

# Ecologic Recycling Agriculture (ERA)



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*Biodynamic Research Institute [www.sbfise](http://www.sbfise)*

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*  
*Artur.Granstedt@jdb.se*

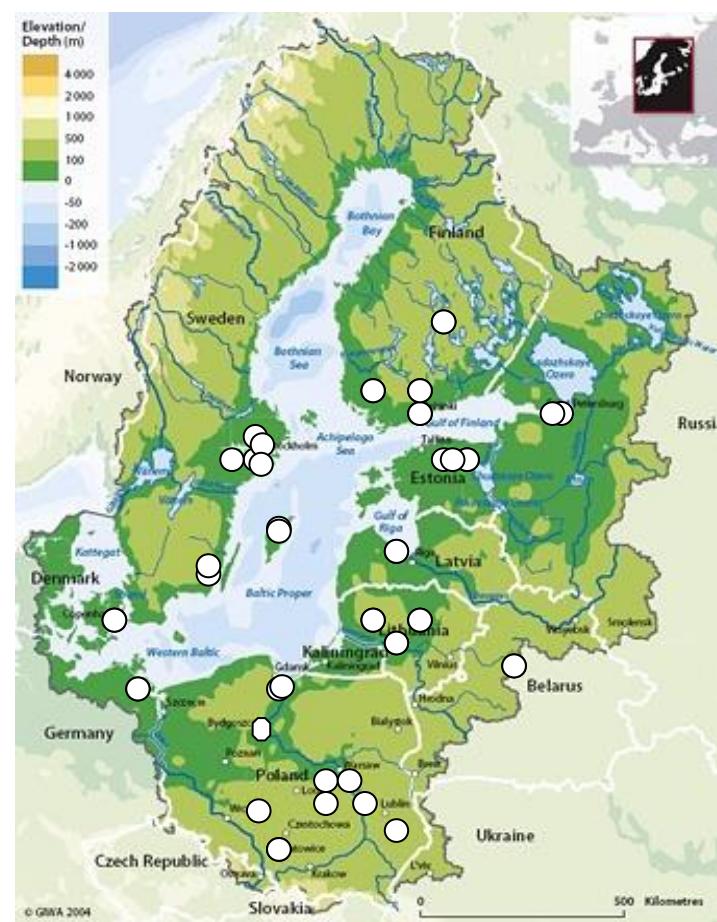
## **BERAS 2003-2006**

**48 farms, 20 partners in 8 countries**

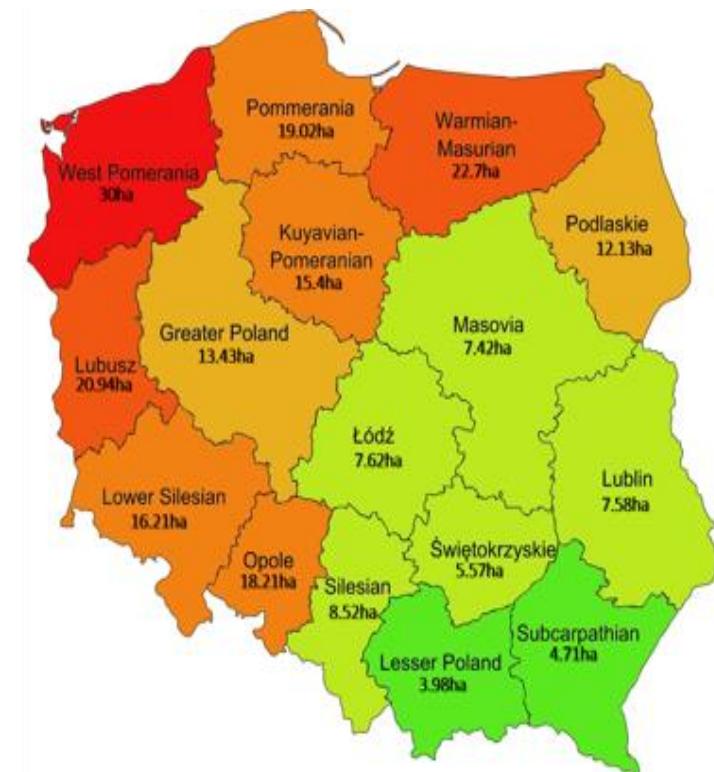


## **BERAS Implementation 2010-2013**

**24 partners, 18 farms in 9 countries**



## **Ecological Recycling Agriculture with focus on Poland 2016-2018**



# BERAS Partners



SWEDEN  
Södertörn University  
[www.sh.se](http://www.sh.se)



Biodynamic Research Institute,  
[www.jdb.se/sbfi](http://www.jdb.se/sbfi)



Söderläje municipality,  
[www.sodertalje.se](http://www.sodertalje.se)



Swedish Rural Network,  
[www.landsbygdsnätverket.se](http://www.landsbygdsnätverket.se)



Swedish Rural Economy  
and Agricultural societies,  
Gotland: [www.hush.se/i](http://www.hush.se/i)  
Kalmars: [www.hush.se/h](http://www.hush.se/h)



FINLAND  
MTT Agrifood Research  
[www.mtt.fi](http://www.mtt.fi)



Centre for Economic De-  
velopment, Transport and  
the Environment  
for Uusimaa, [www.ely-keskus.fi/uusimaa](http://www.ely-keskus.fi/uusimaa)



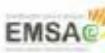
Finnish Environment Insti-  
tute,  
[www.environment.fi/syke](http://www.environment.fi/syke)



University of Helsinki, De-  
partment of Agricultural  
Sciences,  
[www.helsinki.fi](http://www.helsinki.fi)



ESTONIA  
Estonian University of Life  
Sciences,  
[www.emu.ee](http://www.emu.ee)



Estonian Organic Farming  
Foundation (EOFF),  
[www.maheklubi.ee](http://www.maheklubi.ee)



LATVIA  
Latvian Rural Advisory and  
Training Centre, [www.llkc.lv](http://www.llkc.lv)

[www.beras.eu](http://www.beras.eu)



LITHUANIA  
Aleksandras Stulginskis Uni-  
versity  
[www.izuu.lt/pradzia.lt](http://www.izuu.lt/pradzia.lt)



Baltic Foundation HPI,  
[www.heifer.lt;](http://www.heifer.lt)  
[www.heifer.org](http://www.heifer.org)



Kaunas District Municipality,  
[www.krs.lt](http://www.krs.lt)



POLAND  
Institute of Soil Science  
and Plant Cultivation –  
National Research Institute,  
[www.iung.pulawy.pl](http://www.iung.pulawy.pl)



Kujawsko-Pomorski  
Agricultural Advisory Centre in  
Minikowo, [www.kpodr.pl](http://www.kpodr.pl)



Polish Ecological Club  
in Krakow, City of  
Gliwice Chapter,  
[www.pkegliwice.pl](http://www.pkegliwice.pl)



Independent Autonomous As-  
sociation of Individual Farmers  
'Solidarity',  
[www.solidarnosciri.pl](http://www.solidarnosciri.pl)



Pomeranian Agricultural  
Advisory Center in Gdańsk,  
[www.podr.pl](http://www.podr.pl)



GERMANY  
Leibniz-Centre for Agricultural  
Landscape Research, [www.zalf.de](http://www.zalf.de)



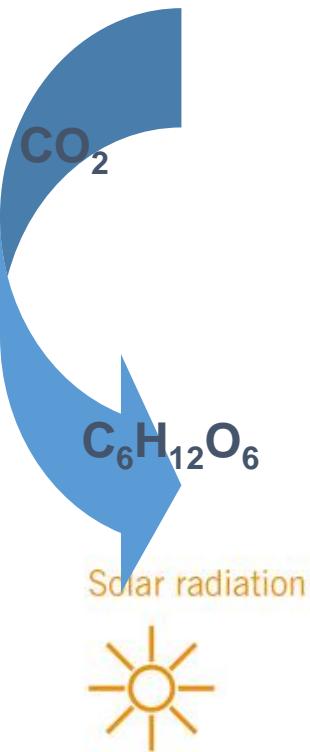
DENMARK  
The Danish Ecological Council,  
[www.ecocouncil.dk](http://www.ecocouncil.dk)



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

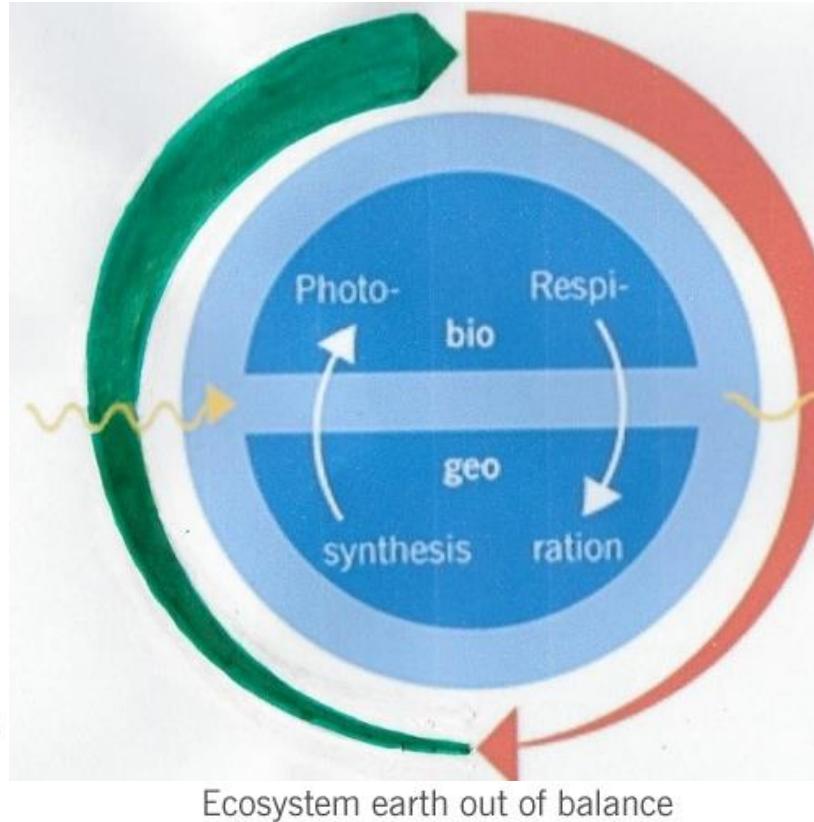


Knowledge  
Responsibility  
Action



Photosynthesis  
5/10/2022

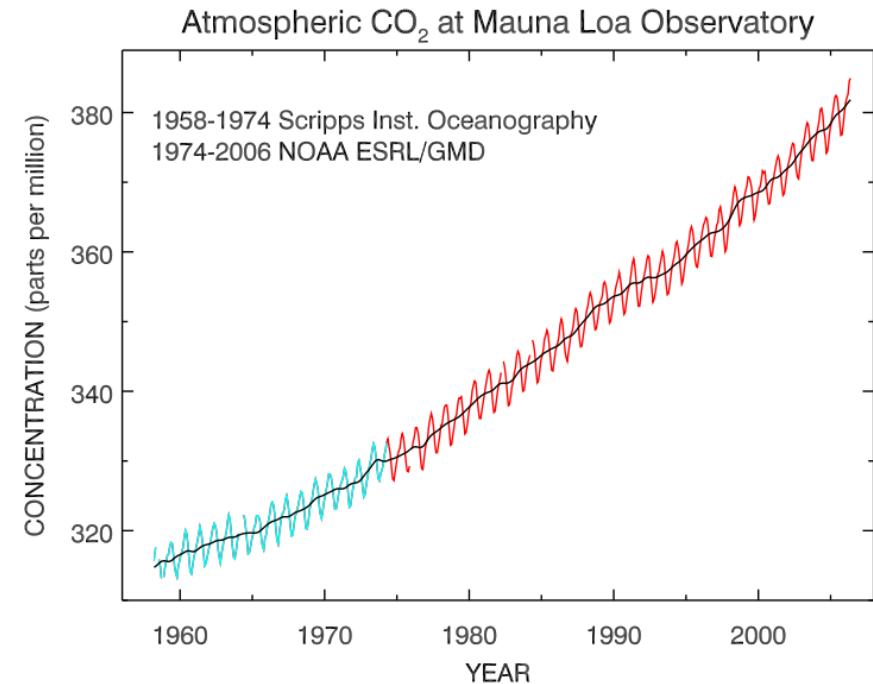
**Basic ecological conditions**  
energy flow, recycling and biological diversity



