Ecologic Recycling Agriculture (ERA)

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JÄRNA INTERNATIONAL STEINER COLLEGE

Ecological Recycling Agriculture (ERA)

To save the Baltic Sea, to stop the global warming, protect the biological diversity and produce high quality food

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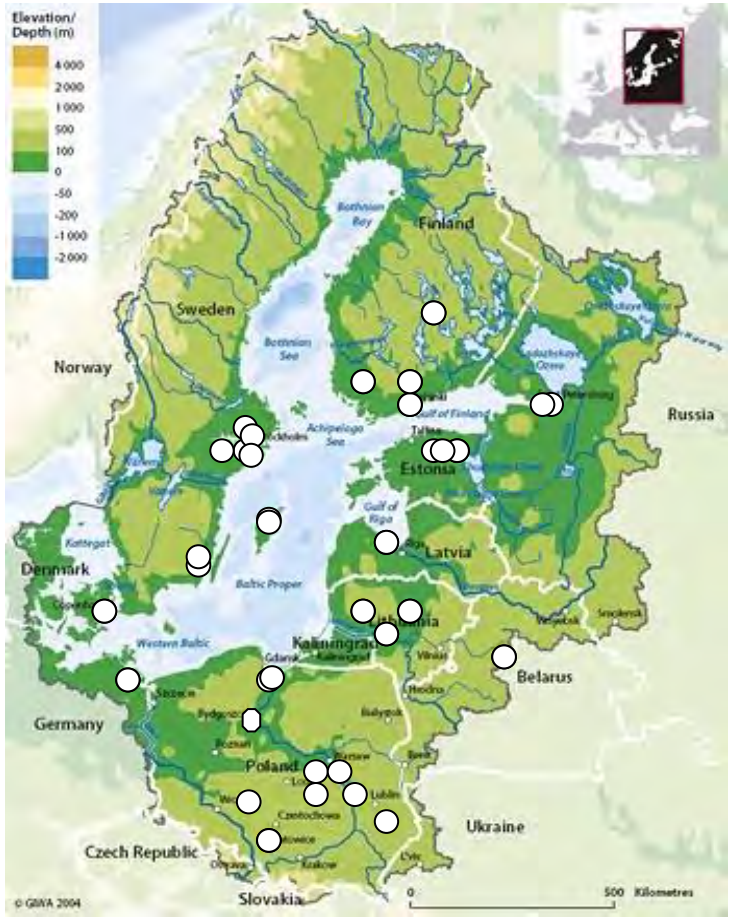
BERAS 2003-2006

48 farms, 20 partners in 8 countries

BERAS Implementation 2010-2013

24 partners, 18 farms in 9 countries



Ecological Recycling Agriculture with focus on Poland 2016-2018

BERAS Partners

SWEDEN
Södertörn University
www.sh.se

Biodynamic Research Institute, www.jdb.se/sbfi

Södertälje kommun Södertälje municipality, www.sodertalje.se

Swedish Rural Network, www.landsbygdsnatverket.se

Swedish Rural Economy and Agricultural societies, Gotland: www.hush.se/i Kalmar: www.hush.se/h

FINLAND
MTT Agrifood Research
www.mtt.fi

Centre for Economic Development, Transport and the Environment for Uusimaa, www.ely-keskus.fi/uusimaa

Finnish Environment Institute, www.environment.fi/syke

University of Helsinki, Department of Agricultural Sciences, www.helsinki.fi

ESTONIA
Estonian University of Life Sciences, www.emu.ee

Estonian Organic Farming Foundation (EOFF), www.maheklubi.ee

LATVIA
Latvian Rural Advisory and Training Centre, www.llkc.lv

LITHUANIA
Aleksandras Stulginskis University
www.lzuu.lt/pradzia/lt

Baltic Foundation HPI, www.heifer.lt; www.heifer.org

Kaunas District Municipality, www.krs.lt

POLAND
Institute of Soil Science and Plant Cultivation – National Research Institute, www.iung.pulawy.pl

Kujawsko-Pomorski Agricultural Advisory Centre in Minikowo, www.kpodr.pl

Polish Ecological Club in Krakow, City of Gliwice Chapter, www.pkegliwice.pl

Independent Autonomous Association of Individual Farmers 'Solidarity', www.solidarnosc.pl

Pomeranian Agricultural Advisory Center in Gdańsk, www.podr.pl

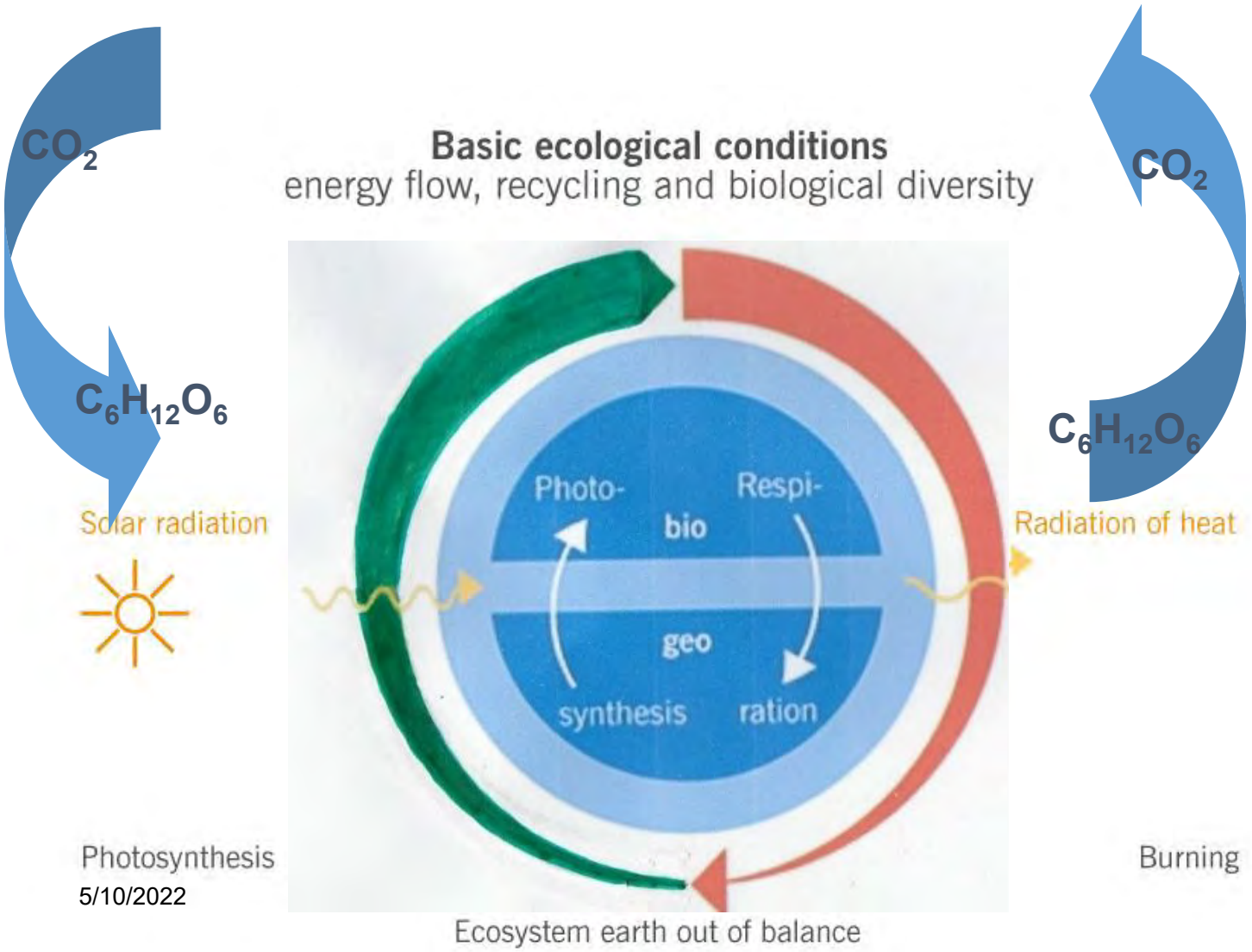
GERMANY
Leibniz-Centre for Agricultural Landscape Research, www.zalf.de

DENMARK
The Danish Ecological Council, www.ecocouncil.dk

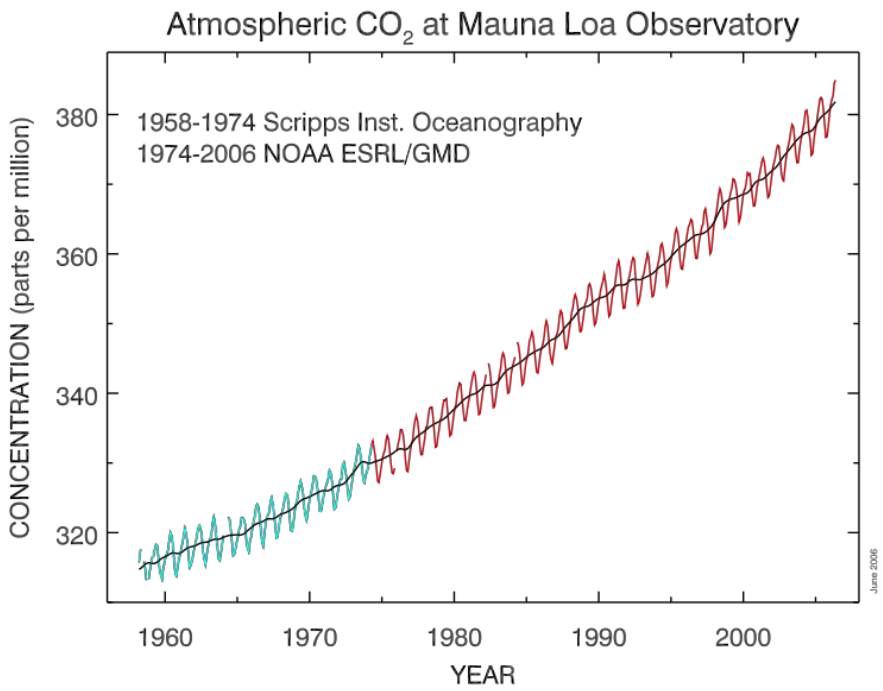
BELARUS
International Public Association of Animal Breeders "East-West"

