The research leading to these results has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement n° 311778
Dutch Case Study Report
(Task 3.5)

Henk Oostindie, I. Horlings, R. Van Broekhuizen, Wageningen University and Research Centre (WUR) and E. Hees, Centre for Agriculture and Environment (CLM)
Summary

This report presents the case study results of local-global pork chain performances in The Netherlands. As part of Work Package 3, this case study was carried out in cooperation with our Italian GLAMUR partner.

The Dutch pork production sector came up after World War 2 and developed into a highly intensified and specialized sector, with emphasis in the southern part of the country. As it became possible and economically attractive to transport fodder ingredients over great distances, pig husbandry became a booming sector, with high technology and knowledge input, and a major exporting sector. In the last decade, the number of pig farms reduced sharply, whereas the number of pigs per farm rose constantly. As a consequence of a combination of factors as pig disease outbreaks in the late 90-s, environmental externalities, growing national opposition against animal welfare conditions and growing international competition, the pig sector came to a standstill.

In this study three chains are compared: first the Good Farming Global pork chain, to be considered Dutch most typical bulk pork chain, oriented towards more anonymous far-from-home markets with basic requirements in terms of low-priced, food safe and mainstream qualified. The second is the Sustainable Pork Chain, developed some 10 years ago on the Environmental certification schema (MK) as a transparent pork chain towards specialized butchers and more critical retailers. Third, the so-called Lupine Pig project has been analyzed, an early-life cycle initiative that responds to national growing demand for more locally sourced pork production.

This comparison aimed to respond to following principle research questions:

1. How to characterize and distinguish these three pork chains in terms of local versus global in line with the criteria as agreed upon in Glamur?
2. How to characterize these in terms of local-global dynamics?
3. What are the most significant and meaningful dimensions, attributes and indicators to assess, measure and compare the performances of the three chains?
4. To what extent and in which ways do pork chain stakeholders agree or disagree about relevant performance dimensions, - attributes and – indicators?
5. How are selected pork chain performances influenced by prevailing policy- and wider regulatory frameworks?
6. What is the methodological strength and weakness of overall applied double pairwise comparative analysis with its specific combination of quantitative and qualitative approaches?

The multidimensional performances of these three Dutch pork chains have been assessed along four common attributes as agreed upon with our Italian research partner: added value, resource use-efficiency, chain governance and resilience. Additionally, following six exclusive Dutch attributes have been taken into account: affordability, animal welfare, labour relations, territoriality, food safety and biodiversity. Quantitative and qualitative methods and data have been used.

Overall assessment along this range of attributes, indicators and methods shows that localness and globalness in relation to pork chain performances are relative notions that become especially meaningful in relation to each other. First, Dutch pork chain actors turn out to operate frequently in multiple chains. Second the three Dutch case studies underpin how local and global pork chains may interact in different ways, by processes of distantiation, hybridization, transformation and incorporation.

More generally the Dutch case-study findings enable to draw the following conclusions:
Performance comparison of pork production is about complex interaction patterns between its vertical, horizontal and vertical components;

The pre-selected attributes reveal to different degrees significant differences in performances between the three Dutch pork cases;

*Chain governance* and *added value* are the two attributes that most clearly differentiate between the three selected chains;

The attributes *labour relations*, *biodiversity* and *territoriality* are relatively little distinctive for Dutch (more) local and global pork chain performances;

*Food safety, resource use efficiency and animal welfare* are highly disputed attributes among Dutch pork chain stakeholders;

The different types of methodological complexity of local-global pork chain comparison, including their normative aspects, do not permit for simple and straightforward policy recommendations regarding priority setting between local versus global food provision systems.
1. Introduction

This document presents the outcomes of Dutch case studies on pork production in line with overall methodology as elaborated with our Italian research partners in a double pairwise pork chain research plan. This research plan refers to the following specific objectives for the Dutch pork cases:

1. How to (further) characterize and distinguish these pork chains in terms of local versus global in line with the criteria as agreed upon in GLAMUR?
2. How to (further) characterize these in terms of local-global dynamics?
3. What are the most significant and meaningful dimensions, attributes and indicators to assess, measure and compare the performances of the selected pork chains?
4. To what extent and in which ways do pork chain stakeholders agree or disagree about relevant performance dimensions, -attributes and -indicators?
5. How are selected pork chain performances influenced by prevailing policy- and wider regulatory frameworks?
6. What is the methodological strength and weakness of overall applied double pairwise comparative analysis with its specific combination of quantitative and qualitative approaches?

The report starts with the introduction of Good Farming Global as the dominant global pork chain in the Netherlands. This will be followed by a description of Sustainable Pork Chain (KDV) as an example of a relatively new pork chain in search for re-localization opportunities. The third case-study concerns Lupine pork, in many ways a still more embryonic initiative. Yet, it enables to further demonstrate how local pork chains in the Netherlands are closely interwoven with attempts to mitigate the trade-offs of global pork production by developing new partnerships, new markets and new relations with institutional settings.

The presentation of these three cases has been structured in accordance with the following format: 1) background and dynamics; 2) Local-Global characterization and 3) chain performances along a set of pre-selected attributes. It enables to show how global versus local pork chain comparison may become especially meaningful if their mutual interdependencies and interaction patterns are explicitly taken into account.

After introducing the single cases, we will address the research questions more specifically, starting with the distinction of different types of global-local interaction patterns and their impact on pork chain performances. This will be followed by a section that synthesizes the interrelations with policy environments and wider regulatory frameworks. Finally, the concluding section will reflect upon the strength and weaknesses of overall case-study methodological approach.

2. General introduction on Dutch pig husbandry

The Dutch pork production sector is a highly intensified and specialized sector (Politiek, 2012). The development of the intensive pork sector started after World War 2. Before the war, pigs were often used...
to ingest farm-waste and to convert it to a more valuable product: pork. After the war and progressively
during the sixties, technological progress and social developments caused structural changes in the whole
agricultural sector, especially in the Southern part of the country. By specialization, the efficiency of the
production started to rise quickly (Greef & Casabianca, 2009). Moreover, as it became possible to
transport fodder ingredients over great distances, the specialization enforced a disconnection between
the agricultural land needed for feed-crops and the location of the farm. The specialization not only
caus ed a disconnection between agricultural land and the location of the pigs, but also a drastic growth of
the number of pigs housed on one farm (Table 2.1). Eventually, the Netherlands became one of the
leading export countries of piglets, adult pigs and pork (PVV, 2012).

Table 2.1. Dutch pork production in numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of specialized pig farms 2000-2013</th>
<th>No. of pigs (x 1,000), 2000-2013</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>15,000</td>
<td>7,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Sows/piglets</td>
<td>2,390</td>
<td>1,685</td>
<td>1,040</td>
</tr>
<tr>
<td>Others</td>
<td>1,725</td>
<td>1,260</td>
<td>830</td>
</tr>
<tr>
<td>Fattening pigs</td>
<td>3,555</td>
<td>2,640</td>
<td>2,040</td>
</tr>
</tbody>
</table>

Pig husbandry in The Netherlands came to a standstill in numbers in the last decade. One of the causes
was a major pig fever outbreak in 1997, which had a catastrophic effect on the pig sector and of which it
only slowly recovered in the subsequent years. But also the environment changed. The ‘traditional’ bulk
production and exports of pork and by-products to Germany and the United Kingdom, and the exports of
piglets to Southern Europe, began to suffer from competition by Danish and German pork producers and
Spanish piglet-producers. As the self-sufficiency ratio stayed above 250%, export markets had to be found
elsewhere. Eastern Europe (incl. the former Soviet Union) and Asia became important destinations for
Dutch pork and by-products (Rabo, 2013).

More recently, Dutch pork producing firms started developing special market concepts, referring to
animal welfare and environmental production conditions, to deliver specific markets, as for example
British retailers. Against this background, VION Good Farming Global may be considered as representing
the more ‘traditional’ bulk, that is, primarily price-based competing pork production. Although VION is
working on the development and marketing of all kinds of special concepts, the production of mainstream
bulk remains very important for VION, not just for global markets but also for processing industry. In
other words, Good Farming Global may be indeed perceived as a point of reference for the other two
selected Dutch pork chains: KDV and Lupine Pork.
3. Critical issues and relevant attributes /indicators

Based on the outcomes of the national QuickScan several issues for further analysis have been selected to compare the performances of these three Dutch pork chains. These issues cover a range of attributes. Four of them are also of specific relevance for the Italian case studies, the other six are used exclusively to compare the Dutch cases. Both the common and national selection of attributes are the outcome of first and preliminary assessments of available collected material on the six selected pork cases. Except for pragmatic reasons such as data-availability and –accessibility, this choice for a limited number of common attributes and indicators complemented with other, more context specific attributes partly reflects the methodological complexity to capture all relevant differences in contextual settings, as elaborated in more detail in chapter six and --particularly-- the WP4 cross-country comparative analysis. Here we will limit ourselves to following summary of the list of common and national attributes and indicators.

<table>
<thead>
<tr>
<th>COMMON INDICATORS</th>
<th>Main attribute</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added value</td>
<td>Added Value</td>
<td>Average off-farm prices minus non-factor costs over the period 2009-2013 per kg live weight</td>
</tr>
<tr>
<td>Negative externalities</td>
<td>Added Value</td>
<td>estimation for pork production accompanying external costs that affect external added value creation negatively.  Aspects that can be included are (1) environment (including acidification, fine dust, eutrophication, toxicity), (2) climate change and biodiversity (3) animal diseases and (4) animal welfare</td>
</tr>
<tr>
<td>Positive externalities</td>
<td>Added Value</td>
<td>estimation for pork production accompanying external benefits that affect added value creation positively.  Aspects that can be included are (1) employment, (2) extra tourism in the region (3) liveability</td>
</tr>
<tr>
<td>Water Use efficiency</td>
<td>Resource use-efficiency</td>
<td>Use of water in the total chain per kg carcass weight</td>
</tr>
<tr>
<td>Fossil energy use</td>
<td>Resource use efficiency</td>
<td>Use of direct and indirect fossil energy in the total chain per kg carcass weight. Direct fossil energy use includes fuel use for transport and machinery; indirect fossil energy includes fossil energy use for the production of fertilizers, feed and electricity</td>
</tr>
<tr>
<td>Land use efficiency</td>
<td>Resource use-efficiency</td>
<td>use of land in the total chain per kg carcass weight</td>
</tr>
<tr>
<td>Eutrophication Potential (EP)</td>
<td>Resource use efficiency</td>
<td>Total contribution to eutrophication in PO4-equivalents per kg carcass weight</td>
</tr>
<tr>
<td>GHG emissions</td>
<td>Resource use-efficiency</td>
<td>total emissions of greenhouse gases in the chain expressed in CO2-eq. per kg carcass weight</td>
</tr>
<tr>
<td>Trust based internal relationships</td>
<td>Chain Governance</td>
<td>Level of trust-based relations between chain actors, based on (1) absence of conflicts, (2) trust among chain partners, (3) continuity of chain relations</td>
</tr>
<tr>
<td>Trust based external relationships</td>
<td>Chain Governance</td>
<td>Level of trust-based external relationships based on chain partners' capacity to mobilise support from (1) social movements, (2) citizens and (3) policy actors</td>
</tr>
<tr>
<td>Self-governance capacity</td>
<td>Chain Governance</td>
<td>Self-governance capacity in terms of creation of distinctiveness</td>
</tr>
<tr>
<td>Chain-based value governance</td>
<td>Chain Governance</td>
<td>Overall value governance characteristics conform the typology of Gereffi et al. (2005)</td>
</tr>
<tr>
<td>Farm-level resistance against price-volatility</td>
<td>Resilience</td>
<td>Price volatality of the input and output markets of relevance for pork production, defined as the max delta added value per kg live weight per year over the periode 2009-2013</td>
</tr>
<tr>
<td>Resilience</td>
<td>or: percentage of contracts</td>
<td></td>
</tr>
<tr>
<td>Farm-level risk-spreading</td>
<td>Resilience</td>
<td>Risk-spreading by farm-level diversification</td>
</tr>
<tr>
<td>Farm-level resistance against fodder price fluctuations</td>
<td>Resilience</td>
<td>% of feed produced by farmers themselves</td>
</tr>
<tr>
<td>Adaptation capacity through downstream actors' diversification strategies</td>
<td>Resilience</td>
<td>Strength of interlinkages with downstream actors diversification strategies in terms of productfolio - and marketing</td>
</tr>
<tr>
<td>Chain-based adaptation capacity through learning and innovation</td>
<td>Resilience</td>
<td>Chain actors' collaborative efforts to learn and innovate</td>
</tr>
<tr>
<td>Use of antibiotics</td>
<td>Resilience</td>
<td>number of days per year a fattening pig uses antibiotics</td>
</tr>
</tbody>
</table>

**DUTCH INDICATORS**

| Consumer price | Affordability | Consumer price |
| Pork consumption | Affordability | Pork consumption as compared to other meat. |
| Welfare definition | Animal welfare | Global level playing field or intrinsic value of the animal |
| Space per animal | Animal welfare | Average space per fattening pig |
| Castration | Animal welfare | Castration allowed? |
| Labor input | Labour relations | labor input (Euro’s) per ton slaughter weight |
| Temporary Labour | Labour relations | Percentage temporary labour relations |
| Labour compensation | Labour relations | Average salary in slaughterhouses |
| Territorial connection | Territoriality | Level of territoriality in market communication |
| Input sourcing | Territoriality | Use of local and regional resources in fodder, piglets, etc. |
| Use of antibiotics | Food safety | Number of animal/day doses |
| Food scandals | Food safety | # of food scandals |
| Specific attention for food safety? | Food safety | Is there in the case specific (more than average) attention for food safety? |
| % of (imported) soy in feed | Biodiversity | % of feed that is imported soy |
| Genetic variation | Biodiversity | # of breedings used in pig husbandry |
This overview shows that the economic dimension of local-global comparison in pork production centers particularly on issues as added value production, the distribution of this added value among chain actors and across space, as well as the presence of economic externalities (both negative and positive). The environmental indicators focus on different expressions of resource use efficiency and the levels of GHG emissions, primarily building upon the opportunities and limitations of LCA to which we will return in our methodological reflection at the end of this case-study report. The chain governance attribute deals especially with differences in terms of trust based relations, chain internally as well as externally, chain-based self-governance capacity and the (lack of) broadness of value governance within pork chains. Finally, the set of common resilience indicators enables to compare pork chain performances in terms of resistance against threats as well as their ability to adapt to changing conditions and or to transform foodscapes as two other resilience components.

The complementary set of attributes enables to further compare pork chain performances in relation to food affordability, animal welfare, labour relations, territoriality, food safety and biodiversity. As underpinned in our GLAMUR WP2 contribution, stakeholders may perceive these food chain attributes rather differently since this Dutch society is characterized by co-evolving contrasting food performance discourses. The selection of these attributes permits as such to scrutinize the significance of local-global performance comparison of Dutch pork chains.

3.1 Research methods

The data-collection around the set of attributes as outlined in the foregoing has been built upon multiple research methods with a focus on the analysis of abundantly available secondary sources on national pork production. Although often not directly related to local-global distinctions, these secondary resources give a rather detailed impression of the controversial nature of Dutch pork production and consumption features and are therefore from different perspectives certainly of relevance for our specific GLAMUR WP3 purpose.

Additionally to in depth analysis of available scientific material on the economic, social and environmental performances, the following other data-sources have been consulted: websites of pork chain actors and stakeholder organizations, agricultural journals, -newspapers and branch publications, as well as relevant discussion platforms on Dutch most popular foodlogs. Annex 1 gives an overview of this broad range of secondary data-material that has been taken into account to justify, legitimize and underpin foregoing selection of relevant attributes and their specific translation into different types of indicators. There where necessary this consultation of secondary data-sources has been supplemented with a limited number of additional interviews to deepen or actualize available material and/or check preliminary conclusions with respect to the specific and distinctive features of pork chain performances in relation to each other. For different reasons these complementary interviews have been especially conducted among Dutch more local pork chain actors. Firstly, our selected global pork chain remains clearly dominant in the Netherlands, implying that relatively much information about its performances. Secondly, our research took place during a time period in which this pork chain passed great disturbances, as will be shown in the next chapter. As a result it got a lot of media attention in which a variety of stakeholders participated and expressed their ideas and comments but simultaneously its most influential chain actors turned out to be rather reluctant to contribute to a research programme that aimed to assess performances in comparison to other, more local oriented pork chains.
A second feature of the research method consists its attention for longitudinal approaches. This could be partly realized by building upon empirical material already earlier collected for the KDV case within the European SUSCHAIN project. It enabled to follow a re-localization attempt in Dutch pork production setting over a period of time and to analyse this initiative from a dynamic perspective, including its specific interaction patterns with national more dominant global pork chain (see particularly chapter 6). More generally this has been further done by the collection of empirical material that covered multiple years, preferable tracing back from the most recent times.

A third general feature of overall applied methodology concerns its integration of qualitative and quantitative approaches, with especial attention of the latter for environmental performances by life-cycle analysis. The methodological choices, details and synchronization needs and efforts to cover the peculiarities of both Dutch and Italian pork production settings of this LCA are explained in detail in the document with its principle outcomes.

Finally, the research method has been during several occasions, both wider GLAMUR project meetings as well as bilateral SKYPE sessions of team members discussed, adjusted and aligned with our Italian partners to safeguard as much as possible the comparability of mutual case-study findings, whilst at the same time guaranteeing a certain flexibility to adapt both research methods to the contextuality of pork chain analysis in different settings, including data-availability and – accessibility features and challenges, and having sufficient eye for the specific expertise and interests of both research teams. Therefore, the synchronization efforts have been especially concentrated on the LCA-analysis, where the decision to select generic Parma ham as the Italian global pork chain, which is closely interwoven with primary production in the Netherlands, turned out to facilitate the exchange of each other’s available data-bases.
4. Good Farming Global Pork

4.1 Background, Dynamics and History

VION has a background in Dutch tradition of a strong cooperative movement. Its predecessors, a number of cooperative slaughterhouses, were established by farmers’ organizations to assure farmers an acceptable pork price. After a period of severe economic crisis, the initial cooperative slaughterhouses were merged with private slaughterhouses into the VION company in 2005 (www.VION.nl). The slaughterhouses were active in different animal sectors (pork, beef, lamb and poultry): Dumeco, Hendrix Meat, Moksel and Kroot. The main driver for the process of concentration was to avoid severe competition between the many small slaughtering houses.

The new company VION is not stock market listed and has as single shareholder the regional farmers organization ZLTO, historically having strong interlinkages with the national cooperative sector. A particularity which has immediate consequences for the chain governance, as will be explained in next sections. Until 2014, VION further entailed a slaughter-by-product company, formerly Rendac and since 2005 VION Ingredients. The origin of this animal waste-flow valorization company traces back to former national food safety regulations regarding dead animal destruction obligations. Since the start of these early food safety regulations, Rendac got increasingly a strong and dominant position in Dutch slaughterhouse by-product valorization industry (www.Rendac.nl). More precisely, it has been the principle financer of the expansion of VION after a period when Dutch cooperative slaughterhouses were in large financial problems.

