# Effect of group housing on the productive efficiency of sow farms in Flanders


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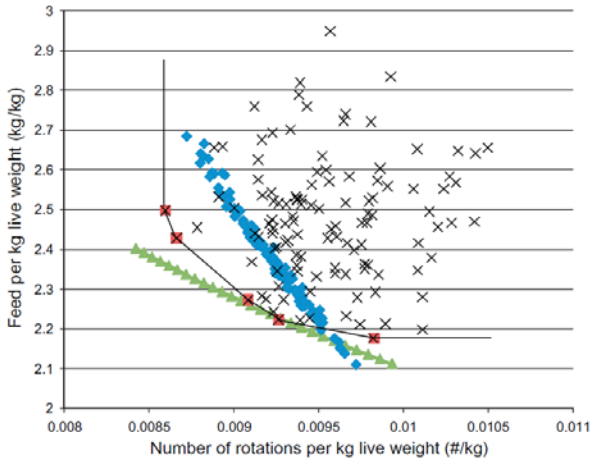


# Background and research goals

- Structural differences between housing systems may affect performance parameters, e.g. feed use efficiency
- Shift from individual housing to group housing might affect the overall efficiency of sow keeping and result in environmental and economic trade-offs
- Research goals:
  1. Compare the environmental impact and economic performance of a group of Flemish sow farms, applying different housing systems
  2. Compare efficiency performance and identify farm-specific environmental and economic benchmarks using frontier analysis

Work in progress

Preliminary results

Limited dataset

# Case-study farms

| | individual housing | free access stalls | feeding trough/ trickle feeding | electronic feed stations | ad libitum feeding |
|---|---|---|---|---|---|
| **total number of farms** | 15 | 17 | 3 | 5 | 5 |
| **total number of sows** | 2300 | 5068 | 626 | 1264 | 1120 |

| type of housing system | physical separation during feeding | individualised ration | all sows can eat simultaneously | feed restriction |
|---|---|---|---|---|
| individual housing | yes | no | yes | yes |
| free access stalls | yes | no | yes | yes |
| feeding trough/trickle feeding | partial/no | no | yes | yes |
| ad libitum feeding | no | no | no | no |
| electronic feed stations | no | yes | no | yes |

Adapted from Tuyttens et al. (2011)

