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Diversification of the Dutch pork chain – Initiatives to meet threats from market and society

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Abstract: *From an encyclopaedic point of view, there is a vast array of production systems and diversification initiatives in the Dutch pork sector. However, from a market share and sectoral organisation point of view, there is a massive, homogeneous commodity system. Efforts for enhancing sustainability (including economic viability) through diversification are present, but effects on systems diversity are small.*

Quality assurance systems can facilitate diversification by allowing variants and alternatives to guarantee and communicate their competing claims, but can also standardise by increasing homogeneity and dominance. To date, quality assurance systems (including labelling towards the end consumer) have not proven to produce substantial diversification in the Dutch pork chain, but are successful in communicating presence of more sustainable alternatives. Their key role seems to be their effect on innovation of the commodity system towards (ecologic and social) sustainability. With the risk of, in the end, being eaten by the system due to lack of distance.

Nowadays, collaborations of NGO's, farmers organisations and the government actively strive to enforce a second chain (so called Tussensegment, 'intermediary segment'). One with improvements on sustainability issues, but with limited cost increase. The initiative is valuable for the actors to address societal unease and demonstrate their search efforts. But expectations for a real second (improved) 'main stream' chain have to be modest. From an academic / reflective point of view, the inevitable increase in social sustainability of the Dutch pork system will have to be expected from improvement of the commodity system. Possibly with the 'Tussensegment' acting as the hunted fox leading the route.

Key observation in this paper is that several initiatives did not alter the situation of a uniform commodity system dominating more than 95% of production volume. Despite the substantial support for alternatives and a multiply expressed sense of urgency due to societal unease and market position. Explanations for the inertness of the commodity system can be found in the lack of vertical integration and in the dominance of the existing system ('regime' in innovation theory), including self-enhancing processes such as the metaphoric Microsoft Mechanism.

Keywords: *pork chain, sustainability, innovation management, pig production systems*

Introduction

Due to increasing globalization, European farmers are challenged in their position. When producing commodity goods, all the world is their competitor. To evade this, diversification is a proven strategy. However, when producing special goods, one often has the extra burden to define and organize the production system and to develop the selling process. Seen from a commodity-position, the key challenge is to be special, to remain special, to communicate this status and to find a cost effective outlet market. For this challenge, quality assurance systems are a tool. Present paper not only introduces quality assurance as a part of the innovation repertoire, it also addresses two principal theoretic approaches for innovation. This is illustrated with cases form diversification efforts in the Dutch pork chain. In fact. The paper tries to answer the question why a threatened system like the Dutch commodity pork production system is so very insensitive to diversification efforts.

Aim and structure of this contribution

The central question / aim of present contribution is why is the Dutch pork system so much a commodity system, despite the substantial societal pressure on sustainability issues and several initiatives for diversification? First, Quality assurance will be introduced, focussed on it's indirect effects on the production chain. Next, two contrasting innovation concepts will be introduced. Then,

after introduction the Dutch pork production system as a massive commodity system threatened by market and society, a series of diversifying initiatives will be described. The paper will end by an attempt to explain why these effort hardly lead to any diversification.

Quality assurance

Quality assurance is *a set of activities whose purpose is to demonstrate that an entity meets all quality requirements* (ISO, 1998). As part of a system, these activities form quality assurance systems (QAS), which, when applied to food industry, *enable the application and verification of control measures intended to assure the quality and safety of food* (Trienekens and Zuurbier, 2007). QAS use *Quality assurance schemes* to provide these systems the desired product attributes. These attributes are described by standards. A standard defines the requirement a characteristic must comply with. In other words, *QAS define a series of technical requirements for producing, processing, or transporting food, and may include standards of environmental and other management practices. The schemes also delineate an inspection system to verify that members comply with these requirements* (Bredahl et al., 2001).

QAS have several goals. Key ones are to restore the safety perception of consumers, to introduce standardization, to encourage diversification, and finally to communicate about the special characteristics of products and production methods. But next to these goals, QAS also cause side effects. By the so called lock-in effect, QAS may lead to additional barriers for alternatives to enter the market.

Safety perception

When looking at literature it is eminent that one of the most important goals of quality assurance in food industry is to restore the safety perception of consumers. Several food scandals and the outbreak of highly infectious animal diseases have caused for societal concerns about the safety and quality of food products. Governments and private actors have responded to this by imposing new regulations to restore the confidence of the consumers in their production processes. For the Dutch commodity oriented system, IKB (in English: IQC, Integrated Quality Control) was introduced, mainly aiming at restoring confidence in food safety and quality.