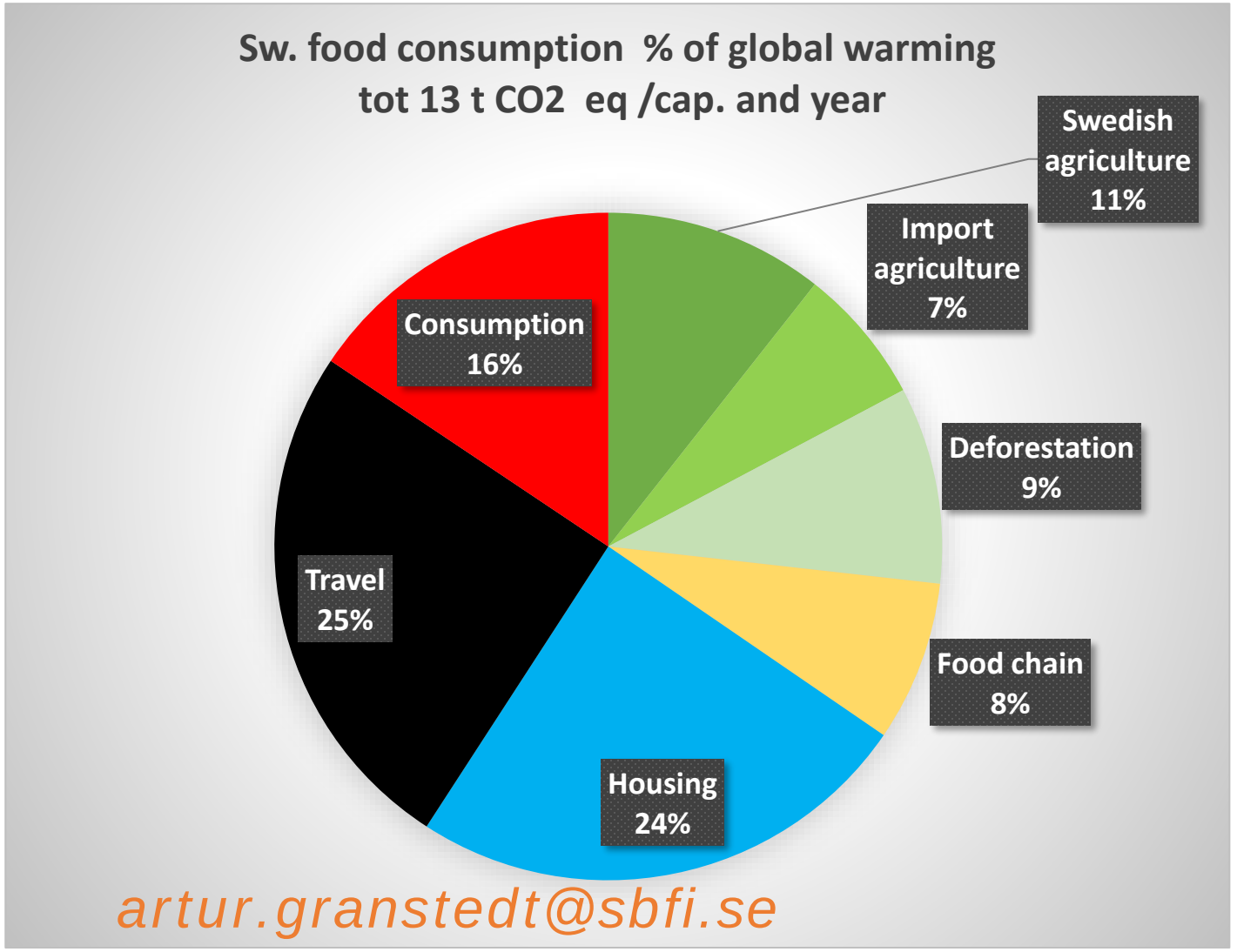
www.beras.eu

Knowledge
Responsibility
Action



Ch. D. Keeling mobilized enough resources so he could, starting . 1958, measure the CO_2 in the atmosphere on Mauna Loa observatory in Hawai




Sw. food consumption % of global warming
tot 13 t CO2 eq /cap. and year
Swedish agriculture 11%
Import agriculture 7%
Deforestation 9%
Food chain 8%
Housing 24%
Travel 25%
Consumption 16%
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Källa enI tillstånd, SMHI

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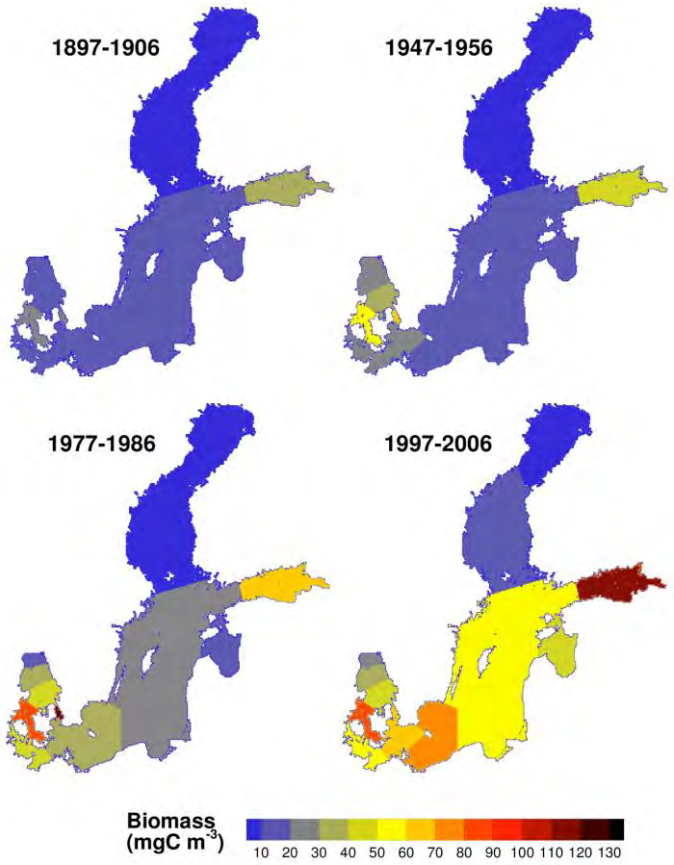
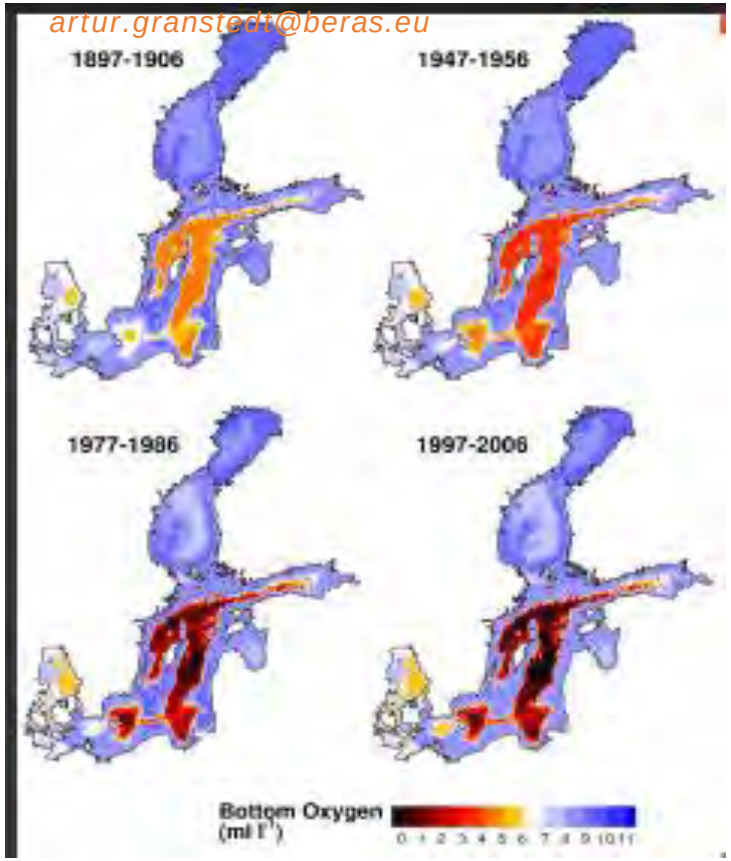
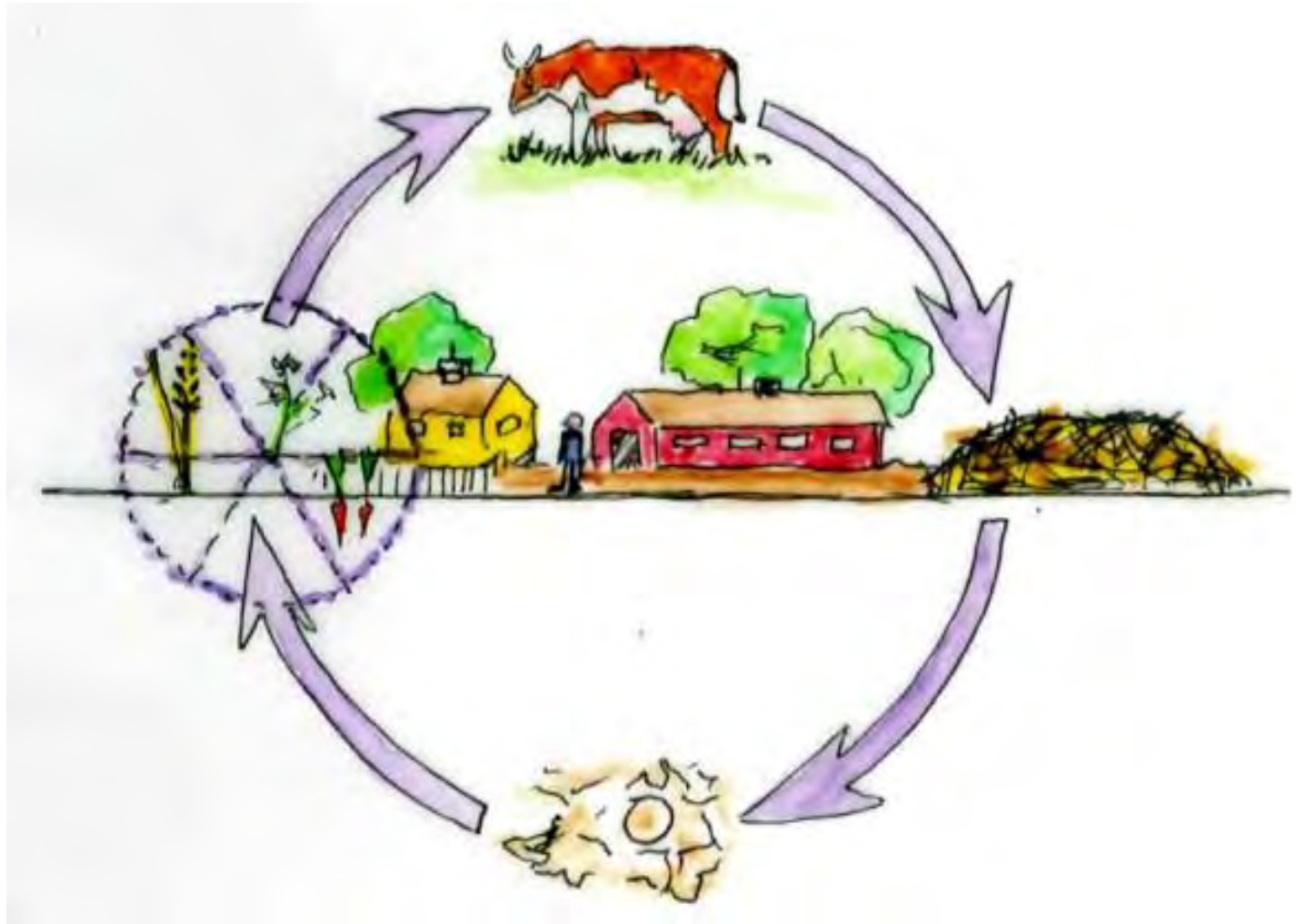
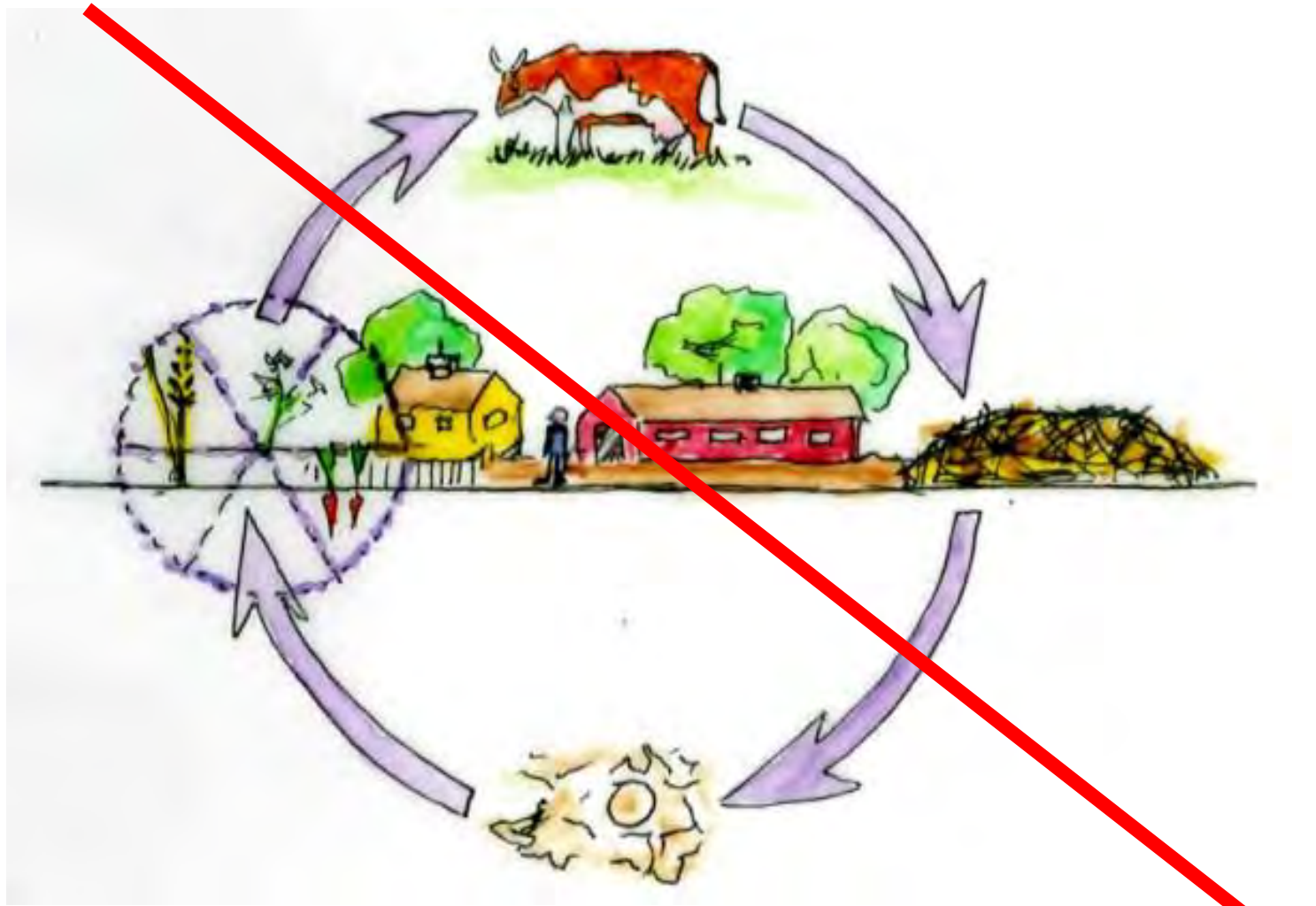




