# Best practice examples in combined housing and pasture systems

## Description

All organic pigs in Europe are produced according to EU organic Regulations 2018/848 and EU 2020/464 and to the general principles of organic farming defined by IFOAM (https://www.ifoam.bio).

These stipulate that pigs must always have access to concrete outdoor runs, but not pasture. However, national legislations and private organic labels can have very different minimum requirements, especially concerning housing and management (for more information see factsheet 02. "Outdoor runs general information and legislation").

This part of the POWER project has aimed to identify and evaluate best practice examples and selected stakeholder-driven innovations in combined housing and pasture systems of organic pigs through-out Europe. In these systems, animals are housed both indoor and outdoor (pasture or woodland) during the production cycle. Various measures focussing on animal health and welfare, productivity, feed efficiency and manure and pasture management were collected at each farm to account for their diversity. These include a description of the system and hygiene levels, behavioural and clinical assessments of the animals, assessments of the farms' productivity, work load and labour force, and finally, a paddock assessment.

On-farm case studies were carried out during 2019 and 2020. Based on a common protocol, farm data were collected from one to two best practice farms in Austria, Denmark, Germany, Italy, Sweden and Switzerland, between one and two innovative farms in Denmark, Italy and Switzerland. Based on the collected data, the fact sheets discuss potential welfare issues, environmental impacts and labour or organisational details of the farms.

## Applicability box

**Theme**
Pigs
**Production stage**
All stages of pig production

**Farm type**

- Indoor housing with outdoor run
- Indoor housing with outdoor run and access to pasture
- Outdoor housing

## What makes a farm "best practice" or "innovative"?

- **Best practice:** In the project, best practice farms were defined as farms with a stable level of high productivity and animal welfare. This means that the farmers had to have worked with their system for several years, were not planning changes during the project period and were satisfied with their system. Moreover, the farm type and herd size had to represent commercial organic pig herds in that specific country.
- **Innovation:** Innovative farms were defined as having developed new systems and strategies that are different from the common best practice systems in the respective countries as well as having a high level of animal welfare.

## Assessment of animal welfare

The housing system and management affects the welfare of animals. Different issues arise when looking at indoor or outdoor housing. Therefore, combined housing, a mixture of the two systems, includes issues from both systems.

Besides, when animals change between indoor and outdoor housing, e.g., with seasonal production or different production stages in different locations, they experience a change in their surroundings, regarding climatic conditions, different surfaces, and physical limitations which can also give rise to welfare issues.

Data on animal welfare from the farms presented in the following fact sheets are related to issues found in a previous study on animal welfare in various organic pig production systems (Leeb et al., 2019). This identified relevant clinical parameters to evaluate animal welfare in best practice and innovative farms of the present study.

- **Sows:** vulva lesions/deformations, lameness
- **Weaners:** diarrhoea, tail and ear lesions, short tails, runts and respiratory problems
- **Finishers:** diarrhoea, eye inflammation, tail and ear lesions, short tails and respiratory problems

The listed welfare issues are however, not uniquely found in combined housing systems but relate to pig production systems and management in general.

## Assessment environmental impact – The life cycle analysis

### Description

The project POWER showcases a variety of farms that stand out for their good management practice or innovative housing systems. Apart from improving welfare, organic pig production systems also strive to reduce their environmental impact. We calculate the emissions and environmental impacts of the selected best-practice and innovative farms in the following factsheet, using a so-called "farm-gate life cycle impact analysis". The results help to understand better ways in which organic pig farms can reduce their environmental impact.

### Methods

- As part of the project, farm data from selected best practices and innovative organic farms was collected. Data included information on pig productivity, feed, housing and manure.
- A farm-gate life cycle impact analysis was then undertaken, accounting for all the inputs (e.g. externally sourced and home-grown feeds, energy usage and any purchased animals) and outputs (weaned or slaughtered pigs, depending on production stage). For each farm, environmental impacts in terms of greenhouse gas (GHG) emissions, terrestrial and marine eutrophication, as well as energy and water usage were calculated. All environmentally harmful gasses were converted to $CO_2$ equivalents ($CO_2$ eq) to make GHG emissions comparable. For more information on life cycle analysis , see the FiBL factsheet "Life cycle assessments of organic foods", shop.fibl.org, publication number 1020.
- Each farm's environmental impacts and GHG emissions were then allocated to the various farm outputs to obtain values per kilogram of weaned piglet, per kilogram of slaughtered pig, or per kilogram of culled sow. These results can be found in chapters 3.1 to 4.4 (pp. 63–118).

Pasture provides space and environmental stimuli that promote positive behaviours like rooting.

### Overall results of the life cycle analysis

The life cycle analysis showed that the two most significant contributors to GHGs are emissions from manure storage and feed usage, both for breeding and the growing-finishing stage. The following patterns influenced emissions across farms:

- Farms that use faster-growing breeds require less feed per kilogram of weaned and finished pig. This reduces emissions from feed production and manure.
- Farms that keep their pigs outside tend to have lower GHG emissions since losses during manure storage are avoided.
- Warmer regions have increased emissions from manure storage, as manure releases more GHGs at higher temperatures.