Standardisation

An other aspiration of QAS in pork production is to introduce standardisation in food production processes. As known from economic literature standardisation is one of the key requirements in modern industry for a successful business. This also applies to the pork chain. Different parts of the chain have to be harmonized with each other in order to reach lower production costs and to formalise the production process.

Standardisation is especially important when it comes to trade were products can have many different quality characteristics, like food. Seller and buyer have to agree on the quality of the product that is for sale, before they determine a price. When there is uncertainty about the quality, a buyer will not take the chances of a bad buy, and calculate this risk into his offer, i.e. a lower price. This is roughly what economists call *transaction costs*. At this point, QAS can play a major role to bring clarity about certain quality characteristics, so that buyer and seller know what is brought under the hammer.

Diversification

Besides standardisation, another role of this QAS can be diversification of the production and supply of pork on the market. QAS in pork production also arise to pay attention to societal concerns considering existing commodity based pork production. This has led to the birth of alternative production systems, that is, diversification of the way the pork is produced in the primary part of the chain in terms of animal welfare, environmental aspects, safety of food, quality of food, etc. The aim of this diversification is to create alternatives for the commodity directed system of pork production.

Knowledge development

Development and implementation of QAS can also contribute to the extension of (scientific) knowledge, i.e. the introduction of sustainability labels indirectly contributes to the development of knowledge of sustainability. The criteria that are the result of this knowledge development can be an instrument for the support of durable production (SER, 2004). Also, labels increase the consciousness of citizens on these points.

Communication and confusion

Products may carry a specific label to communicate its certification to the outside world (SER, 2004). Especially QAS for the niche market promote their own label to communicate their specific product information to consumers. I.e. labels are used to stress superiority (or production requirements) on animal welfare, safety, origin, or durability.

In a repport on the effects of sustainability labels for general products, SER (2004) claims that objective product information, for instance by a label, for most consumers plays a minor role in their buying behaviour. Social and emotional aspects have a major impact. In other words, certain products are bought to express the social identity of the buyer. If this is true, the connection of consumers to the technical achievements of the 'improved' system can be limited and can even become absent. In a jungle of labels, brands and other diversifying communication vehicles in the end market, the market value of labelling (and thus of the underlying system improvements) may even be lost.

As noted earlier, introduction of QAS can lead to diversification. This can be considered a good thing for the industry, but there also lie hazards in this trend. The proliferation of labels may lead to confusion for consumers and market actors (including farmers).This might lead to loss of the ability to harvest additional value from the market. With the associated risk of falling back into the easy commodity approach by producing and buying world pork. One other mechanism that causes a risk for diversity will be mentioned additionally: so called network effects.

Network-effects

One of the effects of QAS on the pork production process is standardisation. This may lead to uniformity, decreasing diversity, caused by the advantages of joining the majority. Katz & Shapiro (1985) describe this mechanism as follows: "Because the value of membership to one user is positively affected when another user joins and enlarges the network, such markets are said to exhibit "network effects", "or "network externalities" (Katz & Shapiro, 1985). Network effects are very common for the adoption of technological artefacts which for interaction purposes use standardisation[1].

This phenomenon can also be seen with the adoption of IKB (key Dutch pork quality system, see above). The utility of IKB increases with the number of entities (levels / phases in the production chain) also implementing it. An integrated part of the Dutch QA system IKB is the demand that other entities in the chain that interact with IKB entities, are also IKB certified. This requirement holds for every part of the chain. Implementation of IKB thereby causes network effects. I.e., the more feed companies are IKB certified, the more choice IKB farmers have to take their feed from and the more the force for feed manufacturers to join (and the less the price surplus). This also goes for other IKB certified phases such as transport companies, slaughter houses, cutting plants, etc. The network effect seems extra strong for pig-*farmers*, because their position is the middle of the production chain, having to interact with different other chain members (i.e. feed companies, veterinarians, transport companies, buyers, etc.). Because of it's dominance on the Dutch pork market it is almost impossible not to comply to IKB.

Network effects can also cause so called "lock-in effects". A lock-in effect is the phenomenon that the market is 'locked-in' by a dominant 'technically not by definition best' standard, because it is difficult for other (possibly technically superior) alternative standards to become relevant market share in the field[2].

