



HAL
open science

An evaluation of productive and environmental performance of pig farming systems in France

Isabelle Piot-Lepetit, M. Le Moing, M. Ulvé, M Bonneau, . Inra - Umr
Systèmes d'Élevage, Nutrition Animale Et Humaine

► To cite this version:

Isabelle Piot-Lepetit, M. Le Moing, M. Ulvé, M Bonneau, . Inra - Umr Systèmes d'Élevage, Nutrition Animale Et Humaine. An evaluation of productive and environmental performance of pig farming systems in France. International workshop on Green pork production : "Porcherie verte", a research initiative on environment-friendly pig production, May 2005, Paris, France. hal-02290714

HAL Id: hal-02290714

<https://hal.science/hal-02290714>

Submitted on 4 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0
International License

An evaluation of productive and environmental performance of pig farming systems in France

I. Piot-Lepetit*, M. Le Moing, M. Ulvé

INRA-ESR, France

[Results obtained within the research initiative « Porcherie verte »]

INRA - ECONOMIE
DOCUMENTATION
Rue Adolphe Bobierre
CS 61103
35011 RENNES CEDEX
Tél. 02.23.48.54.09

Introduction

One of the main concerns with the pig sector is the environmental impact of this activity. Pigs are extremely efficient at converting feed to meat. However, the environmental consequences of pig production in relation to water and air pollution are of increasing public concern. While different types and scale of production have potentially different effects on the environment, little evidence is available to judge between pig farming systems. Comparing their productive efficiency together with their ability in controlling environmental pollution is complex. This is because of the large array of pig production systems ranging from, indoor to outdoor systems, small to large fully integrated production operations, extensive to intensive units. Also while one particular system might be highly efficient in producing pig meat in terms of economic cost, it might be poorer in attaining high standards in terms of environmental objectives or vice versa. Furthermore, the performance of nutrient emission can also vary considerably between farms using the same pig husbandry practices (OECD, 2003). At present, there is little empirical work to evaluate the relative efficiency in productive and environmental terms of different pig farming systems and scale of production. This paper is an attempt to cover this point.

Material and Methods

Data are drawn from the Farm Accountancy Data Network dataset over the time period 1996 to 2000. The size of the sample is around 3000 individuals (600 farms per year). It contains all farms with a pig farming activity during the time period.

The analysis is undertaken in two steps.

First, an explanatory data analysis is implemented to obtain a classification of the productive structure of these farms. Clusters are built on three main items: land use (production per hectare), labour use (production per worker) and the degree of specialisation in pig production. Second, a Data Envelopment Analysis (DEA) was used to assess the performance of these different pig farming systems. It is a frontier approach, which allows us to represent a best-practice technology against which the efficiency of farms within the dataset can be compared. If a farm belongs to the frontier, it is an efficient farm. If a farm is beneath the frontier then, it is an inefficient one and further analysis identifies the sources and extent of the inefficiency. Here, two sources are studied: productive and environmental efficiencies, i.e., the ability of producers to increase their production with a decrease in pollution (Piot-Lepetit and Le Moing, 2000).

Results

A classification in 7 classes is obtained which is stable all over the time period. Farms from the sample are allocated between these different pig farming systems which highlight the diversity of pig production in France (Ilari et al., 2003) as described in Table 1. The evaluation of the productive and environmental efficiency of farms is then implemented on each of these pig farming systems.

On average, the *productive efficiency* of our sample is 1.175 (Fig.1). Thus, desirable outputs (total production) can be increased from around 17% jointly with a decrease in undesirable outputs (nitrogen emissions) from the same amount. This result is variable along the time period. On average, the most efficient years are 1996 and 2000 with an inefficiency rate of 15%. The most inefficient year is 1998 with a rate of 20%. Among the pig farming systems,

I
N
R
A

E
S
R

R
E
N

I
P

3
5



the most efficient one is class 4 (pig producers with medium-scale farms). A good performance is obtained by farms from class 1 (crop producers with large-scale farms) and class 3 (pig producers with large-scale farms). At the opposite, farms with a small-scale of production are less efficient (classes 2, 6 and 7). The environmental efficiency measures gains that can be realised if the environmental regulation is withdrawn. The improvement is very low (around 2 or 3 % on average). Best performances are obtained by producers from class 4 (Medium-scale farms with pig production), by crop farms from class 1 and after 1999, by producers from class 3.

Discussion

First, results reflect the economical context of production. The time period 1996-2000 corresponds to the higher part of the pig production cycle. From 1996 to 1998, producers were affected by a very important decrease in production prices. Prices were so low that production costs were not covered. Furthermore, a more restrictive environmental regulation was implemented in France in 1998. It affects the most polluted areas from France, with the most intensive and concentrated pig production systems, mainly the western part of France. Second, it seems that large pig farms enjoy competitive advantages of scale while small-scale pig farms seem to be more affected by costs imposed on producers by manure management regulations.

Conclusion

This work is an attempt to study the competing claims between relative efficiency in productive and environmental terms. Results highlight that, farms classified in different pig farming systems based upon the scale of their activity and the specialisation of their production, have integrated environmental constraints and can still improve their production by taking advantage of the state of the art in technologies which control pollution. However, smaller producers seem to have more difficulty to manage with environmental regulation.

References

Ilari E., Daridan D., Desbois D., Fraysse J.L., Fraysse J. (2003), Les systèmes de production du porc en France : typologie des exploitations agricoles ayant des porcs, Rapport d'étude ITP/OFIVAL, 120p.
 OECD (2003); Agriculture, Trade and the Environment, The pig sector, Paris, 186 p.
 Piot-Lepetit I., Le Moing M. (200), Agriculture et environnement : une évaluation de la performance technique et environnementale d'exploitations bovines, Economie et Prévision, 142-143, 201-211.

Table 1: Classification in 7 classes

Class 1	Large-scale farms specialised in crop production
Class 2	Medium-scale farms specialised in crop production
Class 3	Large-scale farms specialised in pig production
Class 4	Medium-scale farms specialised in pig production
Class 5	Large-scale farms specialised in dairy production
Class 6	Small-scale farms specialised in beef and dairy production
Class 7	Small-scale farms specialised in beef production

Figure 1: Productive Efficiency

