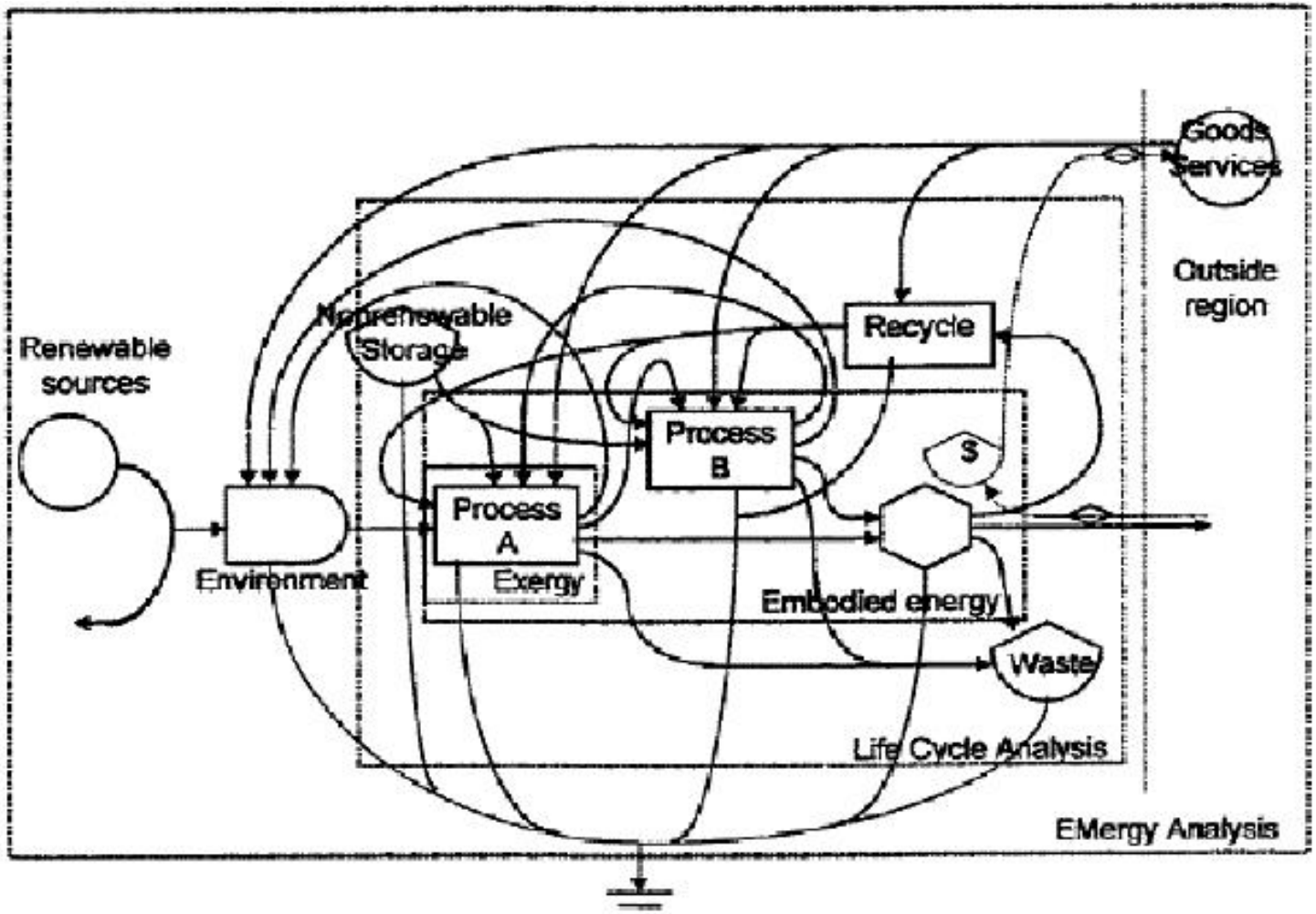
WP2 Energy need and energy resources
2.1 Analysis methods, assumptions, and definitions