# Case-study farms

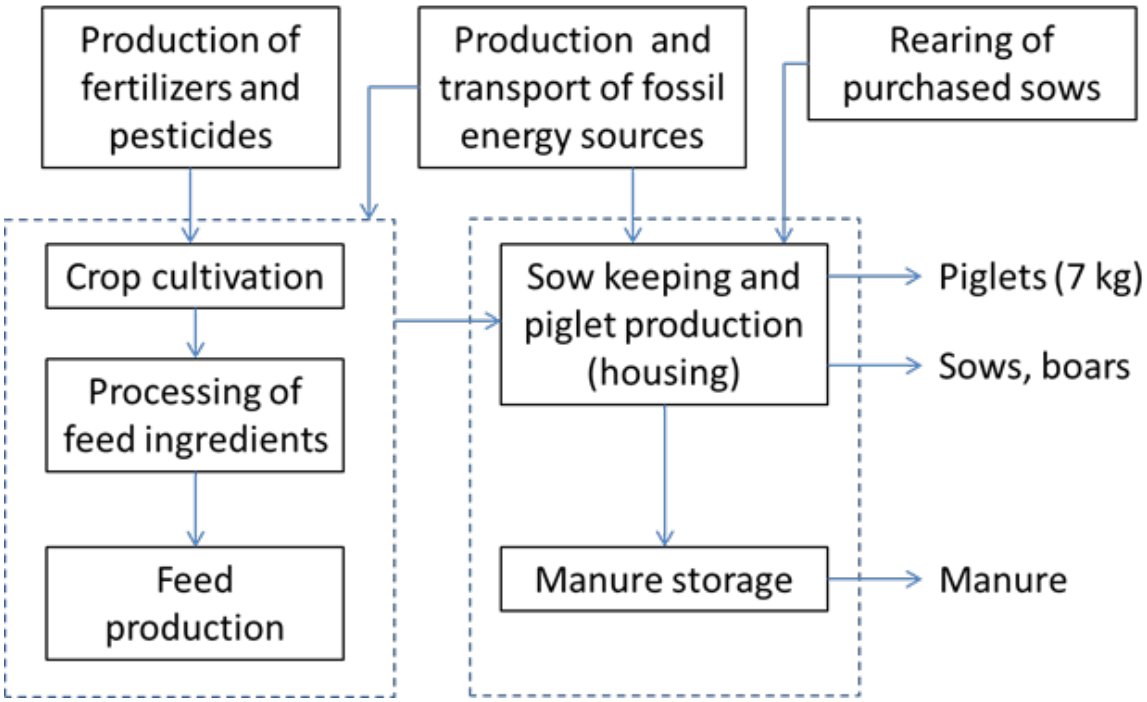
HOGESCHOOL GENT
LID VAN DE ASSOCIATIE UNIVERSITEIT GENT

Other GHS

| | individual housing | free access stalls | feeding trough / trickle feeding | electronic feed stations | ad libitum feeding |
|---|---|---|---|---|---|
| **total number of farms** | 15 | 17 | 3 | 5 | 5 |
| **total number of sows** | 2300 | 5068 | 626 | 1264 | 1120 |
| **number of sows** P<0,05 | 153 (64.5) a | 298 (162) b | 209 (24.6) | 253 (97.5) | 224 (83.1) b |
| **weight of piglets sold (kg)** | 7.2 (0.37) | 6.8 (0.64) | 7.2 (0.29) | 6.9 (0.56) | 7.0 (0.18) |
| **number of weaned piglets per sow** | 24.8 (2.6) a | 26.8 (2.7) b | 25.8 (3.0) | 26.9 (1.7) | 24.9 (3.1) ab |
| **replacement rate (%)** | 39.7 (10.8) | 48.2 (9.3) | 51.9 (8.3) | 50.0 (11.9) | 43.1 (9.1) |
| **concentrate use per sow (kg 88% DM)** | 1194 (109) | 1224 (105) | 1173 (41) | 1251 (73) | 1269 (58) |
| **total production costs (€ per sow)** | 599 (71.6) a | 693 (104.3) b | 766 (36.1) | 756 (110.8) | 633 (88.0) b |
| **total revenues (€ per sow)** | 791 (96.9) | 846 (89.6) | 856 (112.8) | 888 (51.2) | 799 (57.7) |

# Environmental and economic performance of different housing systems: methods

Environmental performance of farms based on life cycle assessment (LCA) of 1 kg of piglets sold




Data and methods:

- Farm accountancies
- Feedprint (Vellinga et al., 2013)
- Ecoinvent (2010)
- IPCC (2006)
- Economic allocation
- $NH_3$: based on N-intake, independent of housing system (Groenestein et al., 2001)

Impact categories: global warming potential (kg $CO_2$-eq), acidification potential (kg $SO_2$-eq), eutrophication potential (kg $PO_4^{3-}$-eq), non-renewable energy use (MJ) and total land use ($m^2$)

# Environmental and economic performance of different housing systems: results

| *units per 100 kg piglets* | individual housing | free access stalls | other GHS |
|---|---|---|---|
| environmental performance | | | |
| global warming potential (kg $CO_2$-eq) | 712 | 694 | 700 |
| acidification potential (kg $SO_2$-eq) | 8.91 | 8.19 | 8.32 |
| eutrophication potential (kg $PO_4$-eq) | 3.11 | 2.94 | 2.96 |
| non-renewable energy use (MJ) | 5588 | 5218 | 5542 |
| land use ($m^2$) | 1727 | 1784 | 1780 |
| economic performance | | | |
| net farm income (€) | 3.19 | 2.30 | 1.85 |
| gross value added (€) | 4.99 | 5.41 | 5.21 |