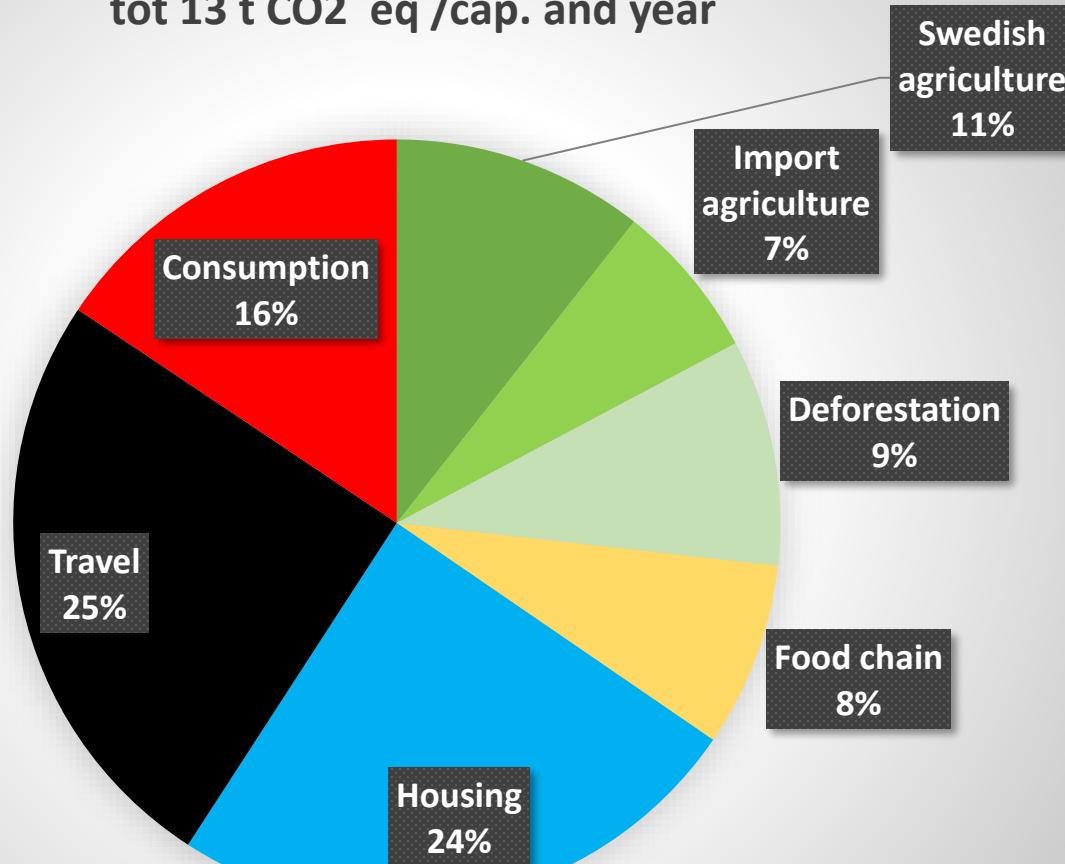
Burning



**Ch. D. Keeling mobilized enough resources so he could, starting  
• 1958, measure the CO<sub>2</sub> in the atmosphere on Mauna Loa  
observatory in Hawai**



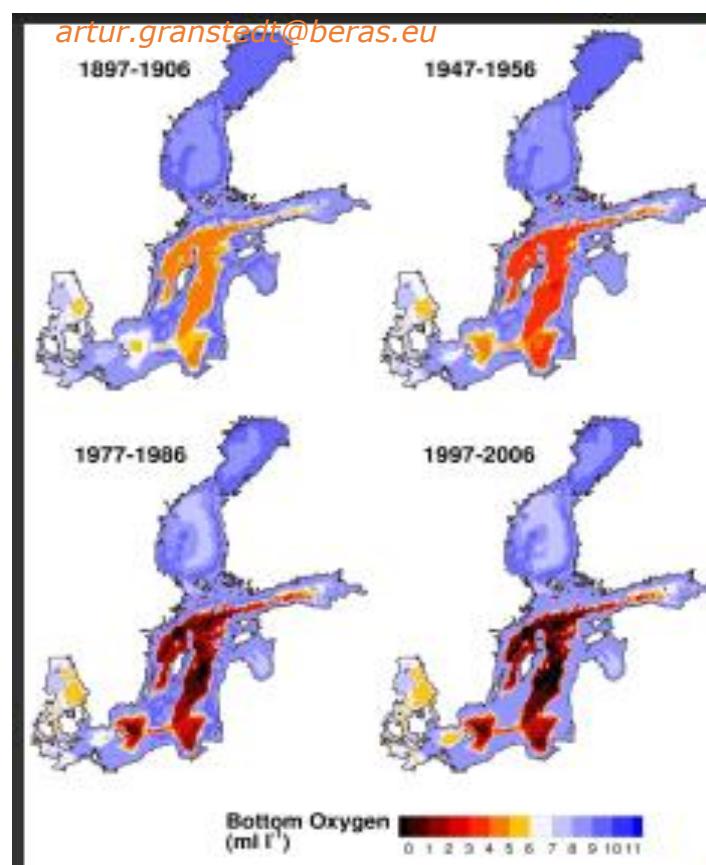
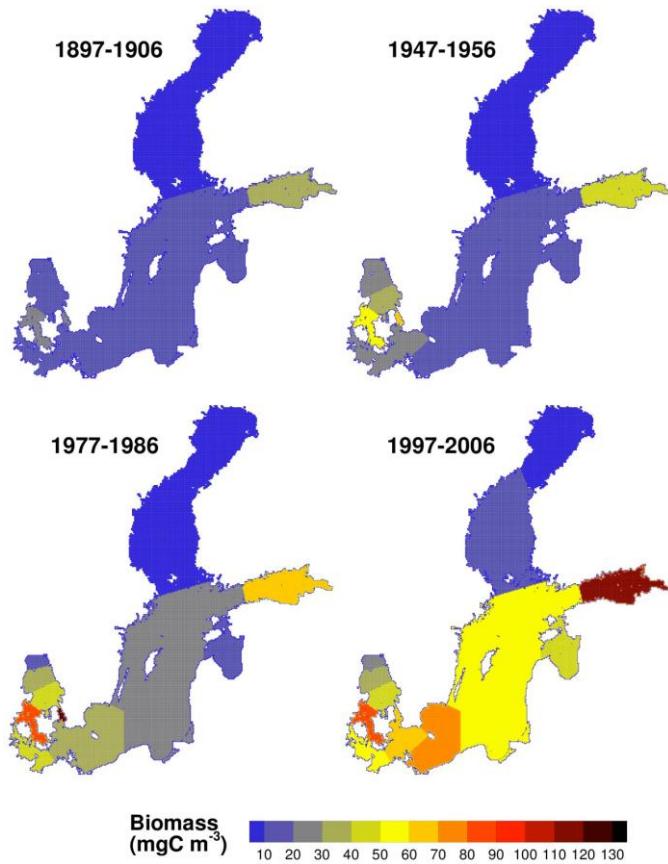
**Sw. food consumption % of global warming**  
tot 13 t CO<sub>2</sub> eq /cap. and year