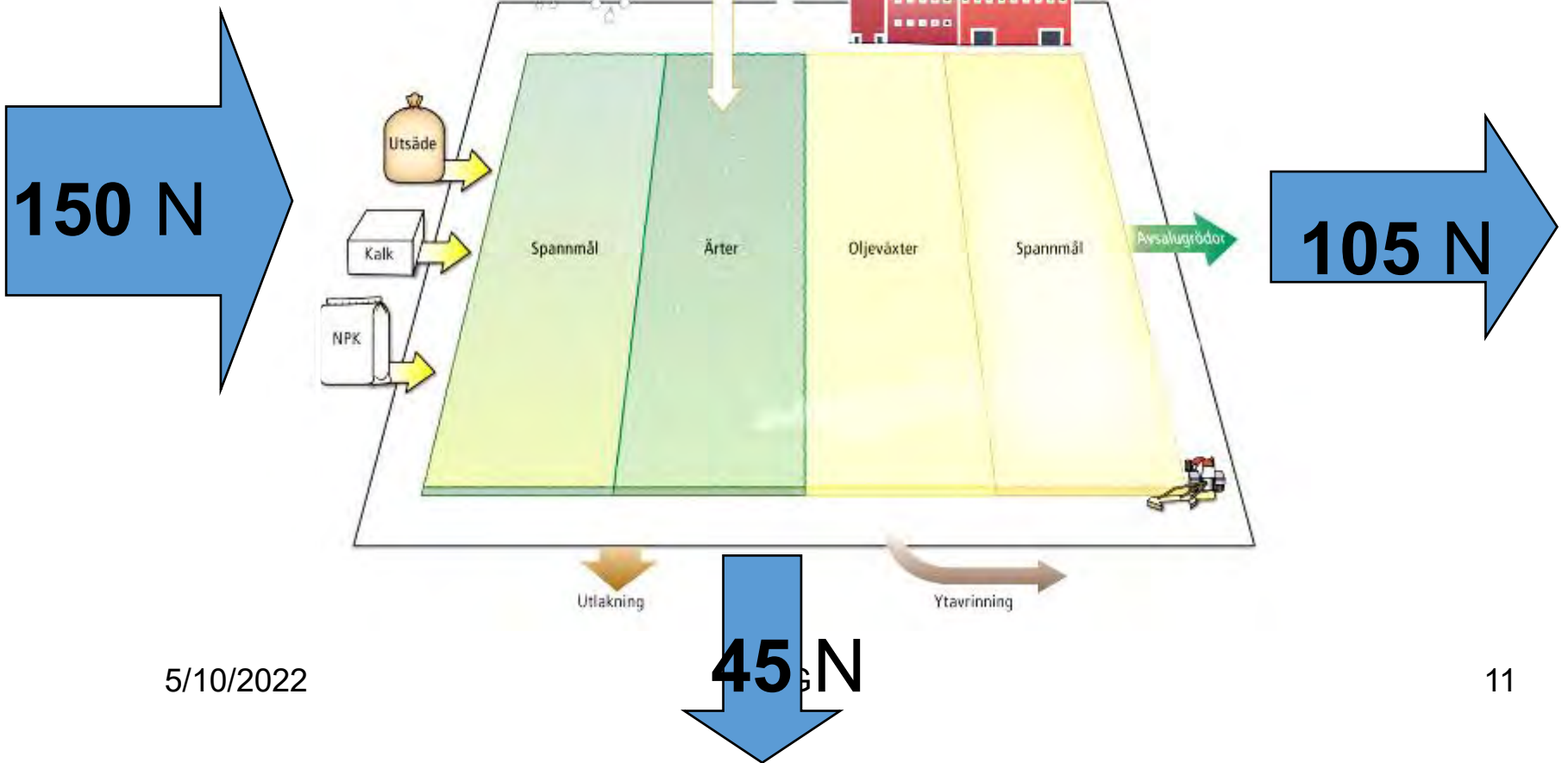




Specialized crop farm

Input, output and surplus of Nitrogen kg/ha and year

(Average 563 farms 01-06 data from Swedish board of agriculture report 2008:25)