Figure: 3.1 Global Good Farming Pork principle chain actors

It enables VION to start a global business strategy that may be summarized by the following key words: expansion, concentration and – as we will see in later sections - a growing interest in pork quality segments. The expansion included the acquisition of slaughterhouses in the UK and Germany. With these acquisitions VION aimed to become one of the leading pork companies in Europe and a serious partner for European retailers. In particular through the acquisition in 2008 of Grampian, one the UK’s largest
food companies, it thought to get access to more quality oriented pork market segments with more added value.

By 2007 VION was world’s third largest pig processor, with 19 million slaughtered pigs/year, after US-based Smithfield Foods (30 mln) and Danish Crown (22 mln). (Rademakers, 2012). The sales of VION, growing rapidly from a mere €760 million in 2002 to more than €7 billion euro in 2007, stabilized around €10 billion in 2008 after acquiring Grampian.

The concentration tendencies were especially manifested in a steadily reduction of the number of slaughterhouses and accompanying scale-enlargement at remaining locations in the Netherlands, Germany and the UK. The outcome of overall business strategy of expansion and concentration in terms of globalization is illustrated in Table 3.1. It shows how the overall turnover is realized in different countries and continents, primarily related to pork and – to a much lesser degree - beef and lamb. Only some 10% is realized in The Netherlands. Indeed, VION appears to be a global operating food company with strongly globalized pork activities, as later described in more detail. At this stage it is important to keep in mind that this chain is embedded in a variety of food related processing activities (VION Food) as well as the valorization of waste-flow originating from animal production systems (VION Ingredients).

Table 3.1 Geographical origin of turnover of VION (in 1.000 euro’s)(Source: VION annual report 2014)

<table>
<thead>
<tr>
<th>Country</th>
<th>2013</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>802.696</td>
<td>992.909</td>
</tr>
<tr>
<td>Germany</td>
<td>2.740.719</td>
<td>2.901.559</td>
</tr>
<tr>
<td>Belgium</td>
<td>108.610</td>
<td>166.038</td>
</tr>
<tr>
<td>Italy</td>
<td>567.988</td>
<td>579.937</td>
</tr>
<tr>
<td>Rest of EU countries</td>
<td>1.288.849</td>
<td>1.410.930</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>619.976</td>
<td>2.401.753</td>
</tr>
<tr>
<td>Non-EU countries</td>
<td>109.596</td>
<td>118.997</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>6.238.434</td>
<td>8.572.103</td>
</tr>
<tr>
<td>US</td>
<td>147.415</td>
<td>284.285</td>
</tr>
<tr>
<td>Mexico</td>
<td>10.040</td>
<td>34.886</td>
</tr>
<tr>
<td>Canada</td>
<td>17.166</td>
<td>25.886</td>
</tr>
<tr>
<td>Asia</td>
<td>497.139</td>
<td>546.000</td>
</tr>
<tr>
<td>Other countries</td>
<td>122.371</td>
<td>157.118</td>
</tr>
<tr>
<td>Total</td>
<td>7.032.565</td>
<td>9.620.278</td>
</tr>
</tbody>
</table>

More recently (2011-2012) it became clear that VION’s business strategy of (rapid) expansion and concentration turned out to be highly fragile in economic terms. Grampian appeared to be not a very profitable investment for VION. The battle for Europe’s meat markets began during 2005, not long after the rise of VION as a leading firm in the industry and the competitive battling continued and accelerated since 2008. In search of growth markets, large global firms, including Smithfield Foods (US) and Brazil’s JBS Swift and Perdigão, started penetrating and expanding into European territory. Also European competitors such as Danish Crown in Denmark and Tönnies in Germany took part in the battle. VION’s business model collapsed.

In 2012 VION entered in a severe financial crisis. This crisis-situation enforced VION to des-invest by selling most of its UK activities in 2012 and 2013 and to concentrate on the European continent. These
Des-investments resulted in a sharp reduction of turnover, from 9.7 billion in 2012 to 6.5 billion in 2013. The number of employees reduced from 21,000 to 13,000 by 2014.¹

On 24 April 2013 VION explained its restructuring program by stating: "this efficiency measure is necessary to restore results on the highly competitive pork market". Together with its disinvestments, it replaced the total company top: executive committee, communication officials and - apart from the ZLTO-members - the total Board of Commissioners. It saved the company from bankruptcy, yet, for single shareholder farmers-organization ZLTO this went along with an enormous loss of capital.

According to available financial data, this loss amounted a total of 800 million euro! (The Meat Site, 6 December 2013). Moreover, ZLTO had to accept the sale of VION Food Ingredients to the US-based Darling International, whereas especially this division positively contributed to overall VION’s economic results.²

Apart from this painful re-structuring processes, VION had to face in recent years also various public scandals. First of all, these scandals reflect a growing involvement in pork quality segmentation and the different types of problems that might emerge around these segmentation tendencies. The company was publicly accused by (anonymous) employees that it is not uncommon that labels of conventionally produced pork (Good Farming Global) are illegally tagged as Good Farming Star pork, a quality label introduced by VION³. A similar scandal starting from the revelations of company internal ‘whistle-blowers’ concerned the ‘switching’ of conventional pork into certified organic pork at one of VION’s processing locations. After a trial, VION was not only sentenced to a penalty of 15,000 euro (NRC, 15.04.2014) but it also made Dutch retailers decide to strengthen their controls of meat and pork suppliers (Omroep Brabant, 19 June 2014).

VION tries to recover from these difficult financial times and involvement in food scandals by implementing a so-called ‘demand-driven business strategy’ that, according to its current CEO Michiel Her kemij, will concentrate on the production of fresh pork for retailers plus pork market segments with a focus on cold storage products for food service and catering markets (Boerderij, may 2014). The sale of the highly profitable Ingredients Division, that stimulated to produce as many by-products as possible, gave room for this alternative, more quality driven strategy. Besides, the new CEO announced the ending of geographical management divisions (Germany, Netherlands, and so on) and to replace these by a product division management structure⁴.

Although saved from bankruptcy, VION’s future remains strongly dependent on constant approval by its main financier Rabobank.⁵ VION has been placed in the so-called ‘Special Supervision’ division of the Bank, which confronts its company with higher interest rates and intensive interference of Bank personnel. It

¹ Nevertheless, VION by far remains the largest pig-slaughtering firm (49%) in The Netherlands, followed by Van Rooi (17%), Compaxo (10%), Westfort (8%) and Hilckmann (7%).
² Even after these difficult economic times VION is still in the Top 5 of Dutch agro-industrial companies, after Unilever, Heineken and Royal Friesland Campina.
³ This was introduced in close cooperation with retailer organisations and societal movements, as an active response to growing animal welfare concerns.
⁴ That VION continues to be in crisis is also manifested in the sudden resignation / replacement of this new CEO at the end of January 2015.
⁵ The same Rabobank until some years ago fully promoted the expansion strategy, as was illustrated on its website: "To the top of the food chain with Rabobank. Dutch-based VION is the largest meat processor in Europe — a position it achieved in just five years through a string of strategic takeovers. The acquisition of Scottish family-owned Grampian Country Foods was the crowning glory. Rabobank assisted VION on every step of its pan-European growth journey, providing both advice and financing."
was also the Rabobank team that ‘advised’ VION by the end of May 2014 to sell the German Convenience Retail, one of its largest producers of sausages, schnitzels, and so on.

4.2. Local-Global characterisation

4.2.1. Geographical distanced markets
VION Food operates in multiple markets, with two major ‘home’ markets: the Netherlands and Germany. For the sake of this case study, we will focus on its most global operating pork markets. Good Farming Global pork, as the name suggests, starts from a global market orientation, with Italy, Spain and Greece as most important intra-EU markets. Outside the EU its principle market outlets are South Korean, Japanese and American consumers. The growing export of legs, ears and tails to China particularly demonstrates how by-products of the mainstream pork markets may contribute to the ‘square valorization’ of pigs, as will be further illustrated in the performance section.

4.2.2 Resource use characteristics
The Good Farming Global concept heavily depends on global resource flows, especially soy and other fodder inputs, but increasingly also in relation to exports of transformed manure surpluses from the pig farms. Pig husbandry manifests itself further in VION’s multiple slaughterhouse locations and processing industries throughout Europe, although this globalization process has been stopped, as was explained in the former chapter. Also the globalization of labour force in these slaughter- and processing facilities is impressive, where nowadays Eastern European workers compose the major part of it (see also Performances, 3.3.6.). We could further refer to the global origin of energy inputs, technology, ICT applications and the interlinkages with global operating pharmaceutical industries to illustrate that Good Farming Global is indeed highly globalized in terms of resource use characteristics and in many ways a food-loose pork production system which is increasingly actively exported to the rest of the world.

4.2.3 Locus of control in chain governance
The Good Farming Global Pork chain shows different types of conflicts and tensions between chain actors. Firstly this may be illustrated by the historically rather problematic interrelations between pig farmers and VION as a processor. In 2003 part of the Dutch pig farmers, organized in National Pig Farmers Union (NVV) tried, without success, to prevent the fusion of the slaughtering houses in one umbrella company. They feared a loss of entrepreneurial freedom.

Secondly, the ownership and management structure of VION are quite particular and vulnerable for all kinds of tensions. ZLTO, the farmers’ organization, as only shareholder, used to provide all the members of VION’s Board of Commissioners but since the management reshuffle of 2013/14 ZLTO has only two representatives in this Board. The Executive Board and most of the Commissioners are representatives of (multinational) business life, mostly national agro-industrial companies as Douwe Egberts, Avebe,
Nutreco, but also insurance companies and banks. Farmers’ influence has been correspondingly diminished.  

Third, Dutch pork market continues to function largely as a spot market with weekly prices that provide farmers with the opportunity to change from processor and / or intermediary depending on the weekly spot prices that they offer. According to many experts and stakeholders current absence of longer term, trust-based and mutual cooperative relations between farmers and other chain actors remains a highly persistent bottleneck for national pork sector. Similar expressions of distrust and longer term mutual commitment appear chain down- and upwards. Advocates of VION’s expansion strategy, for instance, argued that excessive retailer power has been one of the key reasons for its failure. EU retailers would have simply not allowed a concentration in pork supply as countervailing power that would undermine their influence.  

Even consumers are frequently accused to be part of the problem. As time and again confirmed by researchers, citizens may be increasingly concerned about the negative externalities of narrowly defined economic efficiencies, but as consumers continue to opt for the cheapest alternative, stimulated by retailers that continue to profile themselves through price stunting with food products. This introduction on the weaknesses of national pork chain governance in terms of internal conflicts, lack of coordination, lack of consumer commitment, etc. justifies the question whether Good Farming Global comprises any more than rather superficial, fluid and volatile sets of relationships which are primarily driven by price-competition and narrowly defined economic efficiency mechanisms.  

3.2.4 Communication and information characteristics  

Good Farming Global is one of the four marketing concepts of VION that aims at global markets and in that sense might be considered to be the bottom of Dutch pork production range. Its global criteria make it the bulk product of VION with a rather low communication profile in comparison to Good Farming Welfare and Good Farming Star as its more recently introduced specific marketing concepts.  

![Figure 3.2 Good Farming Star](image)

4.3. Performances  

4.3.1 Introduction  

In line with the joint research plan, the performances of the VION Good Farming Global pork-chain have been assessed in more detail along the following set of pre-selected attributes that are thought to be of particular importance to compare pork chains within the Netherlands and between Italy and the Netherlands.

---

8 In 2014, a possible restructuring towards a real cooperative, including farmers’ financial participations, was under study within the ZLTO but lack of trust in VION’s future and a negative economic situation in pig husbandry at large, withheld the organization to continue this line. (Boerderij Vandaag, 08.01.2015)  
9 The others are: Good Farming Welfare, Good Farming Star and Organic.
4.3.2 Added value

Figure 3.3 depicts how added value creation in the pork sector involves a range of activities. The figure stresses that pork production is not just about the valorization of fresh and processed meat but intrinsically interwoven with waste-flows as bones, skin, leather, gelatin, acid fats, etc. In the Netherlands this is mostly framed as the ability to realize ‘square valorization’. The following data give an impression of what this is about: of overall slaughter weight about 54 kg is transformed into fresh and processed meat, about 14 kg of bones becomes primary material for the production of bouillon, gelatin and porcelain and paint pigments, 14 kg of organs (kidneys, liver, etcetera) are used for food purposes and medicinal insulin, additionally to rind de skin (3 kg) also provides leather and gelatin, blood (5 kg) is processed in meats and its hemoglobin used for medicines, acid fats (5 kg) are used for the production of soap, fabric softener (?), toothpaste, paint and candles, the remaining products (6 kg), among others hair, for brushes.

Figure 3.3: ‘Nose-to-tail valorization’ of pigs (Source: ING, 2012)

This complexity of added value creation in pork production has been earlier touched upon in relation to the (discrepancies between) VION’s business results for its food and non-food divisions (3.1). The importance of a business strategy what in the Netherlands is known as ‘squared valorization’, synonymous with the internally more familiar notion of ‘nose-to-tail valorization’, is underlined once again by recent interview statements of CEO Herkemij in which he notices that -conform the conditions of sale of the former ingredient division- only after a couple of years VION will be allowed to engage itself again in the transformation of waste-flows. Activities that Herkemij describes as the former ‘crown jewels of the VION concern and that he therefore would like to take on board again (Volkskrant, 2014, ‘Grab bagging meat companies without vision’)

Now we want to address in particular the issue of fairness of the distribution of added value among chain partners. Figure 3.4, based upon a European Commission commissioned study, gives an impression of this distribution in 2005.
More generally this distribution is often perceived as biased, with a loss for the farmers and a benefit for the processing industry and – especially - retailers. This perception is particularly shared by pork farmers but also expressed by some consumer- and environmental movements. On the other hand, research by the National Agricultural Economic Institute draws the conclusion that pork farmers’ share in overall value added creation in national pork production did not significantly deteriorate over a period of 15 years (LEI, 2012). Figure 3.5 visualizes this by comparing the dynamics of pork consumer prices (dark blue), producer prices off-slaughterhouse (orange), off farm prices (green), fodder prices (purple) and oil prices (light blue) over the period 1996-2011.

During the last decade, Dutch pork production faces a loss of competitiveness that particularly affects farmers. Overall economic results of Dutch pig farmers are extremely volatile, as illustrated by Figure 3.6. Net economic results of pig husbandry in the Netherlands go up and down and tend to be negative in last decade, while it seems that also the traditional price-recoveries after 7 years pig-cycles are disappearing. As shown, these difficult economic times affect pig farmers that concentrate on breeding activities (blue line), ‘closed’ firms that combine breeding with fattening (green line) as well those with exclusively fattening activities (red line) in rather similar ways.
It is often argued that these problems are closely interwoven with the absence of more long term chain relations. Retailers, for instance, negotiate on the basis of tendering without longer term price agreements with their providers of fresh pork and approach pork frequently as one of the cheap, little distinctive food products that will have to secure their wider retail shares: thus pork as ‘clientele attractor’ and pork, likewise many of the other fresh food products, as ‘traffic generator’. It makes that retailers accept low or no profit rates for pork and frequently use it in promotional campaigns to attract consumers, especially the relatively poor (Baltussen c.s. 2011). Obviously, particularly in times of oversupply this will go along with rather vulnerable positions for primary producers and processors in terms of opportunities for value added creation.

As mentioned earlier, VION’s new CEO announced a radical shift in overall business strategy that intends to move away from these threats for ‘traditional’, little distinctive scale enlargement and bulk oriented pork production systems and to occupy a larger share of the domestic markets for quality pork. This shift in overall business strategy should be understood as an attempt to reduce current dependence on rather anonymous, volatile and often conflictual chain relations dominated by spot market characteristics and farm-gate pork prices fixed for only seven days periods by slaughterhouses.

4.3.3 Affordability
Global Good Farming Pork may be described as ‘poor man’s beef’ in terms of affordability. Consumer prices are relatively low and overall affordability of pork is strong, with poultry as main competitor as animal protein source. Figure 3.7 compares dynamics in different types of meat consumption in the Netherlands for the period 1995-2011 with a distinction between poultry (blue), pork (red), beef/calve (green) and a ret-category of meat types (orange). It illustrates the strong position of pork as key animal protein source in Dutch dietary patterns, which in terms of overall volume goes along with an average level pork consumption per capita compared to other European Member States and an only slightly decreasing pork consumption per capita.
This high affordability of pork is certainly not undisputed. Especially environmental NGO’s stress current absence of ‘real cost pricing’ methods that succeed in assessing national pork production costs more comprehensively by inclusion of its environmental effects, overconsumption threats causing health problems, etc. Therefore, these opposing voices associate current affordability of conventional pork (that is: its low consumer price) primarily with different types of ‘rebouncing effects’, including the frustration of more sustainable and animal friendly production methods.

**4.3.4 Chain governance**

The governance of Global Good Farming Pork is difficult to understand in isolation from some far reaching public interventions in Dutch husbandry. First, the total, national size of pig husbandry has been limited since the late 1990’s as a consequence of the Swine fever outbreak and the vast overproduction of manure in those days. Since then each pig breeder has an established quotum of production rights (so-called ‘Dierrechten’) with the objective to regulate national pork production volume in a way that contributes to environmental and animal disease related policy objectives. Together with a set of strict rules and regulations for manure production and application, this forms the heart of Dutch public pig husbandry governance. Additionally a wide range of self-regulation initiatives of pork chain actors with regard to all kinds of quality standards can be witnessed. These self-regulation initiatives make the regulations for pig husbandry and pork production not seldom stricter than required by European regulations, particularly with respect to animal welfare and environmental issues.

![Diagram](image-url)
Feed producer | GMP – HACCP PDV product norms | GMP – HACCP PDV product norms
---|---|---
Ban on antimicrobial growth promoters
Producer | IKB | IKB | GWWD
IKB | IKB | Varkensbesluit
HACCP | GWWD
VVL | Environmental law
Minas
Veterniarian | GVP | GVP
Destruction law
R&D
Animal Medicine Law
Varkensbesluit
Transporter | Agreement with VWA | Agreement with VWA
Agreement with VWA
Slaughterhouse | HACCP | IKB | Environmental law
IKB
ISO 9001
Meat inspection law
Deletion Law
VKI
Processor | Foodstuffs law | Environmental law
IKB
Retail | HACCP

Figure 3.8 gives an impression of the different types of public and private regulations that Global Good Farming Pork chain actors have to follow, with a distinction between the categories 1) food quality and food safety, 2) traceability, 3) animal health and welfare and 4) environment. Notwithstanding this ‘Christmas tree’ of public and private regulatory frameworks, it does not protect Global Good Farming Pork from political and societal debate about the need for further balance regulation10, as also manifested in VION’s recent decision to enforce its food safety controls. ‘If we want trust in our sector, we should be open to society about our performances’ according its CEO.

4.3.5 Animal Welfare
This is probably the societal most sensitive attribute that Global Good Farming, as the basic scheme of Dutch pig husbandry, faces. The disputed nature of animal welfare in Dutch intensive husbandry systems is, amongst others, reflected in the emergence of the Party for the Animals, with currently seats in National parliament, Provincial States and City councils and since 2014 also the European Parliament. The “abolition of the industrial husbandry” is number one on the list of priorities of this political party (www.partyfortheanimals.nl).