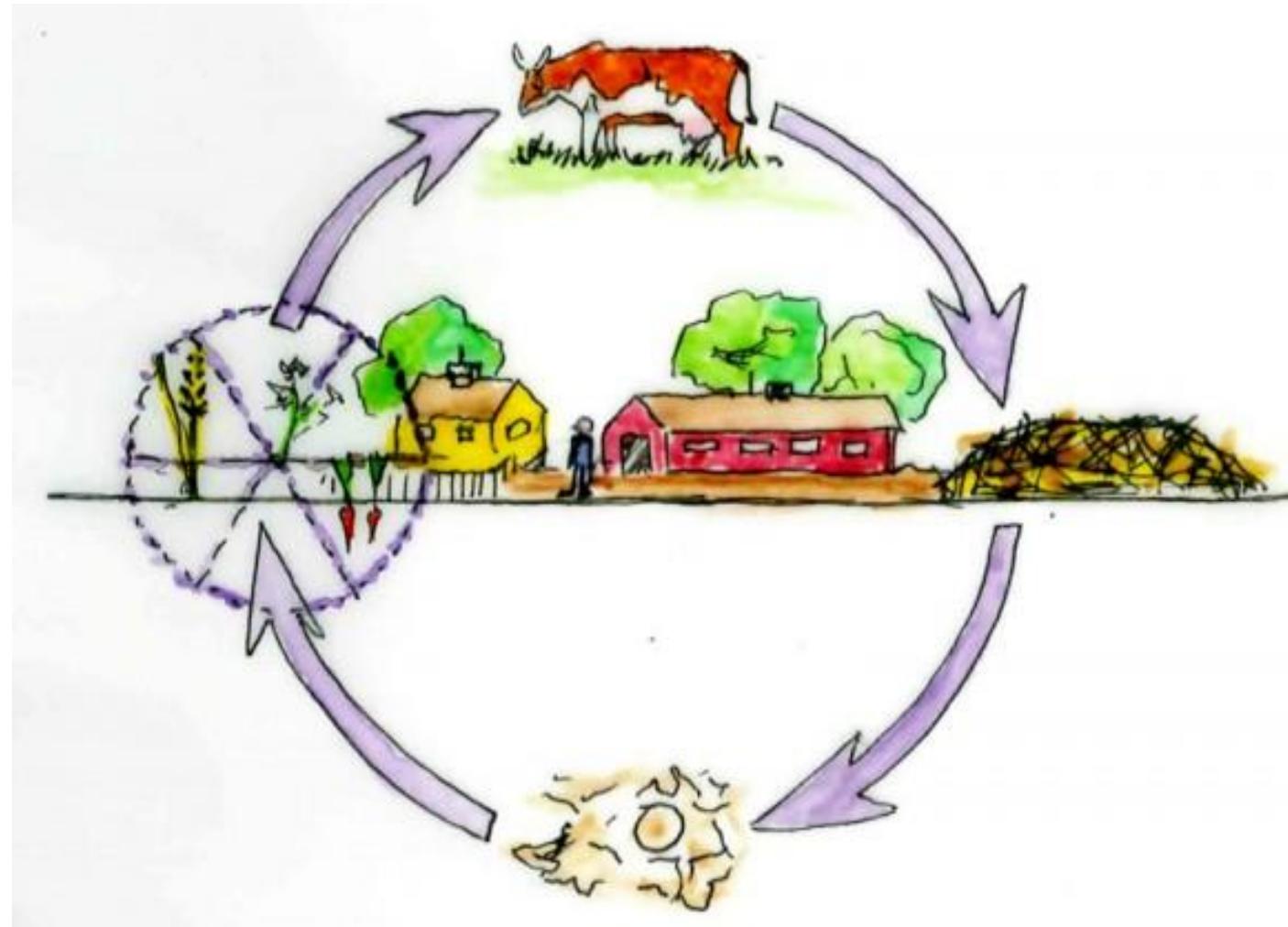


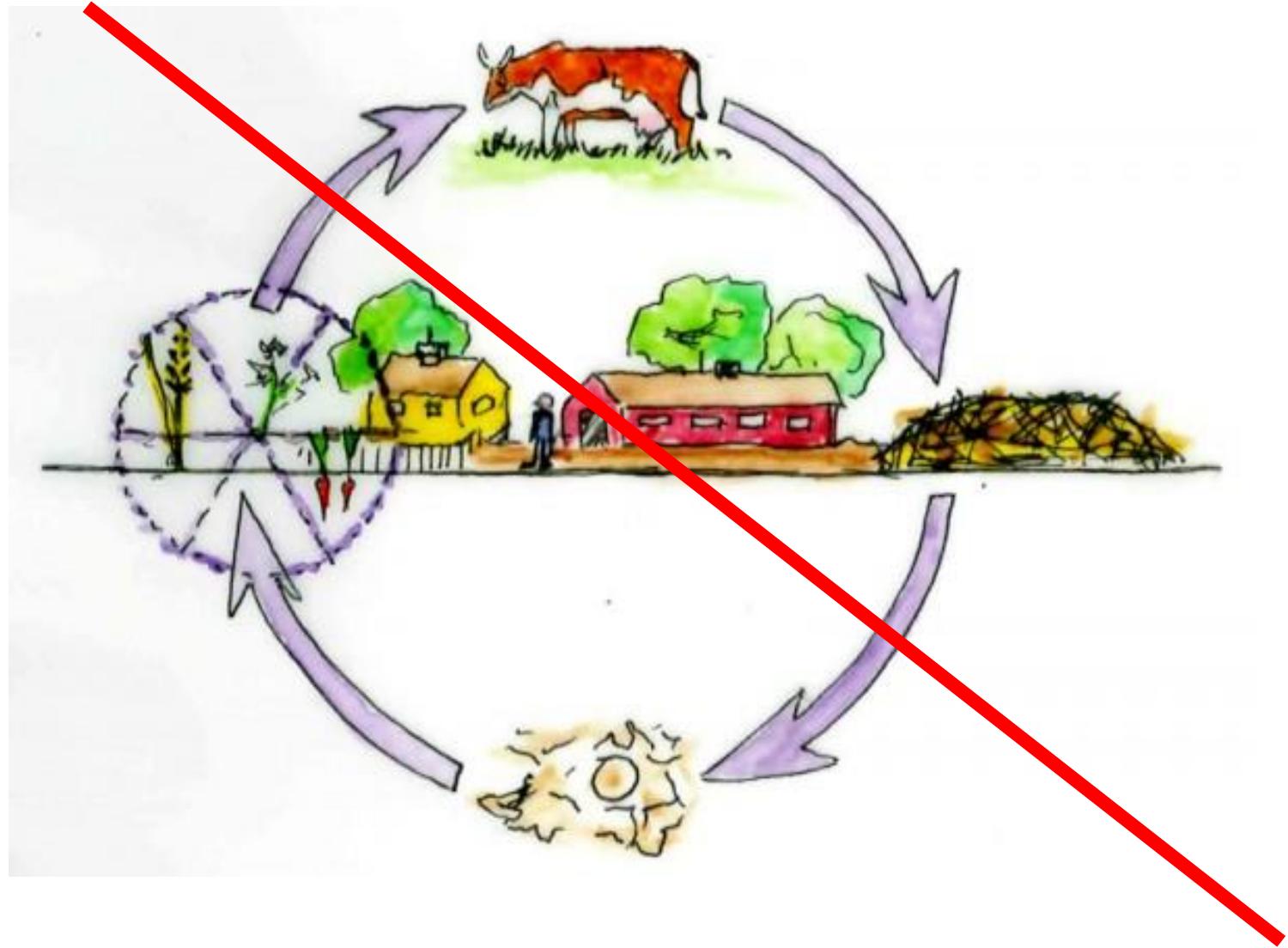
*artur.granstedt@sbfi.se*



Källa enl tillstånd, SMHI



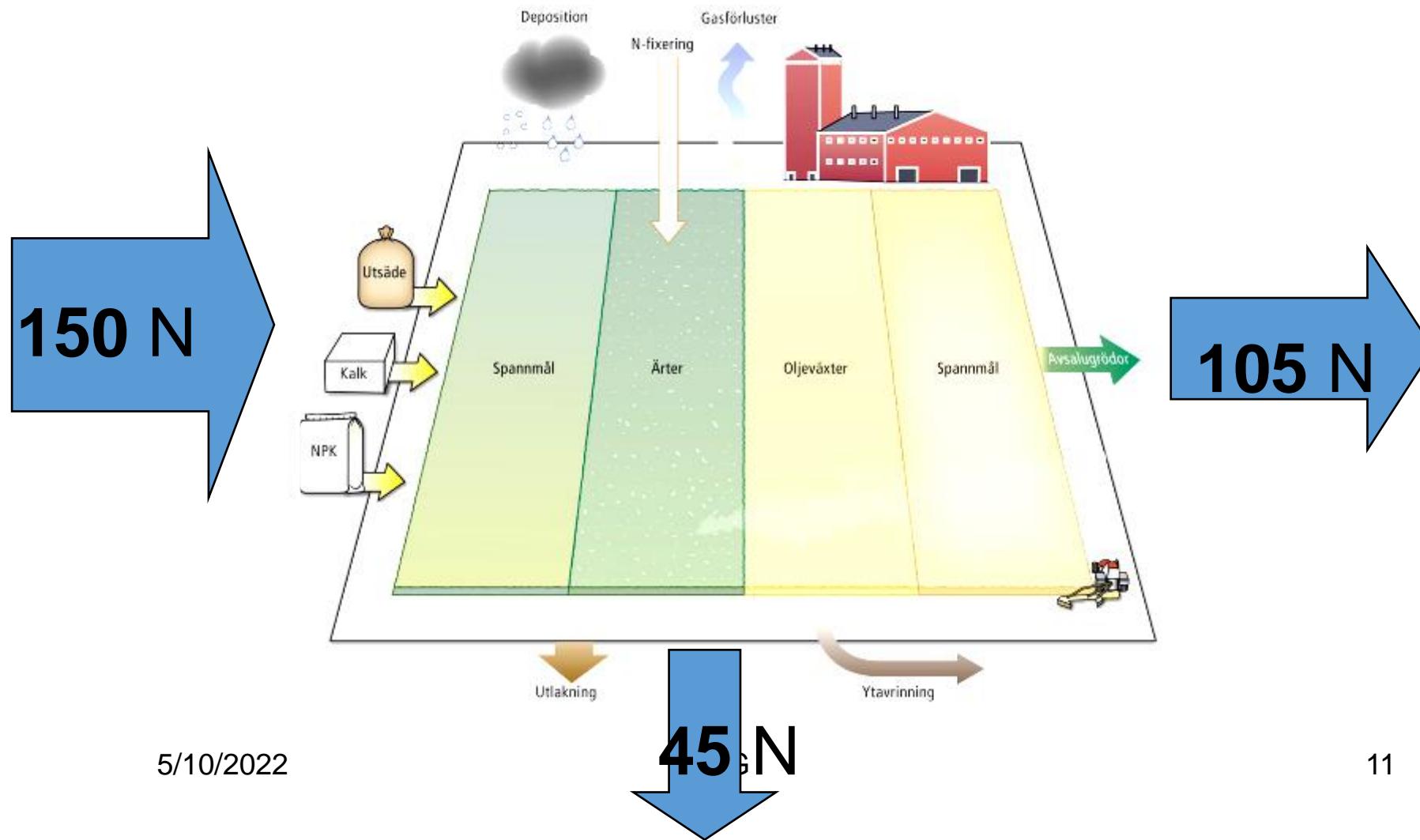




# Specialized crop farm

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

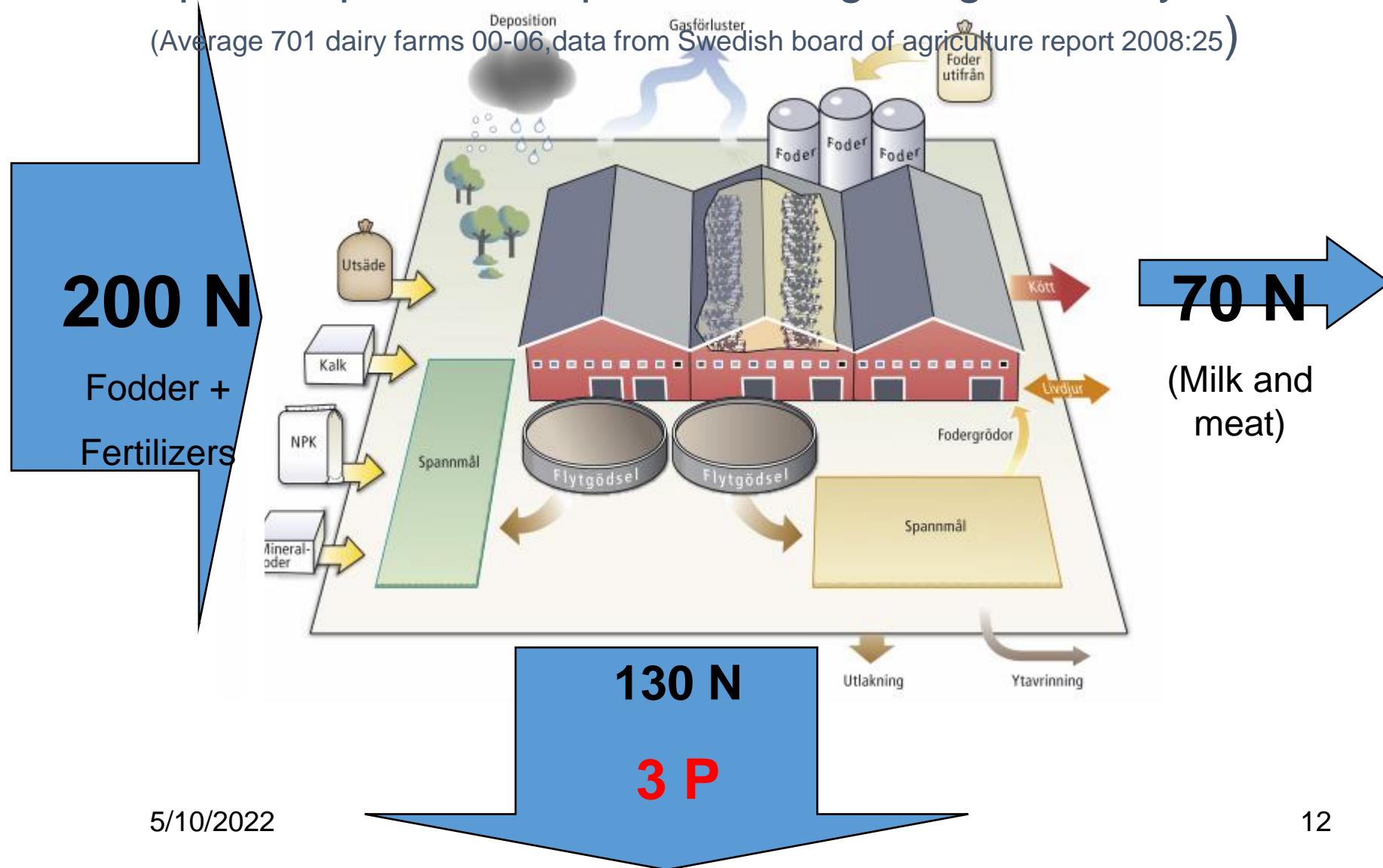
(Average 563 farms 01-06 data from Swedish board of agriculture report 2008:25)



