Case studies assessment results: Environmental externalities of centralized co-digestion

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Greenhouse Gas emission from animal manure

Manure is the source of the gases:

- Methane: CH_4
- Nitrous oxide: N_2O

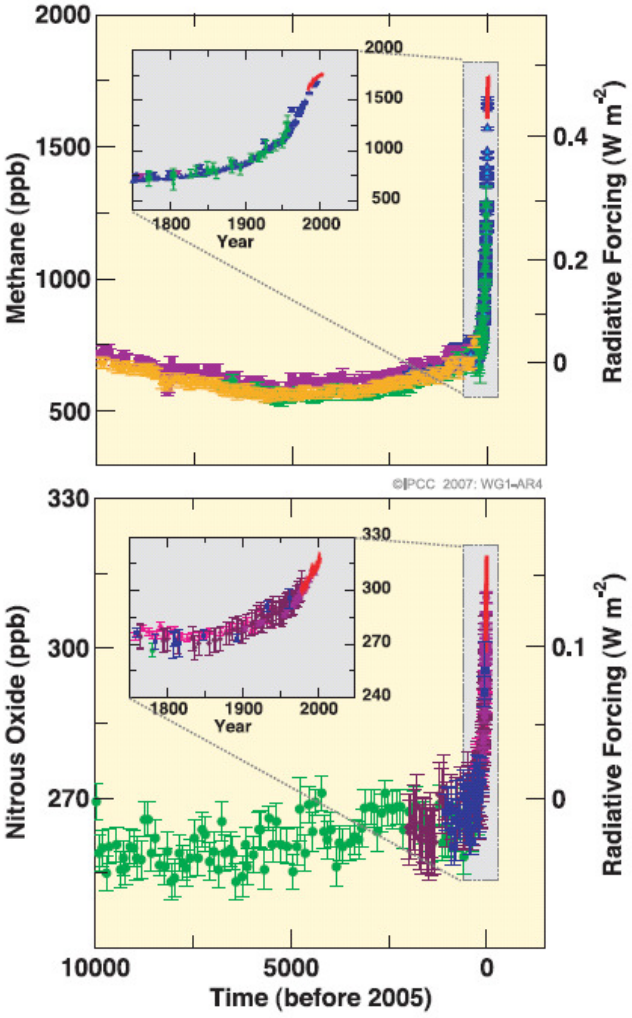
Global warming potential (IPCC 2007)

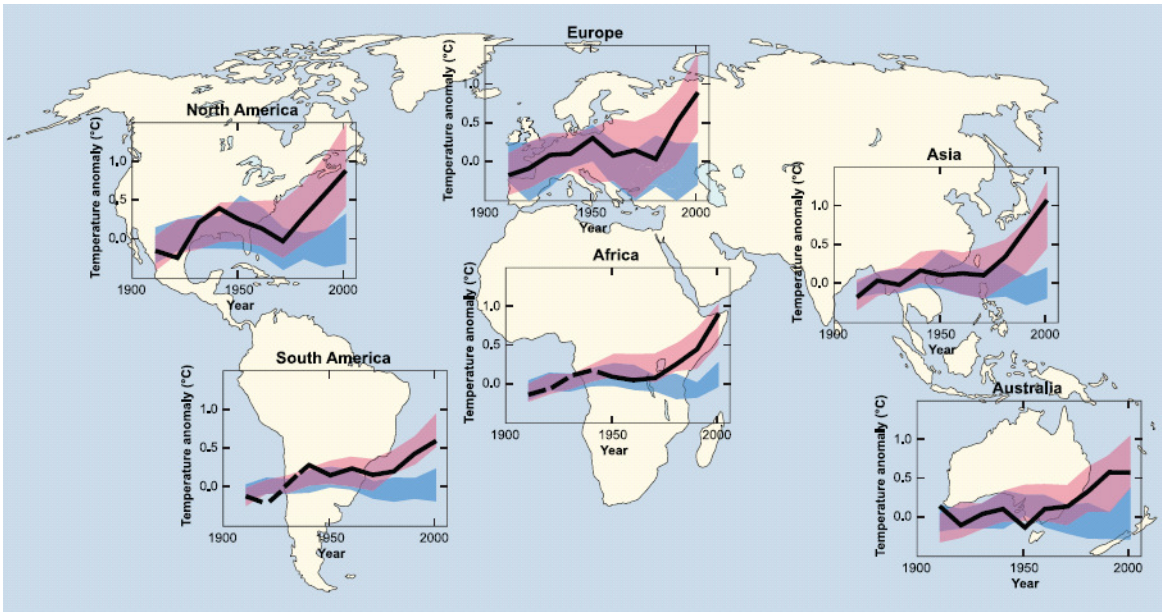
- Methane: 25
- Nitrous oxide: 296

Contribution to global warming (of the net-effect of long-lived GHG)