Specialized animal farm

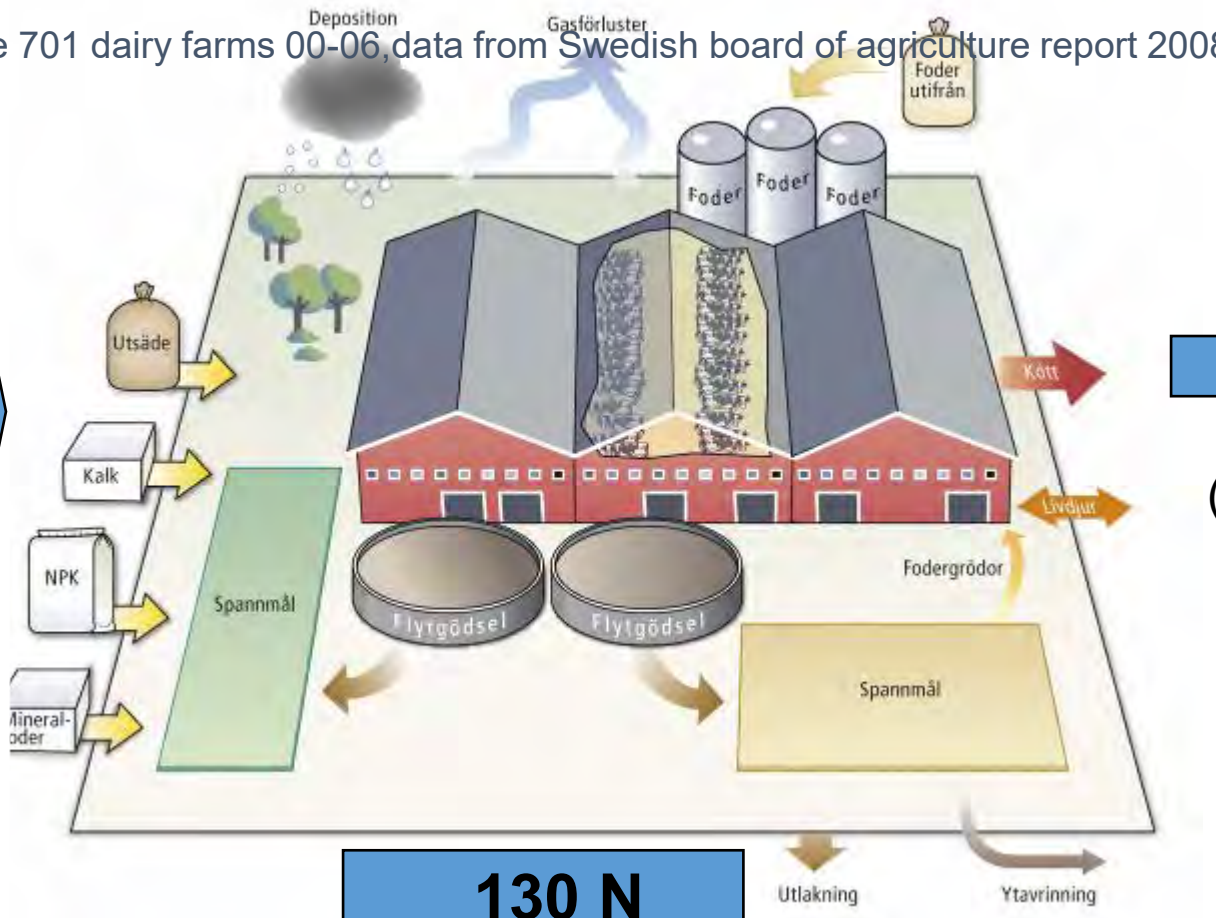
Input, output and surplus of Nitrogen kg/ha and year

(Average 701 dairy farms 00-06,data from Swedish board of agriculture report 2008:25)

200 N

Fodder +

Fertilizers



70 N

(Milk and meat)

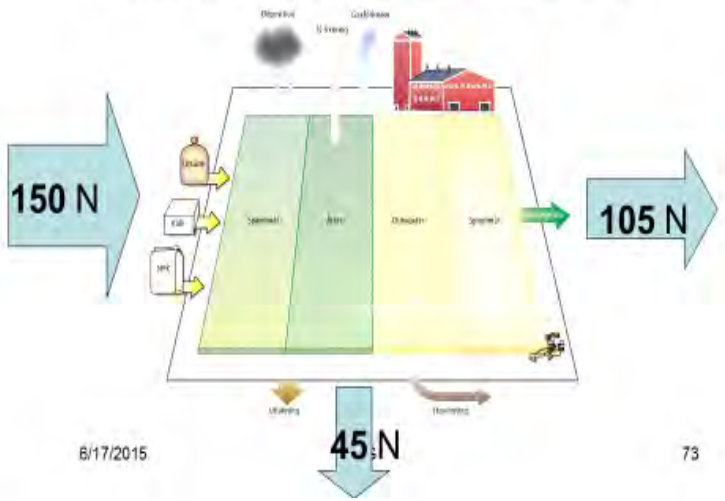
130 N

3 P

Specialized crop farm

Input, output and surplus of Nitrogen kg/ha and year

(Average 563 farms 01-06 data from Swedish board of agriculture report 2008:25)



Specialized animal farm

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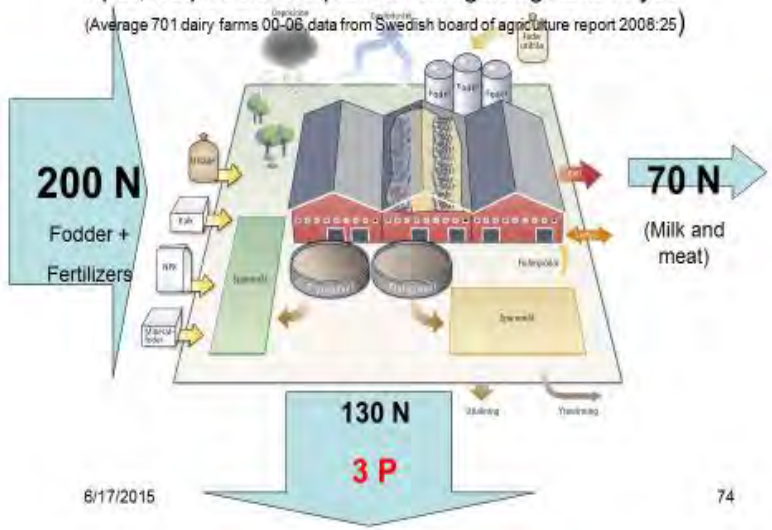
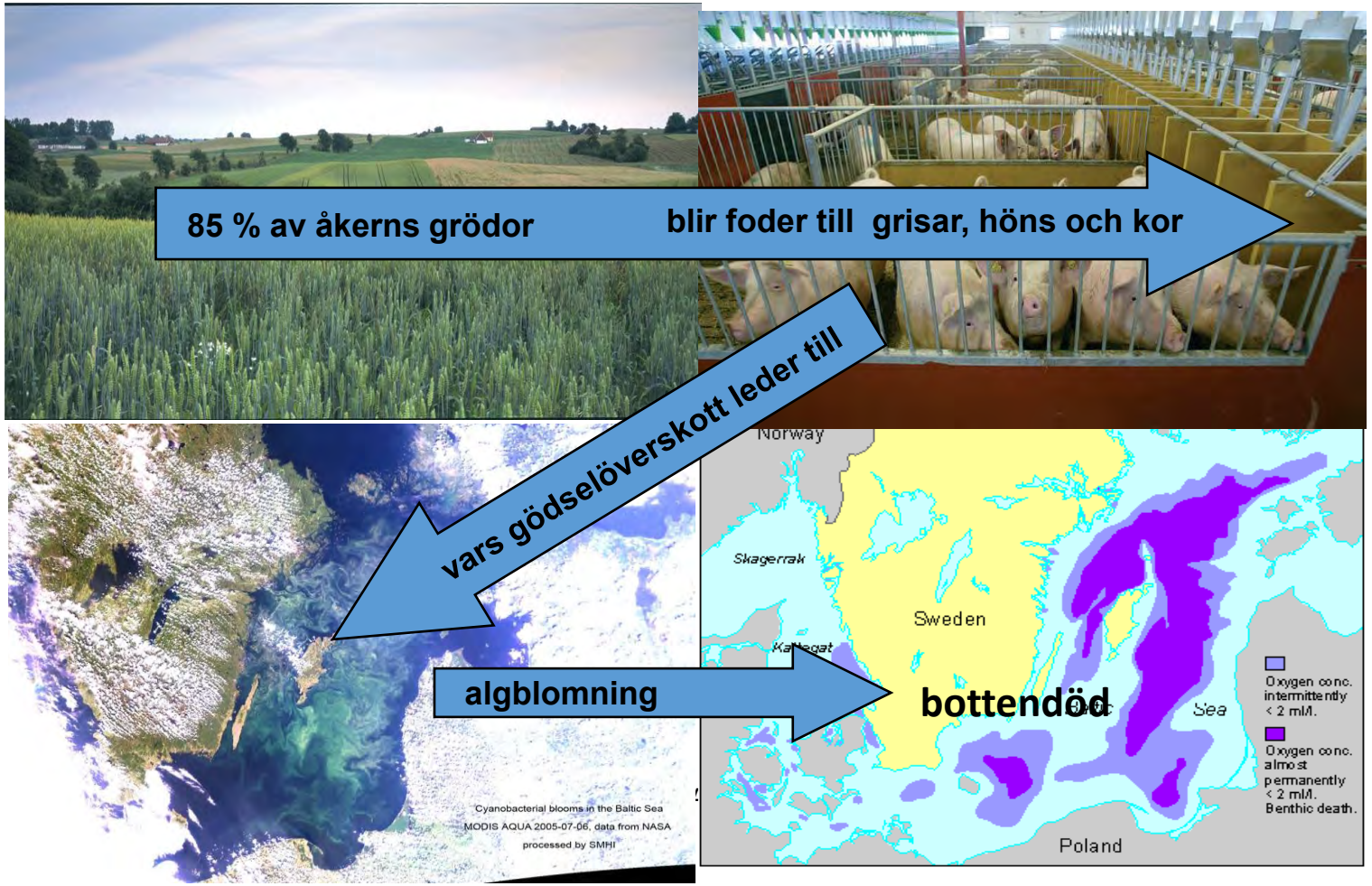
(Average 701 dairy farms 00-06 data from Swedish board of agriculture report 2008:25)