# Specialized animal farm

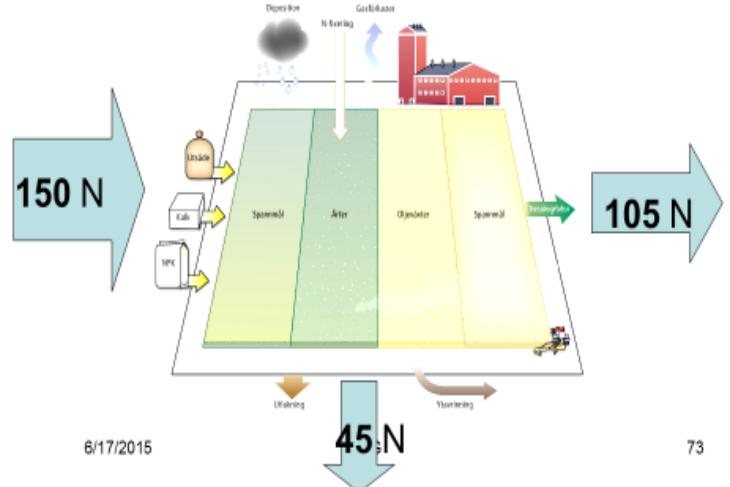
Input, output and surplus of Nitrogen kg/ha and year

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



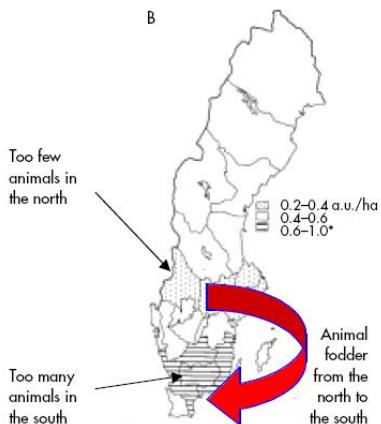
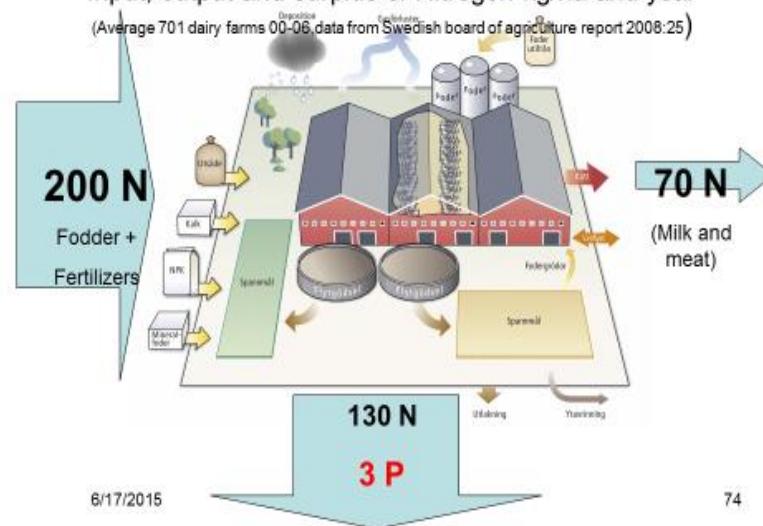
## Specialized crop farm

Input, output and surplus of Nitrogen kg/ha and year  
 (Average 563 farms 01-06, data from Swedish board of agriculture report 2008:25)

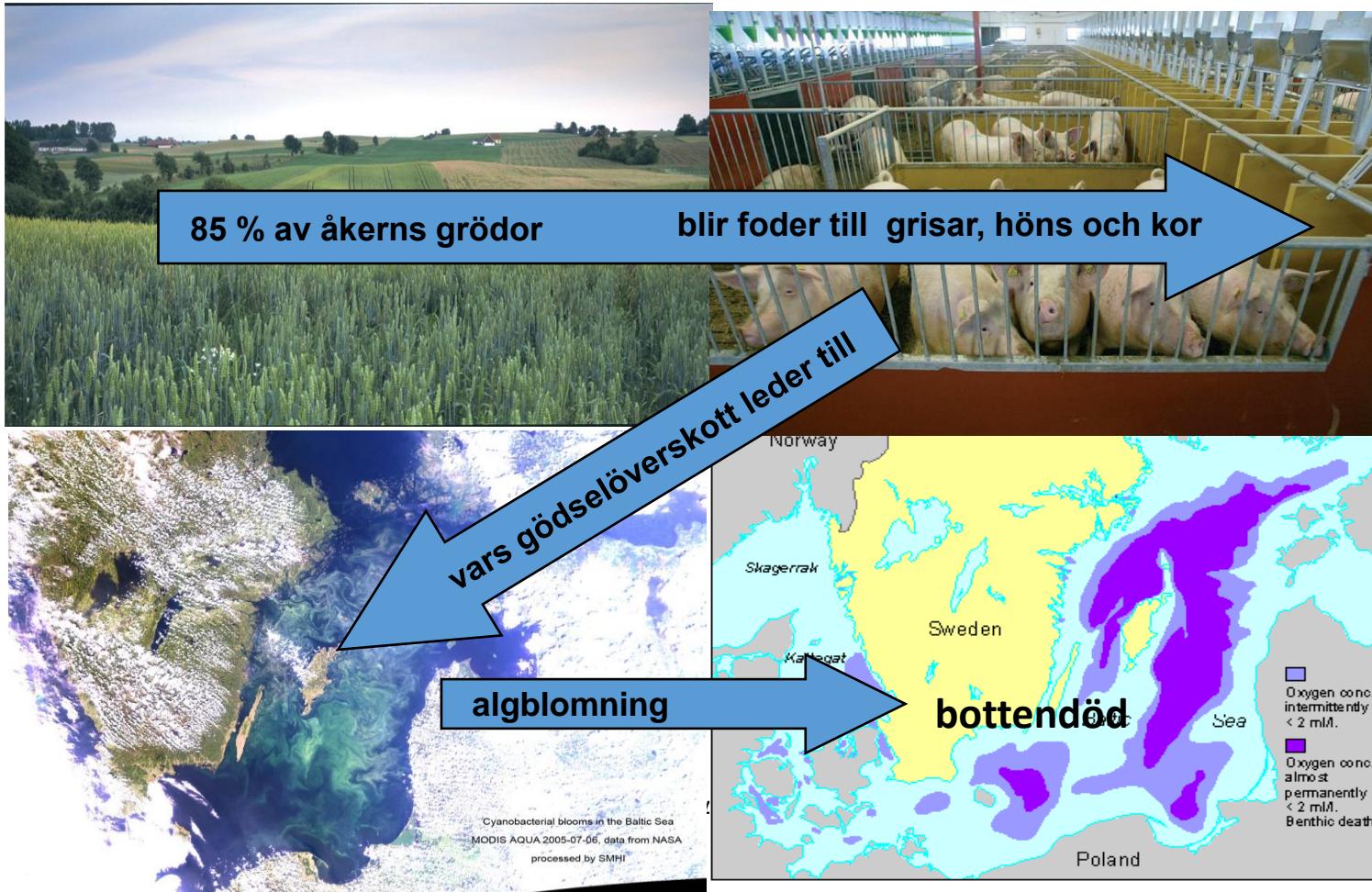


## Specialized animal farm

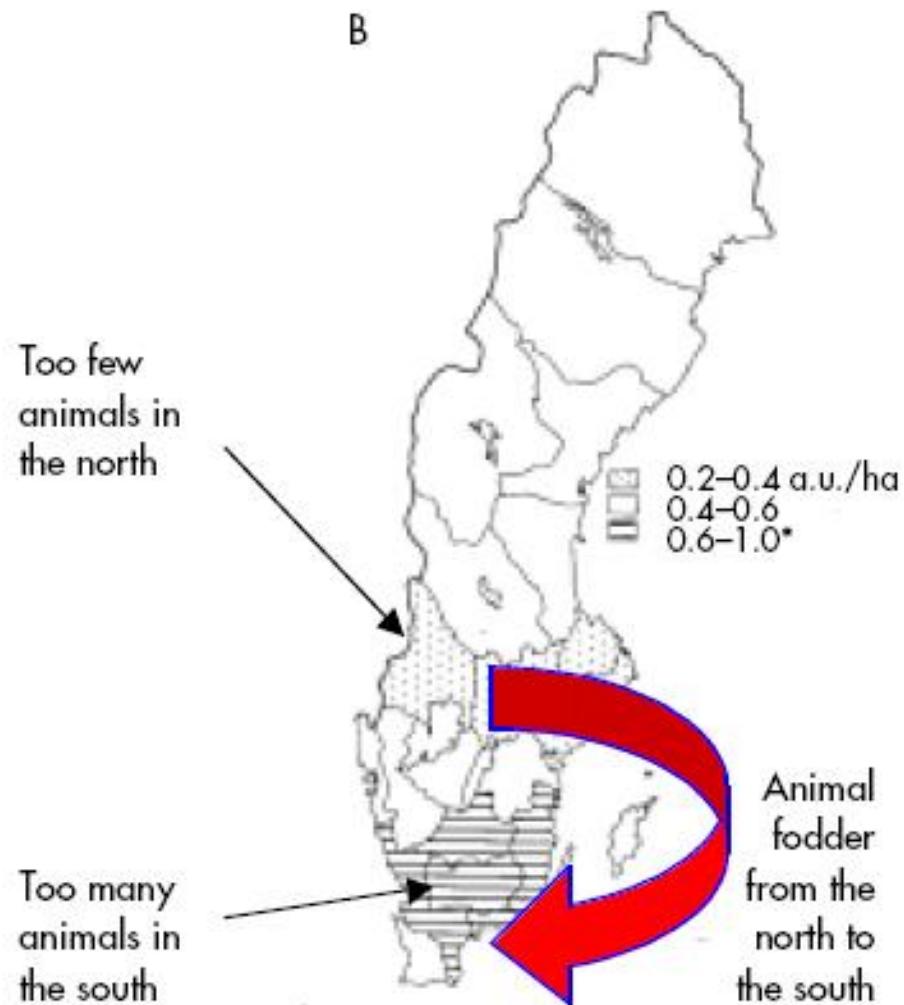
Input, output and surplus of Nitrogen kg/ha and year  
 (Average 701 dairy farms 00-06, data from Swedish board of agriculture report 2008:25)