[1] For example, the utility of a word processor program increases, with the number of users who also use it. As a consequence, network effects are self-enforcing

[2] An illustrative example is the lock-in effect that comes with the dominance of Microsoft operating systems on personal computers. It is very difficult for an alternative operating system to enter the software market, because the majority of other PCs can only communicate with Microsoft operating systems.

Summarising

There is an apparent paradox in the various (possible) roles of QA systems. At the same time, they enhance standardisation and they allow diversification (including its communication). Both mechanisms are (fixing standards and identifying diverse offers) are complementary and required in a market. The balance between these two opposite effects is possibly determined by the dominance the standardisation produces in the major system.

Two innovation concepts

Traditionally, innovation can be viewed as coming from two sides: bottom up and top down. Bottom up implies that small initiatives grow out into larger and meaningful arrangements. Top down implies that initiatives are purposely developed by institutions, and spread out into practice. For each of these two perspectives, a conceptual framework will be introduced that is useful either to characterize / understand innovation processes or to guide such processes. The systems generally differ principally in ownership of the innovation process: chain actors in the bottom up initiatives and public funded parties in the top down projects.

Bottom up innovation: Multi-level Perspective & Strategic Niche Management

Traditionally, alternative production systems develop from local small scale initiatives that acquire a position and grow out into a self maintaining variant to the regular. The Multi Level Perspective of Geels (2002 and 2004) and the concept of Strategic Niche management (Kemp et al, 1998) provide a useful framework to describe or understand the process of this development. This evolutionary view is represented as initiatives reaching increasing levels, by finding more general introduction / impact. In a way, they escape their level by adoption. The phases can roughly be seen as 1) a local initiative (novelty) that is adopted by other actors, becoming an innovation. E.g. a new technique invented by a farmer starts being used also by other farmers. 2) The next level (systems innovation) illustrates the innovation affecting it's context. For example, a new technique that affects other dimensions as well, such as culture and structure. Intensive, specialized indoor housing of farm animals can be viewed as a systems innovation, as it also affected the way we look at animal production and it affected the structure of the chain. 3) In the following level, the systems innovation affects its context in a wider sense, one could say that society changes with it. This could be called a transition. The phases are illustrated in Figure 1. Essential in this view is the notion that at each level, the initiative (be it a novelty, innovation or systems innovation) has to escape the dominant context, called the regime. This regime (e.g. existing structures, economic laws and mechanisms, beliefs, legislation and other rules etc.) generally resists change. The term management implies that novelties / innovations require some protection to be able to develop and not directly being killed / having died within the common practices / kept down by the regime. For example: a technological niche may require some financial support before it is able to survive market selection. And a market niche may require protection and support to grow out of it's own context (such as the case in the Dutch organic pork chain. And a good idea requires some proof period of testing or thinking over before it is killed as being 'non practical' (one of the many idea-killers). MLP/SNM are rather useful as an explanator of innovation processors than actively used as a practical guide.

Top down innovation: DTO – Sustainable Technology Development

As an opposite to the evolutionary (bottom up) development from individual or local initiatives, improved production systems can also deliberately be designed. The DTO concept ('Duurzame Technologie Ontwikkeling' ~ Sustainable Technology Development) (Weaver et al., 2000) is a guide (method) to such initiatives. The two key characteristics are 1) use of future images and 2) awareness of the inter-dependency of Technology, Culture and Structure.

Simply stated, DTO formulates future images in the long term. Both the desirable future and the autonomous future. The discrepancy between these is the innovation ambition. Generally such future images are developed in interactive sessions with a wide array of stakeholders. The images are expressed in the long term to overcome the effect of short term interests of parties involved. From the desirable future, an interactive think experiment is made to formulate what the desired state should be in increasingly nearer periods (so called back-casting, as opposed to fore-casting). The last phases of

this process then formulate the aims and routes of innovation in the shortest term that have the best chance of contributing to the desired future. The method not only aims at designing technological artefacts, but also the surrounding structure and maybe aspects of the culture. As the period is very long term (~40 years / 2 generations), as virtually all current interests and existing infrastructure are then of minor importance. DTO is primarily a guide to actively design innovation trajectories than an explaining concept.

