

Intensive Pig Farming

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The impacts of agriculture in general and livestock farming in particular on environmental degradation have been causing increasing concern worldwide, especially in livestock production areas with a high animal density. However, advanced breeding and feeding strategies are needed to supply the growing global demand for animal protein. Wildlife might be a substitute for pork, beef, and poultry from intensive farming; this may be the case for wild boar, but the consumption rate is low.

Keywords: wild boar ; wild boar expansion ; wild boar management systems

1. Introduction

The interconnection between people, animals, plants, and their shared environment is a major concern today in light of the One Health approach ^[1]. This kind of approach is nothing new, but it has become more important in the last few years because of ever-growing increases in human populations, expansion into new geographic areas, changes in climate and land use, such as deforestation and intensive farming practices, and the increased movement of people, animals, and animal products due to international travel and trade, with increased risks of diseases spreading across borders and around the world ^[2]. As Lerner and Berg stated ^[3], One Health is a concept that involves the values of interdisciplinarity, public health, animal health, and ecosystem health. Furthermore, the One Health procedural model can be used to identify threats to health as well as positive models for the sustainable coexistence of humans and animals ^[4]. Cooperation between human, animal, and environmental health partners is essential to the success of public health interventions. Biodiversity and the conservation of geographical areas are among the health outcomes that can be achieved for people, animals, and plants using the One Health approach ^[1].

In light of these statements, sustainability has become a central goal for pig farming, as well as in agriculture in general ^[4]. Sustainability, a term frequently used in connection with biological systems, is defined as the ability of an ecosystem to maintain ecological processes, biodiversity, and productivity into the future ^[2]. Livestock farming is involved in global environmental degradation and global warming, through methane and nitrous oxide, especially in intensive systems ^{[5][6]}. In 2006, an FAO report stated ^[7] that the global animal industry was responsible for 18% of the total production of greenhouse gases (GHG; N₂O, CO₂, CH₄, and H₂O as expressed in CO₂ equivalents (CO₂e)), and the other parts are due to energy production plants, transport, industry, and environmental conditioning ^[2]. Methane (CH₄) is a potent climate warmer that is often referred to as the second most important greenhouse gas (GHG) after carbon dioxide (CO₂) ^[8]. In the first two decades after it is emitted, it is approximately 80 times more powerful than CO₂ as a GHG ^[8]. Emissions and atmospheric concentrations of CH₄ are continuing to rise ^[9].

Intensive meat, egg, and milk production systems are very often based on feeding grains and other ingredients sourced from far-off places, and this would make them economically and environmentally unviable if the price of feedstuffs rises above a critical level ^[10]. Moreover, more and more land has been converted to the intensive monocrop production of soybeans and corn (and other feed crops) globally, resulting in the pollution of waterways with pesticides and fertilizers, biodiversity reduction, the destruction of natural carbon sinks mainly due to direct and indirect land use change (dLUC and iLUC), and GHG emissions in all stages of intensive feed production and transport ^[2]. Intensive farming systems have been developed to achieve maximum production and profit, but they still contribute to ecosystem degradation and require careful examination regarding the excessive depletion of natural resources and the possibility of adopting more efficient farming systems ^[2].

Pork production involves several sustainability issues. The recent increase in the natural wild boar population and the possibilities of its breeding to produce meat and for sport hunting have revived attention on this wild species. The most important factors that could account for its expansion and niche invasion are briefly summarized with the scientific opinion on management strategies. The information available to date on the quantitative, nutritional, and sensory characteristics of wild boar meat is reviewed to highlight its potential, if properly managed, as a sustainable option in meat production.

2. Intensive Pig Farming

Pig farming provides an important contribution to world food production, especially in Asia, accounting for around 30% of meat consumption worldwide ^[11]. The European Union (EU) is the world's second largest producer of pork and the major exporter of pork and pork products ^{[12][13]}. Pig farming occurs with large differences in breeding systems as well as in the size of farms, with outdoor pig farming accounting for more than 16% of the total number of European pig farms and around 0.7% of the total number of pigs ^{[12][13]}. The negative impacts of pig farming on the environment are essential concerns, as there are several issues in terms of sustainability ^[4]. It has been reported that pig farming is globally responsible for 668 megatons CO₂-e annually, representing nine percent of emissions from the livestock sector ^[10]. It has also been reported that overall greenhouse gas emissions from pork production and consumption is 12.1 kg CO₂ per 1 kg and includes processing, domestic transport, retail refrigeration, home cooking, and waste disposal ^[5]. In comparison, the greenhouse gas emissions produced by 1 kg of lamb and beef are 39.2 CO₂ and 27.0 CO₂, respectively ^[5]. The carbon footprint and land use values for pork are 5 kg CO₂-e kg⁻¹ meat and 40–75 m² kg⁻¹ protein per year, respectively ^[14]. It has been reported that a globally sustainable diet entails a reduction in pork production by 85% ^[4]. Feed production and manure management (storage and spreading) in particular, as well as land use change from soy production, produce a critical load on the environment ^[2].

Due to the scale economies, larger units have been developed that can produce pork more cost-effectively ^[15]. In order to improve the economic efficiency of pig farms, housing systems have been developed (e.g., farrowing crates, fully slatted floors, and reduction in space allowance), which are not respectful of the normal behavior of pigs ^{[12][16]}. Tail biting ^[17] and stereotypic behavior ^[18] are among the problems that have arisen.