# Depleted arable fields, eutrophication in seas and global warming

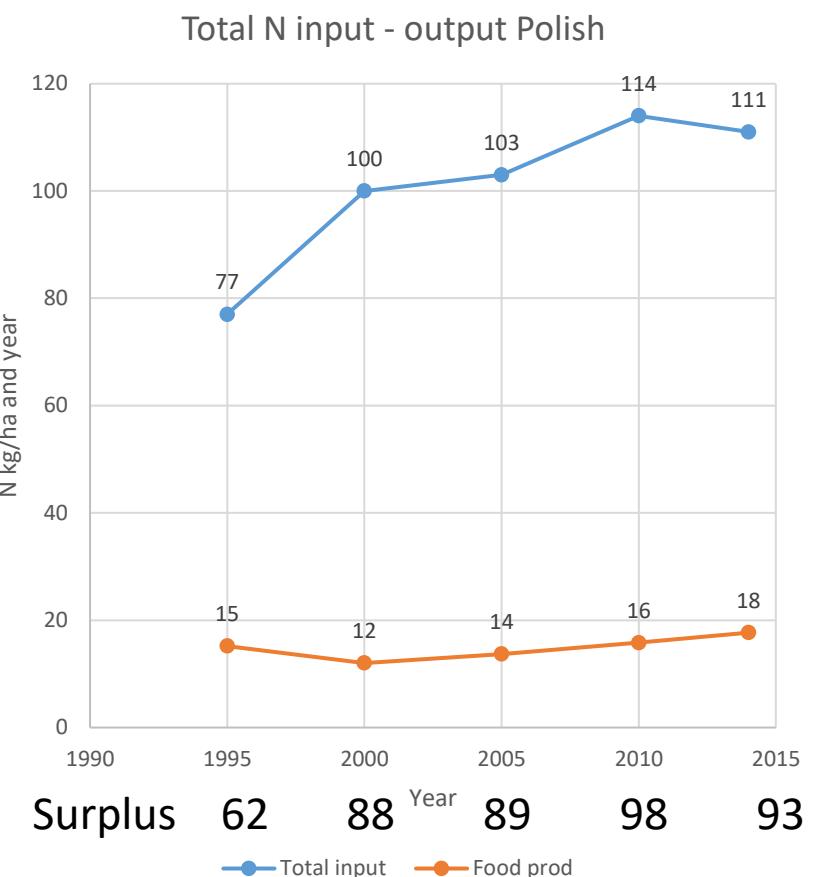
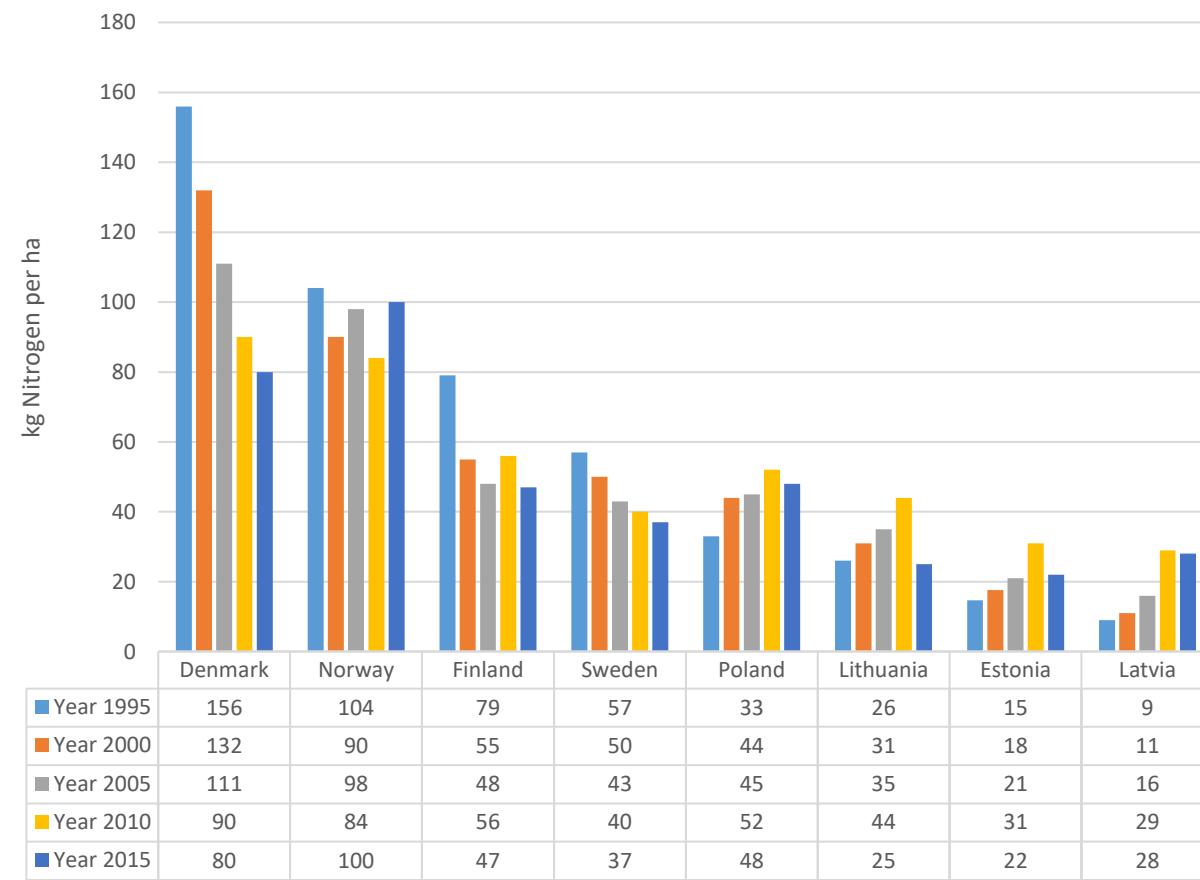


# With regional – concentration

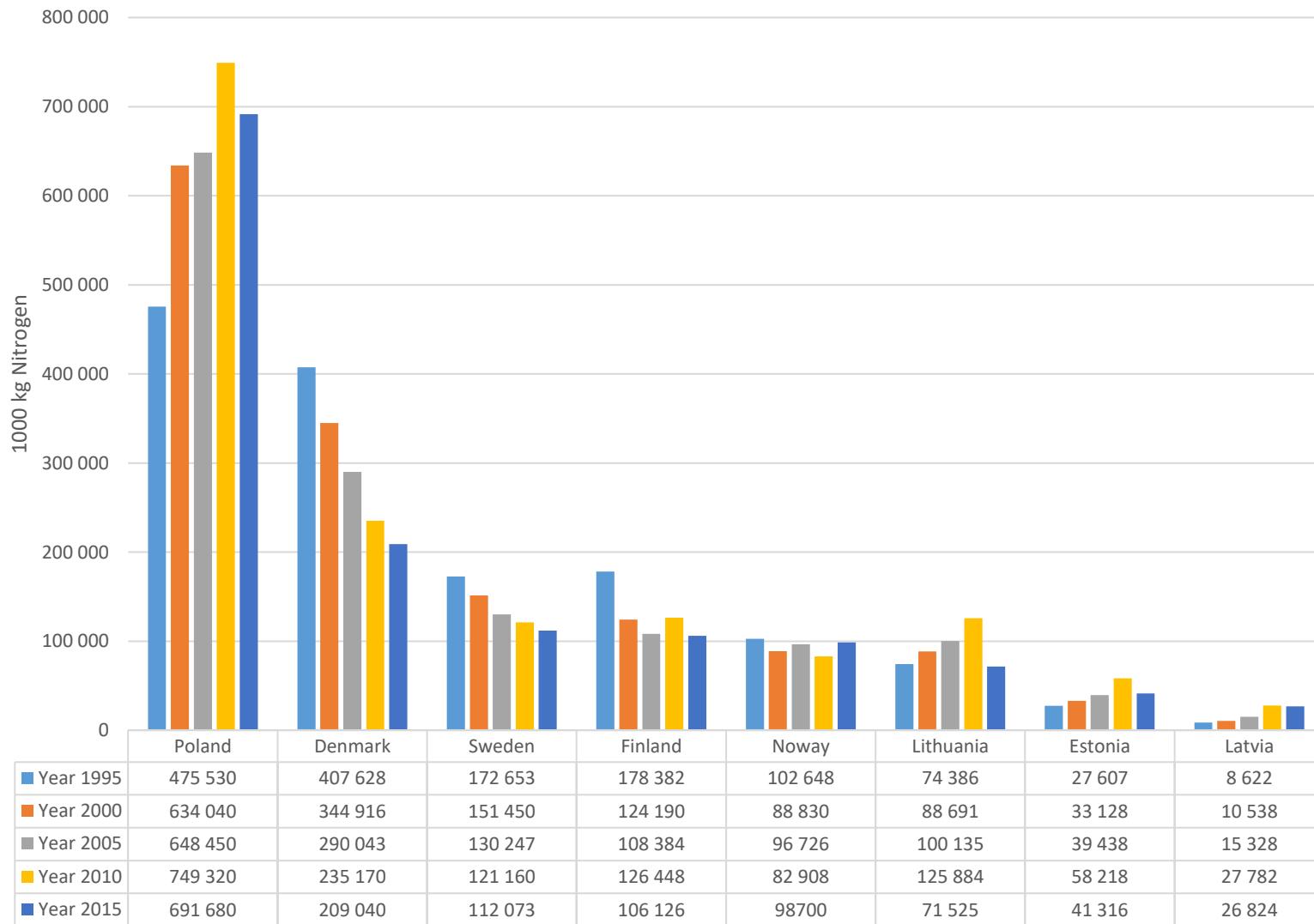




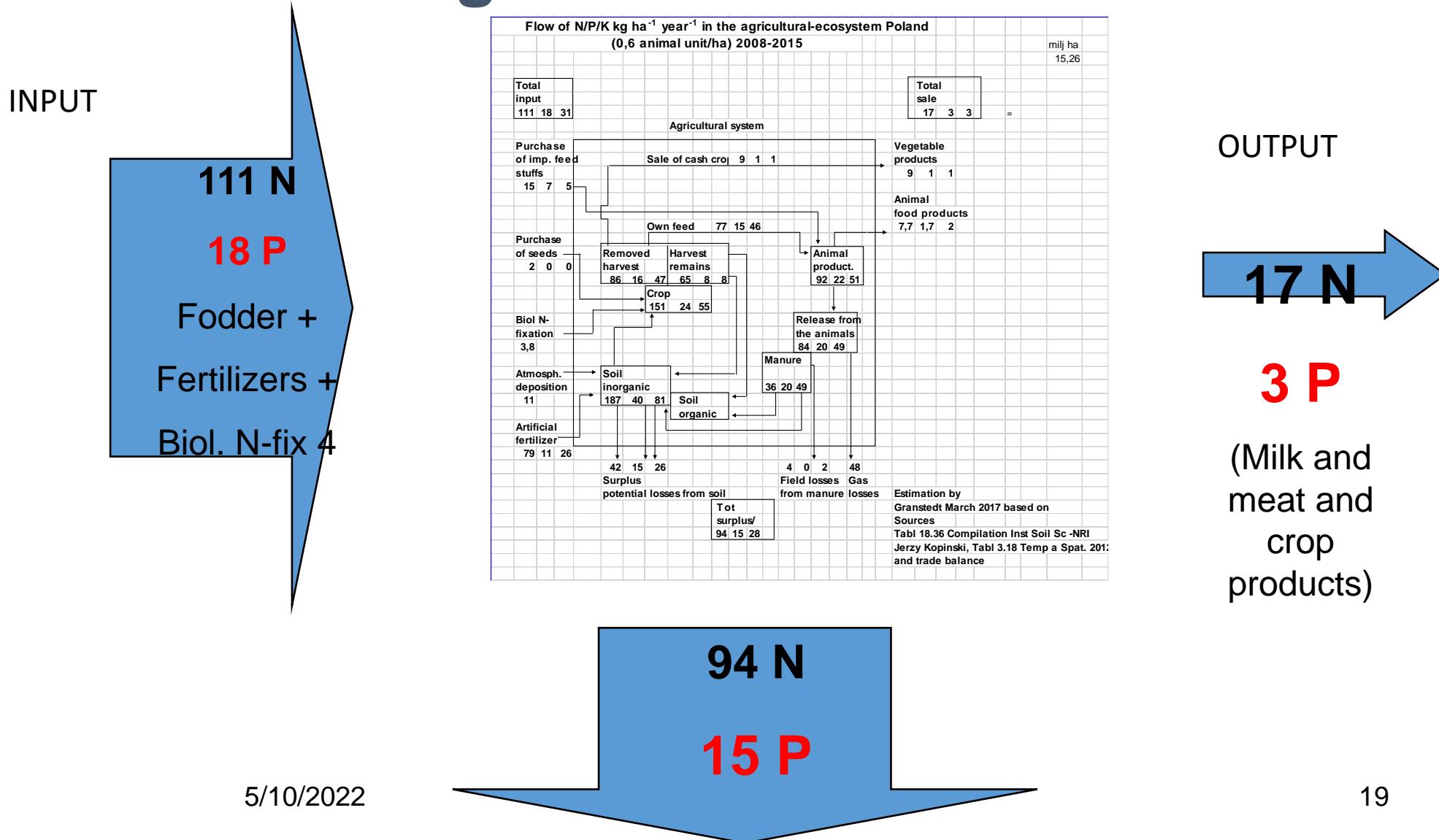
## Field Nitrogen Surplus per ha utilised agricultural in Baltic Sea Countries