As already mentioned in our GLAMUR WP2 document, two fundamentally different positions can be witnessed in Dutch debate on animal welfare concerns. A first movement, especially representing traditional agricultural interests, starts from a relative and functional perception on animal welfare. That is: Dutch pork production has a vanguard position compared to animal welfare conditions of most international competitors and that only through establishing level playing field conditions for all

---

10 Recently, CFO Straathof of VION stated he has no intention to control competing firms in hygiene matters (NRC...)

www.glamur.eu
competitors further improvements of animal welfare in Dutch pork production systems may be realized. A second movement, much more driven by NGOs, starts from a more absolute perception on animal welfare. In this perception, animal welfare conditions are defined as opportunities for natural behavior, living space, etc. Both perceptions co-exist with mutual communication problems that have been associated with ‘a dialogue between the deaf’ (Termeer, 2012).

It illustrates how in the Netherlands Global Good Farming pork faces serious societal resistance against its tendency to approach animal welfare primarily as a technical issue. TOPIGS, the globally operating Dutch pig breeding company, with a national market share of about 85%, may be considered typical for this system. TOPIGS claims to deliver “robust animals that produce robust progeny”. It says to take the biology of the pig into account and defines this as “balanced breeding, an advanced and sophisticated approach to breeding that results in a pig, capable of healthy and efficient high-level production under a wide range of farm conditions”.

To realize these objectives TOPIGS applies the so-called Efabar code of conduct: a voluntary code of good practice in support of responsible farm animal breeding that contains rules for sustainability. By adhering to the code, TOPIGS claims to ensure that the environment, genetic diversity, animal health and animal welfare are sufficiently taken into account in its pig-breeding programs, including a section about ethics and transparency to underscore its accountability to the public and our planet.

As mentioned, this technical approach is increasingly subject of debate in Dutch society, as most clearly expressed by public campaigns of Dutch ‘Wakker Dier’ movement (‘The Wakeful Animal’ movement).

4.3.6 Labour relations
Historically Dutch slaughterhouses have a vulnerable reputation as employers due to the harshness of labour conditions, low salaries and absence of labour certainty. Also today large parts of slaughterhouse employees continue to have temporal labour contracts. Increasingly these employees come from abroad, with re-appearing illegal labour scandals, although less frequently than before due to more strict control systems and high penalties in the case of infringements.

11 Efficiency, not only in terms of feed conversion, is the dominant benchmark: “besides successful breeding for big litters (around 30/year), TOPIGS also breeds for vital pigs and mothering abilities. In recent years the litter size has grown substantially without an associated increase in pre weaning mortality. Not only does this make piglet production more efficient, but it also lowers labor costs and veterinarian costs and contributes to improved animal welfare” (www.Topigs.com).
Figure 3.9 gives an impression of national labor costs (vertical axe right) in comparison to several other production areas in- and outside Europe (horizontal axe). It shows that the Netherlands is characterized by a relatively low input of labour with relatively high labour tariffs (red line) and labour costs per kg slaughter weight (green line). Together these data may point at relative high labour wages at Dutch slaughterhouses, but this remains accompanied by relatively poor performances in other labour condition fields. Reports of National Labour Inspection Service, for instance, mention a wide variety of concerns such as lack of freedom of association, hardship (odor, humidity, noise, temperature), frequency of labour accidents with machinery, avoidance of social welfare obligations, disrespect of obligatory rest-periods, higher risks on skin and infection diseases, stress sensitivity, RSI problems and other physical discomforts related to conveyor belt work. In a recent press release this same Labour Inspection Service stresses the absence of sufficiently safe conditions for cleaning personal in Dutch slaughterhouses (Teletekst, 18-08-2014).

This presence of relatively bad overall labour conditions within Global Good Farming pork could be further illustrated by a similar up- and downstream dominance of temporary contracts and relatively badly paid labour among retailers as well as loss of professional prestige and self-esteem among pig farmers. Altogether it makes the quality of labour conditions in most globally operating Dutch pork chains certainly an issue of societal concern.
4.3.7 Territoriality

The ‘roots’ of Global Good Farming Pork lie in the southern part of the country, the provinces of Brabant and Limburg, where professional pork farming goes back to the fifties and sixties of the 20th century as an overall outcome of a specific set of conditions. First, farming on the sandy soils of Brabant and Limburg was small scaled and labour intensive. The predominantly catholic families tended to be relatively large and most sons (and daughters) did not get the opportunity to take over parental farms. Intensive husbandry permitted them to become farmers, mostly with highly limited land resources and a strong dependency on external fodder providers. Second, the new European Agricultural Policy of those days and the subsequent Trade Agreements with the US (1962) led to the so called ‘Gap of Rotterdam’: the tax free imports of large amounts of cheap oil- and energy crops, in particular soy. This gave Dutch husbandry an important competitor’s advantage. Third, during the subsequent decades, an important system of remains of Dutch food industry (breweries, potato processors, etc.) was developed, as cheap fodder inputs for pig husbandry. More generally these agro-industrial modernization processes made that the use of indigenous knowledge, traditional production methods or traditional breeds almost completely vanished. This loss of territoriality of Global Good Farming Pork is further reflected in the almost complete disappearance of pig production within traditional relatively small scale mixed farming systems.

4.3.8 Biodiversity

The significance of this attribute appears in the Dutch global pork production system particularly in relation to the dependence on fodder from elsewhere. The negative environmental impacts of soy production in countries like Brazil are frequently underlined by Dutch NGOs that oppose against national intensive husbandry systems. These negative impacts on the preservation of biodiversity are associated with various issues as monocultures, deforestation processes and the risks of genetically modified soy (GMO’s). As estimated, overall national intensive husbandry systems require a total of 700.000 hectare of fodder sourcing outside Europe with a ‘soy footprint’ for various animal products as presented in Table 3.2. It shows the high dependency of Dutch production of poultry, eggs and pork upon soy sourcing from abroad. At a national scale this could be further illustrated by following figures: the Netherlands needs around 987.000 hectare of soy production elsewhere for its food processing activities, of which about 440.000 for national food consumption (www.verantwoordesoja.nl). It explains why ‘responsible use of nature and environment’ is one of the key topics currently addressed by a National Taskforce that intends to join forces between national and international stakeholders in the transition towards sustainable soy sourcing (ibid).

Table 3.2 Soy dependencies of Dutch food produce(Source: LEI, 2010)

<table>
<thead>
<tr>
<th>Product</th>
<th>Kg Soy per 100 kg sold animal product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>11</td>
</tr>
<tr>
<td>Veal</td>
<td>128</td>
</tr>
<tr>
<td>Beef</td>
<td>175</td>
</tr>
<tr>
<td>Pork meat</td>
<td>263</td>
</tr>
<tr>
<td>Eggs</td>
<td>307</td>
</tr>
<tr>
<td>Poultry</td>
<td>575</td>
</tr>
</tbody>
</table>
At farm level the preservation of biodiversity is much less associated with pork production since it is almost completely disconnected from local ecosystems and dominated by agro-industrial breeding methods (see before), where biodiversity is hardly an issue. Consequently, national genetic diversity in pig breeding is relatively small and primarily oriented towards efficiency concerns. Most sows and bears come from breeds like Yorkshire and Pietrain, with more incidental use of Dutch land pig breeds for crossing breeding.

4.3.9 Resource use efficiency
The relevance of this attribute could be illustrated by a large amount of environmental data for Dutch intensive pork production, covering issues as nitrogen and phosphate balances, toxic metal concentrations, fine dust problems, eutrophication problems, greenhouse gas emissions, etcetera. The outcomes of the LCA analysis as part of overall case-study approach will provide a more quantitative picture of the resource use efficiency of Global Good Farming Pork. Here we will complement these outcomes of the LCA-analysis quantitatively with some additional information.

Table 3.3 Attempts to come to real-cost pricing of Global Good Farming Pork (Source:?)

<table>
<thead>
<tr>
<th>Costs per kg. pork</th>
<th>Van Drunen et.al. (2010)</th>
<th>Blonk et.al. (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine dust, acidification, eutrophication, and zinc toxicity</td>
<td>NA. Included in costs climate change and biodiversity</td>
<td>0.28</td>
</tr>
<tr>
<td>Impact on climate change and biodiversity</td>
<td>0.62</td>
<td>0.40</td>
</tr>
<tr>
<td>Animal diseases</td>
<td>0.32</td>
<td>0.16</td>
</tr>
<tr>
<td>Animal welfare</td>
<td>Between 1,10 and 4,60*</td>
<td>1,00*</td>
</tr>
<tr>
<td>Government subsidies</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>‘Real’ external costs</td>
<td>At least 2,06</td>
<td>1,84</td>
</tr>
</tbody>
</table>

The environmental costs associated with Dutch pork production have been estimated on different types of ‘real cost’ pricing methods. Although admittedly surrounded by decreasing uncertainty from top to bottom. Table 3.3 gives an impression of the environmental costs related to fine dust, eutrophication, toxicity by sink, impact on climate change, animal welfare and public subsidies at ranging between 2,06 and 1,84 per kilo. Notwithstanding the insecurity of these real cost pricing methods, these data show the resource-use-efficiency of pork production in the Netherlands is clearly subject of societal and scientific debate.

Table 3.4: Dutch agricultural sectors in terms of energy use and emissions (Source:)

<table>
<thead>
<tr>
<th></th>
<th>Energy use</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
<td>2025</td>
</tr>
<tr>
<td>Arable Farming</td>
<td>9.6</td>
<td>9.6</td>
</tr>
<tr>
<td>Horticulture open air</td>
<td>4.4</td>
<td>4.1</td>
</tr>
</tbody>
</table>
This debate is also about the levels of energy inputs and greenhouse gas emissions. Table 3.4 compares these levels for: (1) arable farming; (2) open air vegetable production; (3) glasshouse production; (4) land-based animal production and (5) intensive animal husbandry systems and gives an estimate for the coming decade. As shown, national pork production, as the largest representative of intensive animal husbandry systems, is and will remain an important contributor to greenhouse gas emission of Dutch agriculture and faces major challenges with regard to fossil fuel dependencies.

At the same time it is important to notice that opinions on pork resource use efficiency clearly differ among Dutch stakeholders. Its proponents often stress the interrelations between national pork production and the valorization of waste-flows. First in relation to fodder sourcing. As particularly claimed by pork producer interest groups, about 10% of overall pork fodder comes from food waste and agro-industrial waste-flows (www.watenvarkens.nl). Following a similar line of reasoning it is argued that also slaughter-by-product valorization needs to be taken into account in the assessment of overall resource-use efficiency. According to Dutch Environmental Consultancy Company Blonk (2009), the processing of the 45% non-edible living animal weight into a broad range of products coincides with a reduction of 700 kton CO2 equivalents of greenhouse gasses, save 2,6 PJ energy and 750 km² of land resources in comparison to currently available alternatives for these intermediary products by necessary replacing of e.g. animal fats by vegetal fats and bone meal by soya products. These environmental benefits of slaughter-by-product valorization is claimed to be a crucial aspect in a meaningful and fair assessment of overall resource-efficiency of national pork production.

Table 3.5 Dutch CO2 emission levels compared to other pork production areas (Source: Lusine et al., 2011)
These same advocates of national pork production\(^{12}\) often refer to relatively positive resource use efficiency performances in The Netherlands compared to competitors elsewhere. As illustrated by Table 3.5, CO2 emissions of Dutch pork production is relatively low per slaughtered pig or per piglet. In combination with previous references to upstream (fodder) and downstream (slaughter-by-products) waste flow-valorization, it would make national pork production resource use efficiency in terms of input-output relations much better than often assumed or framed by its adversaries.

### 4.3.10 Food safety

Dutch consumers’ food safety concerns entail a broad range of issues, like hormones in meat, the use of pesticides in plant production, the amount of antibiotics in meat, the use of food additives, the presence of bacteria and viruses causing food infections, etcetera (VWA, 2011). It is rather telling that 2 of the 3 most important Dutch food safety concerns are closely related to pork consumption: the use of hormones and antibiotics. The first concern refers to the frequency of hormone scandals in national intensive husbandry systems, whereas the second reflects the still high dependence on the use of preventive and curative antibiotics in these same intensive husbandry systems. Although the use of antibiotics may have been significantly reduced since 2010, the growing threat of antibiotic resistance remains one of the major food safety concerns among national consumers. Dutch pork chain actors responded with a growing amount of self-regulation initiatives to these and other food safety concerns (see e.g. 4.3.4). Nevertheless the distribution of responsibilities between public and private actors regarding food safety control has become increasingly subject of debate (Silfhout, 2014). Criticasters of national food safety self-regulation initiatives fear their consequences in terms of loss of public control by National Food Authority due to austerity measures. A loss of public control that would have induced an increase of ‘food contamination incidents’, of which the ‘horse-meat’ scandal is probably the most well-known. These returning scandals continue to feed, albeit with more or less hype characteristics, national societal debate about the need for more state-led food safety monitoring and control systems to overcome the vulnerabilities of self-regulation alternatives where consumers increasingly depend on ‘butchers who control their own meat’.

### 4.3.11 Resilience

The performance attribute resilience can be approached in different ways. From an economic perspective, price-volatility is an important indicator for resilience. Earlier we referred more indirectly to the price-volatility of Dutch pork in relation to farm-income levels. Based on the European Pig-link as analyzed by our Italian GLAMUR research partners this price volatility may be further demonstrated by the dynamics in farm-based value added production. As these Pig-link data reveal, in the period 2009-2014 overall added value in terms of off-farm prices minus non-factor costs per kg living weight in Dutch pork production fluctuated between 0.12 euro and 0.22 euro. This confrontation with strong price-fluctuation in farm-gate prices is partly counterbalanced by the presence of off-farm-income sources. In fact, as illustrated in Table 3.6, Dutch pork producers depend relatively strongly on such additional income sources in comparison to e.g. dairy- and arable farmers. It underscores the relevance of farm-diversification as a crucial indicator for resilience at the level of primary production. Later we will return

---

\(^{12}\) Perhaps rather surprisingly, also Jason Clay, senior vice-president of the World Wildlife Fund, recently declared that in order to feed the world population in the coming decades, we should promote intensive production, including the intensive pig and poultry husbandry, thereby combining a maximum food production with a minimal CO2-emission (Foodlog, 18 October 2014).
to more chain based perspectives on resilience building as part of the specific features of newly emerging pork chains in the Netherlands.

Table 3.6. Farm- and off-farm income dynamics over the period 2008-2012 in Dutch agriculture (Source LEI, 2013)

<table>
<thead>
<tr>
<th></th>
<th>Average Income out of farm-activities over the period 2008-2012 (x1000 euro)</th>
<th>Average income out of off-farm activities over the period 2008-2012 (x 1000 euro)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy farmers</td>
<td>38.3</td>
<td>16.2</td>
</tr>
<tr>
<td>Pork producers</td>
<td>38.3</td>
<td>16.2</td>
</tr>
<tr>
<td>Arable farmers</td>
<td>69.4</td>
<td>21.0</td>
</tr>
<tr>
<td>Total Dutch agricultural and glasshouse sector</td>
<td>42.7</td>
<td>18.8</td>
</tr>
</tbody>
</table>
5. Sustainable Pork Chain

5.1 Background, Dynamics and History
This second case study starts with the launching of Hoeve BV around the following objectives:

- To develop a robust chain concept for sustainable pig meat production building on the Environmental certification system (Milieukeur/MK);
- To develop a transparent chain that aims to reconnect regional pig farming with society and rural landscapes;
- To create room for manoeuvre in standardized governmental environmental regulation for alternative approaches to realize sustainability goals.

Hoeve BV started with 16 pig producers, processor and wholesaler Hems and 26 butchers producing 900 carcasses on a weekly basis. Slaughterhouse Westfort in Gorinchem selected the carcasses based on quality criteria defined in close cooperation with regional butchers. These carcasses were transported to meat cutter/wholesaler Hems. Hems processed carcasses in technical parts according to the demands of regional butchers.

Hoeve BV is the initiator of the Environmental Certification system. Meat quality is referred to the criteria of this Environmental Certification label system and the requirements of regional butchers with regard to pigs of a certain type, meat percentage and weight. To be able to provide pork as fresh as possible, the slaughterhouse enabled pig farmers to transport pigs early in the morning. This permitted a reduction of the period between slaughtering an deliverance at butcher shops with 24 hours (Brandsma et al, 20005).

5.1.1 Initiators and phases of development
Hoeve BV is particularly driven by two key actors sharing a vision on how to improve sustainability performances of regional pig meat farming. The first initiator concerns the family-business of pig breeder Hans Verhoeven, also encompassing his wife Diny and daughter Suzanne. Openness is a key characteristic of the family business of Verhoeven: “We have nothing to hide. We notice that we receive a lot in return. With suspicion you achieve nothing” (Asscheman, 2014, p.23). Verhoeven won the title Agricultural Entrepreneur in 2014. In the jury report he was described as an entrepreneur with vision, willpower and perseverance.

In 2008 Hans Verhoeven needed an environmental license for his self-developed pig sty, and came in contact with Marc van der Eijnden, an agricultural engineer and consultant, engaged in environmental engineering. Hans Verhoeven: “When I started with environmental sound production I wanted to label my product. The meat was processed anonymously and there was no way to get a premium price for this product” (Asscheman, 2014, p.22). Via Milieukeur, an environmental certification system, this objective could be achieved. The pig stable of Hans Verhoeven received the status of ‘experimental sty’. The initiators were able to mobilize societal and institutional support and developed strategic alliances with chain partnerships based on trial and error and learning by doing.

De Hoeve started to cooperate with meat processors because it experienced a lack of resilience not having its own slaughtering facility. Verhoeven already knew Jaap de Wit sr. of Lunenburg meat BV and

---

invited him to cooperate in increasing their market power. The interest of Lunenburg was its wish to compete more on meat quality instead of cost price. In retro-perspective 5 stages can be distinguished in the development process from 2005-2014 (see Box 4.1, based on Brandsma et al, 2005; Moesker et al, 2014b; Interviews, 2014).

Box 4.1: Stages of development from Hoeve BV to KDV

1) **Environmental certification**: The initiators succeeded to get the technological novelties of Verhoeven’s stable certified by the national Green Label system. This stimulated both actors to orient themselves at the development of an Environmental Certification system for Pig meat. In 2002 the first pig husbandry received an environmental certificate.

2) **Commercialization**: The actors became business partners and founded the Hoeve BV, a limited company, which aimed to market fresh lean pig meat with an Environmental Certification Label to regional high quality butchers.

3) **Up-scaling**: De Hoeve took the lead as ‘chain director’. A pilot project of the province of Brabant demonstrated that de Hoeve had developed into a reliable and viable supplier of Environmental Certified pig meat with a growing societal support for its specific approach. This was expressed in a public-private covenant in which all partners express the need for further up-scaling of the initiative. Since 2003 Hoeve BV recruited new pig farmers to enable a higher future production volume. This resulted in an increase of the weekly supply to 2000 pigs. In 2004 their own Westfort slaughterhouse was founded in Gorinchem which enabled further up-scaling. In 2006 cooperation started with two large wholesalers and as a result development really took off from 2007 onwards.