Methods:

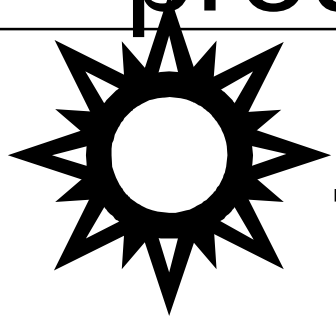
- Exergy -
- Embodied energy -
- Life cycle -
- Emergy -

analysis



Buranakarn, V., 1998. Evaluation of recycling and reuse of building materials using the emergy analysis method. Ph.D. Dissertation. University of Florida. 279 p.

Energy input and output of bio-diesel production kWh m^{-2} $year^{-1}$

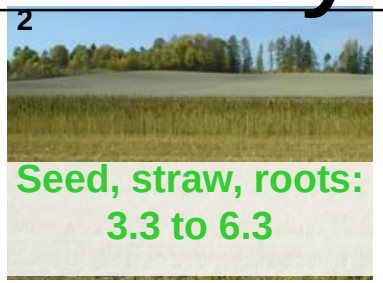


insolation: 900

+

cultivation: 0.3 to 0.8

=



picture courtesy:

1 Timo Lötjönen

2 Winfried Schäfer

3 MTT:n kuvatietokannan tekijät

4 Frederik Teye

+

Extraction: 0.1

=

+

+

Heat and power:
0.03 to 0.15

=

+

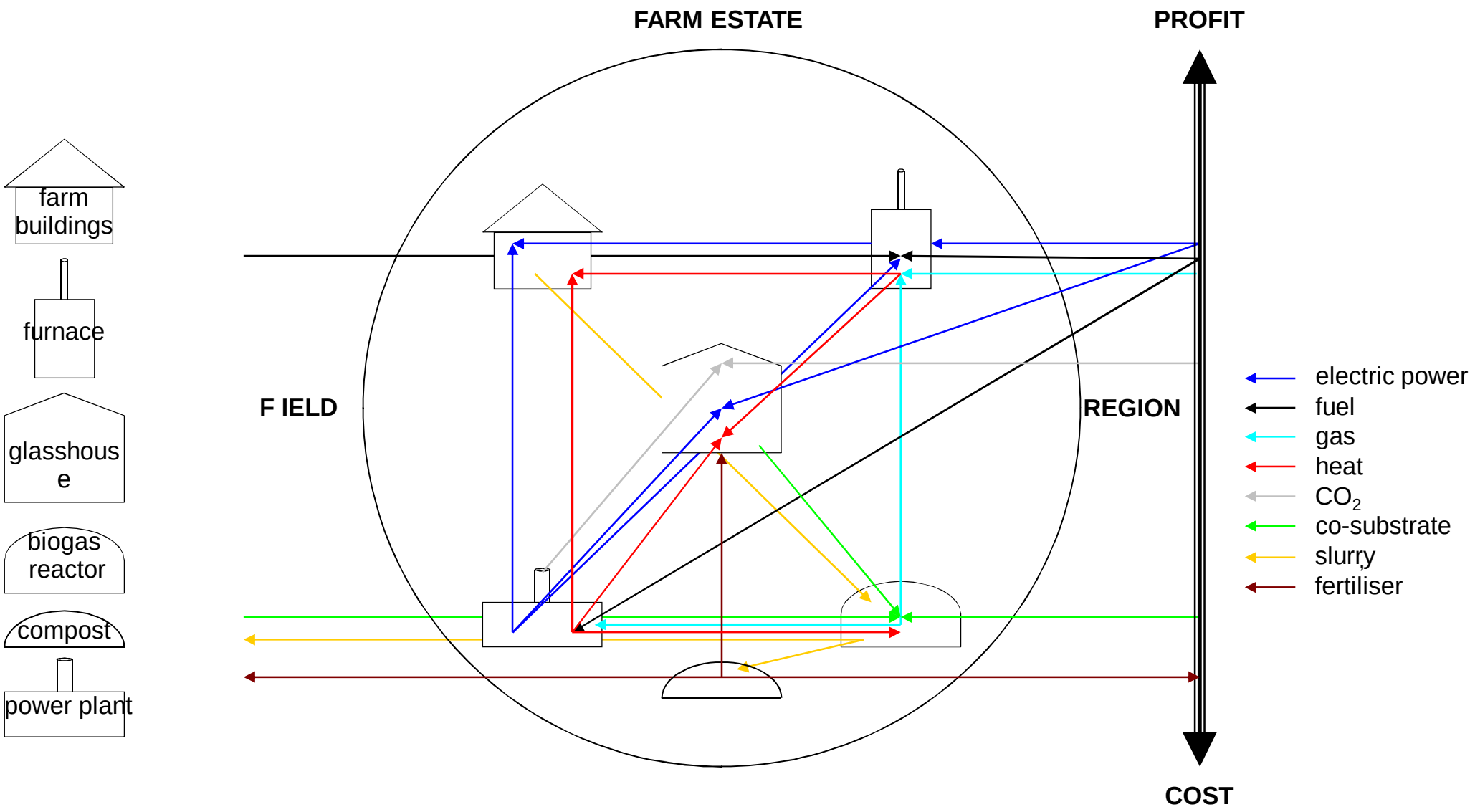
Dairy:
0.2

+

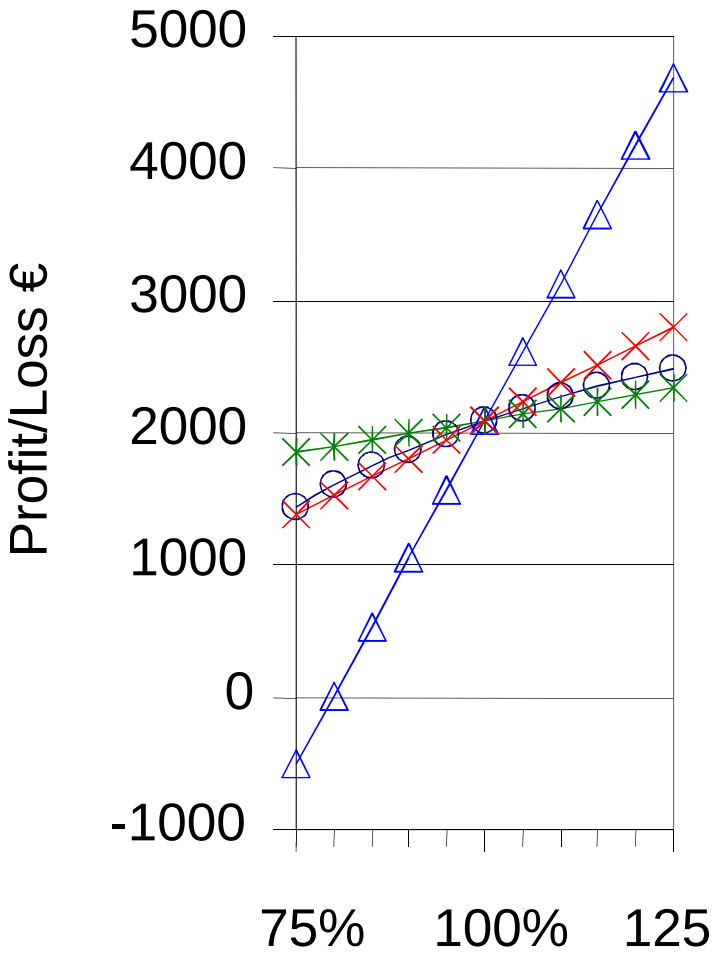
Esterification:
0.1 to 0.2

=

On-farm material and energy flow