- Methane : 30%
- Nitrous oxide: 10%

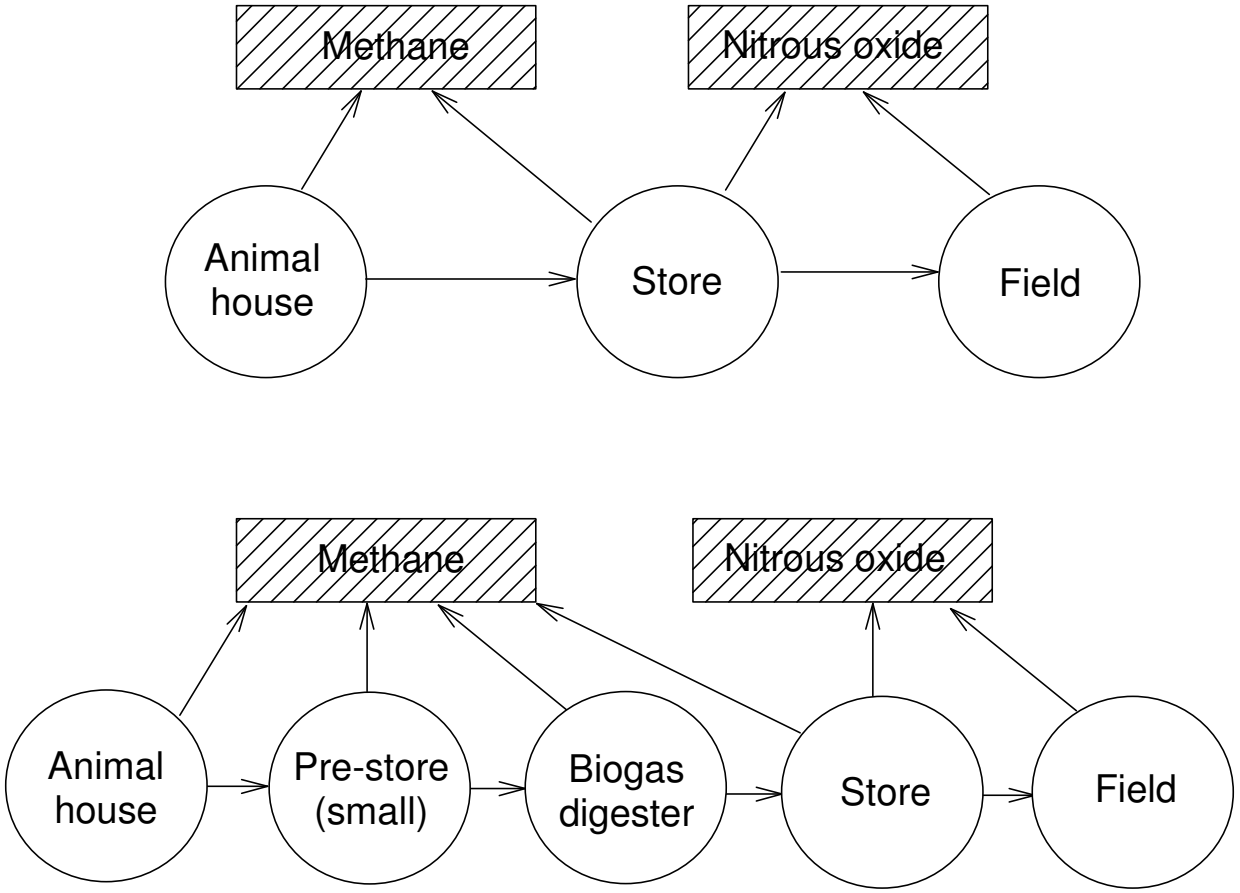
Digestion of animal manure will contribute to reduce the global mean air temperature



