

## THE DEVELOPMENT OF DENSELY POPULATED LIVESTOCK AREAS IN THE EUROPEAN UNION A CASE STUDY IN THREE DIFFERENT EUROPEAN PIG PRODUCTION AREAS

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### Introduction

The paper analyses the development of pig production over the last 150 years in three European regions. These regions are characterised by high pig densities per square kilometre. Study areas are:

- the provinces Parma, Reggio Emilia and Modena (called Emilia) in the north Italian region Emilia-Romagna
- the provinces Noord-Brabant and Limburg (called Zuid) in the southern part of The Netherlands
- the counties Emsland, Cloppenburg, Vechta, Grafschaft Bentheim and Osnabrück (called OBE-region) in Lower Saxony, northern Germany.

These regions represent main national pig production areas.

The main goal of this paper is to create a model of the development of pig production areas with high pig densities in Europe. Today the system of intensive pig and pork production and the environmental impacts from intensive agriculture get high attention from the public. Very often, however, agricultural history and the high-capacity production which was built up over a long time period do not get the right attention.

### Material and Methods

In a first step the three different developments and historical structures of pig production were compared from a historical point of view. Individual aspects during the agricultural development, such as property structures (owner, tenants), different target markets (sausage production, export market, domestic market), sector organisation (co-operatives, private enterprises), political reactions on environmental problems etc. were included. For each research area an individual development structure was made up. The results of the case studies were compared and it was distinguished between individual and typical structure elements and driving forces.

### Results

The three study areas show periods of stable production patterns in pig farms and under the influence of different driving forces the transformation into another stable system. For Emilia as well as for Zuid three developmental phases are distinguished, for the OBE-Region only two (see figure 1). The individual histories are different: while in Emilia the transformations occurred around 1910 and 1960, Zuid changed its pig production structure the first time after the Second World War and again in the 1990<sup>th</sup>. The OBE-region shows only one transformation: in the post-war period of the Second World War. As one can easily see (see table 1) there are considerable differences in the individual structures. Whereas in Emilia pig production started in cheese factories, in Zuid and the OBE-Region small and medium sized family farms were the owners of the pigs. Another important distinction is the market orientation. The Italian region was and still is focussed on the production of traditional sausages and hams (like Parma ham). The Dutch region supplied foreign markets

already, whereas the German region always concentrated on the domestic market. Nevertheless there are typical structures in each study area.

For the model two stable phases could be developed: the first one reached over a period of 100 years from the middle of the 19<sup>th</sup> century to the middle of the 20<sup>th</sup> century. It was based on self-sufficient family farms who more and more integrated pig breeding into their households. They used whey as one part of the basic feed and replenished it with imported feed. Co-operatives and private enterprises, involved in slaughtering and meat processing, were established in the regions and promoted pig production. The main driving forces in this period were: the disposal of whey out of milk processing, good traffic connections to the sea ports for imported feed and to the developing markets for meat products, agricultural innovations and their dissemination, skills of working family members and the introduction of co-operatives. This phase is called "phase of steady growth". The second phase started after the Second World War. It was based on the fast growing family farms, which were highly specialized. Vertical integrated production structures were not yet wide spread, production control systems were established. Depending on the overall growth of pig numbers, regions with high pig densities increased and caused environmental problems. To get rid of the nitrogen loads, different strategies were developed: use of feed with reduced nutrients (e.g. protein), transformation of the manure in their components, shipping the manure into other regions and, as a final possibility, reducing the pig numbers. Besides, various outbreaks of Classical Swine Fever lead to problems in consumer acceptance. The main driving forces were growing meat demand, political regulations to protect the environment, consumer demand for controlled and save food. "Phase of instability" could be the headline of this period.

Figure 1: Comparison of the development phases in the three case study areas

	Emilia (I)	Zuid (NL)	OBE (D)
1860	Phase 1	Phase 1	Phase 1
1870			
1880			
1890			
1900	Phase 2	Phase 2	Phase 2
1910			
1920			
1930			
1940	Phase 3	Phase 3	Phase 2
1950			
1960			
1970			
1980	Phase 3	Phase 3	Phase 2
1990			
2000			

Table 1: Individual and typical structure elements in the different phases of the three study areas