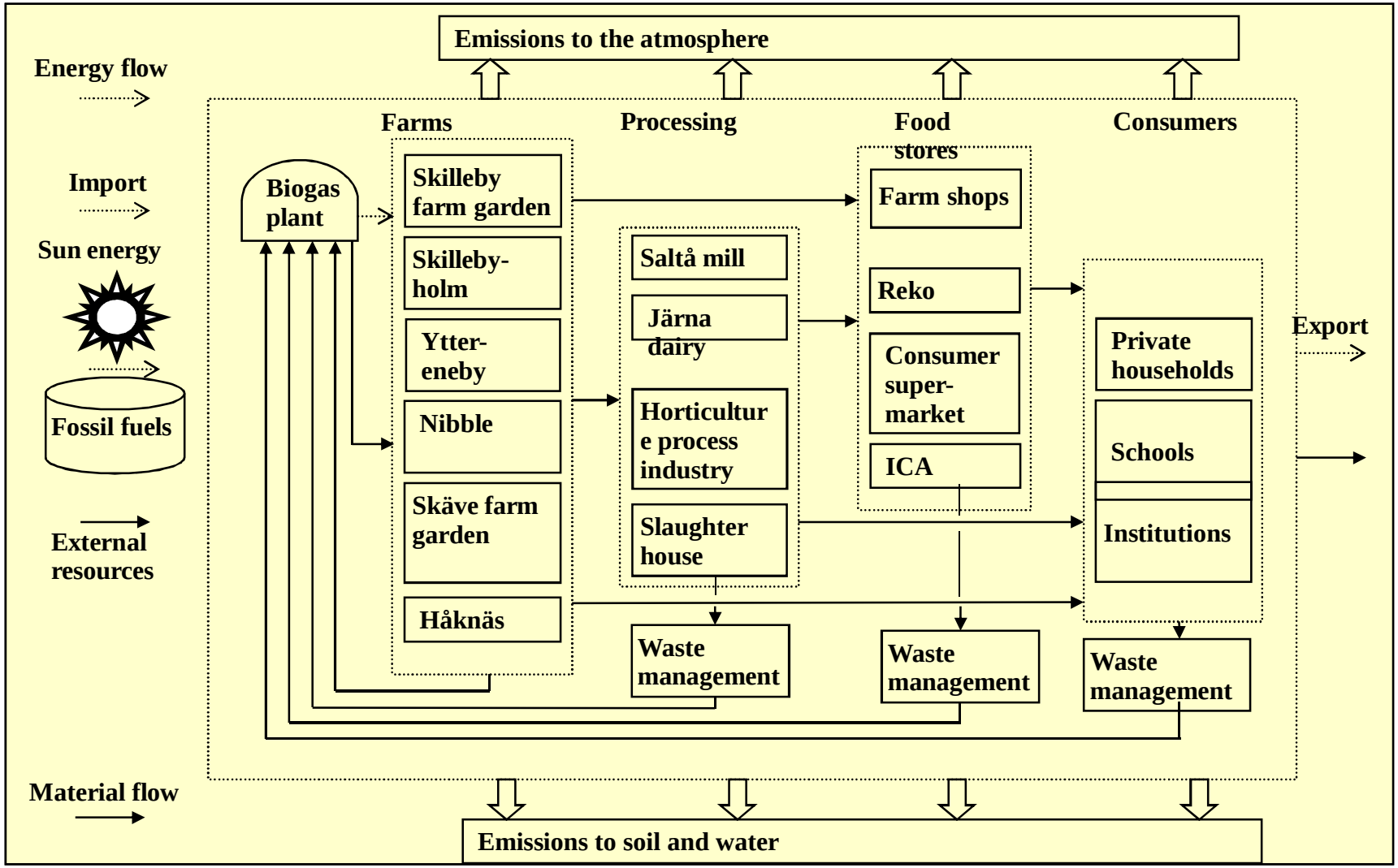


Sensivity analysis of power production from biogas



- 100 % = 18h d^{-1} operating time for power production
- 100 % = 30 % el. power prod. efficiency
  100 % = 7,35 c kWh^{-1} credit elec. power
- 100 % = 333 kWh a^{-1} ABU^{-1} electric power farm consumption
- 100 % = 0,4 € l^{-1} Diesel fuel and 0,115 € kWh^{-1} electric power