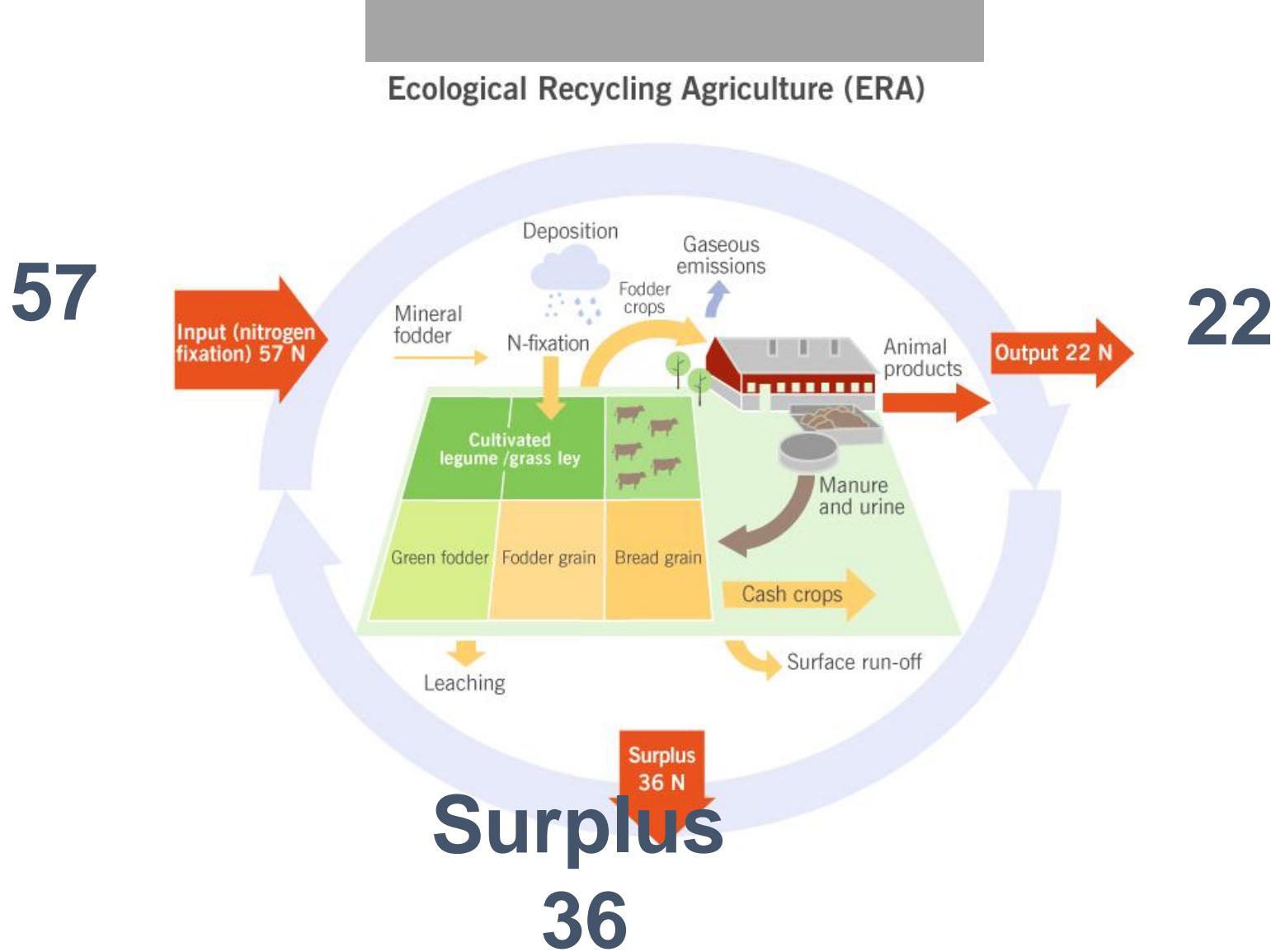
## Total Nitrogen Field Suplus utilsed agricultural area in Baltic Sea Countries



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



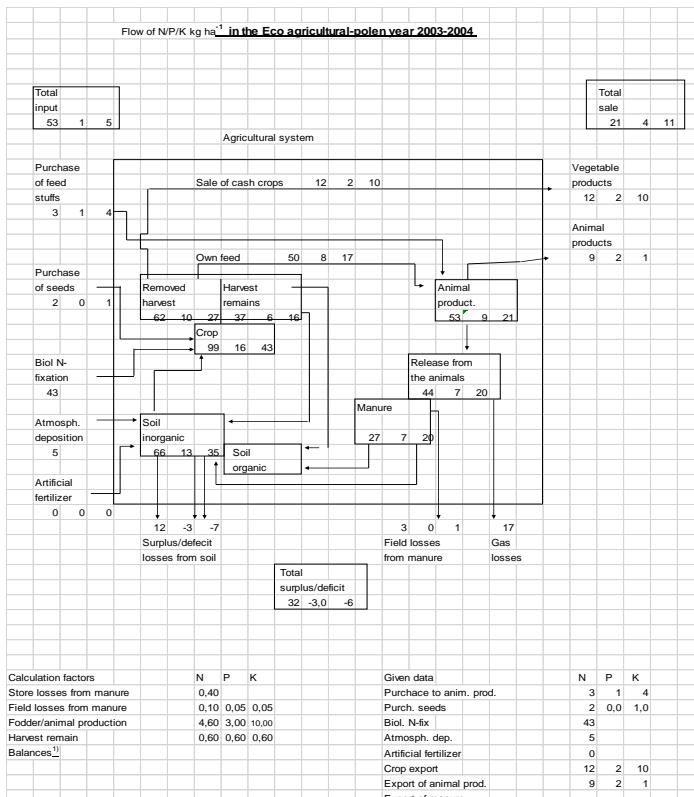
# Ecological Recycling Agriculture (ERA)



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

INPUT

**53 N**  
**1 P**  
Fodder +  
Fertilizers +  
Biol N-fix 43



OUTPUT

**21 N**

**3 P**

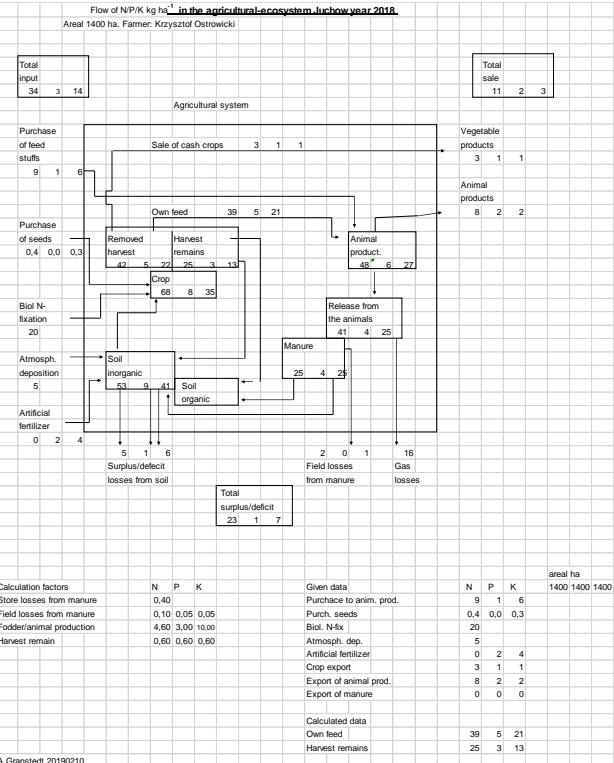
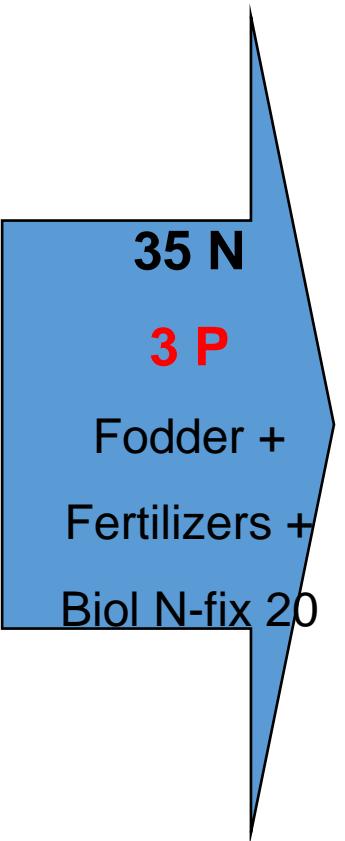
(Milk and  
meat and  
crop  
products)