4) **The Sustainable Pork Chain**: The Sustainable Pork Chain was founded in 2010 as a cooperation between 4 chain partners representing the producers and meat processors: Egbert Kruiswijk Meat Products, Lunenburg Meat, Wholesale Oudewater and De Hoeve BV (Busscher, 2012). *Lunenburg Vlees and Egbert Kruiswijk Vleesproducten* started trading in 2014 under the joint name Westfort Meat Products. The production increased to the weekly slaughtering of 20,000 carcasses in 2014. Since 2011 KDV Organic started. This meat is processed via Deli Harmony, part of Egbert Kruiswijk meat products. The Environmental labeling stopped formally in 2012. KDV now produces 1 million pigs produced by 300 producers under the labels: KDV (see also Figure 4.1) and KDV Organic (300/400 carcasses a week). A new slaughterhouse is being built in IJsselsteijn. which will increase the capacity to 35,000 carcasses a week.

There were several reasons for De Hoeve to quit the Environmental Labeling system (**Milieukeur**) and to start the new production chain KDV. First, other, competing processors also intended to introduce the environmental labeling system, so the USP was lost and their own processors Egbert Kruiswijk Meat Products and Lunenburg Meat (who merged later into Westfort Meat Products) found it increasingly difficult to market the meat. They had to compete more on price. According to spokesmen De Wit from Westfort Meat products the Environmental labeling system is: “a set of criteria which everyone can join. You can’t do investments or build a chain based on the environmental labeling system”.

The second reason was a disagreement with some stakeholders of the Environmental Labeling system about the use of responsible soy. ([www.verantwoordesoja.nl](http://www.verantwoordesoja.nl)). This project doesn’t lead to added value for the soy-producer according to Marc van de Eijnden: “If we wanted responsibly produced soy, this would cost the producers 80 real per ton (26.5 euro) while the producer receives only 0.5 real/ton more (0.17 euro cents). I can’t sell this story to the Dutch producers”.

The Environmental Labeling system became more a system of ‘ticking boxes’ than an management system, without adding value, while Marc van den Eijnden wanted to formulate clear goals on important issues, implemented step by step: “We started more with themes, the long term and certification based on processes. We wanted an energy-neutral chain, free from antibiotics and producing pigs with long tails.”
We also wanted to focus more on the issue of smell”. Parts of the former Environmental Labeling system are still applied such as criteria on minerals, mortality, antibiotics and animal welfare.

5.1.2 Organisation, actors & collaboration
While the Environmental Labeling system in the end appeared to be a system of ‘ticking boxes’, the Sustainable Pork Chain is a management system, with added value. Marc van den Eijnden wanted to formulate clear goals on important issues, implemented step by step: “We started more with themes, the long term and certification based on processes. We wanted an energy-neutral chain, free from antibiotics and producing pigs with long tails. We also wanted to focus more on the issue of odor”. Parts of the former Environmental Labeling system are however still applied such as criteria on minerals, mortality, antibiotics and animal welfare (see also Box 4.2).

It is further emphasized that KDV aims to work mainly with family farms. “We search for family businesses. The larger businesses have a slightly different mentality. We are more conversational and focus on the long term. You need long-term endurance to set this up”.

To produce organically was not an option at first. Marc van den Eijnden still considers organic production ‘as a complete different story’ and prefers to improve sustainability via a step by step approach that leaves more space for regional pork production than a transition to organic although KDV now a days also has its own KDV Organic label in order to meet its customers’ demands as good as possible (Interview, 2014). Of total amount of organic carcasses weekly slaughtered in the Netherlands (1600), KDV delivers about 150-200.

KDV uses different criteria to assess and monitor its own performances. For example emission levels are measured at business level. The reduction of antibiotics has been targeted at chain level with the purpose to create a certain flexibility. Producers can start at different levels, although minimum levels are required. In the beginning around 5% of the producers were unable to meet these minimum criteria. Recently these criteria have been further tightened at chain level with more long term management objectives that producers have to fulfill as outlined more specifically in the performance sections.

5.1.3 Innovation & sustainability
According to Verhoeven: “You have to produce sustainably. It is the only way forward into the future” (Moesker, 2014a, p.5). De Hoeve BV started in 2003 with an experimental reducing CO2 emissions. The chain was the first to announce the prohibition of pig castration in 2007 (Moesker, 2014a). The main innovations since are the new sty opened in 2014, innovations in energy-use, reduction of antibiotics, and financing, as described below. KDV does not prescribe fixed measures but analyses the possibilities per business.

Sty: Hans Verhoeven has opened a new sty for 100 pigs in 2014, in which innovations such as a new floor heating and cooling system using the body heat of sows, extra possibilities for distraction (via the use of a specific feed dispenser), a new type of ventilators, and manure removal system (a ‘pig toilet’) will be tested. The new stable will facilitate a reduction of emissions (manure, metal, smell, dust) and improvement of animal welfare with lower construction costs (Jansen, 2000; Asscheman, 2014, p.23; Interview, 2014). For his contributions to a sustainable Dutch pork production Verhoeven won the best agricultural entrepreneurship prize in 2014. The corresponding money will be used for the planting of the
A next foreseen novelty is the on farm-processing of manure via mono-digestion, an energy saving technology (Moesker, 2014b).

**Energy:** KDV wants to realize a climate neutral pig sector in 2016 by reducing the energy-use and up scaling the use of rest warmth from the stables. In 2013 one participant pig breeder in KDV saved 34% of energy (per firm) in comparison with the average pig holding.

**Antibiotics:** The ambition of the Dutch government for the pig sector as a whole is a reduction of 70% in 2015 compared to 2009 (InnovatieNetwerk, 2013). The KDV pig farmers are advised how to reduce the use of antibiotics. The goal is a pork chain free from antibiotics in 2016, to be realized in three steps. KDV wants to certify the product process based on three types of factors: human (management), animal (stress) and technical factors (drink water quality, climate control, cooling of manure and re-use of the heat for the piglet sty and availability of water and feed) to achieve this goal. In the first phase a pilot group of 7 pig farmers was able to reduce the use of antibiotics to zero within the year. In the second phase the group of pig farmers was enlarged to 35. A special coach has been appointed to disseminate the knowledge and experience in the pork chain. Pig farmers can monitor performance on-line and receive feedback from the coach or experts if necessary.

**Slaughtering and transport:** According to Westfort Meat Products a major difference between KDV and regular pork production is the innovative character. In the new slaughterhouse, built in 2014 in IJsselsteijn, they will invest in floor heating and experimental innovations, like the ‘pit lift’ for group anesthetics (which kills the pigs faster), a system which has not been built in Europe before.

### 5.2 Local-Global characterization

The life-history of KDV reflects a variety of attempts to transform dominant features of Dutch pork chain governance. The fact that these changes cover all four criteria chosen in GLAMUR to distinguish local and global food chains, has been one of the reasons to select HoeveBV as representative for more local pork chains in the Netherlands, as outlined more in detail in following sections.

#### 5.2.1 Geographical distance

In its first stages of development De Hoeve BV may be characterized as a process of re-localization of the pork chain as it depended mostly on regional chain actors within the southern part of the Netherlands. It is a farmers-led response to societal concerns, with a specific focus on the integration of environmental and animal welfare concerns. Compared to the transport of fresh meat in conventional chains, KDV contributes to a reduction of food miles. It delivers to more than 500 sales points in the Netherlands, including market outlets at Quality Butcher Chains (Keurslagers), Small retailers, Catering Companies in Netherlands and Belgium. Additionally, KDV also exports fresh meat to Germany and the UK, so the scope is mainly “the triangle London-Paris-Berlin” (Interview, 2014).

---

14 KDV leaflet “On the way to a chain free of antibiotics”. 
However, KDV does not consider itself as a strongly re-localized pork chain. Its focus is much more on the technical and environmental development of the management pork production system. As expressed by co-founder Marc van der Eijnden: "We had a discussion with the regional Environmental Federation on regional cycles. However, the societal debate here in the province of Brabant is on smell, insecurity and distrust (as a result of health discussions), which can’t be solved by buying fodder from the neighbor. Why should I buy fodder from my neighbor? Why not buy it from France instead, if its environmental impact is lower in the case transport by ship?". Another argument is that criteria have to be communicable to the producer: ‘The longer the chain the more difficult it is to set communicable criteria for producers, such as regionally sourced pig feed, although this may be a strong argument in the communication towards consumers (Interview, 2014).

5.2.2 Resource use characteristics
KDV focusses on the development of tailor-made solutions grounded in business-based knowledge, and is less oriented on implementation of exogenous, ‘turn-key’ technology, illustrated by Verhoeven’s innovative sty. The most significant environmental performances are a reduction of ammonia and CO2 emission, nitrogen losses and energy inputs. KDV works towards a climate neutral pig sector as has been described before (3.1.4) and supports the sustainable sourcing of soy, although it doesn’t want to run ahead of regulation in 2016. KDV also cooperates with soy-producers abroad to reduce their energy-inputs (in cooperation with the NGO Solidaridad).

5.2.3 Locus of control in chain governance
The Foundation KDV has started as a bottom-up process, based on farm-led innovations, is responsible for certification of its producers and initiates all innovation projects. Pig farmers are free to leave, and or deliver products to VION, but when they want to return to KDV, they have to apply for the certification scheme again. KDV is controlled by an Advisory Board, of which one member represents the pig farmers. The search for a balanced decision making process between the chain partners is built on trust, strategic alliances, chain stability and shared risks. The advantage of chain cooperation is commitment of the actors and long-term continuity (interview Westfort Meat Products). As a result chain investments and
innovations can be done. All partners agreed to provide transparency in their business performances. Farm based pork distinctiveness and improved management via technical innovations is the basis for cooperation with other chain partners. As such KDV represents an example of collaborative learning with a more prominent role for farmers in overall chain governance than in Global Good Farming Pork and where producers do succeed to create new partnerships with the objective to align mutual interests and to establish longer term commercial relations and mutual learning processes, including the expectation of a more active role for consumers.

5.2.4 Communication and information characteristics
KDV is responsible for communication, public relations and marketing, and publishes an annual report. The mission is formulated on the website as follows: “We go for sustainable meat. This means we have an open eye for environmental and animal welfare. Furthermore we consider our mission to increase consumer awareness”. Till 2010 the chain was more a Business-to-Business case than a consumer case but KDV gradually develops the latter: “KDV develops from a label to a brand”. The origin of the meat on his table becomes more important for the consumer and KDV has already anticipated this by providing transparency in the chain. Usually supermarkets are considered to be the marketing experts, but recently KDV attracts this task more to itself. KDV aims to focus more on publicity, communication and has recently developed a consumer-oriented website as a community for interactive communication (Van Ginneken, 2000, p.17). As such overall communication and information becomes more oriented at trust based relations, collective learning and the creation of mutual commitment. According to Verhoeven: “Pig meat doesn’t sell on its own, it requires a transparent communication. Society demands this, people want to know about their food. It is however important to choose a concept which suits to your business and doesn’t increase the costs”.

Figure 4.2 Logo Sustainable Pork Chain

5.3 Performances

5.3.1 Added value
With a production of about 1 million carcasses in 2014, encompassing about 10% of total national pork market (Moesker, 2014b), KDV intends to create primarily added value for its producers through better technical performances and by improving chain efficiency, although this was initially accompanied by problems as relatively high transaction costs (Brandsma et al, 2005) and butchers with little interest in active promotion (Smit, quoted in Van der Schans, 2004). In general KDV consumer prizes are not

15 KDV brochure “Op weg naar een antibiotica vrije keten”.
significantly higher, it is mostly by means of chain shortening and cost reduction (higher cutting efficiency, decrease of losses) that it succeeds to create extra net value added. Additionally the profitability for pig farmers will also critically depend on latters’ individual skills. Verhoeven: “If you succeed to deliver pigs with added value for the wholesaler, you can be part of the best 10% in the Netherlands in terms of the cost-benefit balance, but if you use the wrong breeds or the male pigs are too heavy, the margin is lower” (Jansen, 2000).

The farmers receive a payment, based on a fixed price per pig and a flexible reward for ‘good pigs’, with more meat and less fat. These rewards can lead to large price differences (e.g. 1.70 euro instead of 1.50 euro per kilogram). It is estimated that KDV realizes in 2014 a net added value for the pig holders of around 5 cent per kilo, predominantly as a result of business efficiency gains, partly also due to the production of boars. Research confirms that boars grow faster and deliver a higher net profit due to lower feeding costs (Bikker et al., 2010). Another example of efficiency gains in combination with better animal welfare performances concerns the compulsory use of jute bags, which KDV provides for free to the pig holders. Sows are less stressed when using these bags in their nest making behavior and piglets smell the sow lying on the bags. So far KDV doesn’t create added value via the marketing of regional distinctiveness or more artisan processing techniques. According to chain director van der Eijnden, the catering branch is more open to product development then retailers, although also butchers often assess the structure of KDV pork as being better, more marbled and with less water withdrawal (‘drip’) than the mainstream. According to Westfort Meat Products the KDV label enables investments in quality, for example to prevent negative effects of distress and fatigue in pigs.

A KDV client as Hutten catering sees opportunities to further develop the marketing of pig meat: “Brabant is the pig sector but still the Brabant Ham doesn’t exist, while in Italy with smart marketing they know how to sell expensive and exclusive Parma ham”. Distribution among chain partners: The added value of the chain is redistributed among participants. Its price system offers pig farmers more certainties, opposes opportunistic behavior and creates more stability in production volumes. It delivers the meat processors a story to compete on quality and more continuity. However, the chain requires a conventional bypass of the pork that does not meet the demands of butchers or other commercial partners, which also reflects a certain dependency on the conventional pork chains (Van der Schans, 2004). According to J. de Wit of Westfort Meat Products the further you go with square valorization the more difficult it is to do this under a label: “Half of the KDV meat is exported. A large part of the pigs is transported to markets that are not ready for this meat; for example the legs, tails and heads go to China while labeled meat doesn’t interest the Chinese” (Interview, 2014).

Also the distribution of added value between chain partners would show only marginal differences with conventional chains since this would be primarily dependent on market outlet specificities. For instance, in the case of sales through butchers, the latter get a relatively large part of overall added value due to their own processing activities. The same butchers are able to sell good quality meat with additional qualities without (significant) higher consumer prices. It is further noticed that it may be rather difficult to calculate the distribution of added value among chain partners: “The margins for the supermarkets selling KDV meat may be sometimes a bit lower compared to conventional meat, but they get more positive
publicity in return and use meat as a pull factor to attract consumers” (Interview, 2014). For Westfort Meat Products it is important that they have a story towards farmers and can compete more on quality then on price. “The challenge is to deliver at the right place on the right time for a high price. We have fixed price agreements with supermarkets but orders can be cancelled at the last moment” (Interview, 2014).

Added value on regional level: KDV doesn’t consider itself a local or regional chain, although the fact that most chain actors are concentrated in the province of Brabant may create positive multipliers in terms of rural employment. Moreover, it could be argued that KDV’s efforts to reduce the negative externalities of global pork chains enhances the opportunities to create added value in other rural markets characteristic for Dutch predominantly metropolitan rural areas. Overall added value of KDV from a territorial perspective will be particularly reflected in its capacity to (further) reduce the tensions between global operating pork chains and new societal demands in such metropolitan rural areas for other rural functions, although this wider and territorial approach to assess its added value might be difficult to quantify.

5.3.2 Affordability
More generally the consumer price for KDV pork hardly differentiates from conventional pork prices, although some price differentiation might occur between its different market outlets. For instance, the price-levels of pork by quality butchers (Keurslagers) are normally higher than in the supermarkets. Moreover, KDV tries to avoid stunt pricing by making longer term contracts with supermarkets, including agreements with retailers to avoid selling cheaper pork variants. Most of the supermarkets that supply KDV meat switch their assortment at once to 100% KDV. Only premium meat (e.g. Iberico ham) is allowed: “We have been able mostly –though not entirely- to prevent stunt actions with the price of meat”.

KDV’s major objective is to restore consumer’s trust in pork and to increase their willingness to pay a premium price for guaranteed better food quality sold in Keurslager shops and retailers. Its former official Environmental Certification Label, with the ambition to contribute to consumer’s trust in food systems, was hardly known by consumers. Nowadays KDV aims to develop its own labels- which remain so far mainly business labels. While consumers become more and more interested in the origin of meat, KDV realizes that the current story told to consumers is still too abstract and technical. According to a report of the Dutch ING bank, 2% of overall food basket is spend on meat, whereas 5% of national consumers would be willing to spend extra for sustainable food. Based on national consumer marketing studies KDV’s distinctiveness appeals to the 14% ‘thoughtful consumers’ that are particular sensitive to environmental and animal welfare issues and – although somewhat less straightforward- the 17% of Dutch consumers with a strong orientation on taste (ING, 2011)

5.3.3 Governance
KDV arranges regular contacts with delivering pig farmers via farm visits, new year meetings, a newsletter and events such as the opening of Verhoeven’s new sty. Farmers may also contact meat processors. KDV has an Advisory Board with representatives of key-actors16 (from the private sector, producers, NGO’s,

---

16 Paul van Hooren (SuperUnie Retail), Ad v.d. Tillaart (Trader); Ben Hermans (SNM/NGO), Ad Romme (farmer), Katie Minderhout (Solidaridad/NGO), Lenie Klein Holkenborg (independent expert)
traders) to enable a broad societal advice. The Board should guarantee that KDV addresses the needs of producers, consumers and society at large by critically following KDV’s innovation plans and to come with suggestions for new ideas. KDV cooperates with the private sector (slaughterhouses, quality butchers), environmental and animal welfare NGO’s (Stichting Natuur en Milieu, Solidaridad, Dierenbescherming), scientific and governmental bodies. Overall chain governance of KDV may be as such characterized by the key words cooperation and strategic alliances. In the words of Hans Verhoeven: “NGO’s made us aware of developments in society and how we should adapt to these KDV benefits from this” (Moesker, 2014a, p.5).

The fresh and processed meat is particularly sold to smaller Dutch supermarket chains (e.g. Coop, Deen, MCD, Poiesz), and exported to Sainsbury’s in the UK. Different catering companies like Hutten and Albron and even the fast food chain FEBO are other important national market outlets (Van Ginneken, 2000; Moesker, 2014a; Moesker, 2014b, ING, 2011) 17. The contracts with national quality butchers are still on an individual basis, which makes key actor Van der Eijnden confess that KDV “may be increasingly strong in marketing, but still remains a rather weak brand”.

This strong marketing orientation is also expressed in KDV farmers that use the Better Life label, initiated by VIION (see first case) in cooperation with Dutch Organization for the Protection of Animal Rights (Dierenbescherming). About 30% of KDV pig farmers fulfills the Better Life (star) criteria. Additionally, KDV launched an organic pork line with the same purpose to better meet the specific and differentiating demands of its clientele. Westfort Meat Products, being one of the key partners of KDV further produces fresh meat under the higher-segmented FRIBERNE pig label, fed with herbs (www.friberne.nl) since it considers it important to support a large product variety in pork in different price ranges and under different labels, so the consumer can choose. It shows that, similar to VIION, also KDV actors may operate in different chains.