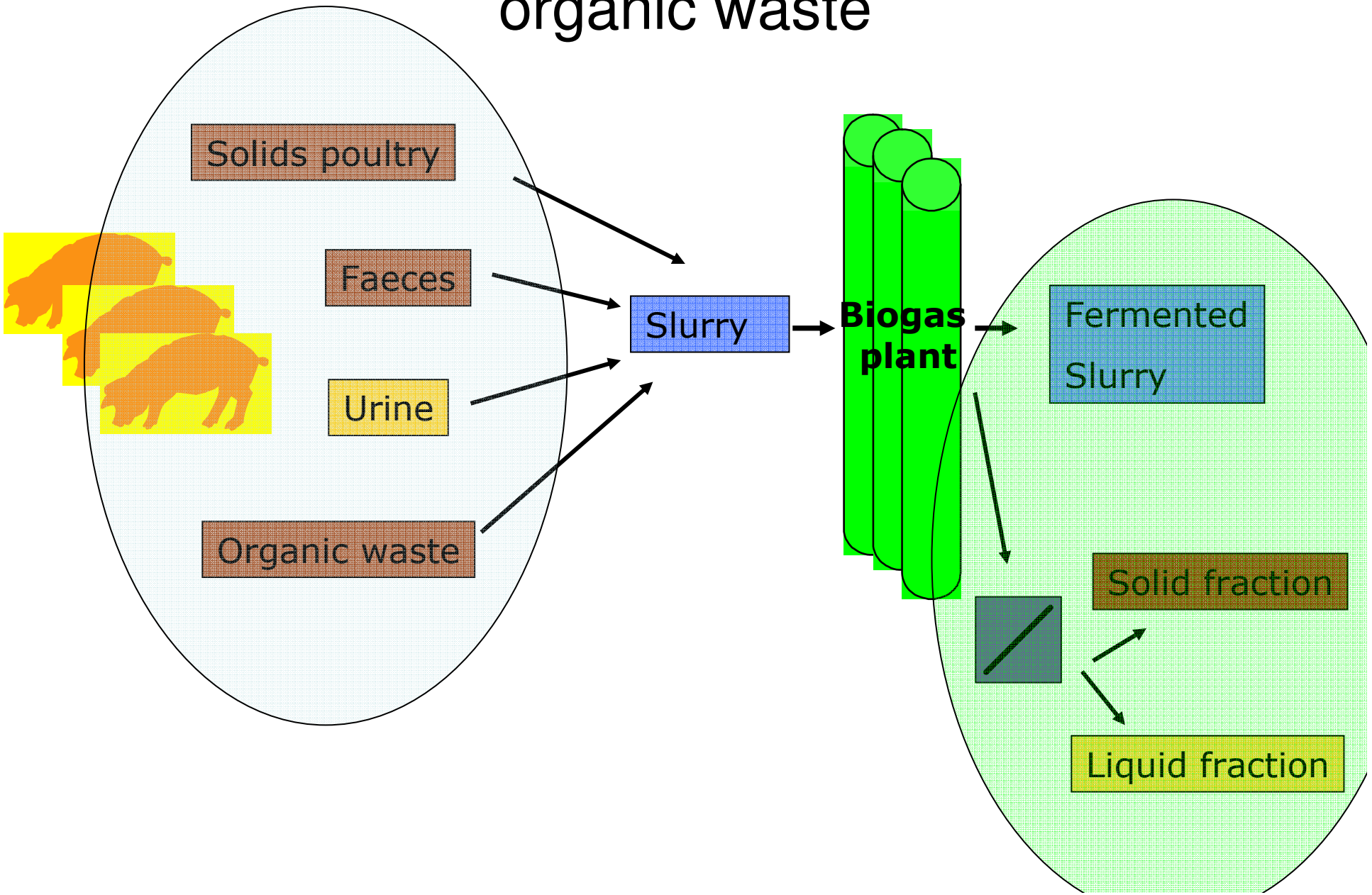


IPCC 2006

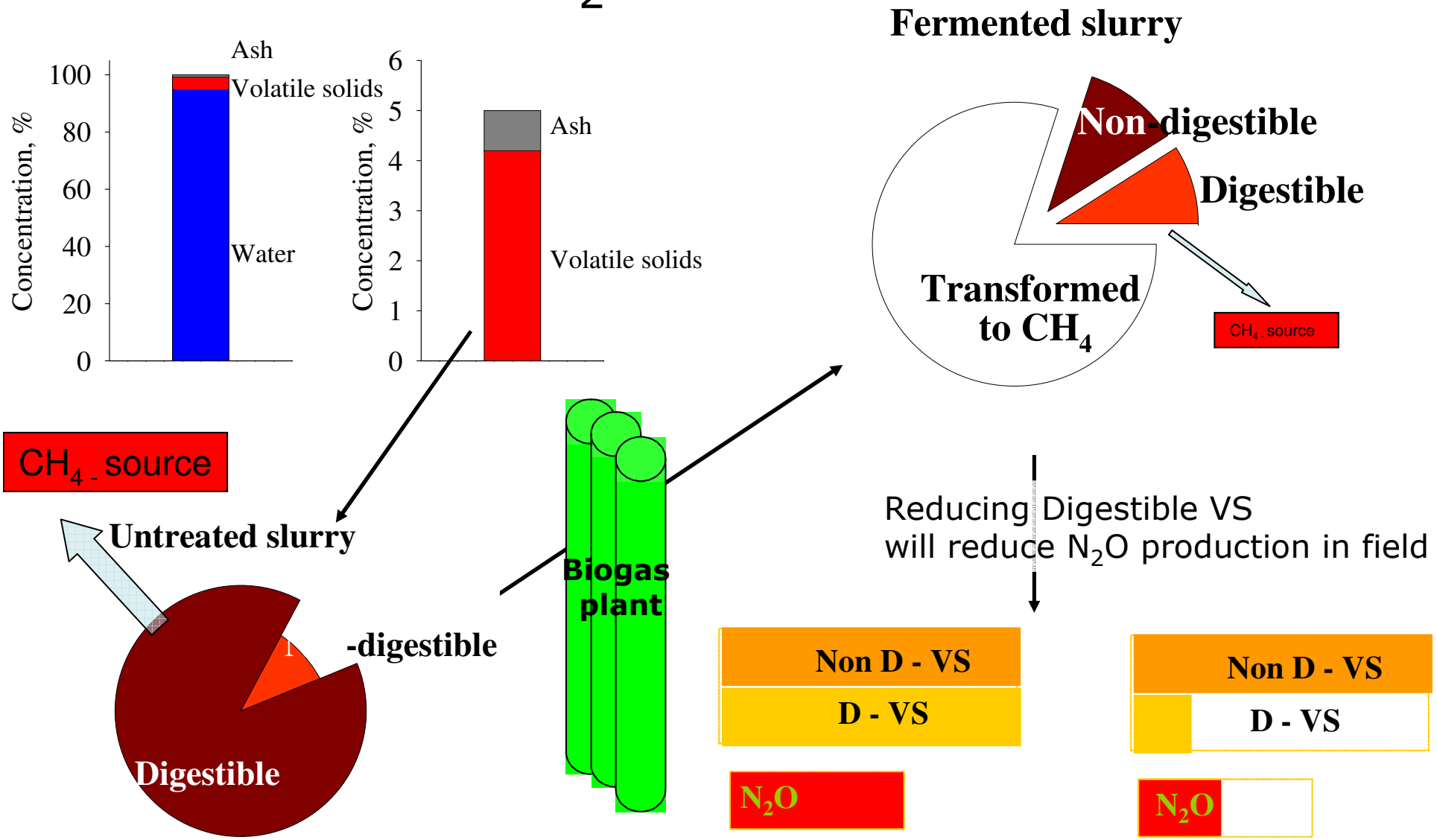
Farming systems with and without Anaerobic Digestion producing biogas