Baltic Ecological Recycling Agriculture and Society (BERAS)



Source: Granstedt http://www.jdb.se/beras/ BERAS- Baltic Ecological Recycling Agriculture and Society

WP3 Energy saving of case farms
3.4 Improving of working methods and chains, land use

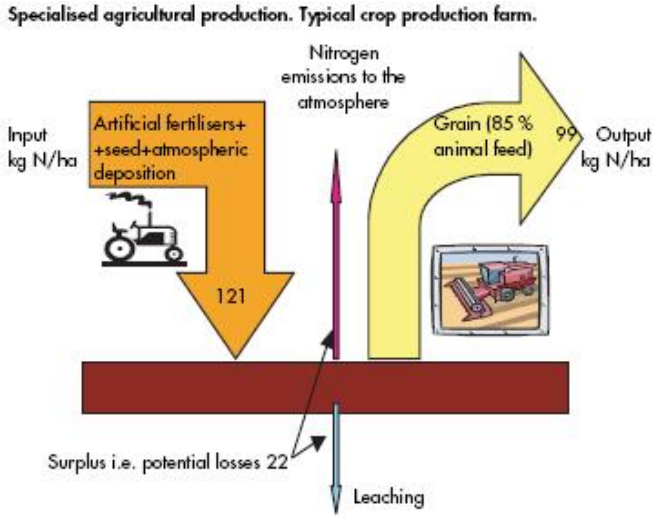


Figure 7. *Plant nutrient (N) flows, in kg/ha and year, for a specialised cereal crop farm in Skaraborg county with no animal units per ha (Granstedt, 2000).*

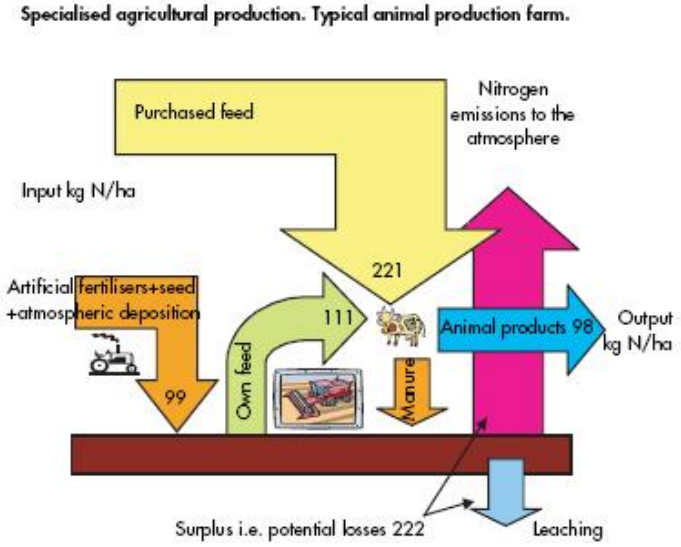


Figure 8. *Plant nutrient (N) flows, in kg/ha and year, for a specialised (swine + dairy) animal production farm in Blekinge county, 50 ha, 15 dairy cows, 10 sows and 680 fattening pigs. The animal density, about 2 animal units per ha, is three times higher than can be fed with own fodder (Granstedt, 1992). This high density was allowed in Sweden before 1995 and it is still allowed in the other BERAS countries.*