Developing countries are rapidly moving pork production to the industrialized model ^[2]. According to Gerber et al.'s (2013) ^[10] modern feed strategies that include beneficial feed additives like enzymes, amino acids, and gut modulation products, manure management practices and energy use efficiency reduce emissions related to farming. Kaufmann (2015) ^[2] has reviewed studies on the negative environmental impacts of pig farming, with special emphasis on a Chinese one, providing an integrated low-emission farm (LEF) concept, that is an innovative combination of nutrient, emission, and waste management, not only significantly reducing the environmental impact, but also improving the economic aspect of farming by producing renewable energy (heat, electricity, and biomethane) with animal manure as major feedstock in an anaerobic digester.

References

1. Rabinowitz, P.M.; Pappaioanou, M.; Bardosh, K.L.; Conti, L. A planetary vision for one health. *BMJ Glob. Health* 2018, 3, e001137.
2. Kaufmann, T. Sustainable livestock production: Low Emission Farm—The innovative combination of nutrient, emission and waste management with special emphasis on Chinese pig production. *Anim. Nutr.* 2015, 1, 104–112.
3. Lerner, H.; Berg, C. A comparison of three holistic approaches to health: One health, ecoHealth, and planetary health. *Front. Vet. Sci.* 2017, 4, 163.
4. Ruckli, A.K.; Hörtenhuber, S.J.; Ferrari, P.; Guy, J.; Helmerichs, J.; Hoste, R.; Carmen, H.; Kasperczyk, N.; Leeb, C.; Malak-Rawlikowska, A.; et al. Integrative Sustainability Analysis of European Pig Farms: Development of a Multi-Criteria Assessment Tool. *Sustainability* 2022, 14, 5988.
5. Macháčková, K.; Jiří Zelený, J.; Lang, D.; Vinš, Z. Wild boar meat as a sustainable substitute for pork: A mixed methods approach. *Sustainability* 2021, 13, 2490.
6. Thøgersen, J. Country Differences in Sustainable Consumption: The Case of Organic Food. *J. Macromark.* 2010, 30, 171–185.
7. FAO. Livestock's Long Shadow. Environmental Issues and Options. 2006. Available online: <https://www.fao.org/3/a0701e/a0701e.pdf> (accessed on 19 May 2023).
8. Mar, K.A.; Unger, C.; Walderdorff, L.; Butler, T. Beyond CO₂ equivalence: The impacts of methane on climate, ecosystems, and health. *Environ. Sci. Policy* 2022, 134, 127–136.
9. Jackson, R.B.; Saunio, M.; Bousquet, P.; Canadell, J.G.; Poulter, B.; Stavert, A.R.; Bergamaschi, P.; Niwa, Y.; Segers, A.; Tsuruta, A. Increasing anthropogenic methane emissions arise equally from agricultural and fossil fuel sources. *Environ. Res. Lett.* 2020, 15, 071002.

10. Gerber, P.J.; Steinfeld, H.; Henderson, B.; Mottet, A.; Opio, C.; Dijkman, J.; Falcucci, A.; Tempio, G. Tackling Climate Change through Livestock—A Global Assessment of Emissions and Mitigation Opportunities; FAO: Rome, Italy, 2013; Available online: <https://www.fao.org/3/i3437e/i3437e.pdf/> (accessed on 19 May 2023).
11. FAO. Food Outlook—Biannual Report on Global Food Markets. 2020. Available online: <https://www.fao.org/documents/card/en/c/cc3020en> (accessed on 19 May 2023).
12. Augère-Granier, M.-L. The EU Pig Meat Sector. Available online: [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/652044/EPRS_BRI\(2020\)652044_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/652044/EPRS_BRI(2020)652044_EN.pdf) (accessed on 19 May 2023).
13. Jiménez Ruiz, S.; Laguna, E.; Vicente, J.; García Bocanegra, I.; Martínez Guijosa, J.; Cano Terriza, D.; Risalde, M.A.; Acevedo, P. Characterization and management of interaction risks between livestock and wild ungulates on outdoor pig farms in Spain. *Porc. Health Manag.* 2022, 8, 2.
14. Freschi, P.; Braghieri, A.; Pacelli, C.; Langella, E.; Riviezzi, A.A.; Paolino, R.; Cosentino, C. Sensory Profile and Consumer Liking of Sustainable Salamis Differing in Wild Boar Meat and Seasoning Ingredients Addition. *Foods* 2023, 12, 1089.
15. McGlone, J.J. The Future of Pork Production in the World: Towards Sustainable, Welfare-Positive Systems. *Animals* 2013, 3, 401–415.
16. Stolba, A.; Wood-Gush, D. The behaviour of pigs in a semi-natural environment. *Anim. Sci.* 1989, 48, 419–425.
17. Valros, A.; Heinonen, M. Save the pig tail. *Porc. Health Manag.* 2015, 1, 2.
18. Terlouw, E.; Lawrence, A.B.; Illius, A.W. Influences of feeding level and physical restriction on development of stereotypies in sows. *Anim. Behav.* 1991, 42, 981–991.

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