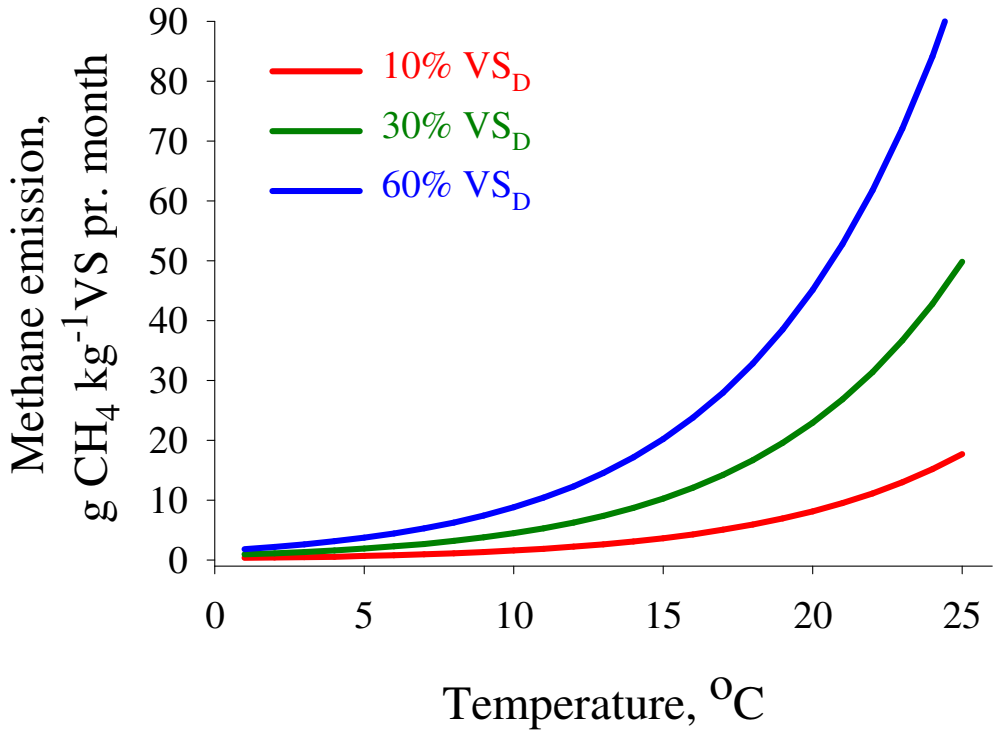
Anaerobic digestion of animal manure and organic waste