Depleted arable fields, eutrophication in seas and global warming

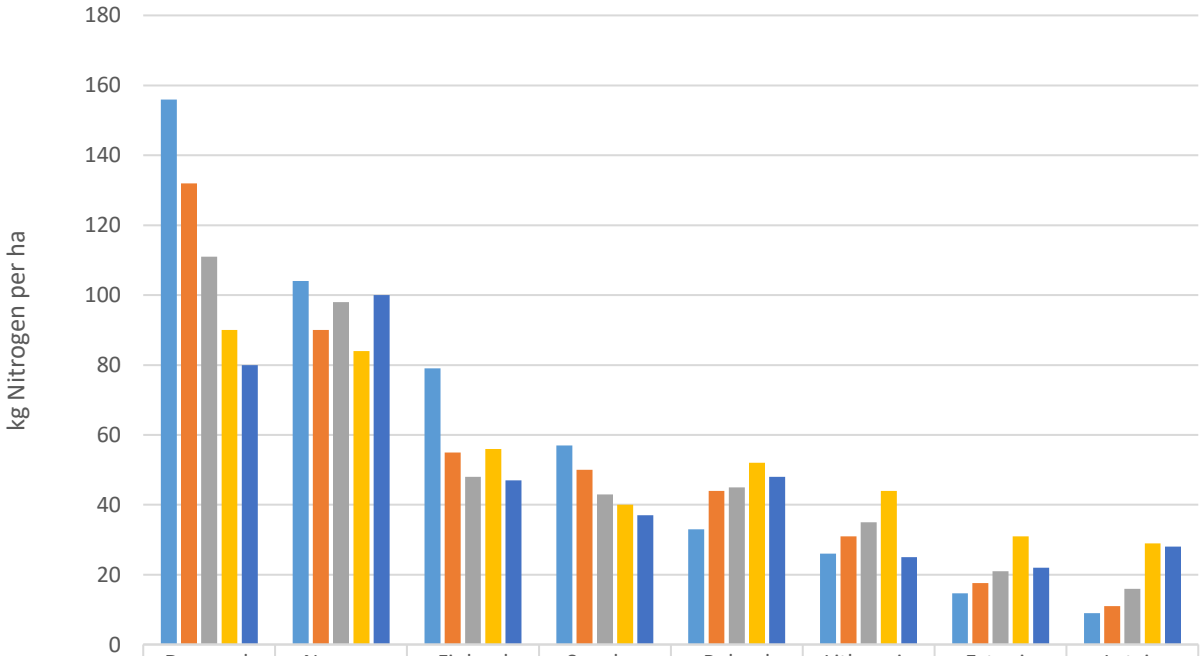


With regional – concentration

Granstedt, 2000. artur.granstedt@beras.eu

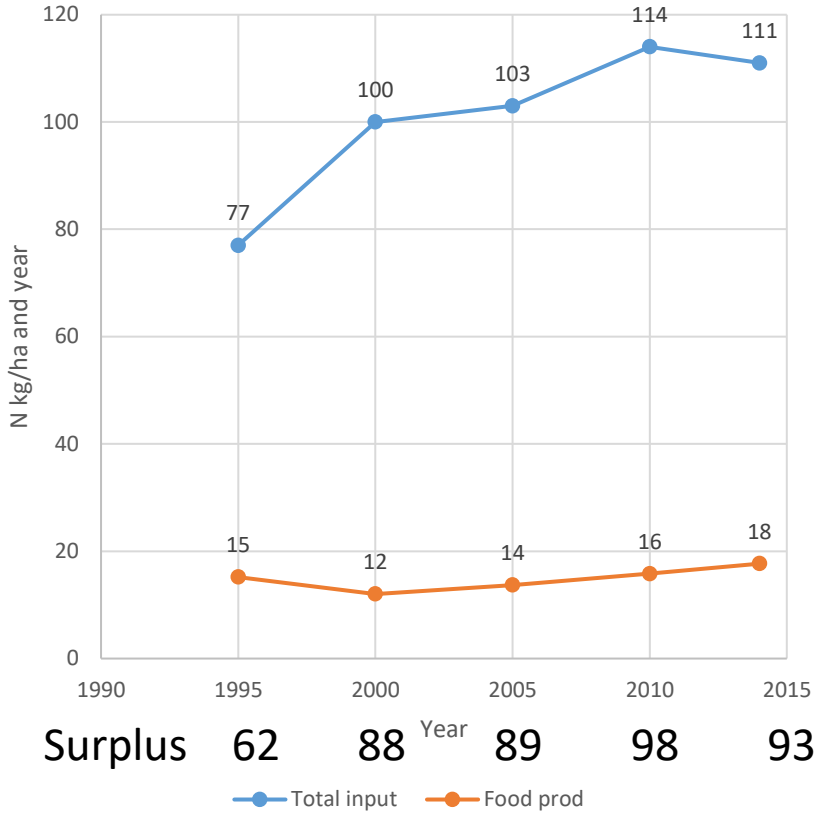

Pomeranian
Warmian-Masurian
West Pomeranian
Kuyavian-Pomeranian
Mazovian
Greater Poland
Lubusz
Łódź
a and year
Lower Silesian
Świętokrzyskie
Opole
Silesian
Lesser Poland
75
150
225
300 km

Field Nitrogen Surplus per ha utilised agricultural in Baltic Sea Countries

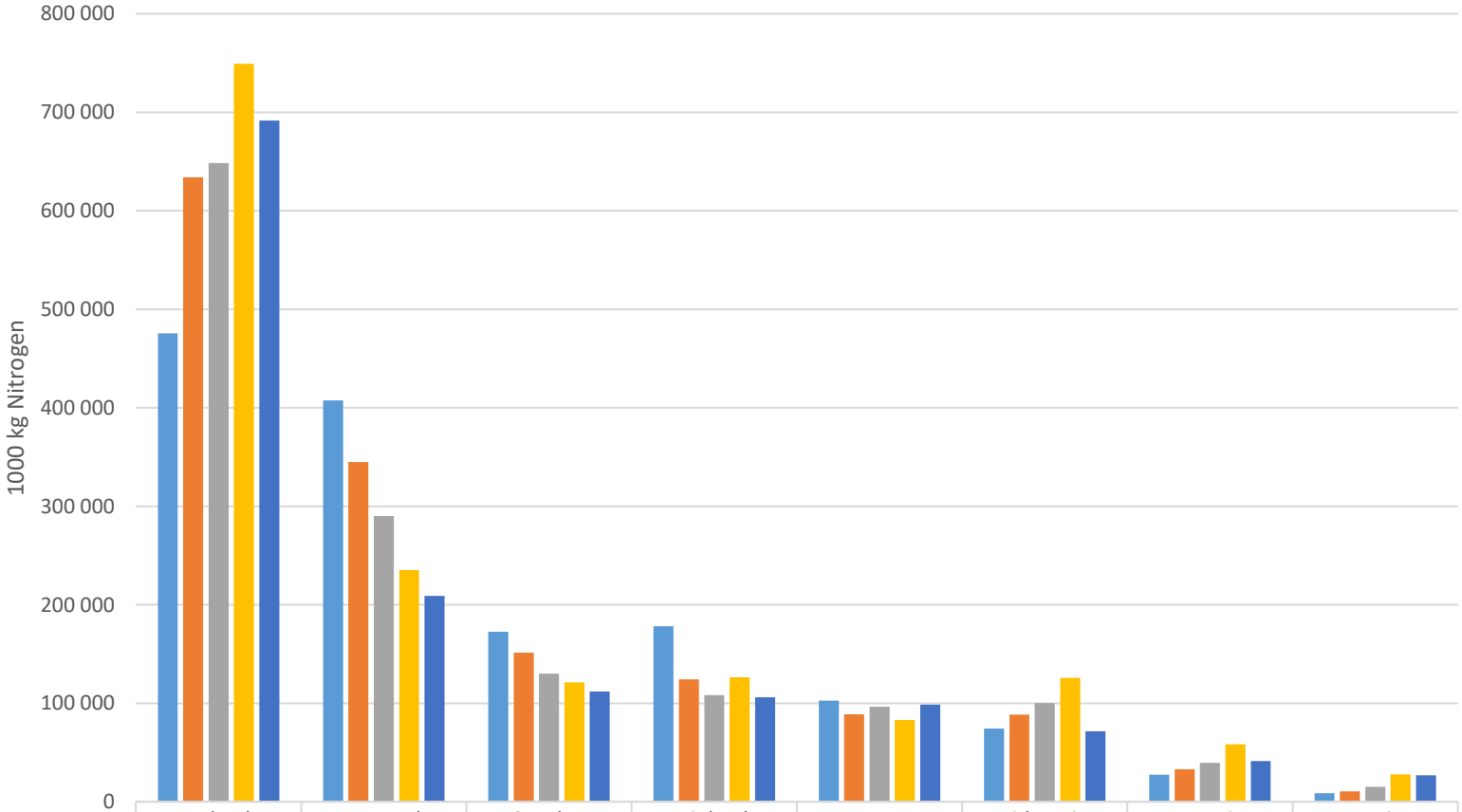


	Denmark	Norway	Finland	Sweden	Poland	Lithuania	Estonia	Latvia
Year 1995	156	104	79	57	33	26	15	9
Year 2000	132	90	55	50	44	31	18	11
Year 2005	111	98	48	43	45	35	21	16
Year 2010	90	84	56	40	52	44	31	29
Year 2015	80	100	47	37	48	25	22	28

Total N input - output Polish



Total Nitrogen Field Suplus utilsed agricultural area in Baltic Sea Countries



	Poland	Denmark	Sweden	Finland	Noway	Lithuania	Estonia	Latvia
Year 1995	475 530	407 628	172 653	178 382	102 648	74 386	27 607	8 622
Year 2000	634 040	344 916	151 450	124 190	88 830	88 691	33 128	10 538
Year 2005	648 450	290 043	130 247	108 384	96 726	100 135	39 438	15 328
Year 2010	749 320	235 170	121 160	126 448	82 908	125 884	58 218	27 782
Year 2015	691 680	209 040	112 073	106 126	98700	71 525	41 316	26 824

N and P balance kg/ha year Polish Agriculture 2008-2015

INPUT

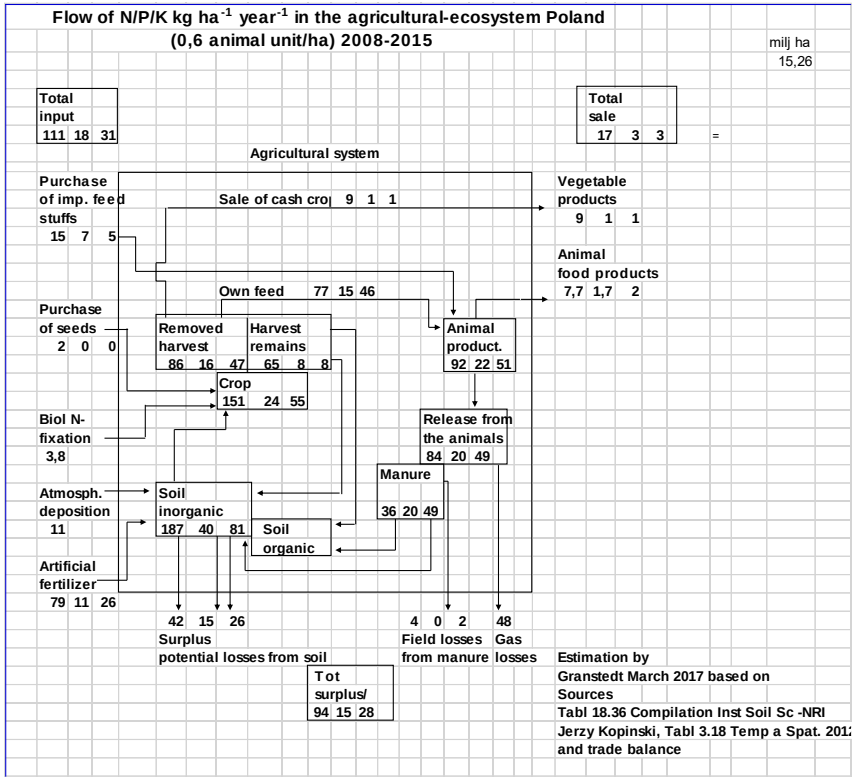
111 N

18 P

Fodder +

Fertilizers +

Biol. N-fix 4



OUTPUT

17 N

3 P

(Milk and meat and crop products)