### Emissions of the breeding stage

At the breeding stage, the majority of emissions are caused by feeding and maintaining the sows. These emissions are accounted to the main output of the system, namely kg of weaned piglets. Systems that wean a low number of piglets per sow and year thus tend to produce higher emissions than systems with high per-forming breeds, even if the feeding of the sows is more intensive. Given the diversity of breeding systems, the carbon footprint per kg of weaned piglets showed a large range from 3.5 up to 10 kg $CO_2$ eq.

**Figure 1: Greenhouse gas emissions of pig breeding systems**

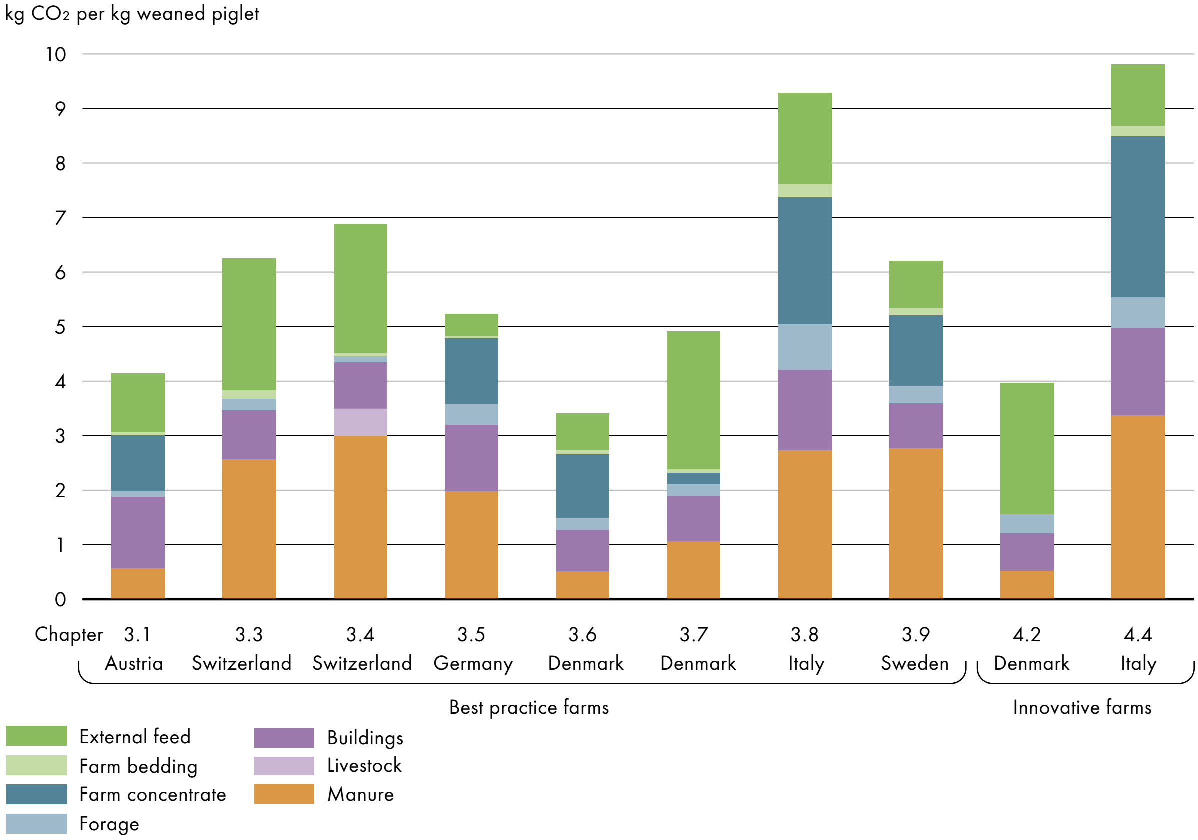
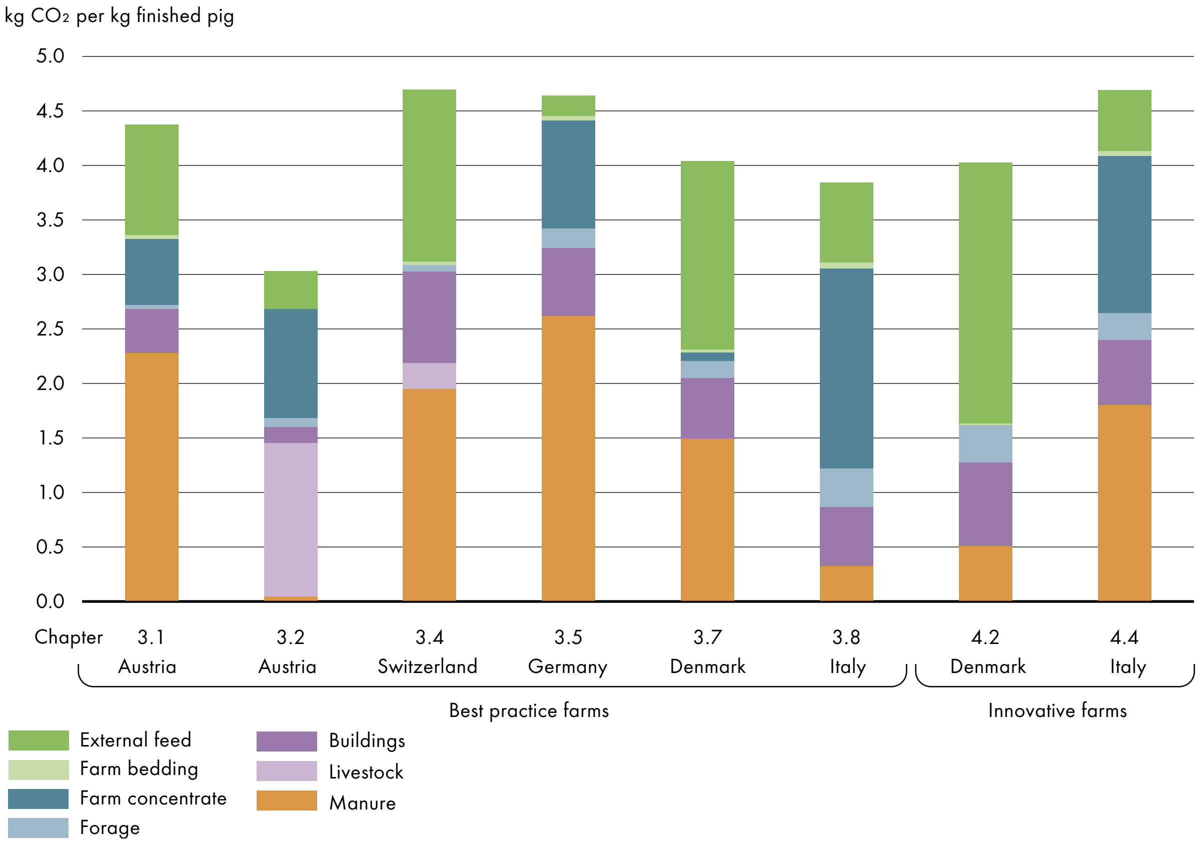