Reduced methane (CH_4) and nitrous oxide N_2O emission



The model include effect of organic matter VS, temperature and storage time



VS_D is the fraction of manure that is digestible

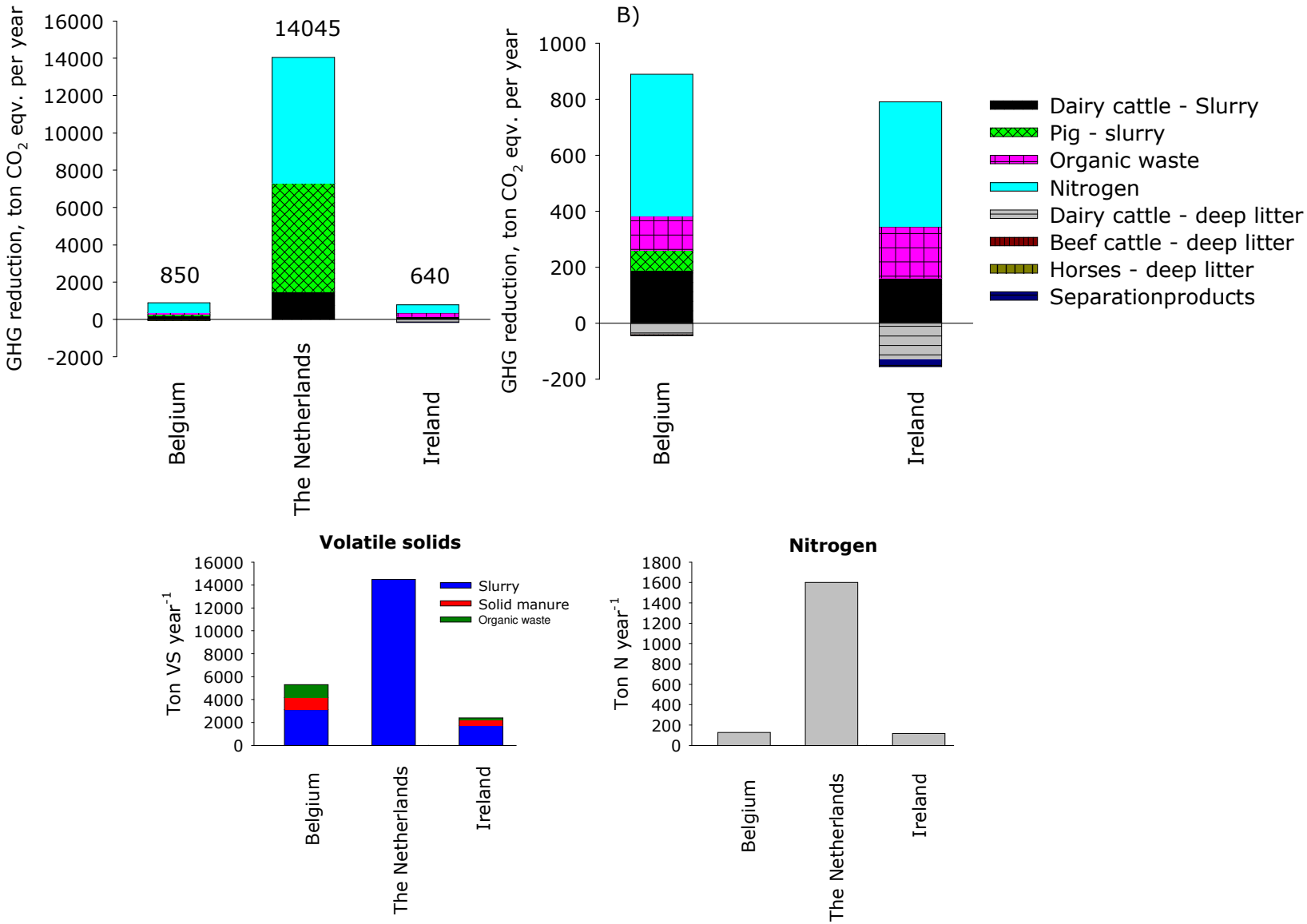
Methane emission is related VSD

Methane emisison is related to Temp

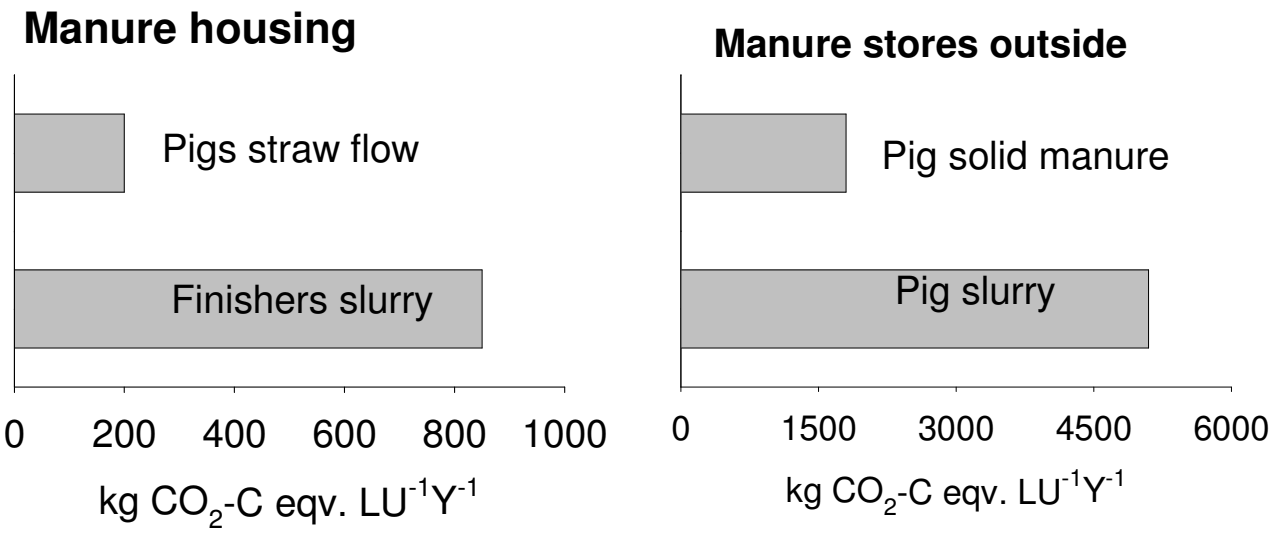
Methane emission is related to storage time