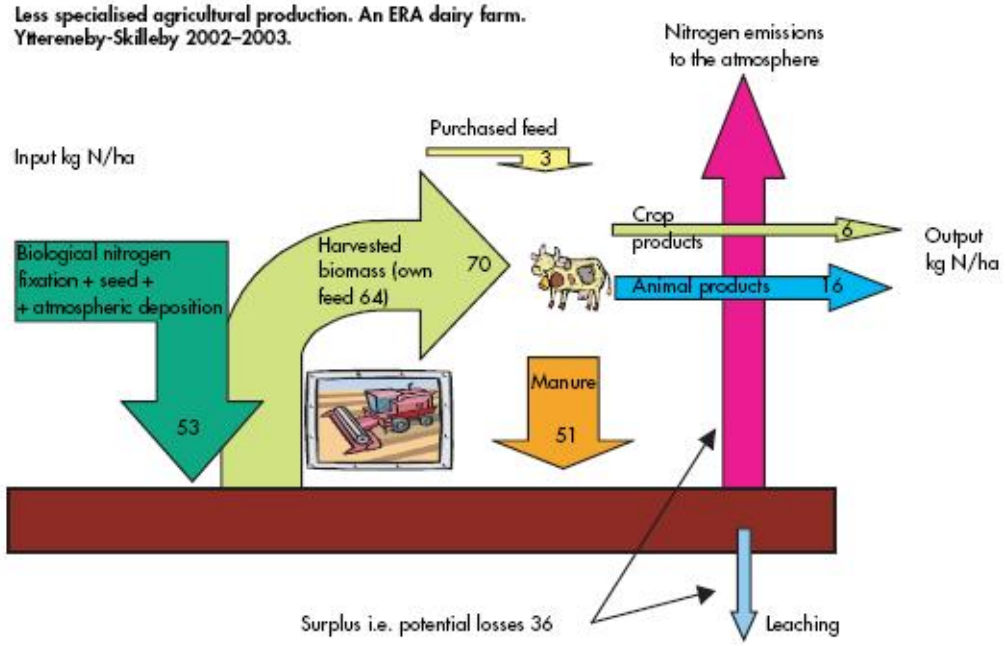
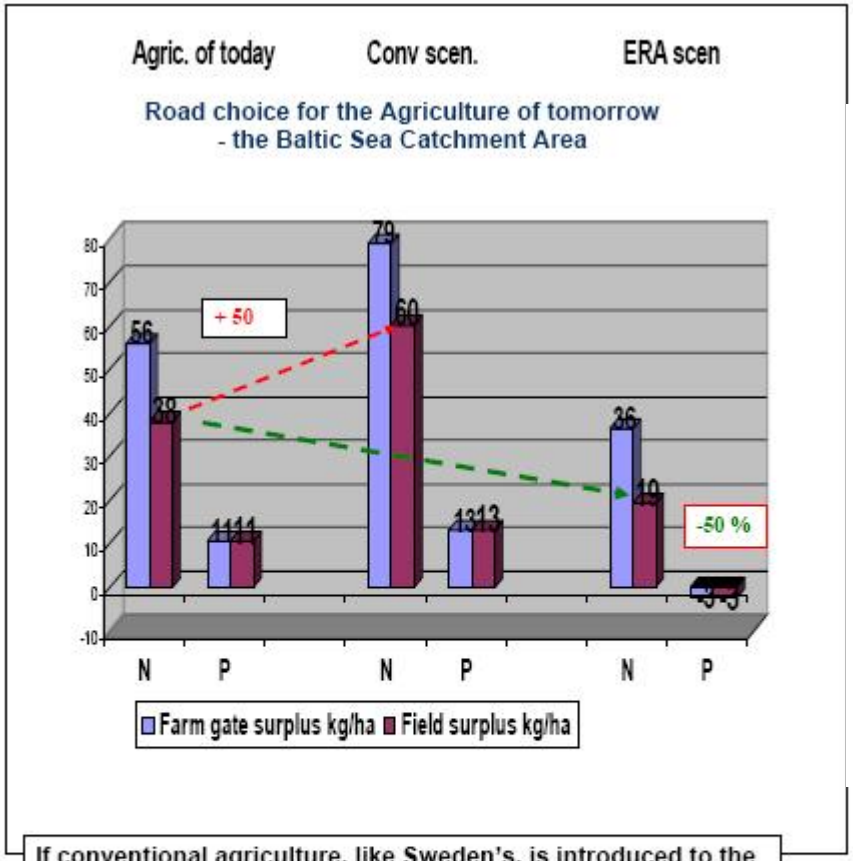