94 N

15 P

Ecological Recycling Agriculture (ERA)

57

22

Surplus

36

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N and P balance kg/ha year Polish BERAS farms 2003-2004

INPUT

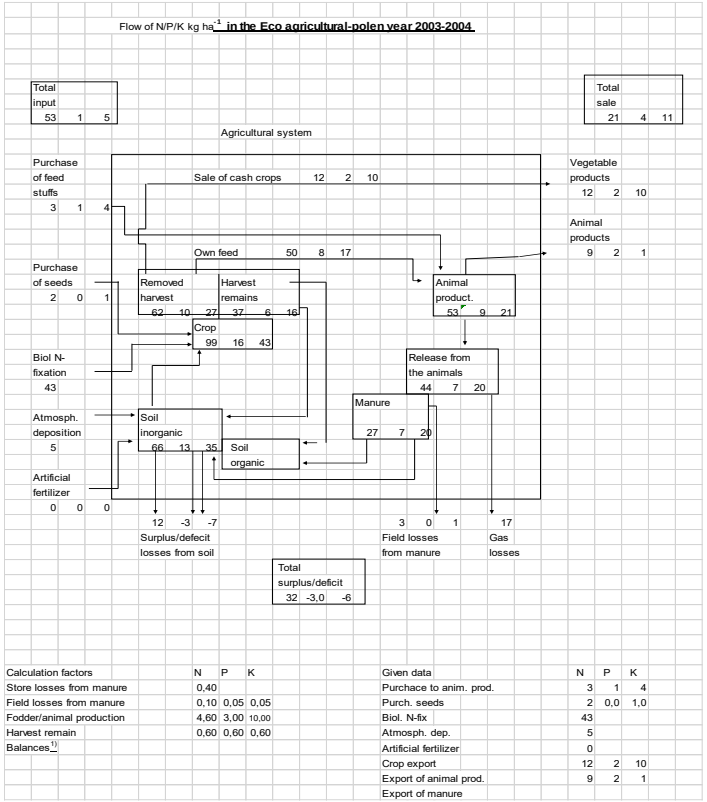
53 N

1 P

Fodder +

Fertilizers +

Biol N-fix 43



32 N

-2 P

OUTPUT

21 N

3 P

(Milk and meat and crop products)

N and P balance kg/ha year Juchowo 2018

INPUT

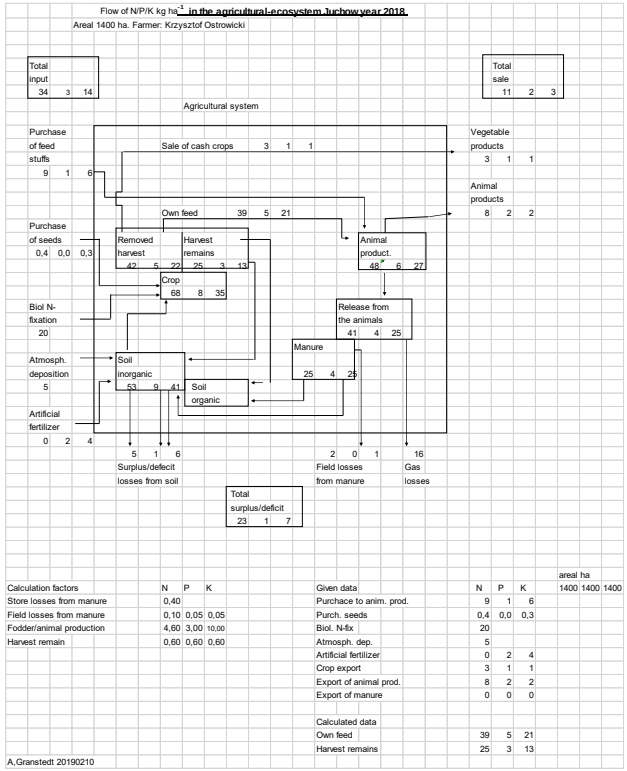
35 N

3 P

Fodder +

Fertilizers +

Biol N-fix 20



OUTPUT

12 N

2 P

(Milk and meat and crop products)

23 N

1 P

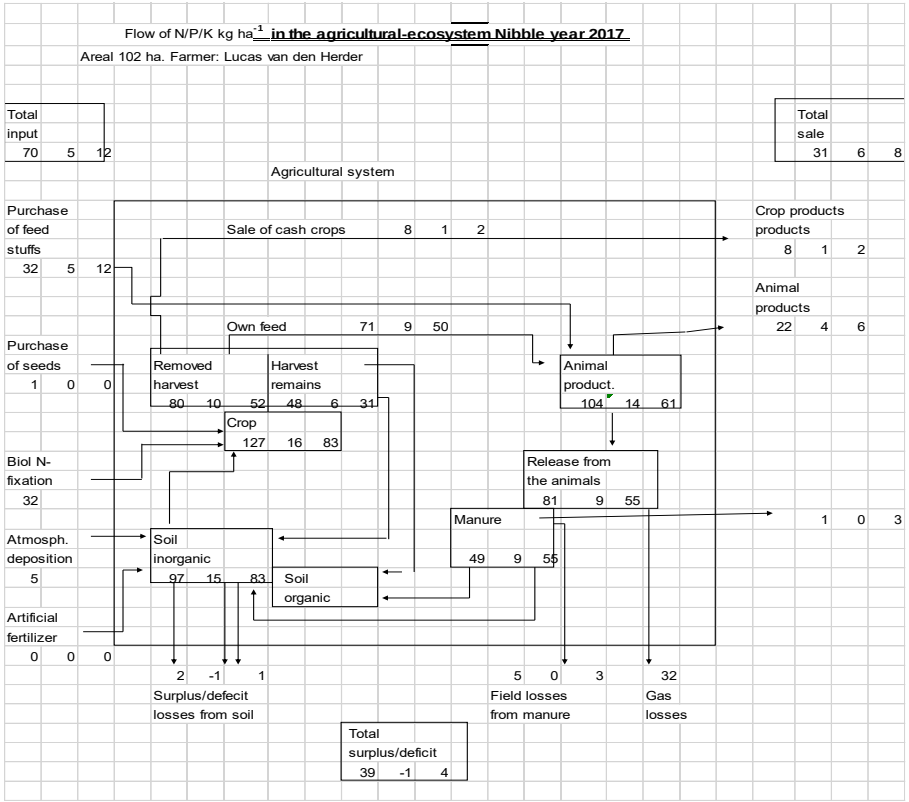
N and P balance kg/ha year the biodynamic Nibble farm Järna Sweden 2017-2020

70 N

5 P

Fodder +

N-f. dep +



31 N

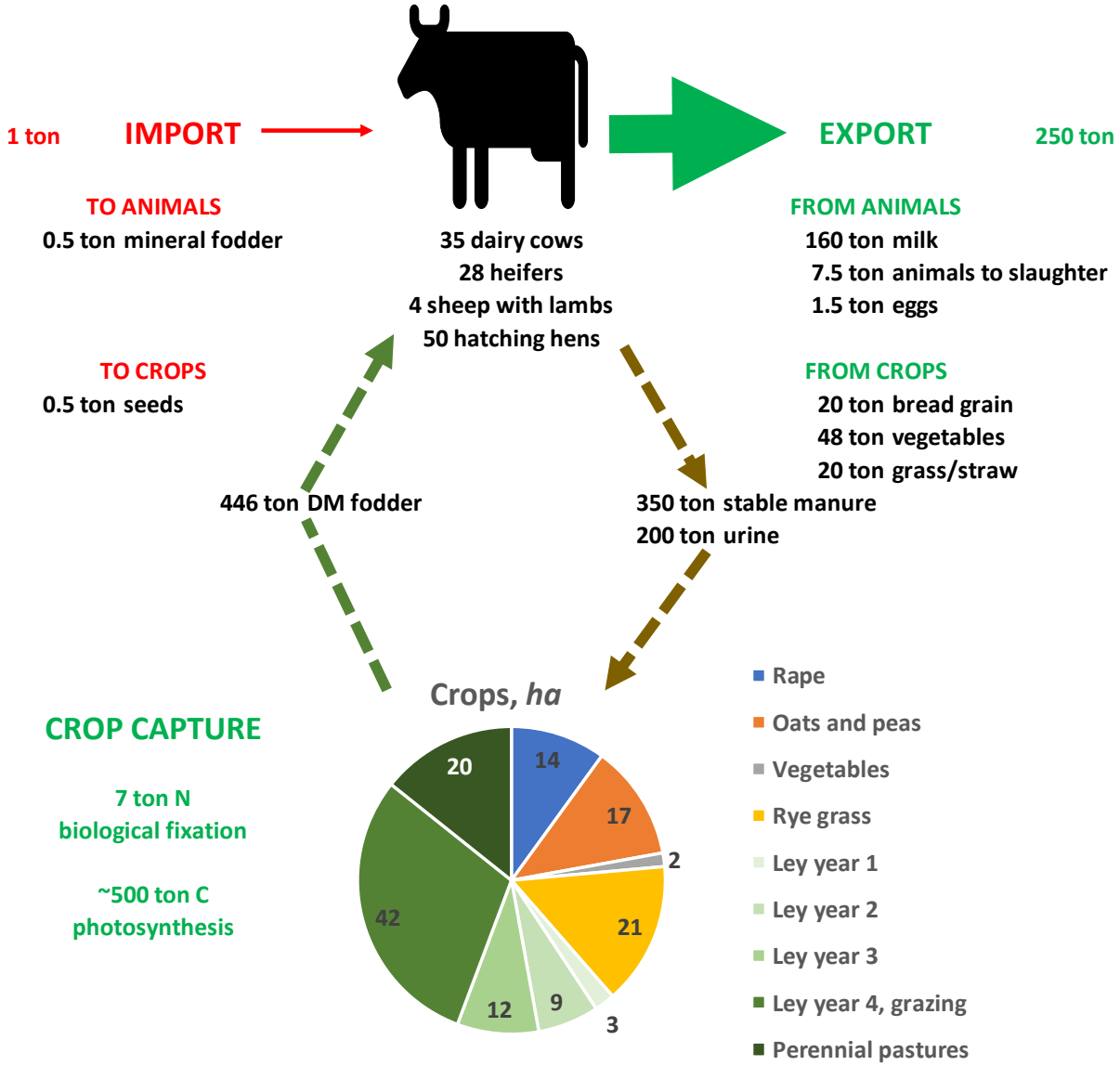
6 P

(Milk and meat and crop products)