Methane emission is related to inoculum

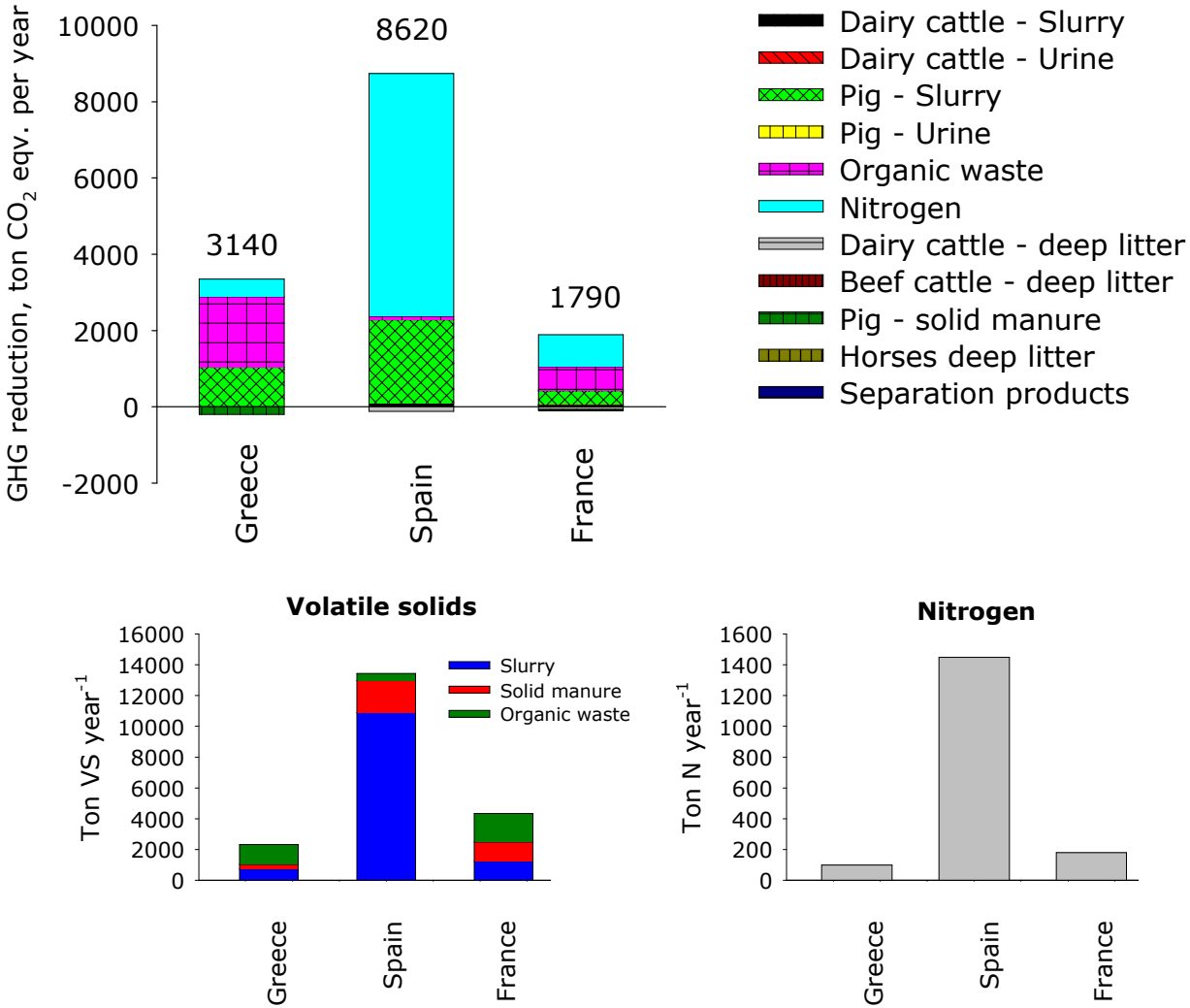
Reduction in GHG emission Atlantic countries



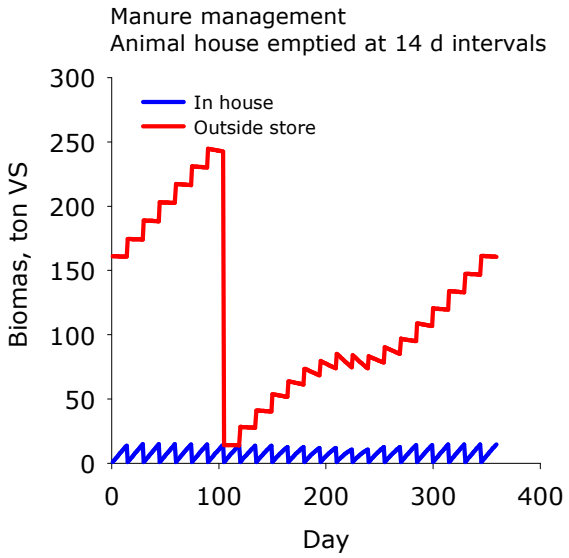
Methane emission
Effect of source i.e. solid or liquid manure