Figure 12b. *Plant nutrient (N) flows, in kg/ha and year, calculated in 2002 and 2003 for the ecological recycling agriculture (ERA) farm Yttereneby-Skilleby, farmed biodynamically since 1967. Detailed plant nutrient calculations are presented in Figure 16 in the Appendix.*

http://www.jdb.se/beras/files/Beras2.pdf

WP3 Energy saving of case farms
3.1.1 Nutrient recycling, composting, waste



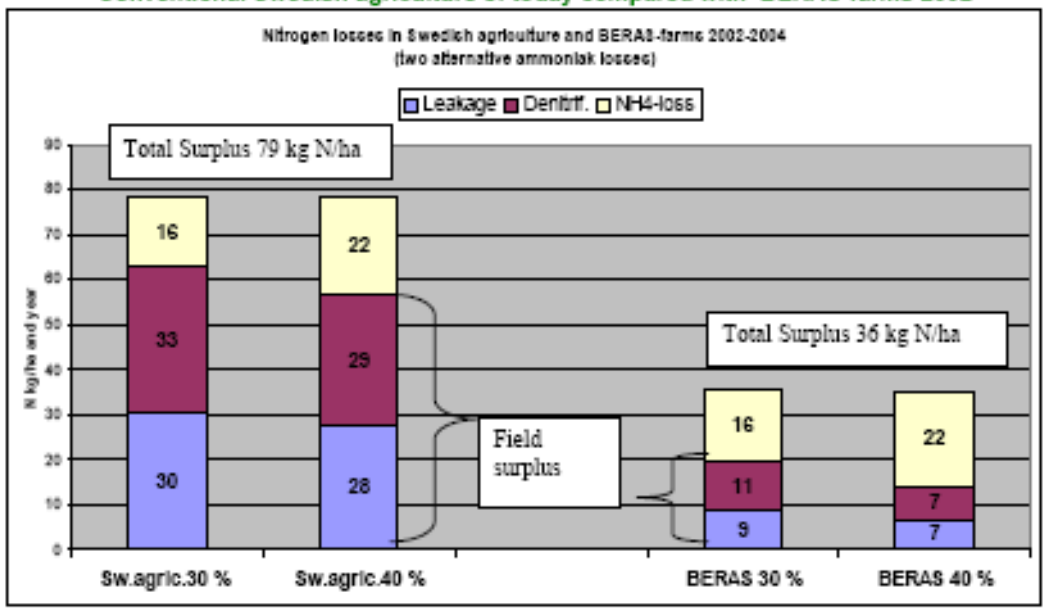
If conventional agriculture, like Sweden's, is introduced to the Baltic countries, the nitrogen output into the Baltic Sea may increase by 50%.

If, however, the Baltic Sea catchments area converts to ERA, the studies show the nitrogen output will decrease by 50%.

In the ERAS-scenario with adapted fodder and animal production there will be no surplus of Phosphorus.

Findings of the BERAS Interreg IIIB project:

Conventional Swedish agriculture of today compared with BERAS-farms 2002



– 2004

http://www.jdb.se/beras/default.asp?page=59

Artur Granstedt, Thomas Schneider, Pentti Seuri, and Olof Thomsson 2008. Ecological Recycling Agriculture to Reduce Nutrient Pollution to the Baltic Sea Biological Agriculture and Horticulture, 2008, Vol. 26, pp. 279–307

In EE: Center for Ecological Engineering in Tartu , JV Jannseni 4, EE - 510 05 Tartu,

Merit Mikk ph. +372 7 422 051