KDV has to face other initiatives as well, such as the so-called ‘Pig of tomorrow’, a set of criteria introduced by the Central Bureau for Food Trade (CBL) and resulting from the growing concern for animal welfare in the Netherlands. The criteria entail 25% more living space for fattening pigs and up to 50% more space for piglets. This should also reduce turbulence in the stable. Requirements are set to keep the tail as long as possible and interventions such as the grinding of teeth will be banned. The transport of pigs will be limited to a maximum of 6 hours and the piglets are allowed to stay longer with their mothers (on average 28 days). Castration will be stopped earlier (2014 instead of 2015) and stringent quality checks on the drinking water of pigs will be introduced (Miele et al, in press). According to KDV these criteria are similar to KDV, but nevertheless not as successful as “The pig of tomorrow’ is not a chain but just a set of criteria. They argue that no one owns this top-down implemented concept and producers will wait and see who will apply the concept most cheap, especially in a situation where a supermarket will demand a lower price. This will create competition based on price and lead to a loss of added value for the producer.

Transparency of the chain: KDV aims to create a constructive environment for further chain improvements and novel responses to market developments. “The big advantage is that we know all our pig holders. We have the certification in place and want to deepen the certification criteria in the coming

17 See also: http://www.meat-co.nl
years. KDV has already anticipated on the demand for more transparency: “The origin of meat becomes more relevant, much has changed in the last 2 years. First it was ‘don’t ask, don’t tell’, but that is over. We have arranged transparency” (Interview, 2014).

KDV has started the so-called Energy Saving Company (ESCO) fund in cooperation with chain actors and the national Rabobank. The ESCO fund aims to facilitate pork producers with energy-reducing investment plans. It provides these producers with low interest loans against annual re-payment obligations that equalize expected annual energy-savings. Additionally there are plans in development, again in cooperation with chain actors (e.g. La Place-restaurants) to start a broader sustainability fund for novel stable systems based on crowd funding.

Dependence on public support: Public support can fulfill different functions such as financial support, legitimization and adaptation of regulations. KDV mobilized these various types of support from (semi-)governmental bodies, societal organizations and national research institutions for its elaboration of an Environmental Certification Label. Certainly, this went along with contradictions and conflicts with prevailing sets of rules and regulations as e.g. demonstrated by unsuccessful attempts to implement a control system that enables to avoid double administrative checks. Yet, KDV appears to dispose of a strong capacity to mobilize different types of support, as particularly illustrated by a large amount of projects developed in cooperation with the national agri-expert system, policy actors and NGO’s. KDV’s own budget amounts about 700.000 euro’s for: 1) control and certification (about 50%); 2) innovation, research, development and implementation (about 35%) and 3) communication activities directed towards producers and consumers (about 15%). This annual budget comes from producers (one third, in accordance to production volumes), Westfort Meat processing (ibid) and participating butchers, caterers and retailers (another third of the total budget).

Self-governance capacity & Self-regulation capacity:
Foregoing description of overall chain governance characteristics of KDV may be summarized as a step-by-step enlarged self-organizational capacity of regional pig farmers in terms of responsiveness to societal concerns. Bridging social capital increased as a result of cooperation with environmental organizations and policy bodies. Organizational dynamics can primarily be understood as an attempt of pig-farmers to deconstruct the dominant organizational configuration in conventional pig meat supply chains. The actor-network has gradually become more stable and robust when relations where formalized (labelling, contracts, and so on) and the new Foundation KDV was established. KDV supports chain partners with training and marketing communication (ING, 2011). Much more than within the Good Farming Global chain, KDV succeeds to implement organizational changes based on reciprocity, trust and mutual interests within overall chain partnership. The initiative illustrates that this ability to build new strategic alliance creates space for experimentation and learning around the spearheads of KDV as summarized in Box 4.2.

Drastic downscaling turned out to be a crucial pre-condition to rearrange these rather persistent problems of Dutch conventional pork supply chain. Subsequently a process of up scaling has been initiated, although, as emphasized, this is not a goal in itself, but closely interwoven with the preservation of distinctive qualities such as environmental and management efficiency and non-castration and their gradually development in new technical-institutional configurations, by building alliances with new actors.

Box 4.2 KDV’s Environmental and Animal Welfare Targets  (Source: Annual Report KDV)

<table>
<thead>
<tr>
<th>Environment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% less minerals in the manure (N, P)</td>
</tr>
<tr>
<td>20% less greenhouse gases (CO2, NH3 emission)</td>
</tr>
<tr>
<td>43% energy savings</td>
</tr>
<tr>
<td>15% reduction of heavy metals</td>
</tr>
<tr>
<td>Use of the environmental measurement tool</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Animal welfare:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ban om castration since 2007</td>
</tr>
<tr>
<td>More freedom of movement</td>
</tr>
<tr>
<td>Unlimited Drinkwater and distraction material</td>
</tr>
<tr>
<td>Pig toilet</td>
</tr>
<tr>
<td>Transport max. 2 hours</td>
</tr>
<tr>
<td>Use of the animal welfare measurement tool</td>
</tr>
</tbody>
</table>

As such KDV combines management efficiency and innovation with a focus on low production costs. Up scaling was realized from 2000 onwards by a closer cooperation with chain partners. “A turning point was when we involved the trade chain more explicitly. We organized a meeting where the Agricultural Economic Institute (LEI) sketched a picture of the market for pig meat. For the trading companies this was an eye-opener and a stimulus to do more with environmentally produced pig meat” (Asscheman, 2014, p.23). “Important is to have a scale that is relevant for market actors and enables us to innovate. Supermarkets work with concepts and we can guarantee that our meat meets the criteria for environment and animal welfare”. KDV now exports also to German, Belgium and British supermarkets and -although incidentally- even to an Australian purchaser impressed by its animal welfare criteria (Logemann, 2013). Volumes have increased to 1 million pigs per year in 2014 and are expected to further increase the next 5 years with 50%. According to Marc van der Eijnden KDV’s growth spurt strategy has however reached its peak. Their strategy will focus more on a ‘deepening strategy’ in the future by a further improvement in sustainability.

The nature of contractual relationships between actors in each stage of the pork chain: With the supermarkets long-term price contracts have been made. KDV makes individual agreements with each of the butchers. Pig holders are free to leave KDV, but have to apply again for the label, when they want to return.

Leadership: The start of the initiative and the ability of De Hoeve to mobilize different types of public support originates largely from the complementary skills and drive of the two initiators working as change agents. And until now Verhoeven and Van der Eijnden remain the leaders. Here we focus on Verhoeven because he has been frequently portrayed in the media, who has a background in consultancy and much experience in process management. This is one of the key factors in the emergence and scaling up of the “de Hoeve” initiative. Verhoeven now deals with the contacts among the participating pig farmers and visits and evaluates potential participants (Moesker, 2014b). “Perseverance, an urge to change and patience to wait for the right moment, characterize the agricultural entrepreneur Hans Verhoeven”

Hans Verhoeven, considering himself more as an entrepreneur than as a man of practice, stopped his chairmanship of general ZLTO pig-farmers organization in 2006: “It gave me the time and space to enhance the KDV-initiative. We organized a meeting with the LEI-institute and the meat companies Kruiswijk and Lunenburg. I presented my vision on the development of the pig sector and how cooperation could lead to chain cooperation. The cooperation took off and this gained momentum” (Moesker, 2014b, p.16).

5.3.4 Animal Welfare
KDV also includes criteria for animal welfare, formulated in cooperation with national NGO Stichting Natuur en Milieu (Nature and Environment). Pig farmers have to pay specific attention to animal welfare issues such as obligatory use of daylight, unlimited availability of drinking water, presence of separate sick bays, toys for entertainment and straw sprinkling on the sty floor to stimulate natural behavior. Moreover, KDV was the first pork chain that announced the prohibition of castration in 2007 (Moesker, 2014a) which is thought to be grounded on family-farming logics: “When you want to support and control health and animal welfare 24 hours a day, this requires a family business”. These welfare measures are combined with animal health issues. In 2010 several pig farmers started an antibiotics project, which led to a reduction of 90%20. KDV also started the debate on the availability of fresh drinking water by introducing in the new test sty of Verhoeven several technical innovations that intended to improve the quality and availability of fresh drinking water and as such to decrease the amount of infections that underlies current antibiotic dependency. Since 1-1-2012 employees from Westfort Meat BV are trained in how to treat animals to receive their obligatory certificate of competence. KDV profiles itself mostly with animal freedoms that can be integrated with better economic results. It emphasizes its positive scores on animal welfare indicators as drop-out rates of piglets and the absence of organ deviations. The places of farrowing are enriched with nest material (e.g. jute bags) with the smell of the mother sow21. The postpartum period (the weaning age) has been extended to 4 weeks. KDV re-introduced a smelling test to guarantee meat quality and communicated this to their chain partners (Van Ginneken, 2000).

KDV selects those criteria for animal welfare that are communicable to farmers and consumers. Compared to organic pork production methods KDV pays less attention to the freedom of natural behavior. A free range system is not only considered too costly, given the specific features of Dutch pork production systems, but also less substantial for animal welfare then the presence of management skills: “I consider the area per animal not as an indication for animal welfare” (Interview, 2014). The amount of straw used on sty floors in organic animal husbandry, for instance, is considered to be a potential source for infection.

As a consequence of national implementation of the EU Pig Directive (see Table 4.3), KDV lost in part its forerunner position on animal welfare, in comparison to conventional pork chain regulatory frameworks. Other chains started to copy parts of the KDV system. However, it keeps the advantage of implementing measures rather quickly by deciding for collective investment, as happened e.g. in the provision of jute bags as distraction material.

---

20 http://duurzaamvarkensvlees.nl/dier-milieu/
21 http://www.meatr-co.nl
Animal transport: Transport distances from farm to slaughter house are lower (the estimation is 250 km), compared with the conventional chain. Westfort has arranged that pigs are transported in closed trucks with better indoor climate (cross ventilation and subdued light). KDV supports transporters when they invest in these special trucks by paying 10 cents extra per pig and has installed camera surveillance. The support in animal-friendly transport can be up to 80% of the investment. Transporters are brought together every year by Westfort and a ‘pig whisperer’ has been enrolled to train truck drivers how to treat the animals and unload them.

Slaughtering: The before mentioned ‘pig whisperer’, a veterinarian, teaches employers of Westfort BV how to prevent fatigue or stressed pigs. Westfort invests in a new anesthetics system that increases the level of CO2 in pigs quicker and thus reduces the choking time.

Table 4.3 Dutch implementation of EU Directive 2008/120 for pigs (Source: EU Animal Welfare Project)

<table>
<thead>
<tr>
<th>Directive 2008/120/EC (pigs)</th>
<th>How implemented in public rules?</th>
</tr>
</thead>
</table>
| Minimum surface per pig | Pig Decision: 
Gilt or sow ≥ 2.75m², Other pigs ≥ 2.5m² (0.2-1.2m²) from 1-1-2013 |
| Group housing (4 weeks after service). | Pig Decision Act 2: after 6 days (after service). |
| An environment corresponding to their needs for exercise and locomotory behavior; Sows and gilts have permanent access to manipulable material | Conform Directive |
| Rules should be laid down to ensure better practices on tail-docking, tooth-clipping, tooth-grinding and castration. | Pig Decision art. 35. Castration only with anaesthesia and by a veterinarian |
| A balance between welfare, including health, economic and social considerations, and also environmental impact. | ? |
| From 1 January 2006 the use of teethers for sows and gilts shall be prohibited. | Was already prohibited in the Netherlands |
| Sufficient food | Art. 11 and 13 Pig Decision conform Directive |
| Inspections by the competent authority (each year a representative sample) | (The KDV system includes training for pig holders). |

5.3.5 Labour relations
Initially KDV intended to integrate labour relations during its participation in the development of the Environmental Certification Scheme for pork production since this would allow to distinguish itself from e.g. German competitors, where workers in slaughterhouses (until recently) did not know collective labour arrangements. Yet, as KDV commercial activities are primarily oriented at the Netherlands, it did not consider the issue of labour relations as a priority and therefore finally decided not to include these in the Environmental Certification Scheme. Yet, it is argued that KDV attracts a certain type of farmers, that is, those with a preference for family-businesses. A family-business is considered the most appropriate organization as the promotion of animal welfare and health, requires 24 hour monitoring. KDV has a lower fit with larger businesses and perceives them to have a different mentality. More generally KDV’s attention for labour relations in pork production may be associated with a loss of professional prestige and self-esteem of national pork producers. Whereas pork producers in general may have been accused to ‘turn their back to changing societal demands’, KDV could be understood as an active attempt to counterbalance these kinds of sentiments and to preserve the professional prestige and self-esteem of pork producers by much more pro-active attitudes regarding the ‘societal license to produce’.

---

22 [http://duurzaamvarkensvlees.nl/dier-milieu/](http://duurzaamvarkensvlees.nl/dier-milieu/)
Labour scandals & Temporal labour, contracts etc.: With regard to labour conditions in the slaughter houses and processing industry that are part of KDV, Westfort Meat Products sees itself as a family-business where a relatively large part of employees has a fixed contract and tricky labour constructions would be absent. Although no information could be found on wage labour conditions at the level of primary production, it may be argued that family-farm business are over-represented among KDV producers and therefore in general will depend less on external labour force.

5.3.6 Territoriality
As mentioned in the Good Farming Global case, Dutch pork production has territorial components in the sense of strong relations with the southern part of the Netherlands with a tradition of cooperativism among relatively small, highly intensive family-farms. Although influenced by processes of modernization, individualization and privatization, it may be argued that KDV at least partly builds upon this tradition by searching for new forms of territory based cooperation, not only involving farmers but this time also societal movements and pork chain actors. These new forms of cooperation primarily intend to safeguard perspectives for family-based pork production by developing new solutions for the most persistent problems of regional pork production instead of returning to territory-based product identities. According to KDV’s chain director Van der Eijnden their problems would center especially on odor and health concerns, the latter also due to a regional Q-fever outbreak in goat keeping with severe public health consequences and growing public health concerns about antibiotic resistances caused by pork production. These public concerns are probably most clearly manifested by the introduction of quarantine obligations for pork producing families in the case of hospitalization. Additionally to these more territory specific public concerns, KDV further responds to wider societal concerns regarding animal welfare and food origin issues. As such KDV claims to contribute to sustainable rural development by following a step by step, gradual improvement of its sustainability performances (Brandsma et al, 2005). Finally, although KDV dissociates itself from being a strongly territorial or regional oriented pork chain, it does intend to source inputs as technology as nearby as possible. Also the fact that its principle chain actors are concentrated in two provinces is thought to positively contribute to the preservation of rural and regional employment.

5.3.7 Food Safety
KDV builds strongly upon the private and public regulatory frameworks as earlier introduced for Good Farming Global pork.
Levels of use of antibiotics: De Hoeve purchases feed from a GMP+ recognized food supplier which guarantees the absence of preventive use of antibiotics in pig feed. In general large pig farmers in areas with a high density of pigs use antibiotics more often (van der Fels-Klerx, 2011 cited on internet 23). The Dutch government wants to reduce the use of antibiotics by 50% in 2013 and 70% in 2015. KDV aims to realize a pig chain totally free from antibiotics. The use of antibiotics in the pig and chicken sector decreases since 2007, was 50% lower in 2011 compared to 2009 (Bondt et al. 2012 cited on internet 24) and has further decreased since then.
Food scandals: Animal feed in general is a weak link in food safety control systems. KDV doesn’t offer an alternative trajectory to reduce food safety risks, although it abandoned the use of waste flows from the food industry to avoid food scandals. Moreover, due to the close relationships, KDV claims to respond

23 Ibid.
24 http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0565-Antibioticagebruik-in-de-veehouderij.html?i=11-60
more quickly to general food scandals. For instance, in 2013, after the aflatoxine scandal with Croatian maize, KDV was able to guarantee within a few days that the use of this feed stayed below the norms.

### 5.3.8 Biodiversity

The major part of KDV pigs stems from the Pietrain-breed which originates from Belgium and was bred between 1920 and 1950 (see also the cover picture of this report). Yet, biodiversity is an issue that attracts hardly attention in relation to the preservation of genetic diversity. More indirectly biodiversity appeared in KDV’s fodder sourcing policy. It participates in the national Taskforce Sustainable Soy Sourcing, as mentioned before, which aims to achieve a sustainable soy production, without deforestation or use of genetic modified varieties (GMO’s). However, KDV so far does not distinguish itself by the use of more sustainable soy\(^\text{25}\) since its current scale features would make this too expensive. Therefore, it limits itself to the financial support of sustainability projects of soy producers in countries such as Brazil, India and Mozambique, together with the Dutch NGO Solidaridad.

### 5.3.9 Resource use efficiency

We will limit ourselves here to a more general impression of stakeholders opinions about the distinctiveness of KDV performances in this respect. National NGO involved in the development of the environmental certificate for pork production claimed a 7% improvement on environmental performances through a better feed conversion and less energy inputs in 2002 (Milieukeur 2003a). In 2013 KDV profiled itself with distinctive performances as summarized in Table 4.4 with references to the established norms for energy, phosphate, nitrogen, copper, zinc and the better performances of Sustainable Pork producers in relative terms (last column).

Table 4.4 KDV’s resource efficiency performances compared to national norms (Source: Annual Report KDV, 2013)

<table>
<thead>
<tr>
<th></th>
<th>KDV Pork producers</th>
<th>Norm</th>
<th>% Better performance of KDV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>1395,4</td>
<td>1800</td>
<td>22</td>
</tr>
<tr>
<td>Phosphate</td>
<td>13,8</td>
<td>16,2</td>
<td>15</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>38,1</td>
<td>41,4</td>
<td>8</td>
</tr>
<tr>
<td>Copper</td>
<td>90,1</td>
<td>92</td>
<td>2</td>
</tr>
<tr>
<td>Zinc</td>
<td>297</td>
<td>415</td>
<td>28</td>
</tr>
</tbody>
</table>

To a certain extent KDV re-localized pork production and consumption, although it gradually increased its marketing scope to nationally and internationally operating supermarkets and catering firms. The reduction of food miles is not a deliberate KDV strategy: “I don’t see the point of buying grain from my neighbor just because it is my neighbor. What is the advantage of buying grain from the neighbor when grain from France may have a lower overall environmental impact” (Interview 2014)

KDV aims to realize a climate neutral pig sector in 2016 via the decrease of energy-use and the use of rest warmth from the stables, as part of a so called ‘Green Deal’ with the government. “We are experimenting with solar panels, which deliver not just electricity but also heat. The heat can be used to dry the manure” (Bojorge & Hoed, 2012, p.18). The heat of a pig-toilet in the new demonstration stable of Verhoeven will

---

\(^{25}\) Soya is 10% of the pig feed.
be re-used and a new type of ventilator will be installed to reduce the use of energy. In 2013 an average KDV pig farmer saved 34% of energy in comparison with Dutch pig holding with a similar size.