**Figure 2: Greenhouse gas emissions of pig growing-finishing systems**



#### Emissions of the growing-finishing stage

At the growing-finishing stage, the differences between systems were smaller, with the carbon footprint per kg of finished pig varying from 2.95 up to 4.75 kg $CO_2$ eq (figure 2). For farms that purchase weaned pigs, the emissions from the breeding stage are included as a single value ("breeding phase"). However, for farms that breed their own piglets, the emissions from the breeding stage are spread across the original categories (food usage, manure storage, etc.).

#### Environmental impacts apart from GHGs

Impacts from other environmental categories, including eutrophication (increase in the concentration of phosphorus, nitrogen, and other plant nutrients in an aquatic ecosystem such as a lake), energy and water usage, were distributed similarly across farms as the GHG emissions.

#### Recommendations

To decrease GHG emissions and other environmentally damaging impacts of pig production, farms should:

- Increase the time pigs can spend on a pasture or use an outdoor production system since manure storage emissions often represent the largest single source of GHGs.
- Avoid over-stocking and maintain a good vegetation cover year-round on pastures. For instance, this can be achieved by using rotational pasture systems or feeding pigs before they access the pastures.
- Try to avoid high carbon footprint feeds, such as imported soya, by replacing them with home-grown legumes. Home-grown feeds furthermore maintain nutrient circularity and avoid excess nutrient imports to the farm through purchased feeds.
- Optimise feeding and improve welfare (e.g. prevent heat stress) to obtain higher growth rates.
- Improve production system efficiency by reducing piglet mortality, using breeds suitable for the system, avoiding feed losses and excess nutrients that will be excreted and may be lost as pollutants.

## Further Information


- **EU (2018)**: Regulation (EU) 2018/848 on organic production and labelling of organic products. At: eur-lex.europa.eu [Link].
- **EU (2020)**: Commission Implementing Regulation (EU) 2020/464 of 26 March 2020 laying down certain rules for the application of Regulation (EU) 2018/848. At: eur-lex.europa.eu [Link].
- **Leeb C. et al. (2019)**: Effects of three husbandry systems on health, welfare and productivity of organic pigs. Animal, Volume 13, Issue 9, pp. 2025-2033 [Link].
- **Meier M. et al. (2017)**: Life cycle assessments of organic foods. Research Institute of Organic Agriculture FiBL, Frick. Available at shop.fibl.org, publication No. 1020 [Link].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