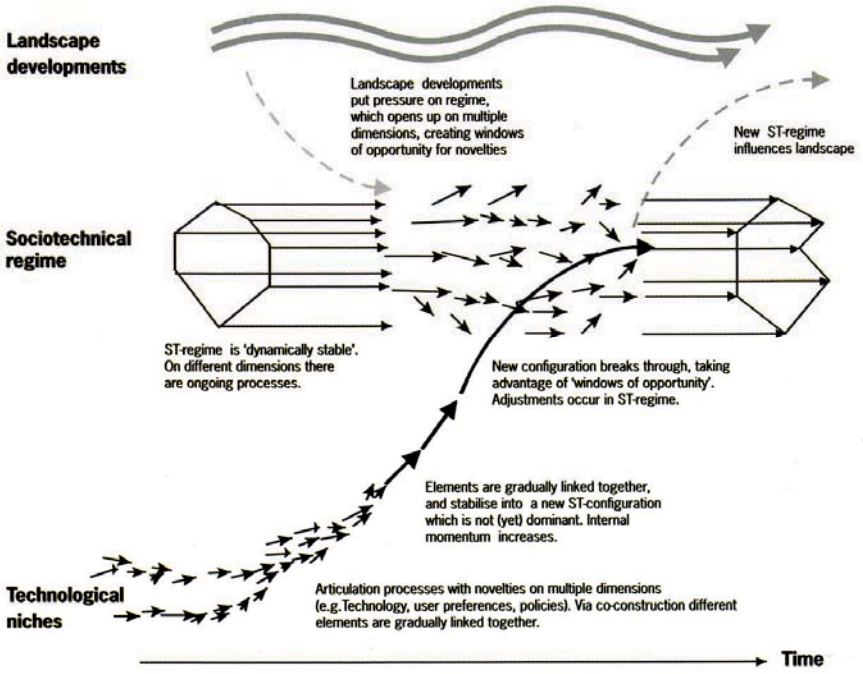

Figure 1. Schematic representation of the Strategic Niche Management view on innovation (after Geels et al., 2004).

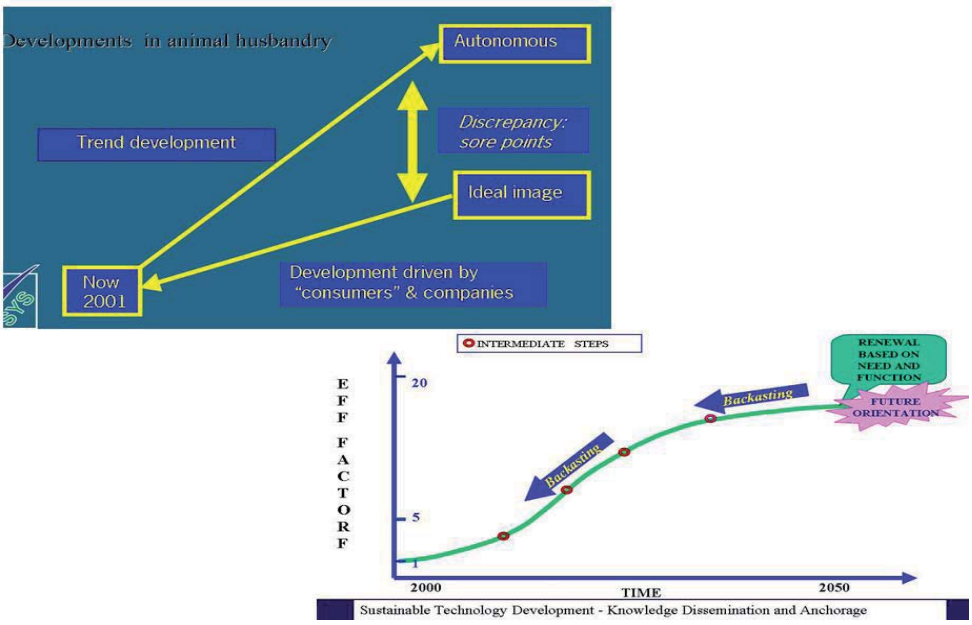

Figure 2. Schematic representation of two major steps in STD: future visions and back casting

Dutch pork production: a commodity system threatened by market and society

The Dutch pork production chain is an export oriented system, based on highly specialized production units. Despite the highly stressed individual private entrepreneurship, on the farm level the production system is quite uniform with regard to housing system, feeding system, slaughter weight, chain organization etc. Typical farms now would comprise 300-400 sows and / or 3000-5000 fatteners housed in state of the art intensive conditions. The chain is organised as independent producers without binding contracts with subsequent phases in the chain. The number of slaughterhouses and processors is limited, but their demands towards farmers are comparable, allowing easy switches. In other words, the level of integration is limited.