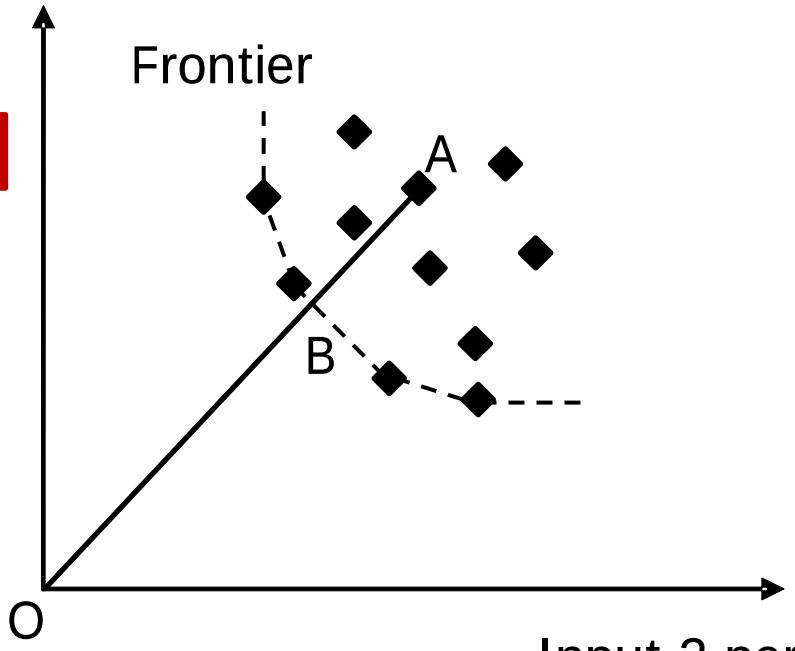
| *contribution (%)* | global warming potential | acidification potential | eutrophication potential | energy use | land use | total production costs |
|---|---|---|---|---|---|---|
| purchased feed | 51 | 28 | 55 | 56 | 100 | 53 |
| fossile energy use on-farm | 22 | 8 | 6 | 44 | 0 | 7 |
| housing and manure storage | 27 | 64 | 40 | - | - | - |
| health and fertility costs | - | - | - | - | - | 13 |
| fixed costs | - | - | - | - | - | 19 |