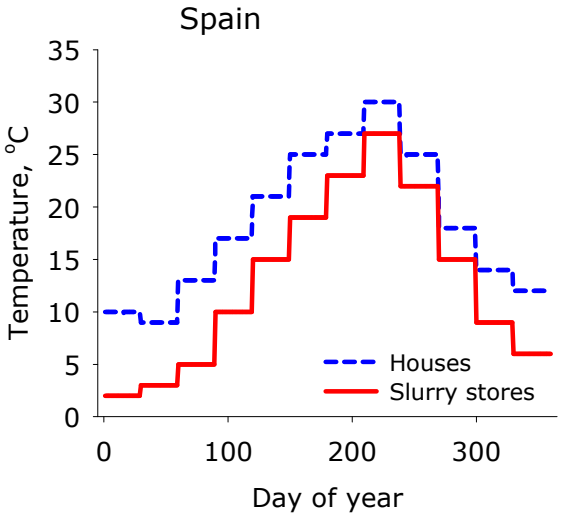


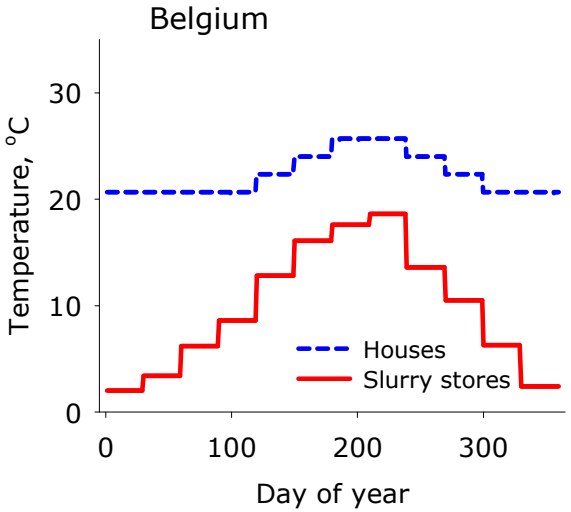
Reduction in GHG emission Mediteranian countries