The Netherlands can be seen as a primarily urban region. Due to the relative high cost of land and labour, production costs of pork in NL are well above European (let aside world) level. The urban context also affects the production system in a social way. The connectedness of society to agriculture is limited. This has resulted in unawareness of the public of current practices in animal production. At the same time, socio-cultural developments have initiated consumer concerns with regard to issues like animal welfare, environmental quality and food safety (Kanis et al., 2003). On basis of this, the government has intervened into the primary production system (farm practices) by regulatory directives on especially slurry (mineral) load to land, emissions of ammonia and husbandry conditions in relation to animal welfare.

Despite the public intervention in animal welfare and environmental impact, societal acceptance of current practices remains a problem. And the economic perspective (competitive position in the world or EU market) has continued to reduce. In this context, there are considerable search efforts to enhance profitability and sustainability from a social and ecological perspective. There are at least ten recognisable alternative production schemes with self imposed improved production requirements. But this does not change the situation that more than 95% of pork has to be classified as regular (to avoid the term bulk). Some of these diversifying efforts will be touched here. The key story below is that the innovation activities in and around the Dutch pork chain (both niche formation and development of variants to the dominant system) seem not to have led to a substantial increase in diversity of the system. Despite the fact that most actors involved are convinced that break through of such innovations is essential for long term viability. A key limitation is lack of market pull & uptake, an explanation can be the rigidness of the governing regime (Geels, 2001) including mechanisms such as lock-in.

Two challenges / threats

Two challenges (or threats) can be discerned that drive innovation: cost price and societal acceptance. This has resulted in two quite contrasting search directions. The first ‘innovation’ search is the regular commodity strategy directed at cost reduction per unit of product, by enhancing production efficiency and by increasing scale of production. This search direction will only be touched superficially. The second search direction seeks to combine societal acceptance and economic viability by creating alternatives to the regular chain. This will be described in more detail by presenting some diversifying cases.

Standard commodity strategy: scale increase to meet market threats

The dominant ‘innovation’ search is directed at cost reduction per unit of product, by enhancing production efficiency and by increasing scale of production. The governmental directives on reduction of environmental impact and enhancing animal welfare have even stimulated this development. This has resulted in about a doubling of the ‘standard’ farm size every decade. This is a rather autonomous development. Related to this, a new concept has been proposed “*Agro-production parks: large scale production units with or without combinations with other agro-functions”* that accepts the scale increase with the ambition of exploiting it. This search direction comprises large and highly integrated units, in which various functions (horticulture, pig production, energy production etc.) are combined (de Wilt, 2006). The innovative function combinations exist especially on brainstorm and report level. Both commercial success and scientific documentation are limited. In practice, this search direction has been effectuated in initiatives for large units of around 20000 pigs, *without* the innovative combination with other functions (*mega-development* / *megamorphosis)*. The observed increase in actual and

reference scale has left the existing system (regime: ownership, beliefs, structures etc.) as it was. The proposed agro-production parks would have opened up that system because of the combination with other functions and the required tight bonds between entrepreneurs. The absence of success of that innovative concept may be partly explained by the revolutionary character of the system.

Initiatives for diversification in the pork chain

The search efforts for economic viable alternatives to the commodity production will be illustrated by seven cases. Structured into three strategies / approaches: A) based on future visions, B) by adding modifications to the regular system and C) by exploitation & scaling up of existing alternative systems

A. Alternative systems designed from idealised future visions

The expression of societal unease (especially in media and parliament) has resulted in a series government financed studies to develop new systems that combine societal acceptance and economic viability. This produces an important search direction: ideal alternative systems. These systems are often developed with the academic / public domain, and are aimed to function as inspiring (albeit distant) opportunities.

Familiestal: family pen system [Aarnink et al., 2004a]
On basis of a well documented study (Stolba and Wood-Gush, 1984), a system has been developed that facilitates the social structure of families of pigs. The system was analysed to be animal welfare friendly, based on the resemblance of natural living. Also, it was expected that 'harvesting' of the (indoors confined) pigs would deliver a potential economic system. The system was researched from a systems innovation perspective and concluded to be promising. However, it has not grown out of the farm-pilot phase: one single farmer has implemented it.

Comfort Class: pig husbandry system without animal discomfort [de Greef et al., 2003]
In a public funded project comprising a collaboration between an NGO and a research institute, a husbandry system for fattening pigs was developed that aimed at being as economic as possible but with full meeting the needs of the animals. Since it's delivery (2003), considerable effort has been spent on scientifically evaluating the welfare claim in a test facility and translation into practice using 6 subsidised farmers. The current phase is that this is successful as an attractive reference point for 'animal friendliness', but the system has not spread because of absence of a market initiative that can carry the increased production costs.