5.3.10 Resilience
As compared to Good Farming Global, overall resilience of KDV may be summarized as follows:

- Similar farm-gate price-volatilities without indications that off-farm income generation differ significantly from average Dutch pork producer.
- A stronger intention to create mutual commitment between chain actors.
- A stronger ability to develop tailor-made and farmers-led innovations that intend to integrate environmental- and animal welfare performances in pork production
- A stronger ability to mobilize policy and wider societal support, including experimental room for manoeuvre with prevailing regulatory frameworks and more crowd-funding inspired ways of financing.
- A stronger focus on territory specific trade-offs of pork production as smell and public health issues (MRSA)
- A more proactive attitude to sustain pork production in balanced ways without losing its traditional high consumer affordability.
- More self-governance capacity in terms of collaborative learning, also due to the presence of leadership skills.
- A vulnerable but promising pork chain configuration in terms of: 1) overall competiveness in a context dominated by strong scale enlargement tendencies; 2) preservation of distinctiveness vis-à-vis pork quality differentiation initiatives of the principle competitors; 3) overall ability to translate sustainability performances into extra added value and higher farm-incomes; 4) mobilization of consumer commitment by means of willingness to pay for its superior performances.
6. Lupine Pork

6.1 Introduction
The third Dutch pork case enables to further illustrate some of the complexity to re-localize pork chains in a context characterized by long lasting and dominantly present modernization and globalization forces. It concerns an early life-cycle initiative which has been primarily selected as an interesting case in point to apply LCA as an instrument to further substantiate (or not) claims on better environmental benefits through a return to local fodder sourcing in pork production. As emphasized before, fodder sourcing is one of the most globalized component of Dutch pork production. As such this third Dutch pork case shows similarities with the Italian Cinta Senese pork case, where local fodder sourcing is an important distinctive feature, although with an already much longer history and in many other ways fundamentally different from this most ‘local’ Dutch pork chain. For the sake of comparability we will present this third case in the same format as the two previous cases, notwithstanding the fact that for most performance attributes it is still rather premature to include these in this qualitative analysis.

6.2. Background, Dynamics
Lupine pork consist of an individual initiative of a female farmer, Annechien ten Have, with roots in national pork producer interest organization.26 Rather exceptional in the Dutch context, her pork producing activities have been traditionally embedded in a mixed farming system that comprises different arable crops such as grain, potatoes, sugar beets and maize. Some years ago, Annechien developed the idea to deepen their land based pork production by the re-introduction of Lupine as fodder source for pork production with the intention to improve its environmental, animal health and taste performances. To further explore and substantiate the potential benefits of Lupine Pork as a fodder source, she sought contact with the Dutch agri-expert system. Since then several steps have been made, although the initiative continues to be in a pilot stage. The main obstacle for its intended up scaling concerns the mobilization of financial resources. Banks turn out to be reluctant to finance the building of a novel, animal friendly sty in the absence of concrete and secure market outlets. Annechien remains optimistic about the economic viability of her initiative and started to search for other external financers, facilitated by a former retail manager and supplemented with crowd funding initiatives with the main purpose to create commitment among potential consumers.

6.3. Local-global characterisation

6.3.1 Geographical distance of markets
Although first contacts have been established with potential chain partners such as butchers, smaller retailers and catering businesses, so far it is still premature to draw conclusions regarding the

26 In recent years, quite some similar initiatives has been taken by individual or small groups of pig farmers throughout the Netherlands, each of them focusing on different particularities, like animal welfare, typical pork taste, local marketing, etc.
geographical distance of output markets. The overall marketing concept is not primarily local or regional but intends to focus on higher market segments for pork, including quality butchers, catering businesses and restaurants. At the same time it is important to notice that Lupine Pork is embedded in multiple output markets for arable products which are characterized by strong globalization tendencies (e.g. sugar beet and grain), as well as the more regional market for green energy by the presence of a bio-digestor installation. If we consider also the variety of input markets, overall complexity in the interrelations between local versus global interaction patterns further increases. On-farm cultivation of different fodder components for Lupine Pork (additionally to lupine and maize and grain) partly builds upon the use of pork manure and other organic rest-material from the bio-digestor, which energy production and use of rest-warmth partly depends upon the use of other waste material from own potato production (e.g. potato skins) as well agro-food industrial waste-material with a global sourcing origin (e.g. orange skins). All in all shows some of the complexity to disentangle and unreveal overall Lupine Pork characteristics in terms of the geographical distance of its underlying input and output market relations.

Figure 5.1: Lupine Pork’s principle chain relations

6.3.2 Resource use characteristics
Lupine pork starts from the idea that local fodder sourcing goes along with environmental benefits. Additionally to less food miles these benefits encompass extra crop rotation opportunities and less dependence on external fertilizers by Lupine’s Nitrogen fixing capacity. A resource use characteristic that may be perceived as a contemporary attempt to re-construct the closed cycle typical for traditional mixed farming systems by combining plant- and animal production components in ways that improve nutrient efficiency levels. The use and valorisation of waste material for energy production is a novel component in this search for closed circuits. Lupine as a local fodder source is further expected to contribute positively to distinctiveness in terms of taste according to culinary experts during various taste-meetings and to improve animal health by reducing liver problems in intensive animal husbandry systems. An animal health claim that would be also accompanied by lower levels of antibiotics use is another aspect of Lupine pork’s resource use specificity.
6.3.3 Locus of control in chain governance
Overall LUPINE chain governance continues to centre still mainly around Annechien ten Have. As the responsible for pork production within overall farm-enterprise activities, she contacted different knowledge institutions for the development of a distinctive marketing concept, mobilized support for different project proposals, started to contact potential chain partners and negotiates with institutional settings about e.g. experimental space within prevailing regulatory frameworks for the self-designed more animal friendly stable system (see also below). She is also the one who explores the opportunities for the future commercialization of Lupine Pork by contacting or responding to chain partners that show an interest in her initiative. Interestingly, the major Dutch retailer Albert Heijn (part of Ahold) as well as VION expressed their interests to explore future cooperation opportunities. In principle both are perceived as interesting partners for Lupine Pork. Yet, similar to KDV, also Lupine Pork profiles itself as an initiative where the locus of control in overall chain governance will change fundamentally to the benefit of primary producers (see further the performance attribute ‘chain governance’).

6.3.4 Communication and information characteristics
Although still an early-life-cycle initiative, Lupine Pork already succeeded in attracting quite a lot of media attention. The initiative pops up frequently in agricultural media, food culture magazines and food movement related communication channels. Annechien’s capacity to attract media attention and to mobilize agri- and other expertise throughout the world is not just expressed in her successful attempt to be included in Dutch GLAMUR case-study analysis, which initially foresaw to restrict its comparative analysis to Global Good Farming Pork and KDV. She also became the first Dutch Nuffield International Farming Scholar, going along with visits to America, New Zealand, Australia and Brazil, where she got informed about a variety of projects around sustainable animal husbandry systems. In her own words, ‘not with the intention or pretention to copy these projects that emerged in completely different settings, but primarily with the idea to confront myself with solutions elsewhere and to check if I’m still on the right track’.

6.4. Performances of Lupine pork
6.4.1 Added value
There is still little to say regarding this performance attribute given current absence of market lets that surpass the stage of experimentation. The intention is to enhance added value creation at farm level and to position Lupine pork somewhere between the retail price of ‘Better Life 1 Star’ and organic pork. Additionally to a certain plus on off-farm gate pork prices, this extra value creation is further closely interwoven with farm-internal waste flow valorization, not only through pork production but also within the biomass fed energy plant. The environmental benefits of this waste-flow valorization will be further substantiated by the LCA-analysis within overall case-study approach. Here it is important to notice that the value creation of the pork production activities partly depend upon national prices for green energy, which are currently relatively low due to over-supply) and the prices for additional bio-digestor inputs to complement manure as organic material provider (about 50% of total input of organic material). At this moment prices for complementary organic material as maize are relatively high, whereas food waste inputs (e.g. fruits, pears, cucumber, etc.) are relatively cheap, also due to Russian Trade Boycott consequences. All together it illustrates some of the complexity to assess the added value of pork.
production in isolation from these other farm-income activities and to allocate the costs and benefits among these different income activities.

After resolving the spatial planning problems around the building license for its new stable (see above), Lupine Pork is currently mobilizing external funding for its accompanying investment requirements (in total estimated at 2.8 million euro). To attract external financing it explores different trajectories. Ongoing crowdfunding initiatives intend to mobilize particularly commitment among NGO’s and do not foresee to generate a major part of overall necessary investment sum. With the help of someone with a background in private financing, also the opportunity of private investments will be actively being explored, amongst others by the development of a leaflet that foresees an annual profit rate for investors of around 8% (Ten Have Mellema, 2014). A third trajectory concerns financing by banks, which, however, so far still turns out to be difficult due to the absence of customer guarantees.

6.4.2 Affordability
Although key actor Annehien ten Have is reluctant to mention concrete figures about foreseen consumer price-level, it is expected that overall price-setting will imply a significant higher price-level compared to conventional pork outlets. Indicatively price-differences are being positioned between the price of Better Life 1 Star and organic pork, which covers a rather broad range of +20% to +200% compared to non-labeled ‘basic’ pork depending upon the benchmark (other retail outlets, butchers?, caterers?) and the inclusion or exclusion of discount actions. More generally it is stressed that Lupine Pork aims to target consumers that appreciate superiority in taste. As confirmed by recent marketing research, Dutch consumers acknowledge the distinctive features of the taste, bite and smell of Lupine Pork and, after gether additional information of its specific characteristics, would be also willing to pay extra for these specific features. At the same time it is important to recall that so far Lupine Pork is only available at one butcher shop in Rotterdam and that these marketing research outcomes are no more than a first impression of Dutch consumers’ willingness to pay for Lupine Pork quality.

6.4.3 Governance
Its early-life cycle characteristics make it also difficult to assess Lupine pork along this second performance attribute. Nevertheless, some observation can be made. According to key initiator Annehien ten Have, the main governance challenge will be to come to agreements with chain partners about price-agreements for longer time periods to make overall investment plans also economically viable. She further plans to create a sales company, with family Ten Have Mellema as single share-holder, that will have the responsibility to market Lupine Pork and to stimulate product innovation. Both aspects, professional marketing and investing in product innovation, are thought to be of major importance to come to a ‘squared’ valorization of Lupine Pork in different markets for fresh and processed pork. As foreseen, butcher Jan-Willem Tol in the metropolitan city of Rotterdam will be a key actor to come to product innovation (f.e. Lupine ham) that succeeds in combining more artisanal pork product qualities with sufficient up scaling potentials.

6.4.4 Animal Welfare
This performance attribute attracts a lot of attention in overall marketing concept. Firstly, the initiative involves a novel animal friendly stable system, including a free-range system and extra stable space per animal (1.8 m2) and straw as bedding material, developed in close cooperation with national agri-expert system. Its realization had to face especially prevailing environmental regulations for assumed emissions levels, also due to the fact that the exploration of technological solutions such as a ‘manure conveyor belt’ that separate the liquid and non-liquid components of manure to reduce emission levels, still lack sufficient practical proof in free range systems. After a rather time-consuming process to get experimental space within prevailing emissions regulations this novel stable system will get the opportunity to prove itself into practice.
Secondly, also the use of Lupine as fodder source is associated with animal welfare benefits. It is claimed that Lupine will improve animal health by its capacity to reduce the frequency of liver related diseases in pig husbandry systems.

6.4.5 Labor relations
It could be argued that also Lupine Pork illustrates how on-going re-localization attempts in Dutch pig husbandry are primarily driven by proactive responses to the marginalization of family-based farming through agricultural modernization tendencies, covering multiple aspects such as loss of professional self-esteem, loss of labour satisfaction and loss of more direct and close relations with consumers. Family-farms’ specific resilience to overcome these marginalization tendencies manifest itself in the case of Lupine Pork, amongst others, in a re-definition of farm-boundaries (inclusion of energy production), new professional identities (multifunctionality as guiding principle) and novel gender roles in overall farm internal labour division. Annechien ten Have further states that it has been her experiences as chairwoman of national pork producers interest groups that made her belief that if everybody agrees that we should produce differently, it should be possible to produce differently by joining forces and establishing new partnerships.

6.4.6 Territoriality
Lupine pork involves local fodder sourcing as one of the components to return to more farmers-led distinctive pork production, complemented with other aspects as also distinctive pig breed features, although so far unknown for the broader public and thus without transparent roots in terms of territoriality. Together with its multi-faceted relations with waste-flow valorization as mentioned before, it makes Lupine Pork an interesting example of re-localized pork production in a contextual setting without much tradition in this sense. This absence of historical rootedness in regional farming activities may be understood as an indication that territoriality in Dutch pork production may re-emerge in the Netherlands particularly outside the most typical production areas. At the same time it is importance to notice that key actor Annechien ten Have approaches territoriality predominantly as something that enables to restore farm-based distinctiveness and prefers to speak of Dutch Lupine Pork for consumers that know to appreciate tasty pork without putting much attention to the specific features of Groningen as production location.

6.4.7. Food Safety
The issue of food safety gets little explicit attention in the overall profiling of the distinctive features of Lupine Pork. In a more indirect way its food safety performances might be related to its attempts to return to local fodder sourcing and as such to more transparency to the origin of fodder components and less vulnerability to food safety issues through fodder sourcing contamination. Similarly also Lupine Pork’s Animal Welfare claims could be associated with better food safety performances since these might go along with a lower dependence on antibiotics as a more long-term public health threat.

6.4.8 Biodiversity
As a Nitrogen fixer Lupine is expected to contribute positively to the preservation of biodiversity in arable farming. The same goes for its positive contribution to more environmentally friendly crop rotation systems as another aspect of the overall wider environmental benefits of its role in the development of distinctive pork qualities. Additionally Lupine Pork distinguishes itself by the preservation of genetic diversity through the choice for pig breeds with superior taste features, although the exact genetic distinctiveness of this pig breed might be still not revealed.
6.4.9 Resource use efficiency
Lupine Pork represents in different ways an interesting case in point for resource use efficiency. Firstly, it challenges the dominant idea in conventional pork production (Good Farming Global Pork) that land-dependent pork production is economically unviable in the Netherlands. Secondly, it explores new solutions for the trade-offs between animal welfare- and environmental performances. Whereas in conventional pork production these trade-offs are frequently used to disqualify alternative production systems (e.g. organic pork production is said to produce higher emissions per animal and less efficient input-output relations), Lupine Pork challenges these ideas by building upon the advantages of mixed farming systems (closed circuits at farm-level) in combination with new types of circular relations by energy production out of on-farm waste-flows, complemented with agro-industrial waste-material. As demonstrated by the outcomes of the LCA, this goes along with relatively strong resource use efficiency performances.

6.4.10 Resilience
Again building upon our earlier introduction to the multi-facetted nature of this last chain performance attribute, the resilience of Lupine Pork might be summarized as follows:

- Entrepreneurial skills in terms of management of expectations, communication skills, creation of new relations and partnerships and mobilization of experimental space within regulatory frameworks
- A return to local fodder sourcing in combination with waste-flow valorization that integrates environmental benefits with better animal welfare and farm-based distinctive pork qualities that intend to enhance farmers position in pork chains.
- A growing societal, institutional and food chain partners’ interest in the promises of this specific mixture of re-‘localization’ and ‘circular economy’ thinking and acting.

The vulnerability of Lupine Pork appears particularly in the economic domain, where the realization of overall investment plans still critically depend upon the mobilization of external financial support among private investors, formal banks and by crowdfunding activities.
7. Different Global - Local interaction patterns

The three Dutch case studies Good Farming Global, Sustainable Pork Chain and Lupine Pork clearly demonstrate that local and global are relative notions that become more meaningful in relation to each other. Put differently, local and global are in many ways mutually intertwined and entangled and it requires the unraveling of highly complex interaction patterns to assess pork chain performances. The complexity of these interaction patterns has been illustrated in different ways. First, Dutch pork chain actors turn out to operate frequently in multiple chains. VION, as the dominant player in Good Farming Global, is also increasingly involved in the development of other, less global pork chains, covering quality labels as Good Farming Star and Organic Pork. The same goes for HoeveBV, as the key initiator of Sustainable Pork Chain (KDV), which also started to differentiate its pork activities along sustainability and animal welfare criteria. Lupine Pork demonstrates that re-localization attempts in pork production may also be embedded in a wider operation in global chains for arable products. As a whole it depicts how Dutch pork production is looking for ways to counterbalance and oppose the negative externalities of global pork chains, but at the same remains strongly embedded in such global chain relations.

Figure 6.1: Different types of interaction patterns
Second, the three Dutch cases underpin how (more) local and (more) global pork chains may interact in different ways. Figure 6.1 tries to capture these interactions by distinguishing processes of **distantiation**, **hybridization**, **transformation** and **incorporation**. Sustainable Pork Chain as well as Lupine Pork represent specific attempts to **distantiate** from Good Farming Global features in terms of environmental, social and ethical performances. Their specific performance profiles (as will be synthesized in following section) remain partly dependent upon the socio-material infrastructure as created within Good Farming Global. The latter, on its turn, did react in specific ways to its surrounding re-localization initiatives, including active attempts to (partly) copy some of their distinctive features. This multi-faceted nature of Dutch (more) local versus global pork chain may be further illustrated by following examples: Sustainable Pork Chain’s early abandoning of pig-let castration initially reflected a certain capacity to distantiate from conventional pork chain characteristics. Yet, in the near future it will be an expression of transformative capacity when, as foreseen, non-castration will be integrated in all Dutch pig husbandry, including Good Farming Global. Thus, Sustainable Pork Chain triggered, or at least contributed to the adaptation of a global operating pork chain with regard to its Animal Welfare performance. The global pork chain, on its turn, strengthens the performances of (more) local pork chains through its historical involvement in by-product valorization activities. Overall complexity of the three selected Dutch pork chains reveals as such the interdependencies between local and global food chains as well as the relevance of their specific interrelations with by-product valorization.
This could be further demonstrated by referring to the wider configurations of *Good Farming Global*, *Sustainable Pork Chain* and *Lupine Pork*. Part of VION’s recent re-localization initiatives emerged under pressure of Dutch NGO’s. VION introduced *Good Farming Star* pork, which, on its turn, triggered *Sustainable Pork Chain* to launch its *Sustainable Pork Chain Star* variant. The *Lupine Pork* initiative learns that a re-localization of fodder sourcing might co-exist with a strong embeddedness in global food markets, more local green energy markets, as well as knowledge-, experience- and technology sourcing throughout the world. Shortly, it shows how pork chain performances can only be understood as the outcome of highly complex global-local interaction patterns with highly place-specific outcomes and dynamics.