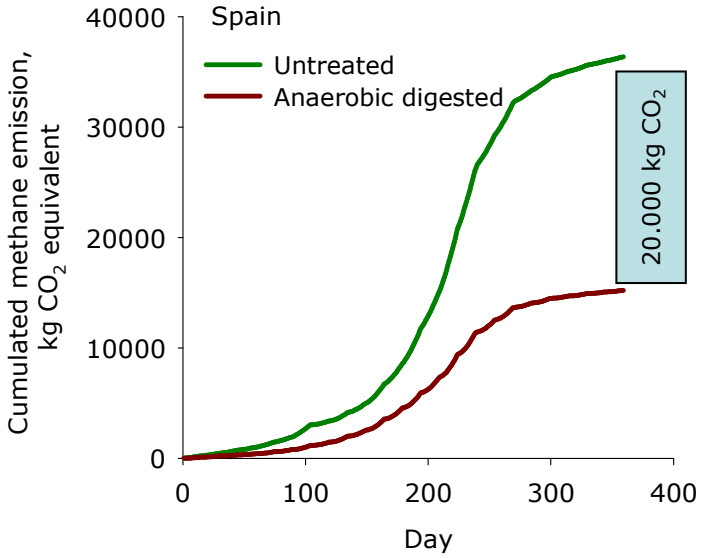


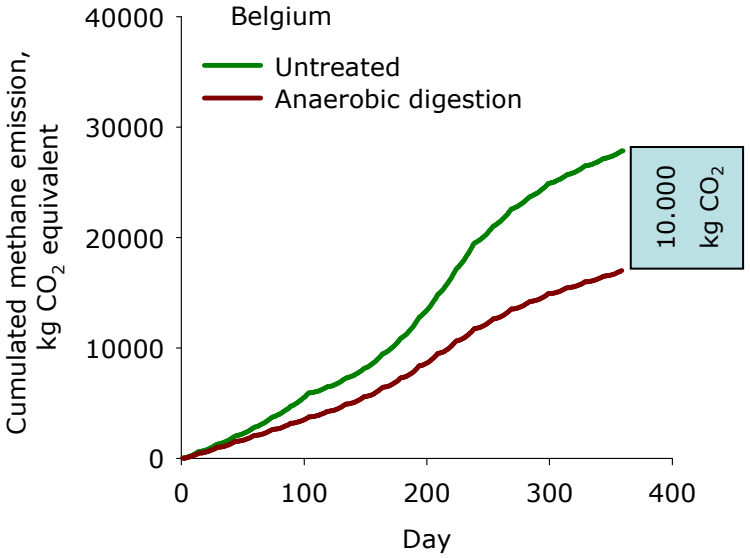
Effect of fermentation Spain & Belgium



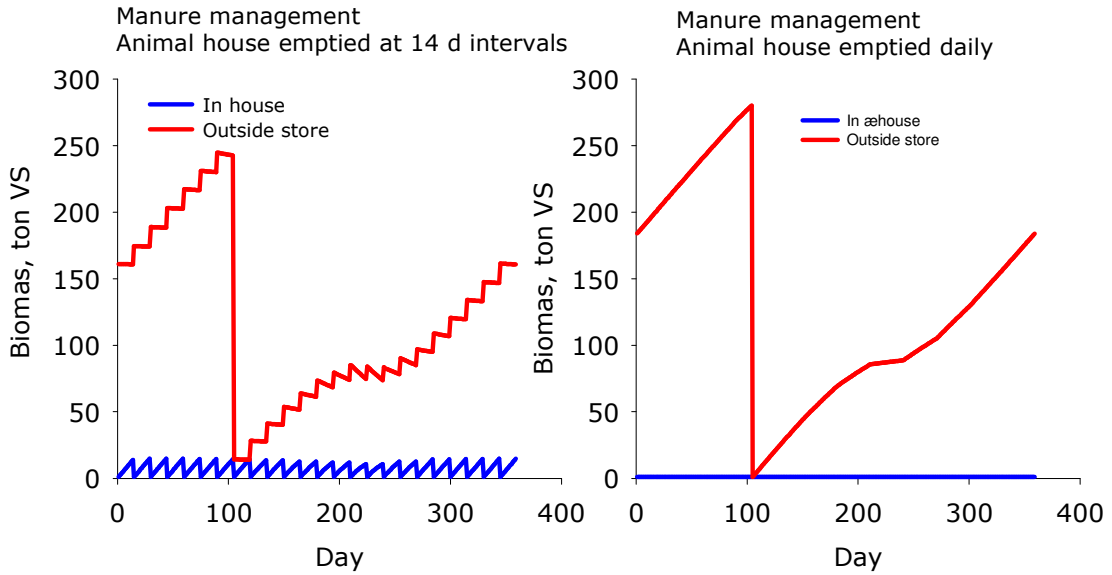


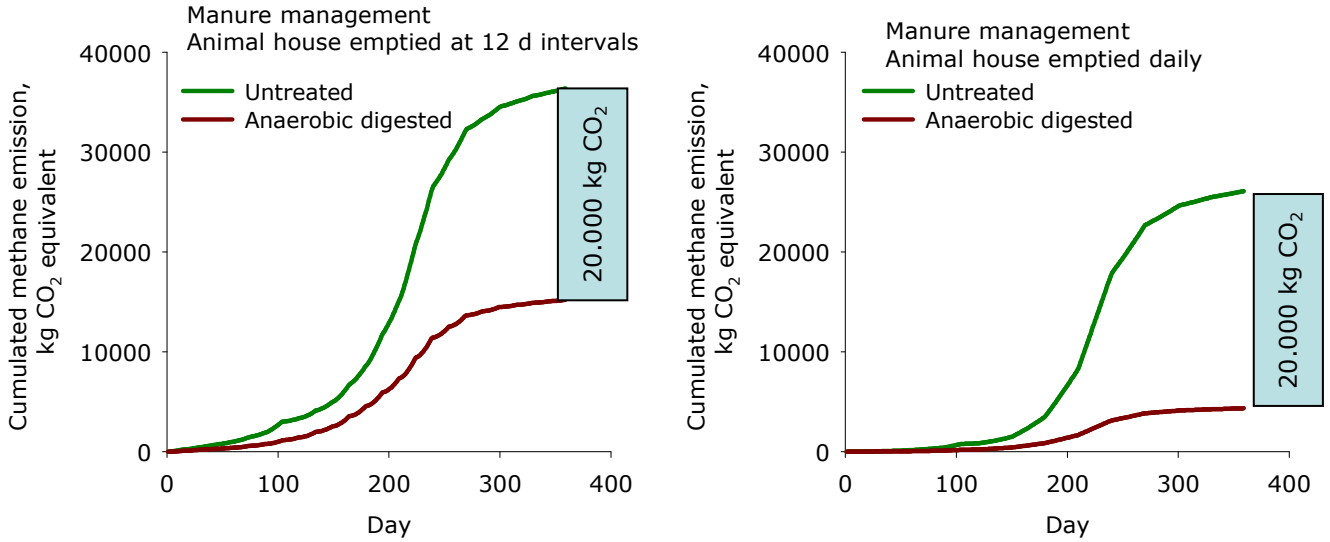






Spain - change in manure management
Reduce in-house slurry storage





Conclusion

- There is a potential for reducing GHG emission by fermenting animal slurry
- Using solid manure as feedstuff for fermentation will increase methane emission
- In this inventory reduction in nitrous oxide emission contributed significantly to the reduction in GHG emission - the assessment is uncertain
- There can be a synergistic effect of combining manure management with fermentation of slurry