission than chicken (Gonzalez m. fl., Food Policy 36, 562; 2011)



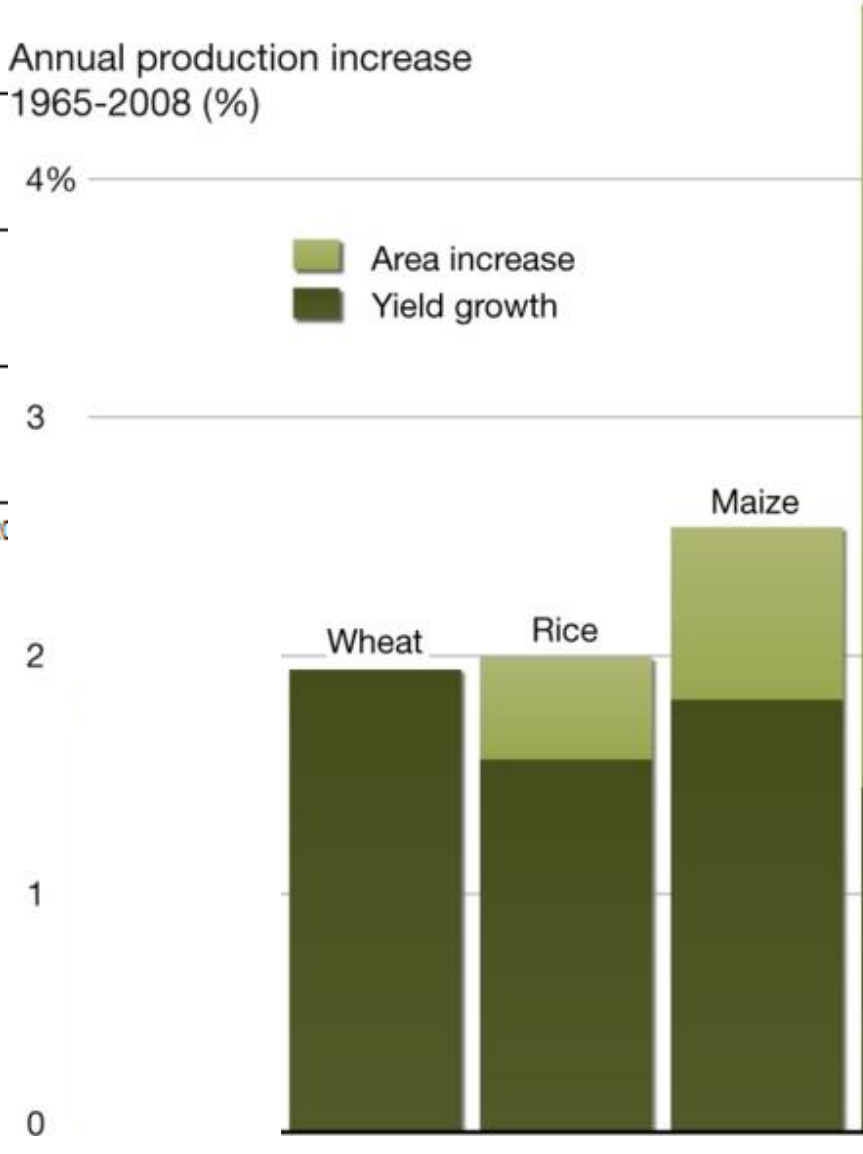
Bananas imported to Norway gives a higher climate gas emission per kcal produced than most meats (Svanes and Aronsson, Int J Life Cycle Assess (2013) 18:1450–1464)

Realistiske løsninger for mer matsikkerhet

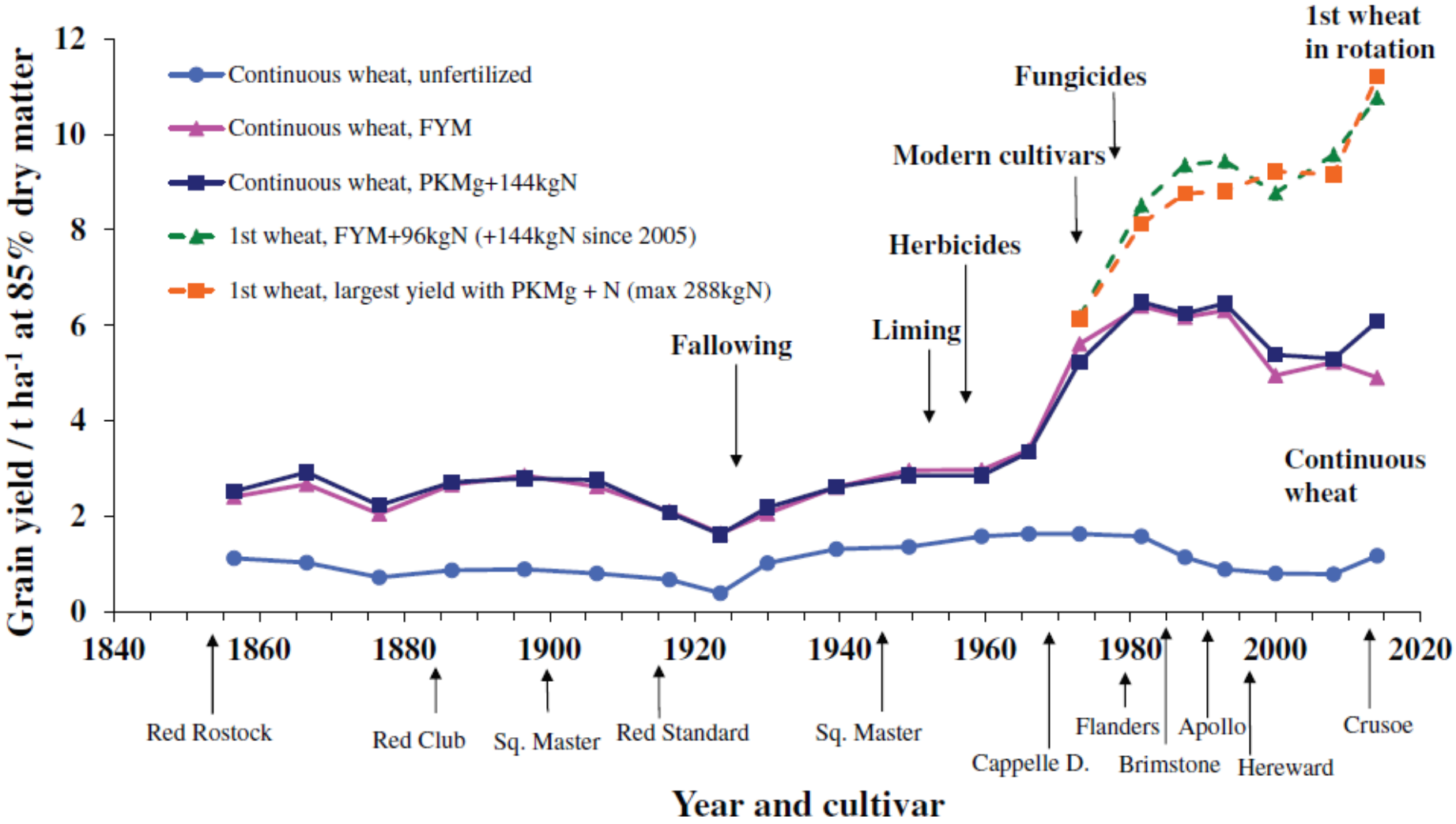
3. Mer teknologi og naturvitenskapelige nyvinninger