**32 N**

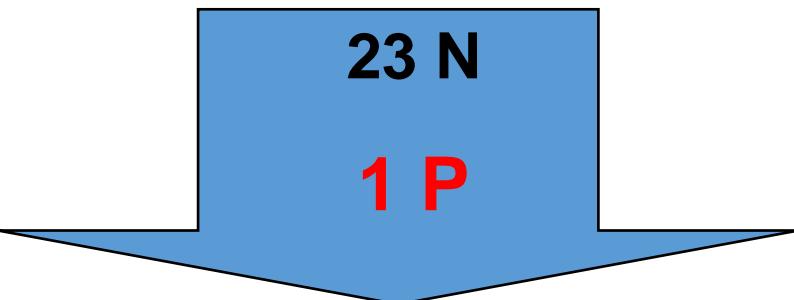
**-2 P**

# N and P balance kg/ha year Juchowo 2018

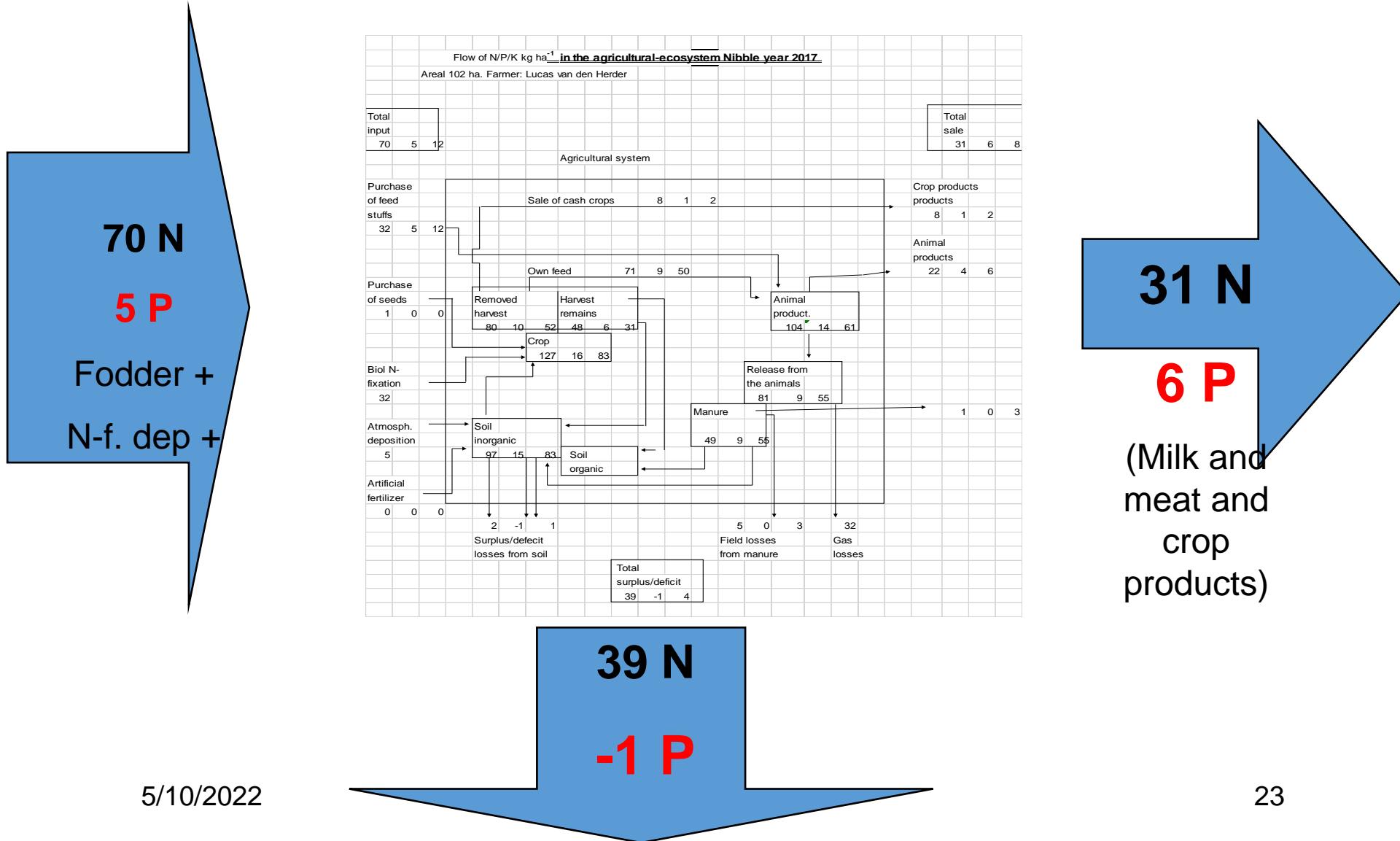
INPUT



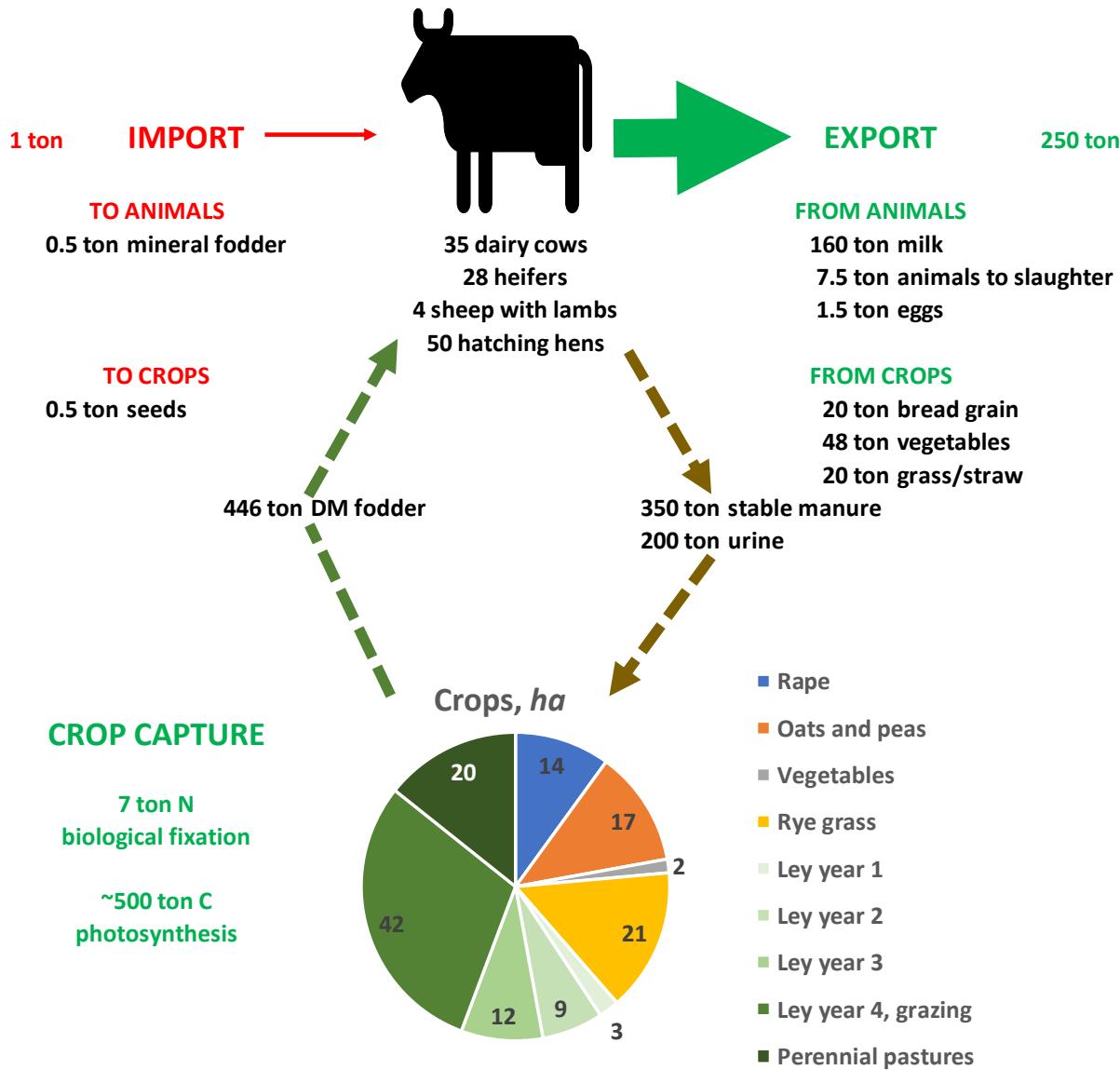
OUTPUT



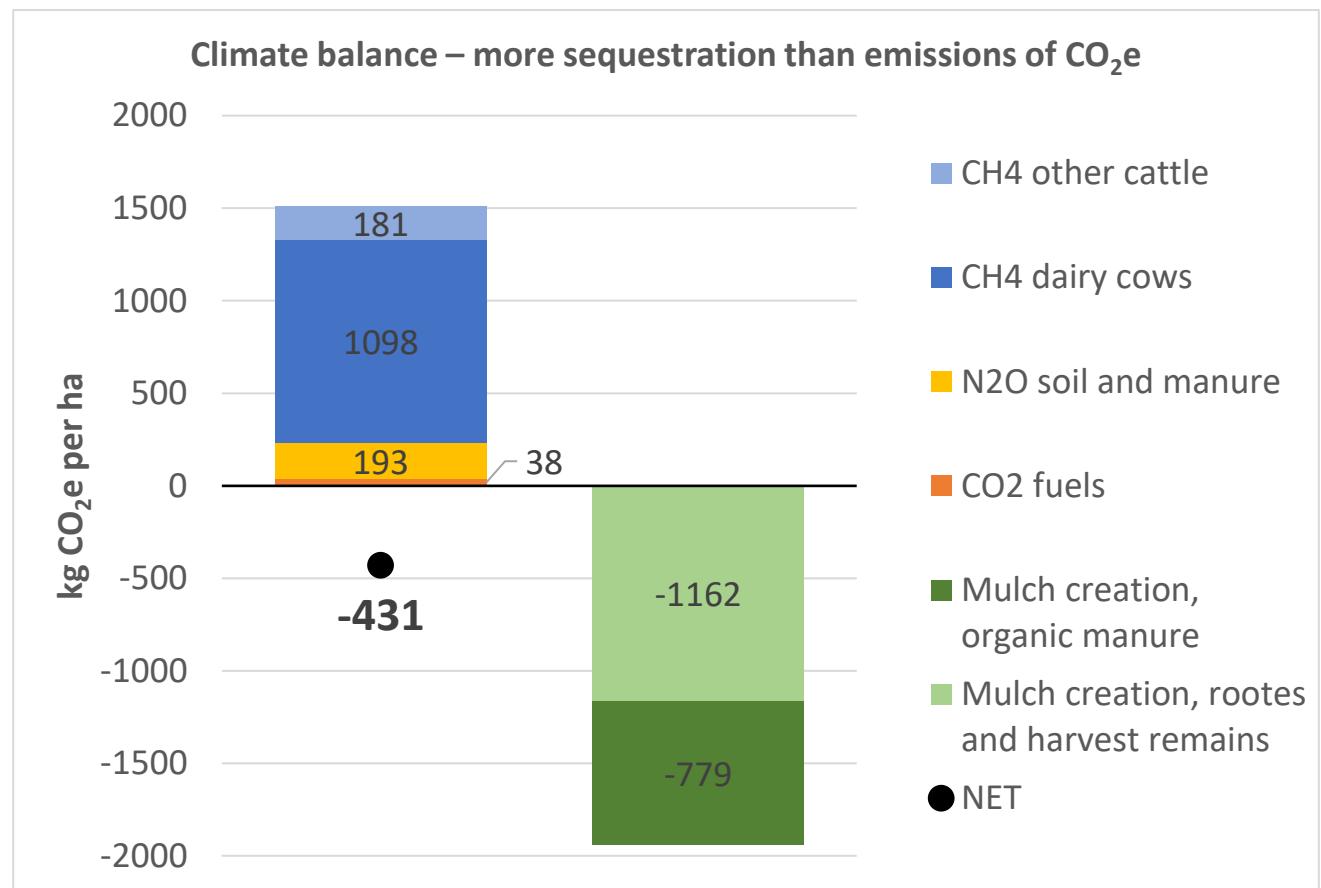
# N and P balance kg/ha year the biodynamic Nibble farm Järna Sweden 2017-2020