Figure 6.1 underpins how the trade-offs of Dutch global operating pork chains induced in different ways re-localization initiatives through new coalitions and new partnerships that seek to sustain pork production and consumption patterns. It aims to stress that it is especially the interaction and mutual interdependencies which make these initiatives more or less distinctive and/or promising. In the following section this will be further illustrated by summarizing the major differences in performances between our three selected pork cases.
8. Performance comparison

8.1. Introduction
As explained in the general introduction, a selected number of attributes has been chosen to compare the performances of the pork chains within and between Italy and the Netherlands with the objectives to come to a double pairwise comparative analysis and to orientate and delineate overall stakeholder analysis. Dutch qualitative findings around these pre-selected attributes have been synthesized in Table 7.1 as case specific performance profiles.
8.2. Performances profiles of Dutch pork cases

Table 7.1. Performance profiles of Dutch pork cases (Source: own data collection)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Main attribute</th>
<th>Definition</th>
<th>Unit</th>
<th>Method</th>
<th>Good Farming Global</th>
<th>KDV Pork</th>
<th>Lupine Pork</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMMON ITALIAN-DUTCH INDICATORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Added value on-farm</td>
<td>Added Value</td>
<td>Average off-farm prices minus non-factor costs over the period 2009-2013 per kg live weight</td>
<td>€/ kg</td>
<td>Quantitative</td>
<td>0.18</td>
<td>N.A.</td>
<td>Premature</td>
</tr>
<tr>
<td>Negative externalities (rural economic)</td>
<td>Added Value</td>
<td>External costs that affect external added value creation negatively within the rural economy. Aspects to be included are (1) local effects on biodiversity (2) liveability in the region (3) landscape (4) animal welfare (5) health (due to dust for instance) etc.</td>
<td>Ordinal 1,2,3 (1=below benchmark, 2=benchmark, 3=above)</td>
<td>Qualitative / Participatory</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Positive externalities (rural economic)</td>
<td>Added Value</td>
<td>External benefits that affect added value creation positively within the region. Aspects to be included are (1) employment, (2) extra tourism in the region (3) liveability</td>
<td>Ordinal 1,2,3 (1=below benchmark, 2=benchmark, 3=above)</td>
<td>Qualitative / Participatory</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Water Use efficiency</td>
<td>Resource use efficiency</td>
<td>Use of water in the total chain per kg carcass weight</td>
<td>M3/ kg</td>
<td>LCA</td>
<td>3244</td>
<td>2657</td>
<td>1917</td>
</tr>
<tr>
<td>Fossil energy use</td>
<td>Resource use efficiency</td>
<td>Use of direct and indirect fossil energy in the total chain per kg carcass weight. Direct fossil energy use includes fuel use for transport and machinery; indirect fossil energy includes fossil energy use for the production of fertilizers, feed and electricity</td>
<td>MJ/kg</td>
<td>LCA</td>
<td>25.7</td>
<td>23.3</td>
<td>13.2</td>
</tr>
<tr>
<td>Land use efficiency</td>
<td>Resource use efficiency</td>
<td>Use of land in the total chain per kg carcass weight</td>
<td>m2 / kg</td>
<td>LCA</td>
<td>6.54</td>
<td>5.25</td>
<td>4.24</td>
</tr>
<tr>
<td>Eutrophication Potential (EP)</td>
<td>Resource use efficiency</td>
<td>Total contribution to eutrophication in PO4-equivalents per kg carcass weight</td>
<td>Kg / kg</td>
<td>LCA</td>
<td>0.0311</td>
<td>0.026</td>
<td>0.0184</td>
</tr>
<tr>
<td>GHG emissions</td>
<td>Resource use efficiency</td>
<td>Total emissions of greenhouse gasses in the chain expressed in CO2-eq. per kg carcass weight</td>
<td>Kg / kg</td>
<td>LCA</td>
<td>2.97</td>
<td>2.78</td>
<td>2.02</td>
</tr>
<tr>
<td>Trust based internal relationships</td>
<td>Chain governance</td>
<td>Level of trust-based relations between chain actors, based on (1) absence of conflicts, (2) trust among chain partners, (3) continuity of chain relations</td>
<td>Ordinal 1,2,3 (1=below benchmark, 2=benchmark, 3=above)</td>
<td>Qualitative / Participatory</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Trust based external relationships</td>
<td>Chain governance</td>
<td>Level of trust-based external relationships based on chain partners’ capacity to mobilise support from (1) social movements, (2) citizens and (3) policy actors</td>
<td>Ordinal 1,2,3 (1=below benchmark, 2=benchmark, 3=above)</td>
<td>Qualitative / Participatory</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Self governance capacity</td>
<td>Chain governance</td>
<td>Self-governance capacity in terms of creation of distinctiveness, ability to integrate economic, social, environmental and ethical dimensions of food chain performance</td>
<td>Ordinal 1,2,3 (1=below benchmark, 2=benchmark, 3=above)</td>
<td>Qualitative / Participatory</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chain-based value governance</td>
<td>Chain governance</td>
<td>Overall value governance characteristics conform the typology of Gereffi et al. (2005)</td>
<td>Nominal: 1 (=markets), 2 (modular value chains), 3 (=relational value chains), 4 (=captive value chains), 5 (=hierarchy)</td>
<td>Qualitative / Participatory</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Farm-level resistance against price-volatility</td>
<td>Resilience</td>
<td>Price volatility of the input and output markets of relevance for pork production, defined as the max delta added value per kg live weight per year over the period 2009-2013</td>
<td>€/kg</td>
<td>Quantitative</td>
<td>premature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm-level risk-spreading</td>
<td>Resilience</td>
<td>Risk-spreading by farm-level diversification and producing feed</td>
<td>Ordinal: 1=below benchmark, 2=benchmark, 3=above benchmark</td>
<td>Qualitative / Participatory</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Adaptation capacity through downstream actors’ cooperation, integration and diversification strategies</td>
<td>Resilience</td>
<td>Strength of interlinkages with downstream actors diversification strategies in terms of productfolio - and marketing</td>
<td>Ordinal: 1 = below benchmark, 2= benchmark, 3 = above, n.a. = not applicable because intra-chain diversity is bigger than inter-chain diversity)</td>
<td>Qualitative / Participatory</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chain-based adaptation capacity through learning and innovation</td>
<td>Resilience</td>
<td>Chain actors' collaborative efforts to learn and innovate</td>
<td>Ordinal: 1=below benchmark, 2=benchmark, 3=above benchmark</td>
<td>Qualitative / participatory</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Use of antibiotics</td>
<td>Resilience</td>
<td>Use of antibiotics per fattening pig</td>
<td>Ordinal: 1=below benchmark, 2=benchmark, 3=above benchmark</td>
<td>Qualitative</td>
<td>2</td>
<td>1</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

**DUTCH INDICATORS**

<table>
<thead>
<tr>
<th>Use of antibiotics</th>
<th>Resilience</th>
<th>Number of days per year a fattening pig is given antibiotics</th>
<th>Days/year</th>
<th>Quantitative</th>
<th>5,7</th>
<th>3,8</th>
<th>N.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space per animal</td>
<td>Animal welfare</td>
<td>Minimal space per fattening pig</td>
<td>m²/animal 85-100 kg</td>
<td>Quantitative</td>
<td>0,8</td>
<td>0,8 - 1,0</td>
<td>1,8</td>
</tr>
<tr>
<td>Castration</td>
<td>Animal welfare</td>
<td>Castration allowed?</td>
<td>Yes/No</td>
<td>Qualitative</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Territorial connection</td>
<td>Territoriality</td>
<td>Level of territoriality in market communication</td>
<td>Ordinal: 1=below benchmark, 2=benchmark, 3=above benchmark</td>
<td>Quantitative / participatory</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Input sourcing</td>
<td>Territoriality</td>
<td>Use of local and regional resources in fodder</td>
<td>Ordinal: 1=below benchmark, 2=benchmark, 3=above benchmark</td>
<td>Quantitative</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Use of antibiotics</td>
<td>Food safety</td>
<td>Type of use of antibiotics</td>
<td>(P)reventive, (C)urative, (N)one</td>
<td>Qualitative</td>
<td>P, C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Food scandals</td>
<td>Food safety</td>
<td>Relative occurrence of food scandals</td>
<td>Ordinal 1,2,3 (1=below benchmark, 2=benchmark, 3=above)</td>
<td>Qualitative / participatory</td>
<td>2</td>
<td>1</td>
<td>Premature</td>
</tr>
<tr>
<td>Dependence of (imported) soy</td>
<td>Biodiversity</td>
<td>% of feed that is imported soy</td>
<td>%</td>
<td>LCA-data collection</td>
<td>20%</td>
<td>10%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Without going into detail in these performances profiles, these allow us to draw the following conclusions:

- the pre-selected attributes contributed more or less significantly to the comparison of pork chain performances in the Netherlands;

- the attributes *labour relations*, *biodiversity* and *territoriality* are relatively little distinctive for Dutch pork chain performances;

- *Chain governance* and *Added value* are the attributes that most clearly differentiate between the selected pork cases;

- *Food safety*, *Resource use efficiency* and *Animal welfare* are the most disputed attributes among Dutch stakeholders;

Particularly *Resilience* may be operationalized rather differently within chain based performance comparison.
9. Interrelations with policy and regulatory settings

As in different ways already implicitly concluded, it makes little sense to try to assess and compare Dutch pork chain performances in isolation from policy and regulatory interventions. Many aspects have been touched upon to illustrate how pork chains are affected by policy-and wider institutional settings. The territorial trade-offs of global pork chains have been mitigated by a range of policy interventions, covering issues as conditional provision of production expansion opportunities, attempts to spatially concentrate pork production in specific rural areas, regulatory frameworks to improve environmental performances (GHG emissions, nutrient losses), as well as ethical (animal welfare) and public health issues (e.g. antibiotics and wider food safety concerns). The relevance of national policy setting has been further illustrated in relation to its facilitation of re-localization attempts as exemplified by Sustainable Pork Chain and Lupine Pork, including their struggles with institutional barriers due to the prescriptive nature of hegemonic socio-technical frameworks. At EU level the future of derogation, which gives the Netherlands the opportunity to apply extra N originating from manure, will be of key importance for the future of Dutch pork production (LEI, 2014).

Overall tendency towards a re-allocation of responsibilities between public, private and civil actors is an issue of returning debate and concern in Dutch pork production, particularly during periods of food safety scandals. On-going initiatives to re-localize national pork production as exemplified by Sustainable Pork Chain and, although so far still primarily intentional, Lupine Pork, are therefore primarily to be perceived as farmers-led responses to the gradual loss of the ‘societal legitimacy to produce’ that global pork production had to face in the Netherlands in the last decades. The same initiatives demonstrate that it requires a certain capacity to dis-embed from prevailing network dependencies and to re-embed pork production in new relations and dependencies. Policy- and wider institutional settings do play differentiating roles in these combined processes of dis- and re-embedding. The relations between Lupine Pork and Dutch agri-expert system are pretty close, whereas the life-history of Sustainable Pork Chain reveals also tensions and conflicts with prevailing regulatory frameworks and policy setting.

It shows how Dutch pork chain actors respond differently to these prescriptive and corrective aspects of policy and regulatory settings. More generally a strategic re-orientation can be witnessed towards more quality and added value oriented marketing concepts, suggesting a loss of confidence in global competitiveness, although there are also the strongly technology driven initiatives that claim to safeguard international competiveness through the development of new concepts as ‘the new mixed farm’: high-tech agri-complexes that restore the closed circles and circuits of traditional mixed farming systems in novel ways by integrating pork production, processing and bioenergy production and (sometimes) the valorization of rest-warmth within glasshouse production. These high-tech responses claim to combine economic viability with superior performances in terms of resource use efficiency, animal friendliness and food safety risks due to less animal transport movements. Although these claims might be legitimate from its specific underlying sustainability perspective, so far it turns out to be extremely difficult to convince rural dwellers in the vicinity of planned production locations of such benefits. It confirms in another way the need to combine chain based with more place based performance assessment methods, including the interaction patterns between pork chains and their territorial policy- and wider institutional settings.
10. Methodological reflections

10.1 Introduction
Table 9.1 summarizes Dutch research teams’ reflections on the strength and limitations of overall methodological approach, covering quantitative (LCA) and qualitative (stakeholder analysis) components. Its references to the specific strength, respectively limitations of this methodological approach will be in following sections further elaborated around some of the key issues that emerged around the attempts to come to chain-based performance comparison.

Table 9.1. Methodological strength and limitations of overall applied case-study methodology

<table>
<thead>
<tr>
<th></th>
<th>Strength</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LCA</strong></td>
<td>• Enables a quantifiable comparison</td>
<td>• One dimensional analysis</td>
</tr>
<tr>
<td></td>
<td>• Better insights in the environmental performances as overall outcome of</td>
<td>• Chain specific differences in most appropriate functional unit may limit the</td>
</tr>
<tr>
<td></td>
<td>interactions between food production and consumption</td>
<td>opportunities for comparative analysis</td>
</tr>
<tr>
<td></td>
<td>• Circular perspective on food chain performance</td>
<td>• Difficult to define the system borders (for example to integrate all flows of slaughter-by-product valorization)</td>
</tr>
<tr>
<td><strong>Qualitative method</strong></td>
<td>• Multi-dimensional performance analysis</td>
<td>• Coverage of all relevant stakeholders opinions and perspectives in assessing the distribution of the costs and benefits of local versus global pork chains across space</td>
</tr>
<tr>
<td></td>
<td>• Deeper insights in the complexity to confine chain boundaries</td>
<td>• Impossible to objectify priority setting in food chain performances due to differentiating sustainability views regarding the role and functions of agricultural activity</td>
</tr>
<tr>
<td></td>
<td>• Recognition of different interaction patterns and interdependencies</td>
<td>• Stakeholders strategic and selective use of chain-based performance assessments.</td>
</tr>
<tr>
<td></td>
<td>between (more) local and (more) global food chains</td>
<td>• Difficulty to capture more systemic effects by chain based approaches (e.g. ‘rebound effects’, knock-on effects, re-placement effects, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Better understanding of the dynamic and place specific outcomes of food</td>
<td>• Difficulty to capture the temporal components of interacting food chains.</td>
</tr>
<tr>
<td></td>
<td>chain performances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Further underpinning of the place-specific outcomes of global-local food</td>
<td></td>
</tr>
<tr>
<td></td>
<td>chain interaction patterns through their interrelations with policy-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and institutional settings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Better understanding of the strategic use of assessment methods to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>compare food chain performances by stakeholders</td>
<td></td>
</tr>
</tbody>
</table>

10.2 Stakeholder involvement
Applied qualitative data analysis has been built especially on available secondary data-resources, complemented with a selective number of additional interviews. It is important to point at some flaws in
this methodological approach regarding overall coverage of relevant stakeholders’ ideas and opinions. This goes particularly for the inclusion of more ‘distant’ actors within Good Farming Global such as anonymous consumers throughout the world and global input providers as e.g. fodder producers. Similar remarks could be made for perhaps less geographically distant but sometimes also more directly involved, informed and committed consumers within KDV. Their ideas and interests are just indirectly represented by consulting interest organizations and social movements. Analytically these flaws refer to the methodological complexity to cover all relevant stakeholders sufficiently with regard to their awareness of and ideas about the cross-scale distribution of wider societal costs and benefits of pork chain performances.

10.3 Some intricacies of chain-based performance comparison
Overall applied qualitative approach enables to identify the following intricacies of global-local pork chain performance comparison:

1. Local’ and ‘Global’ in pork production becomes more meaningful if their mutual interrelations and interdependencies are explicitly taken into account;
2. Chain based performance comparison may be less fruitful in the case of highly volatile and unstable relations between pork chain actors.
3. Multiple chain involvement of pork chain actors may require performance assessment approaches that start from their embeddedness in broader vertical and horizontal actor configurations;
4. This embeddedness in broader vertical and horizontal actor configurations also includes territory based governance and regulatory frameworks
5. Stakeholder opinions about most relevant pork chain performance do vary according to their specific interests and sustainability views.

10.4 Integration of horizontal, vertical and circular approaches
Additionally to previous references to the intricacies of chain-based performance comparison, its methodological complexity may be further illustrated in relation to the selection of most appropriate unit for comparison. Overall qualitative Dutch case-study findings learn that pork chain performances are difficult to isolate from the valorization of waste-flows for input markets (fodder) as well as for non-food output markets (pharmaceutical markets, energy markets, etcetera) and that it requires wider methodological approaches to take these interrelations explicitly into account. Also the integration of these circular components of pork chain performances illustrates the methodological complexity of profound, significant and meaningful comparison of pork chain performances.

As emphasized in different ways, pork chain performances are assessed differently by Dutch stakeholders. For some of them resource use efficiency may be primarily about input-output relations at product- or chain level. For others it is primarily the territorial ‘precipitation’ and impacts of these relations that matter. Stakeholders in Good Farming Global adhere mainly to the first perspective. The principle stakeholders of Sustainable Pork Chain more to the second, although these sometimes switch from perspective depending on the sustainability topic. Ideas about animal welfare and environmental performances, for instance, may be dominated by product- and chain based resource use efficiency perspectives. Contrastingly, public health issues and ‘odor nuisances’ may be primarily approached from a territorial perspective. It exemplifies that methodological choices for a product-, chain- or place based
approach in the Dutch context may correspond more or less with stakeholders’ sustainability, views, ideas, preferences and interests and underpins that pork chain performance analysis requires methodological approaches that permit to take multiple perspectives on board.

Figure 9.1. Integrating multiple pork chain performance components

In a more analytical way this is depicted in Figure 9.1. It emphasizes that comprehensive assessment methods for pork production will have to cover aspects as; 1) the vertical, horizontal and circular components of pork chain performances; 2) the specific features and interrelations between these different performance components and 3) the multi-facetted interaction patterns between different pork chains in specific settings.

The three selected case-studies illustrate this methodological complexity of comprehensive assessment methods in specific ways. Good Farming Global showed that, without taken the circular component of its wider business activities (waste flow valorization) into account, it would have been impossible to understand its financial basis of its global expansion strategy, nor its recent financial crisis. The current absence of this circular component, certainly in combination with the also rather weak vertical and horizontal performances, makes Good Farming Global a highly vulnerable chain configuration.

Lupine Pork knows completely different interrelations between these vertical, horizontal and circular performance components. In this case the specific combination of ‘traditional’ (fodder) and ‘modern’ (energy production) waste-flow valorization mold into mutually reinforcing circular and horizontal interrelations, currently further explored by looking for opportunities to interlink these with distinctive
vertical relations through the commercialization of distinctive pork qualities. The development of these new vertical relations takes place so far within a strong dependence on global operating chains for pork and arable products.

KDV, on its turn, focusses especially on establishing new interrelations between the vertical and horizontal performance components by chain governance that builds upon collaborative learning around how to sustain Dutch pork production and consumption. It is less directly involved in waste-flow valorization and decided to concentrate on solar energy exploration as another way to reduce its fossil fuel dependencies and as such to improve its circular performances. A choice that can be only understood by taking into account its historically strong interrelations with the socio-material infrastructure for waste-flows created (and formerly owned) by Good Farming Global chain actors.

As such these case specificities disclose some of the methodological challenges to define and confine pork chain boundaries and the arbitrary nature of most appropriate point of reference to compare pork chain performances. Should it be the pig? the carcass?, other global operating competitors, or perhaps local pork chains elsewhere?.