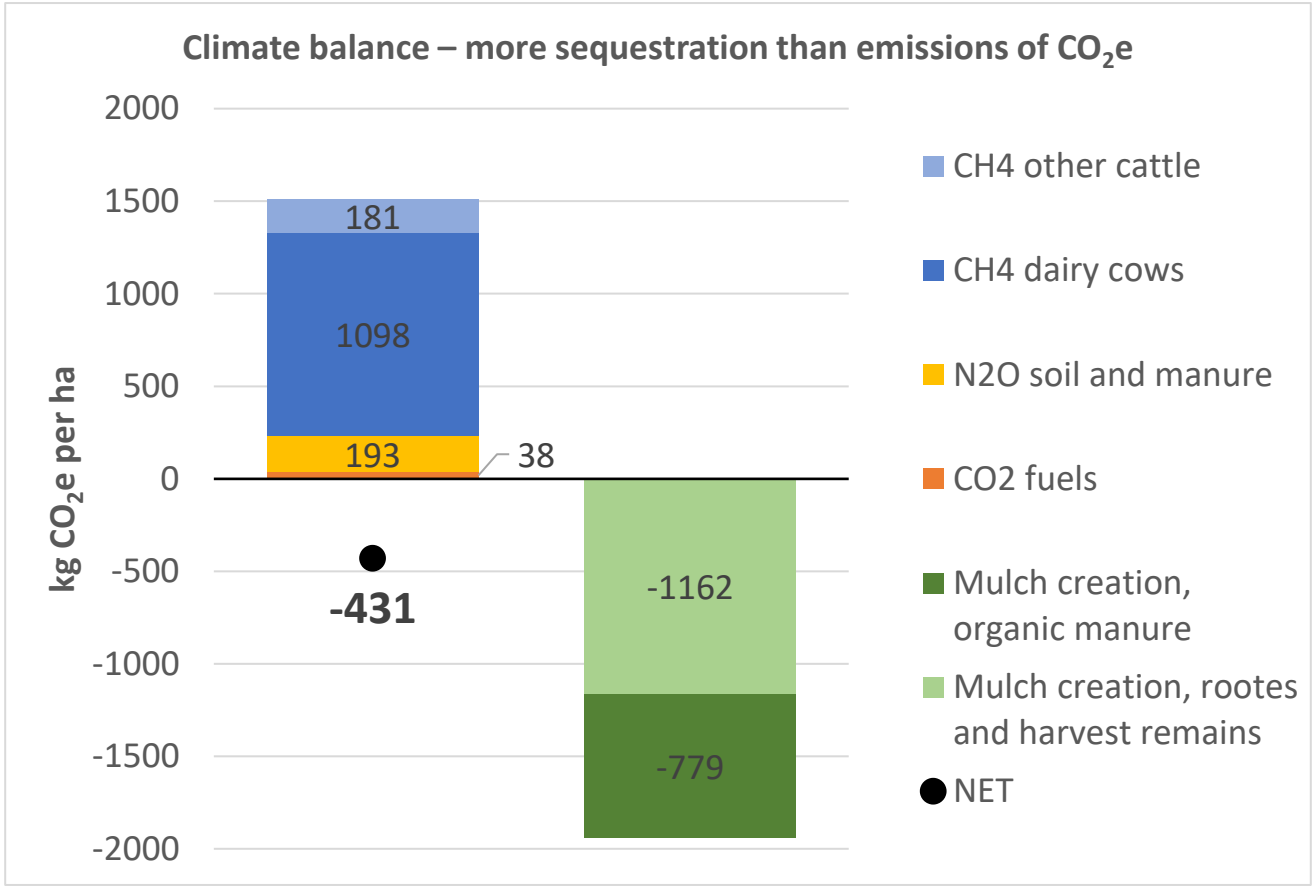
39 N

-1 P

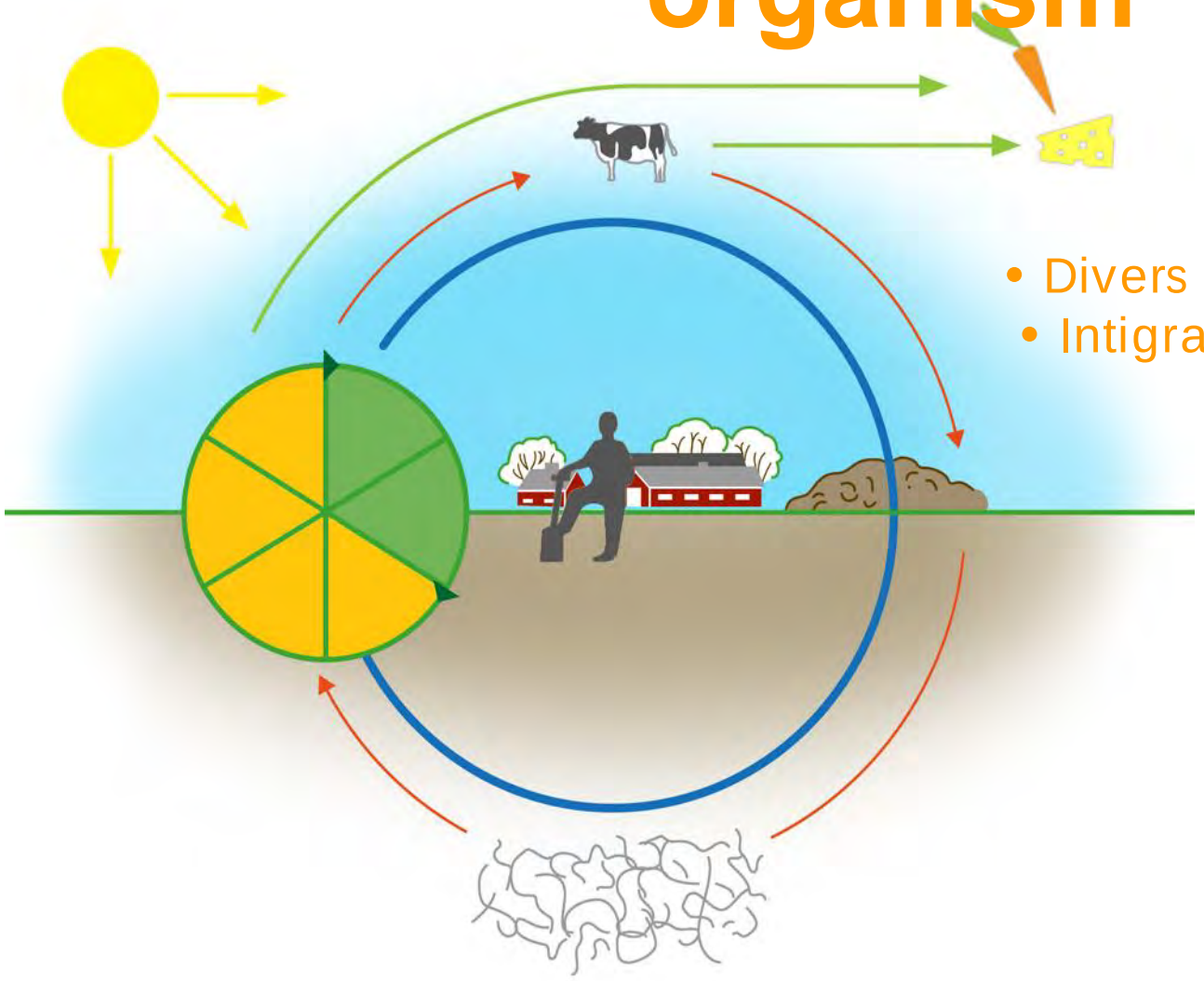
VITAL RECIRCULATION GIVE LARGE PRODUCTION



LEY DOMINATED CROP ROTATION


Climate balance – more sequestration than emissions of CO_2e
2000
1500
1000
500
0
-500
-1000
-1500
-2000
kg CO_2e per ha
181
1098
193
38
-431
-1162
-779
CH4 other cattle
CH4 dairy cows
N2O soil and manure
CO2 fuels
Mulch creation, organic manure
Mulch creation, rootes and harvest remains
NET

”The farm as a recycling organism”