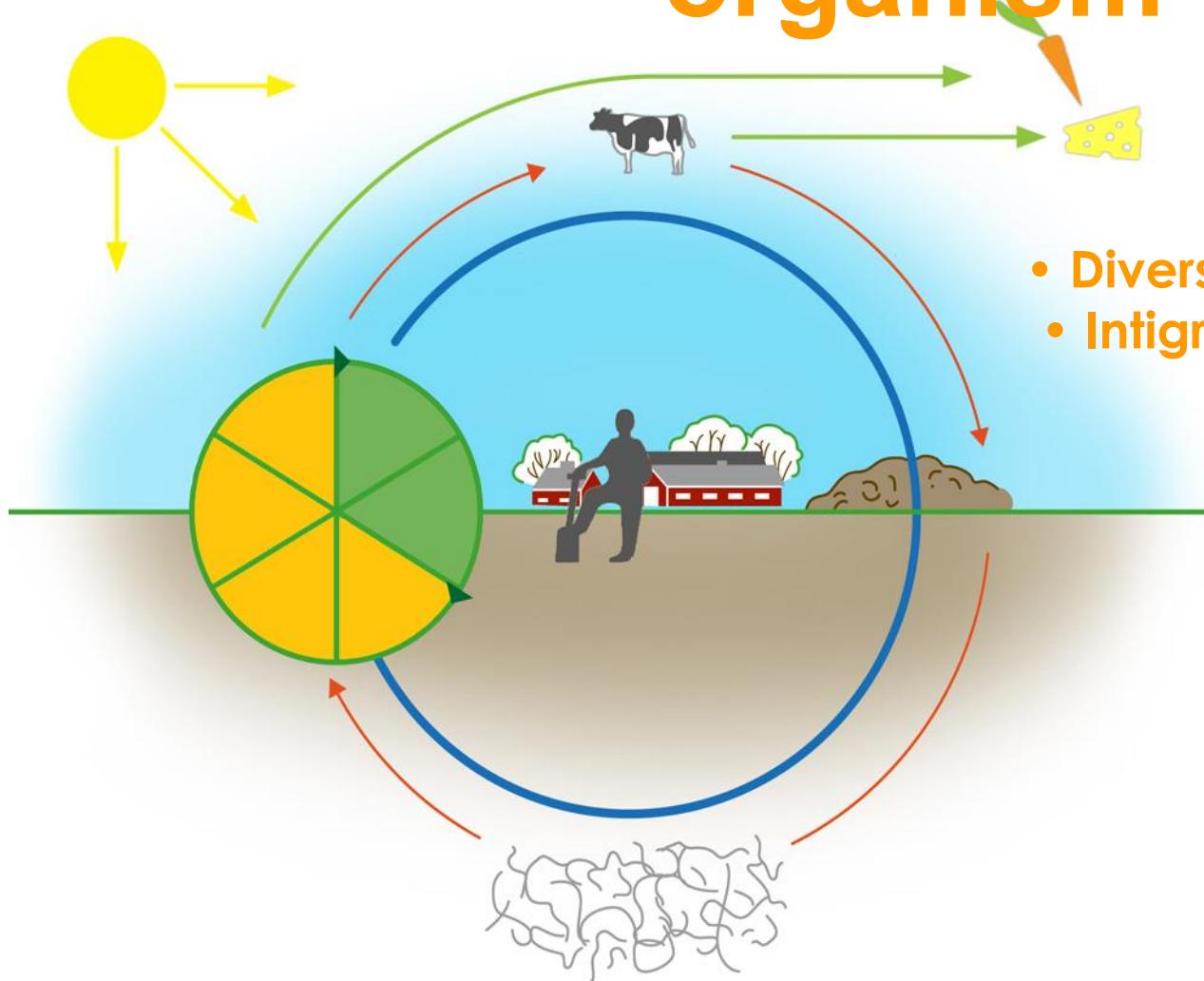
# VITAL RECIRCULATION GIVE LARGE PRODUCTION



LEY DOMINATED CROP ROTATION



# "The farm as a recycling organism"



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

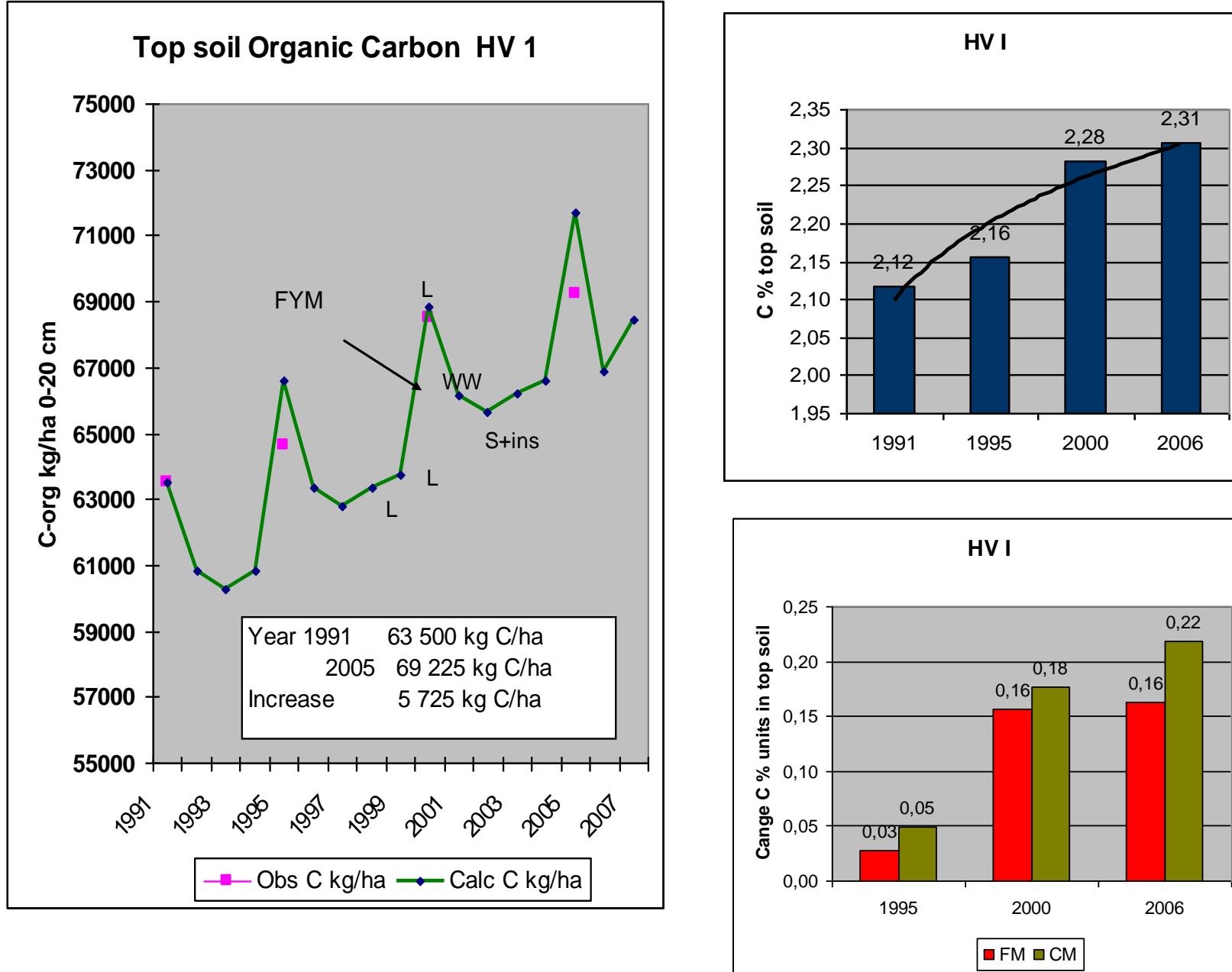
# Long term manure experiment



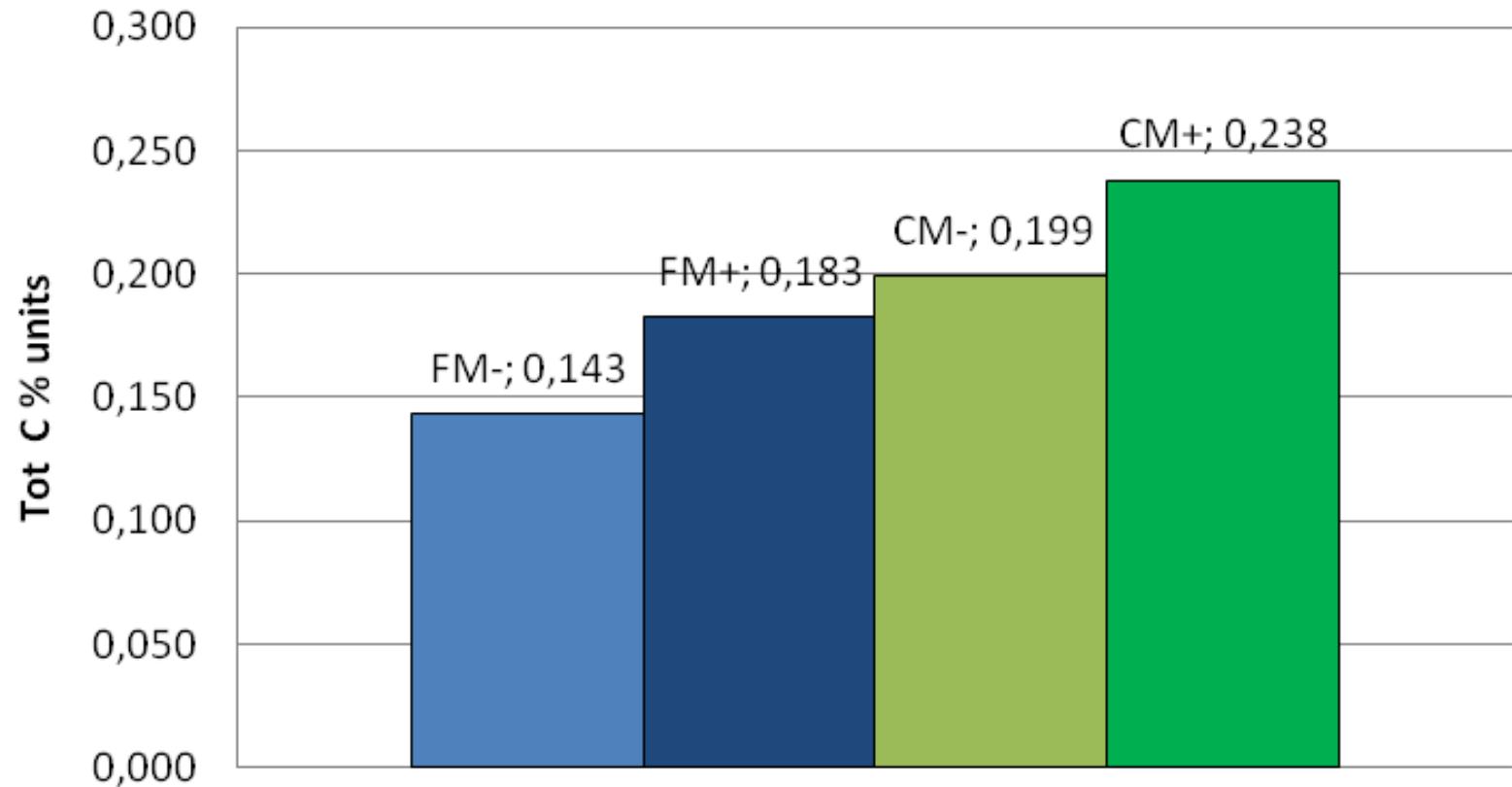
5/

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		



## Change org C in top soil HV I 1991- 2005



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