# Efficiency analysis: methods

e.g. number of sows

Input 1 per output unit

e.g. kg piglet

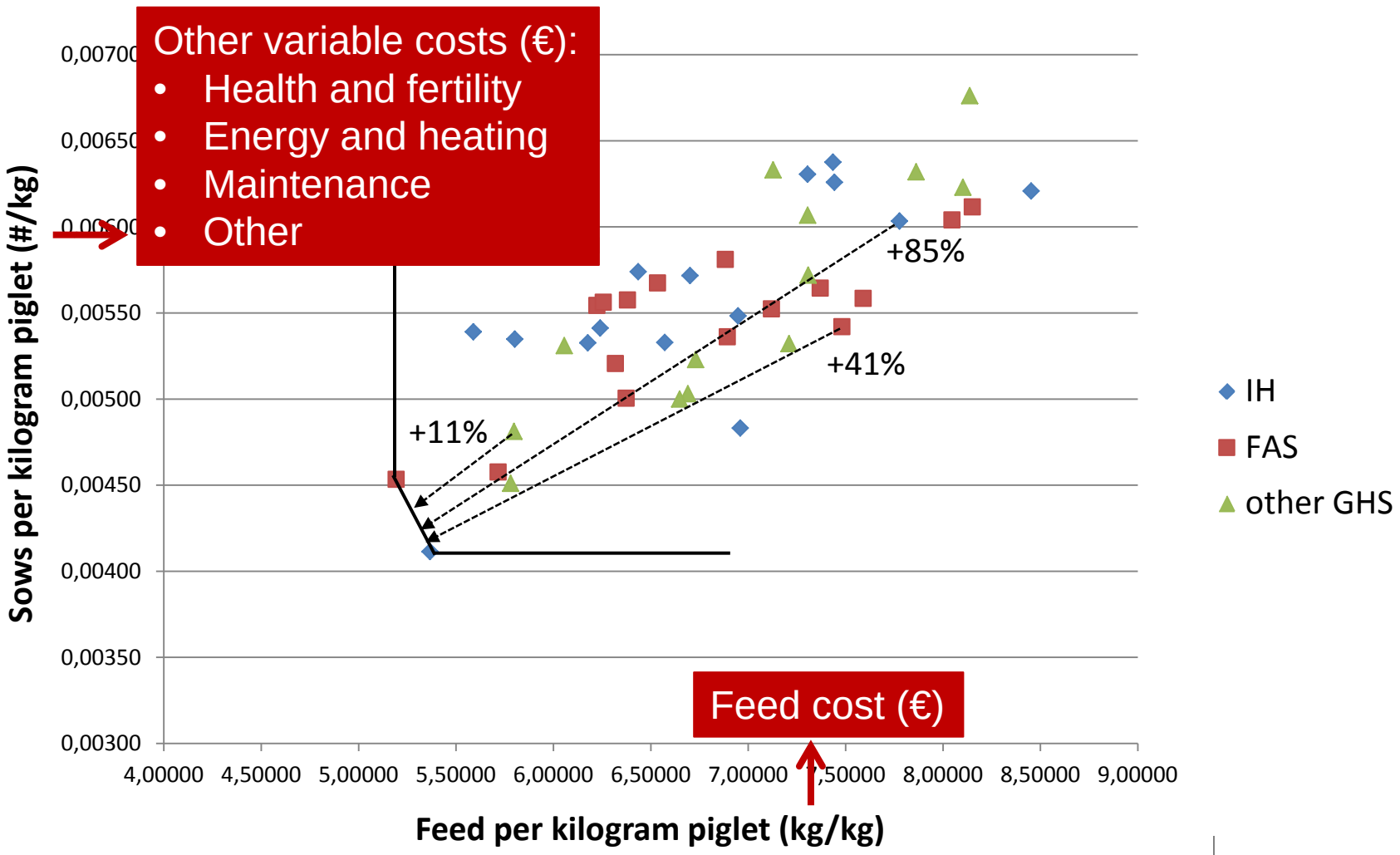



Input 2 per output unit

e.g. kg feed

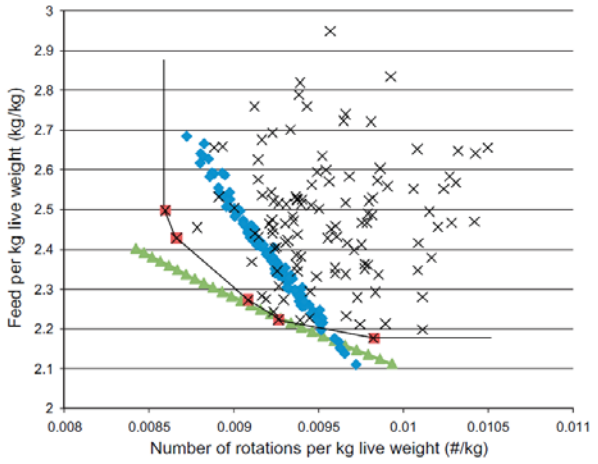
e.g. kg piglet

# Efficiency analysis: results



# Conclusions

- Preliminary results indicate no differences in environmental and economic performance between different housing systems
- There is a large within-group variability in performance and technical efficiency between farms
- There is a large optimization potential for many of the studied farms

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