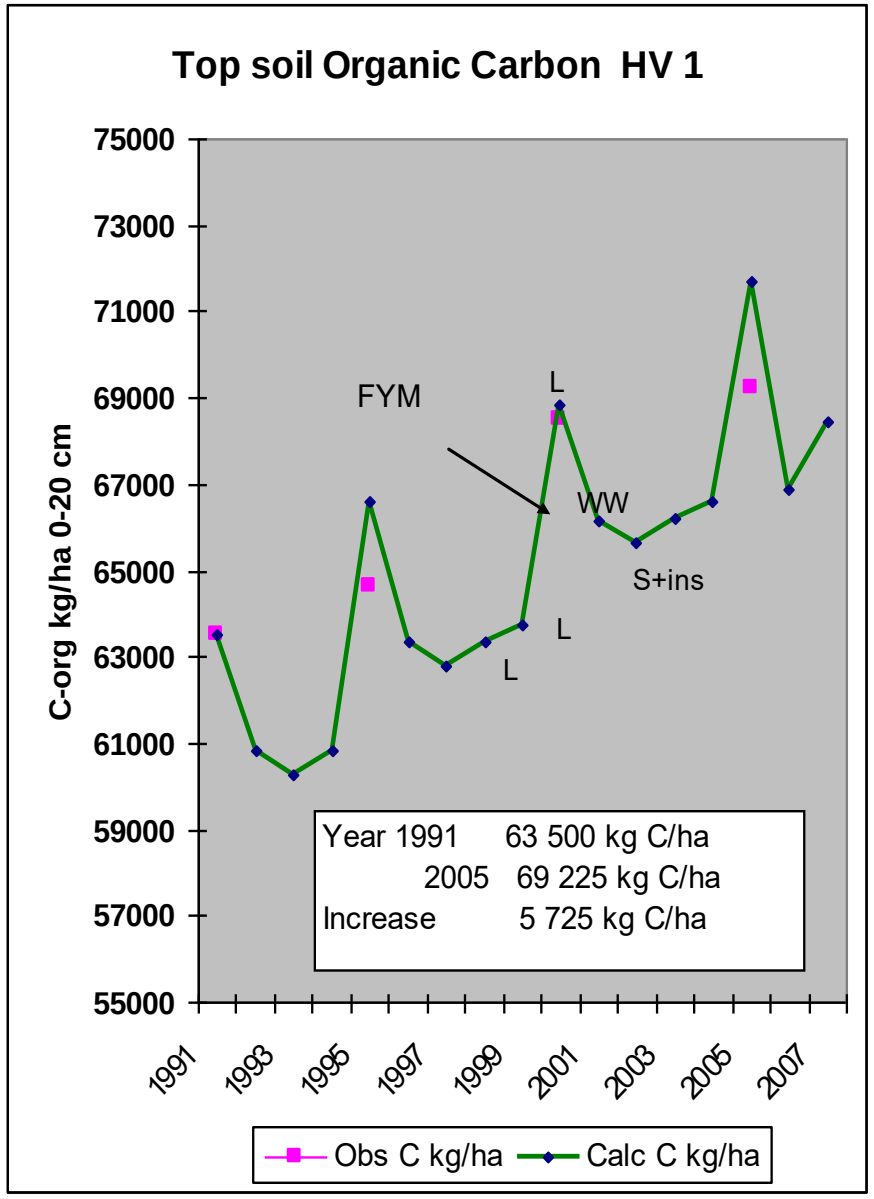
- Divers Crop rotation with N-fix legumes
- Intigrated crop and animal husbandry
  Optimal Manure management
- Building up soil organic matter and soil fertility

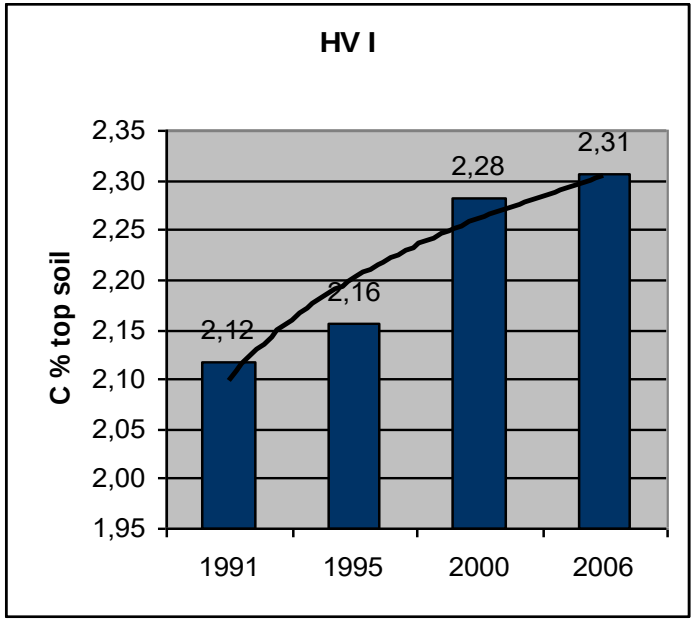
Source: Granstedt, A. *1992*. ... *American Journal* of *Alternative Agriculture*, vol. 6,

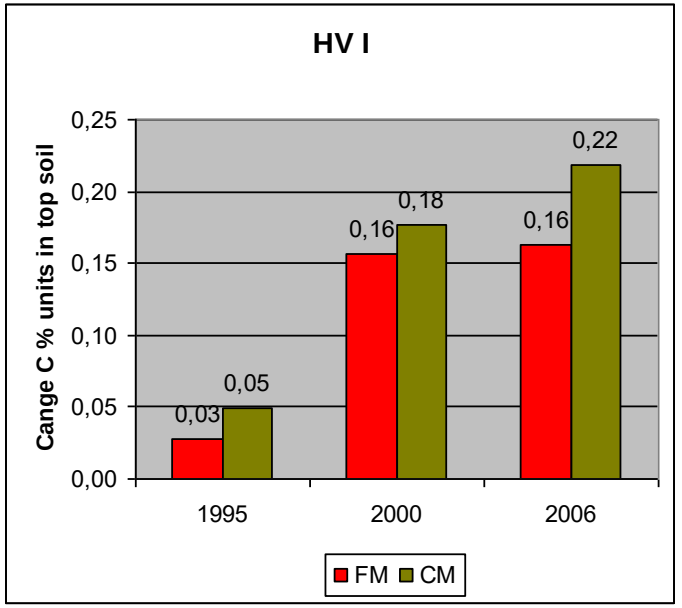
Long term manure experiment

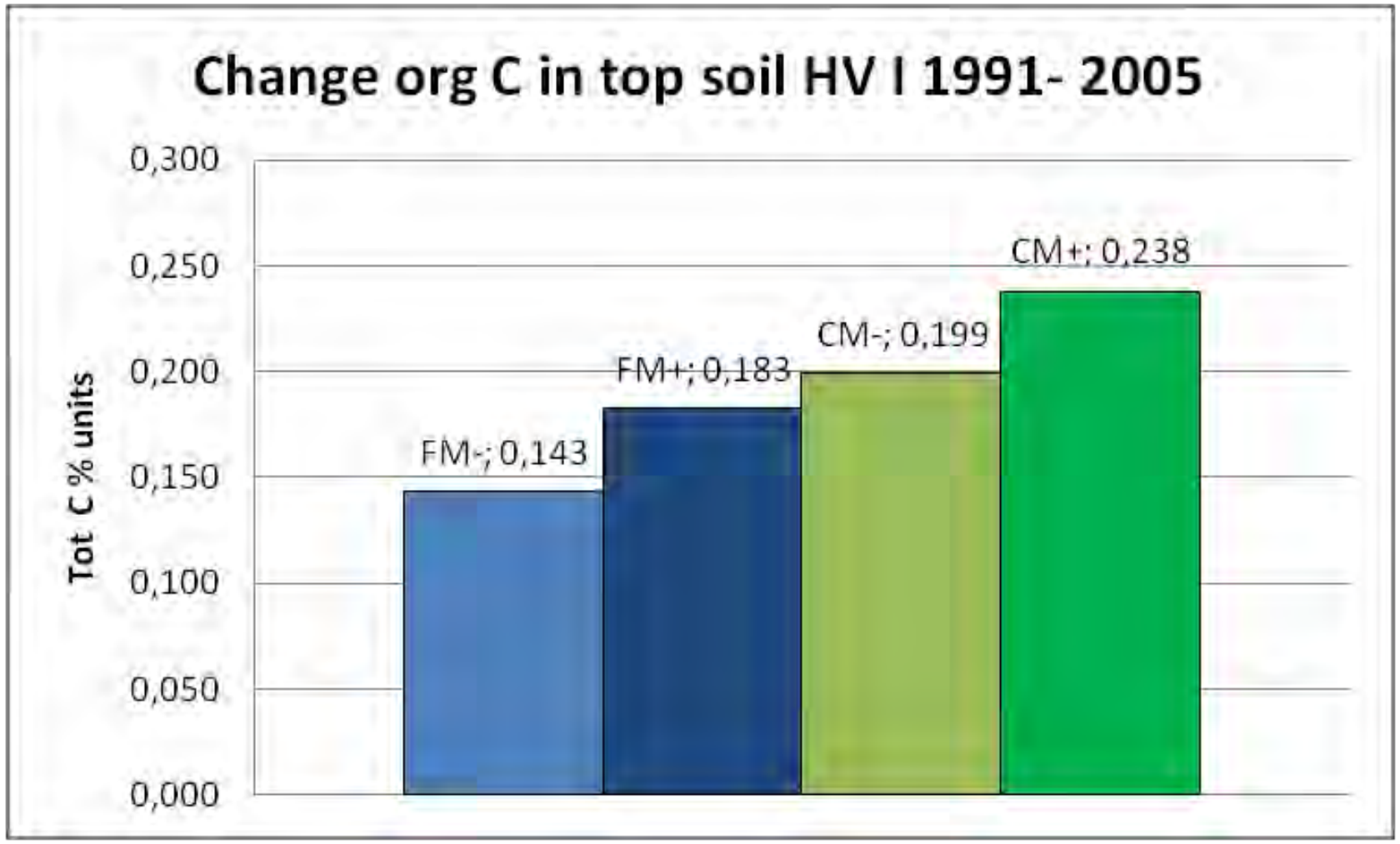
Experimental plan from 1991

Main plot	Treatments winter wheat
F1	Not composted manure 12.5 ton (0 from 1995)
F2	25 ton
F3	50 ton
K1	Composted manure 12.5 ton (0 from 1995)
K2	25 ton
K3	50 ton
Subplot (split plot) +	BD preparation each plot each year
-	Without BD preparation


Top soil Organic Carbon HV 1
C-org kg/ha 0-20 cm
75000
73000
71000
69000
67000
65000
63000
61000
59000
57000
55000
1991
1993
1995
1997
1999
2001
2003
2005
2007
FYM
L
WW
S+ins
L
L
Year 1991 63 500 kg C/ha
2005 69 225 kg C/ha
Increase 5 725 kg C/ha
Obs C kg/ha
Calc C kg/ha


HV I
C % top soil
2,35
2,30
2,25
2,20
2,15
2,10
2,05
2,00
1,95
2,12
2,16
2,28
2,31
1991
1995
2000
2006


HV I
Cange C % units in top soil
0,25
0,20
0,15
0,10
0,05
0,00
0,03
0,05
0,16
0,18
0,16
0,22
1995
2000
2006
FM
CM



1 % unit in top soil = 30 000 kg C/ha

FM Not composted

- **Food from ecological recycling agriculture based on integrated crop and animal production with effective recycling of nutrients and organic biomass and crop rotations with legume - grassland can:**

  1. **conserve basic natural resources**
  2. **rebuild fertile soils**
  3. **reduce the global warming**
  4. **protect the Sea from N, P and pesticides**
  5. **Improve the food nutritional quality**