World Grain Production, 1950-2012
Million Tons
2,500
2,000
1,500
1,000
500
0
1950
1960
1970
1980
1990
2000
2010
Source: USDA


Annual production increase
1965-2008 (%)
4%
3
2
1
0
Area increase
Yield growth
Wheat
Rice
Maize

Hveteavlinger (UK) 1852-2016 uten gjødsling, med husdyrgjødsel (FYM) eller med kunstgjødsel (Europ. J. Soil Sci. 69, 113–125)



Europ. J. Agronomy 51 (2013) 71–80

Contents lists available at ScienceDirect

European Journal of Agronomy

journal homepage: www.elsevier.com/locate/eja

The effect of organic and conventional management on the yield and quality of wheat grown in a long-term field trial

Paul Bilsborrow[a,*], Julia Cooper[a], Catherine Tétard-Jones[a,b], Dominika Średnicka-Tober[a], Marcin Barański[a], Mick Eyre[a], Christoph Schmidt[a], Peter Shotton[a], Nikolaos Volakakis[a,c], Ismail Cakmak[d], Levent Ozturk[d], Carlo Leifert[a], Steve Wilcockson[a]

[a] Nafferton Ecological Farming Group, Newcastle University, Nafferton Farm, Stocksfield NE43 7XD, UK
[b] Molecular Agriculture Group, School of Biology, Newcastle University, Newcastle upon Tyne NE1 7RU, UK
[c] Geokomt Plc, Stvas, Messara, Crete, Greece
[d] Sabanci University, Faculty of Engineering and Natural Sciences, Istanbul 34956, Turkey

ARTICLE INFO

Article history:
Received 15 February 2013
Received in revised form 20 June 2013
Accepted 21 June 2013

Keywords:
Winter wheat
Organic farming
Conventional crop production
Fertility management
Crop protection

ABSTRACT

The performance of winter wheat was evaluated under organic (ORG) and conventional (CON) management systems in the Nafferton Factorial Systems Comparison (NFSC) long-term field trial. The present study separates out the crop protection and fertility management components of organic and conventional production systems using two levels each of crop protection (CP) and fertility management (FM). The experimental design provided the four combinations of crop protection and fertility (CON-CP CON-FM, CON-CP ORG-FM, ORG-CP CON-FM and ORG-CP ORG-FM) to evaluate their effects on yield, quality (protein content and hectolitre weight) and disease levels during the period 2004–2008. The conventional management system (CON-CP CON-FM) out-yielded the organic management system (ORG-CP ORG-FM) in all years by an average of 3.1 t ha^{-1}, i.e. 7.9 t ha^{-1} vs. 4.8 t ha^{-1}. Fertility management was the key factor identified limiting both yield and grain protein content in the ORG management system. The CON-FM produced on average a 3% higher protein content than ORG-FM in all years (12.5% vs. 9.7%). However the ORG-CP system produced higher protein levels than CON-CP although it was only in 2008 that this was statistically significant. In contrast to protein content it was ORG-FM which produced a higher hectolitre weight than the CON-FM system (71.6 kg hl^{-1} vs. 71.0 kg hl^{-1}). The clear and significant differences in yield and protein content between the ORG-FM and CON-FM systems suggest a limited supply of available N in the organic fertility management system which is also supported by the significant interaction effect of the preceding crop on protein content. The pRDA showed that although fertilisation had the greatest effect on yield, quality and disease there was also a considerable effect of crop protection and the environment.


BLADE RUNNER
2049
OFFICIAL TRAILER


grodan
Delta


PIONER BASIS RØD
UN 1479
5.1


YARA
YaraLiva®
CALCINIT®
25 kg