These and other methodological limitations (see again Table 9.1) don’t allow for simple or far reaching conclusions regarding the performances of (more) global versus (more) local pork chains, certainly not in settings characterized by the co-existence of contrasting sustainability views and different ideas about the key functions of agriculture in rural and broader societal development.

Notwithstanding this methodological complexity, overall applied combination of qualitative and quantitative methods does permit to draw some conclusions. Firstly, ‘localness’ in Dutch pork production setting is predominantly associated with distinctive chain governance characteristics as new forms of cooperation, new partnerships and new trust-based relations between food producers and food consumers. Secondly, the geographical distance of input- (especially) and output markets gets relatively little attention in on-going initiatives to sustain pork production by a return to ‘localness’. The issue of food miles is much less emphasized, increasingly also by referring to life-cycle analysis outcomes that downplay the environmental impact of food transport movements. Thirdly, overall case-study findings confirm that Dutch pork chain actors actively explore re-localization opportunities to meet growing societal resistance against the trade-offs of global operating pork chains and –more recently- as specific responses to loss of global competitiveness. As foreseen, global marketing activities might be in the future increasingly restricted to the export of the edible parts of pigs to places where these are more appreciated than in Europe (organs, ears, noses, etcetera to Eastern Asia). Also this more recent tendency towards a more selective exploration of global pork markets confirms again: 1) the multi-facetted and dynamic nature of global-local interaction patterns in pork production; 2) the specific pros and cons of global versus local pork chains and 3) the benchmarking challenges of global-local comparison, including the selection of relevant attributes and their translation into meaningful quantitative and qualitative indicators.

10.5 Data Quality Check
Conform the methodological guidelines for WP3, Table 9.3. presents an overview of the Pedigree Data Quality Check with the objective to depict the quality of overall consulted data-material in a way that should be perceived as complementary to previous remarks about the methodological limitations of
global-local pork chain performance comparison. Put differently, the overall rather positive outcomes of the Pedigree Data Quality Check should not be mistaken for stakeholder agreement around overall case-study findings and conclusions.

Table 9.3 Outcomes of Dutch Pedigree Data Quality Check

<table>
<thead>
<tr>
<th>Criterion</th>
<th>DQG 5</th>
<th>DQI 4</th>
<th>DQI 3</th>
<th>DQI 2</th>
<th>DQI 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score (DQI)</td>
<td>1</td>
<td>0.8</td>
<td>0.6</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Distance (DQD=1-DQI)</td>
<td>0</td>
<td>0.2</td>
<td>0.4</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Reliability of source data qualitative data</td>
<td>Predominantly verified secondary data based on measurement+ primary data-based on qualified estimated</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability of source data quantitative data</td>
<td>Predominantly verified secondary data based on qualified sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completeness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominantly representative data from &gt; 50% of the sites relevant for the supply chain considered, over an adequate period</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporal correlation</td>
<td>Mostly less than 3 years of difference to the time period of the data-set</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographical correlation</td>
<td>Data from area under study</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further technological correlation</td>
<td>Data from enterprises, processes and materials under study</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.6</td>
</tr>
<tr>
<td>Quality Class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

10.5 Double pairwise analysis

Finally, overall double-pairwise methodological approach enable to complement the foregoing conclusion with the following:
• The relevance of overall pre-selected attributes for local-global pork chain comparison differentiates between the Netherlands and Italy, which goes particularly for the attributes territoriality and biodiversity.

• Not only the selection of attributes but also their translation into indicators is difficult to de-contextualize in terms of benchmarking.

• Also the interrelations between the vertical, horizontal and circular components of pork chain performances clearly differentiates between Dutch and Italian pork chains.

• Processes of distantiation, transformation, hybridization and expropriation might have highly context specific outcomes.

• In both contexts particularly global pork chains face internal competition, conflicts, distrust and indifferences.

• Localness in pork production is first and foremost related to chain governance characteristics (more cooperation, more trust-based, more commitment, more integrative resource use, more open to food justice, etc.).

• Local pork chain actors demonstrate to different degrees transformative capacity to sustain pork production and consumption systems.

• In both settings pork chain performances are closely interwoven territory based policy and regulatory frameworks.

• In both settings policy is primarily about intervening in pork chain interaction patterns, although with clear differences in priority setting between the Netherlands and Italy.

• Pork chain performance comparison always involves normative choices with regard to most adequate benchmarks (e.g. VION’s ‘nose-to-tail’ valorization versus more farmers-led valorization strategies of KDV and Lupine Pork).

• These contrasting ideas about most appropriate benchmarks sets serious limits for far reaching conclusions regarding differences in the performance profiles of local versus more global pork chains.
11. References + Sources

- ABN-AMRO (2013) In concept naar consument, veranderende vleesmarkt kans voor ketens (‘In concepts towards consumers; changing meat markets and opportunity for chains’)
- Agri-Holland 15 September 2014 VION wil meer samenwerking in keten van vleesproductie (‘VION wants more chain-based cooperation in pork production’)
- Boerderij 98, no. 12, 16 Juli 2013. Nog 400 bedrijven in 2020, Schaalvoordelen gaan minder tellen (Towards 400 pork producers in 2020; scale advantages become less important’)
- Boerderij 98, no. 36, 4 Juni 2013, Deur naar China staat open, markt is klein maar veelbelovend (The door to China is open, a small but promising market for pork components’)
- Boerderij 98, no. 36, 4 Juni 2013, Supermarkten de schuldgeven, is onterecht. Interview with Foodlog Founder Dick Veerman (‘Blaiming the Retailers is Unfair’)
- Boerderij, 98, no. 37, 11 Juni 2013, Column pork producer Dirk Dekker, Supermarkten moeten via de slachterijen een beloningsstructuur neerzetten voor duurzaam vlees ( ‘Retailers, in cooperation with slaughtercompanies, need to develop a remuneration structure for sustainable pork’)
- Boerderij 98, no., 49, 2013 Steeds minder slachtlocaties. Positie van VION is cruciaal (‘Further decrease in slaughter locations, crucial position for VION)
- Boerderij 98, no. 52, 24 September 2013, Kilo vlees transporteren kost niets (Transport of kilo pork hardly costs anything)
- Boerderij 99, no. 53, 15 Oktober, 2013, Vion gaat zonder kroonjuweel (‘VION continues without Cronjiuwel’)
- Boerderij 99, no. 8, November 2013). Wereldwijd stijgt de consumptie van varkensvlees. Dat is echter geen garantie voor een goede prijs (Worldwide increase in pork consumption is no guarantee for a good pork price)
- Boerderij 99, no. 10, 3 December 2013) Ingredienten vangt verliezen Food op (‘Ingredients compensates losses of Food’)
- Boerderij 99, no. 11 Februari 2014, Kostprijsstijging baart sector zorgen
- Boerderij 99 no. Maart 2014, ‘Je kunt het nooit alleen’ (Interview with KDV co-founder Hans
Verhoeven: “You can’t do it alone’)

- Boerderij 99, no. 28 April 2014, Ondernemers van het Jaar: duurzaam, open, innovatief
  (Entrepreneur of 2014, Sustainable, Open and Innovative’)
- Boerderij 99 no. 30, 23 April 2014 Antibioticavrij werken lijkt haalbaar (‘Antibiotic Free Pork
  seems Feasible’)
- Boerderij no. 99, 3 Juni 2014 Smaak is het allerbelangrijkst (‘Taste is most important’)
- Boerderij Vandaag, Woensdag 12 Juni, 2013, Consolidatie in vleesbranche zet door (‘Further
  consolidation in pork sector’)
- Boerderij no. 99, 9 September 2014 Antibiotica gebruik kan nog lager (‘Use of antibiotics in pork
  production can be further reduced’)
- Boerderij Vandaag, 8 Oktober, 2013 Marktleider VS koopt VION Ingredients voor 1,6 miljard ( 
  Marktleader US bought VION Ingredients for 1.6 billion euro)
- Boerderij Vandaag, 4 December 2013, Gezamenlijk varkensgeluid kent nog accentverschillen
  (‘Shared Pork Narrative Knows Differences in Emphasis’)
- Boerderij Vandaag, 5 December 2013, Top verkocht aandelen Vion in zwaar 2012 (‘Topmen sold
  their VION shares during crisis in 2012’)
- Boerderij Vandaag, 10 December 2013, Vion heeft een probleem met de bedrijfscultuur (‘VION
  has a Business Culture Problem’)
- Boerderij Vandaag, 16 Januari 2014, Ketenvorming zal doorzetten (‘Chain Creation Will
  Continue’)
- Boerderij Vandaag, 23 Januari 2014. Niemand is verplicht om mee te doen (interview with Marc
  Jansen, director CLB and Liselotte Harmelink, manager sustainability CBL (‘Nobody is obliged to
  participate’)
- Boerderij Vandaag, 18 Februari, 2014, Opbrengst varkensvlees dramatisch slecht (‘Revenues Pork
  worsened dramatically’)
- Boerderij Vandaag, 18 Februari 2014, Motto is nu: kop naar de grond, werken! Interview with
  ZLTO-chairman Hans Huijbers (‘Work is the Motto’)
- Boerderij Vandaag, 4 Februari, 2014 Varkensprijzen gaan onderuit ( ‘Deteriorating Pork Price’)
- Boerderij Vandaag, 27 Maart 2014, Consument wil steeds sneller en gemakkelijker voedsel
  (‘Dutch consumers go for Fast and Easy Food’)
- Boerderij Vandaag, 4 April, 2014, Toekomst ligt in duurzaam boeren. Interview met Hans
  Verhoeven (‘Future lies in sustainable production’, interview with KDV initiator Hans Verhoeven
- Boerderij Vandaag, 25 April, 2014, Switch vleeswarenbedrijven gunstig voor Beter Leven (‘Switch
  pork processors beneficial for Better Life Pork’)
- Boerderij Vandaag, 6 Mei, 2014, Topman VION wil meer binding met boeren (‘Topman VION
  wants closer relations with farmers’)
- Boerderij Vandaag, 7 Mei 2014, VION nog niet uit de problemen; zoektocht naar geld duurt
  voort (‘VION stil in problems: search for money continue’)
- Boerderij Vandaag, 21 Mei, 2014, VION straalt bescheidenheid uit en doet boekje open over
  oude situatie (‘VION radiates modesty and reveals its old situation’)
- Boerderij Vandaag, 9 September 2014, VION schikt met ex-topman (‘VION settles with ex-CEO’)
- Boerenbusiness.nl Column Eric de Lijster, 24 April, 2013, Kroonjuwelen de dupe van financiele

www.glamur.eu
teloorgang VION

- Bond et al, 2014.
- Blonk Milieu Advies, 2009, Milieuffecten van dierlijke bijproducten, Gouda.
- Brabantsdagblad.nl 13 September 2012 Nederland geen gidsland Vee. Interview with Director National Centre for Agriculture and Environment (’The Netherlands not a guide for animal production!’)
- Foodlog, Februari 2013, Parma in Brabant. Critical reflection on Provincial policy makers plans to visit the Parma region as source of inspiration for Dutch pork producers
- Foodlog, 27 September, 2013, bijdrage Marcel van Silfhout, Zwak Toezicht op Voedselveiligheid bedreigt Nederlandse Export (’Weak Monitoring of Food Safety Undermines Dutch Export’)
- Foodlog, 31 Oktober 2013, Klokkenluiders reden Dierenbescherming (’Whistleblower save Animal Protection Group’)
- Foodlog, 26 April, 2013, Contribution of Foodlog Founder Dick Veerman, Wat gebeurt er met Vion? (’What happens with Vion?’)
- Foodlog, 17 Mei, 2013, contribution of Marc Jansen director CBL, Er moet inefficiency terug in de keten (’We need to bring back inefficiency in food chains’)
- Foodlog 15 September 2014 Gebruik de Russische handelsboycot om de landbouw selectief te saneren (Interview with Food and Agri-economist Hein Vrolijk: Use the Russian Trade boycott for a selective remediation)
- Foodlog (?), bijdrage Caroline van der Plas, Analyse van VION maatregelen sinds 2012 om het hoofd boven water te doen (’analysis of Vion’s survival measures since May 2012)
- Foodwatch, 14 Juni, 2013, Zelfregulering faalt. Overheid laat herstel voedselveiligheden aan Industrie (’Self-regulation Fails, Government leaves restoration of trust in food to Industry’)
• Inspectie SWZ (2014) Schoonmaak abattoirs vaak onveilig (‘Cleaning Abattoirs Unsafe’)
• It’s the Food Stupid Debate no. 4, 2 April, 2014, presentation of Jan Kluytmann, micro-biologist, Antibiotica: een Tijdbom (Antibiotics: a Time Bomb)
• KDV Jaarverslag 2013, Usselstein.
• LEI (2012), De Nederlandse varkensvleesketen richting 2020, Van Speelbal tot Speler, Wageningen UR, Den Haag (‘The Dutch pig Chain towards 2020, From Plaything to Active Player’)
• LEI-Wageningen-UR (2010) Houden van Beren, Praktijkervaringen en cijfers De Hoeve. Den Haag (‘Keeping Boars, Practical experiences and Figures From De Hoeve’).
• LEI, 2011, Trade-off analyse van duurzaamheid op basis van het Bedrijven-Informatienet, Methodologie en toepassing op de melkvee- en vleesvarkenhouderij
• LEI Wageningen UR (2014) Vergoeding Rendac voor het ophalen, verwerken en vernietigen van kadavers (‘Compensation for Rendac for the collection, processing and destroying of Cadavers’)
• Meat & Co, December 2012 Keten Duurzame Varkensvlees: Nieuwe Speerpunten (Sustainable Pork Chain: New Spear Heads)
• Monitor Duurzaam Voedsel 2012, De Consumentenbestedingen aan duurzaam voedsel (‘Consumer Expenditure on Sustainable Food’)
• Nederlandse Varkenshouders Vakbond (2014) Toekomstvisie NVV (‘NVV’s Vision on the Future’)
• Nieuwe Oogst, 7 December 2013), Verlies VION 2012 830 miljoen euro (‘total loss of VION in 2012 830 million euro)
• Moesker (2014)
• Milieukeur, 2013
• Moesker, S. (2014a) De toekomst ligt in duurzaam produceren, Boerderij, 4-4-2014, p.5.
• Nieuwe Oogst, Zaterdag 12 oktober 2013. Vion terug naar de kern: vlees en boeren (VION returns to its Core business: Meat and Farmers)
• NRC 4 September 2014, Ik ben geen Vleesman ( I‘m not a meatman’). Interview met VION CEO Michiel Herkemij
• Rijksverheid.nl, 6 Juni, 2013, Taskforce voedseltrouwen ingesteld (‘Implementation of Taskforce Trust in Food’)
• Rougoor, R. and Elferink, E. (2014) GLAMUR WP3 QUICK Scan Report the Netherlands, Part B.
• Silfhout, M., van (2014) Uitgebeend, Hoe Veilig is ons Voedsel (‘De -boned’ How Safe is our Food?)
• Stichting Milieu Keur (2014) Certificatie Schema voor Dierlijke Producten, Criteria voor Milieukeur Varkens
• Ten Have Mellema (2014) Lupine varken: een goede investering (‘Lupine Pork; a good investment’)
• The Observer, Sunday 26 May, 2013: Why worrying about food miles is missing the point (interview with Jan Kees Vis, director global sustainable sourcing development at Unilever
• VION, 29 November 2013, Pressrelease Annual Report 2012
• VION, 5 Oktober 2013, Anuga 32013: VION Food-partner for premium fresh meat
• VION Food Group, Jaarverslag 2012
• VION Food Group, Jaarverslag 2013
• VION Food Group, Augustus 2014, Vion breidt Foodservice activiteiten uit
• Voedingscentrum (2012) Smakelijk weten, Trends in voeding en gezondheid (‘Trends in Feed and Health in the Netherlands’)
• Volkskrant 19 December 2013 Waar komt dat vlees vandaan? Supermarkten en de levensmiddelenindustrie willen alles weten over het vlees dat zij van hun leveranciers kopen. Dat is ook goed voor dieren en consumenten (‘From where is that meat? Retailers and Food Industry want to know everything about food origin for the benefit of animals and consumers’)
• Volkskrant 11 Februari 2014, De Tiengeboden van Goed Eten (‘The Ten Commandments of Good Eating’)
• Volkskrant 23 Maart 2013, De Verwarde Consument, Verdwaald in Voedselland (The Confused Consumer, Lost in Foodscape’s)
• Taskforce Duurzame Soja (2000?) Op weg naar een duurzame sojateelt (‘Towards a Sustainable Soja Cultivation’)
• Trouw 7 Juni 2012, Geen steun voor Maxima in Veehouderij (‘No support for Maximum Farmsize in Animal Production’)
- Volkskrant 11 Juli, 2014, Grabbeltong van vleesbedrijven zonder visie (‘Lucky Dip of Meat Companies without Vision’)
- Trouw 4 April 2014 Wantoerstand vleessector vereist bredere aanpak (‘Abuses in pork sector demand for broader approach’)
- Trouw 6 Mei 2014, Supers krijgen VION klein (‘Retailers abase VION’)
- Trouw 10 Februari 2014, Die Duurzame Soja, komt daar nog wat van. Herinrichting land moet Woud Sparen (‘Sustainable Soya, when ‘will it arrive? The re-planning of land resources needs to save the Forest’) 
- www.communicatieonline. 7 April 2014, Interview met Marc van der Lee, communictiedirecteur VION, De meeste mensen willen gewoon een betaalbaar stukje vlees (‘Most people just want an affordable piece of meat’)
- www.VION.nl
- www.foodlog.nl
- www.EVMI.nl/marketing-sales, 31 Mei, 2013, Vleesaffaires laten Nederlanders koud (‘Dutch Consumers little concerned about Meat Affairs’) 
- www.compendiumleefomgeving.nl (info Antibiotics use in Dutch animal husbandry system)
- www.nu.nl/ondernemen/3868791, 4 September 2014, Ontslagen directeur eist 2 miljoen van VION (‘Dismissed Director Claims 2 million euro from VION’)
- www.nu.nl/economie/3867865, 3 September 2014, Vleesverwerker wil nieuw keuringssysteem voor de branche ( Meat processor wants new inspection system for the branch’)
- www.Topigs.com
- www.duurzaamvarkensvlees.nl Energie neutrale varkenshouderij; een duurzame doelstelling (31-7-2013 geraadpleegd) (‘Energy Neutral Pig Husbandry; a Sustainability Target’) 
- www.onderzoeksraad.nl Risico’s in de vleesketen (‘Risks in the meat Chain’) 
- www.nieuwgemengdbedrijf.nl De feiten over Nieuw Gemengd Bedrijf (‘Factsheet New Mixed Farm’)
- www.tenhave.varkensenzo.nl
  Downloaded May 1st, 2014
- https://www.rabobank.nl/particulieren/lokalebanken/dekempen/nieuws/items/agrarisch_onder
  nemer_van_het_jaar_2014 . Downloaded may 1st, 2014.
- http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0565-Antibioticagebruik-in-de-
  veehouderij.html?i=11-60. Downloaded on May 7th, 2014

www.glamur.eu