Phase		individual structure	typical structure
<b>Emilia/Italy</b>			
1	1860 to the beginning of 20 <sup>th</sup> century	<ul style="list-style-type: none"> <li>- regional tenant system (<i>Mezzadria</i>) and large estates</li> <li>- mixed culture (<i>Cultura Mista</i>) and milk production as a basic element</li> <li>- pig production only of owners of cheese factories</li> <li>- production of preserved sausages, this means fattening of 160 kg pigs</li> </ul>	<ul style="list-style-type: none"> <li>- mainly small subsistence farms</li> <li>- cheese production leads to whey feeding</li> <li>- higher disposal of feedings through imports</li> </ul>
2	1910 to the 1950 <sup>th</sup>	<ul style="list-style-type: none"> <li>- regional tenant system (<i>Mezzadria</i>)</li> <li>- emergence of co-operatives with implementation of pig production</li> <li>- production of preserved sausages, this means fattening of 160 kg pigs</li> </ul>	<ul style="list-style-type: none"> <li>- family farms</li> <li>- co-operatives strengthen agriculture</li> <li>- cheese production leads to whey feeding</li> </ul>
3	1961 till now	<ul style="list-style-type: none"> <li>- decline of the regional tenant system</li> <li>- increase divide between cheese factories and pig production</li> <li>- high presence of hired labour</li> <li>- production of preserved sausages, this means fattening of 160 kg pigs</li> <li>- reduction of the pigpopulationr</li> </ul>	<ul style="list-style-type: none"> <li>- high growth of pig numbers in family farms</li> <li>- processing of the manure</li> <li>- introduction of control system (specific to the traditional product)</li> </ul>
<b>Zuid/The Netherlands</b>			
1	mid 19 <sup>th</sup> to mid 20 <sup>th</sup> century.	<ul style="list-style-type: none"> <li>- small/medium sized family farms</li> <li>- return of whey to the delivering farm</li> <li>- mainly focussed on export markets leads to different weights and qualities</li> </ul>	<ul style="list-style-type: none"> <li>- mainly small subsistence farms</li> <li>- cheese production leads to whey feeding</li> <li>- imported feed as basis of production</li> <li>- co-operatives strengthen agriculture</li> </ul>
2	from 1950 <sup>th</sup> to the end of 1980 <sup>th</sup>	<ul style="list-style-type: none"> <li>- setting up of contracts between chain members</li> <li>- mainly focussed on export markets</li> <li>- delivery of manure to manure banks</li> </ul>	<ul style="list-style-type: none"> <li>- high growth of pig numbers in family farm</li> <li>- amounts of manure leads to environmental problems</li> <li>- introduction and extension of control systems</li> </ul>
3	1990 <sup>th</sup>	<ul style="list-style-type: none"> <li>- delivery of manure to manure banks</li> <li>- reduction of the pig number with growing concentration in specialized farms and production areas</li> </ul>	<ul style="list-style-type: none"> <li>- high growth of pig numbers in family farm</li> <li>- distribution and processing of manure</li> </ul>
<b>OBE/Germany</b>			
1	mid 19 <sup>th</sup> to mid 20 <sup>th</sup> century.	<ul style="list-style-type: none"> <li>- regional tenant system (<i>Heuerlinge</i>) and inherit farms (<i>Erbhöfe</i>)</li> <li>- dealers dominate, transport the pigs to slaughterhouses out of the region</li> <li>- home market orientation leads to standard production</li> </ul>	<ul style="list-style-type: none"> <li>- mainly small and medium sized subsistence farms</li> <li>- cheese production leads to whey feeding</li> <li>- imported feed as basis of production</li> </ul>
2	from 1950 <sup>th</sup> till now	<ul style="list-style-type: none"> <li>- decline of the regional tenant system</li> <li>- poultry farmers step into pig production</li> <li>- setting up of slaughter houses and processing industries in the region</li> <li>- marketing mainly by dealers</li> <li>- introduction of feed with reduces nutrients</li> <li>- delivery of manure to manure exchange and distribution agencies</li> </ul>	<ul style="list-style-type: none"> <li>- high growth of pig numbers in family farm</li> <li>- distribution and processing of manure</li> <li>- (hesitant) introduction of quality assurance and traceability systems</li> </ul>

### Discussion

For the near future another organisational pattern can be expected: the increasing demands for safe food and for traceability systems will force the pig and pork producers to invest in supply chains. So far of the three study areas only the Dutch have installed such systems. The Emilian pig production, based on traditional sausages, will also establish such systems in the near future and take advantage of the growing export market. The German study area, focussed on the domestic market, will lose market shares to international competitors if supply chains will not be established.

### Conclusion

The results have to be compared with the historical developments in other European pig production areas.

A global perspective would be helpful to estimate the market chances and risks which the leading pig production regions in the world have to face in a growing global market.

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### References

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