B. Adding modifications to the regular system

Between the described practical upscaling ('megamorphosis') and the ideal systems approach (*Familiestal* and *Comfort Class*), an intermediate approach is discernable. Systems are developed that form an improved variant of the regular system

Hercules: pig husbandry with technology to reduce environmental impact [Bos and Grin, 2008]
A system was developed in a multi-actor project (early nintees) that aimed at combining various technologies to reduce environmental impact and harvest resulting welfare advantages. The system has proven its success in technical terms, but has not developed to a reference system or real life husbandry concept. The authors suggestion for an explanation of this innovation staying within the technical domain is the strict technical nature of the innovation (rather a business to business technological development than the basis for a new husbandry concept or market claim. Stated differently, Hercules had no distinct owner with the ambition to exploit its added value in the consumer market, and remained a technology development to be adopted elsewhere. Presumably, the absence of visibility of the innovation in current system is also caused by the dispersed and complex ownership of the innovations. Also, the communicated increase in production cost, not associated with financial benefits may have played a role (Groot Koerkamp, pers.comm.).

Milieukeur / De Hoeve ~ green label / environment guarantee [Van der Schans, 2004]
A cooperative of (now about 30) farmers has adapted the common system towards a more environmentally friendly system by adding explicit standards and aims. The key instruments are their collaboration as a cooperation and formulation of a quality assurance scheme, adhered to an environmental label scheme for all kinds of consumer goods (Milieukeur ~ environmental guarantee). The original market outlet was towards specialised butchers, but now scaling up is sought in the supermarket channel. Objectively, this system is not very contrasting to the conventional system, but the combination of QA-application, communication, and use of the general quality label has produced a visible chain. Also, the efforts to stay ahead of the regular system and by adding other issues (e.g.

animal welfare and ending castration) makes the initiative chain to one of the major non-conventional pork chains.

C. Exploitation of existing alternative systems

As the last example of search directions, two systems are mentioned that can be seen as niches in the classical sense: individual bottom up initiatives adopted by major actors to serve as alternatives to existing systems.

Biologisch ~ organic [Hoste et al., 2004]
The existing small organic pig chain has been appointed in the late nineties by several parties to provide an alternative to the problematic regular system. This is a classical example of niche formation and management. The government formulated an aim (10% of market share in 2010) and allocated a substantial share of research funds to support this. An alliance of chain partners and other actor groups (e.g. a bank) formulated a covenant with guaranteed prices and fair distributions of revenues. The system is facing ups and downs over time. Currently, market demand exceeds farmers supply, but both at a low level (1-2% market share). In the sunrise period, the original idealistic farmers were supplemented by more opportunistic entrepreneurs. Also, the system has been rationalized and highly structured with a quality scheme. The system clearly functions as a reference system for society on basis of its good image and intentions. The history of this casus also demonstrates the failure to force an innovation when market demand is limited.

LIVAR ~ regional pigs [Hoste et al, 2004]
A group southern Dutch pig farmers have merged forces and formed a collective for buying and selling goods. In their search for added value, they have used the positive image of their region and especially a local monastery ('kloostervarkens' - Monastery pigs). For this, they used the image of the monks as good care takers and added (among other adaptations) outdoor access for the fattening pigs to their facilities. The system is successful in valorising some added value and has especially some penetration in the high end gastronomic environment. The group is now focusing on 'square valorisation' of the carcasses (selling a larger proportion of the carcasses in the higher segment). This latter effort is characteristic for added value pork systems: to limit consumer price surpluses, the cost should be carried by more than just some elite parts of the carcass.

Canadian Bedding [Aarnink et al., 2004b]
A farmer imported a Canadian system to produce fattening pigs on wood shavings. The system carries the claim of improved animal welfare and of reduced ammonia emission. Also, the liquid slurry is exchanged for solid manure, reducing the cost of its removal (which is substantial in NL). A small integration was set up and the product was adopted by a medium sized retail formula. The major Dutch animal protection NGO allowed to use its logo to build a brand for the improved welfare claim. Currently, 4 farmers exploit a CB system, but only the first delivers to the alternative (added value) outlet. The system has received substantial enthusiasm in the media and from chain actors. The chain, however, fails to grow out of the local one farmer – one retail formula phase. To escape this, it is now entering the phase of forming a formal network with some other actors elsewhere in the country. Their first ambition (besides sharing production expertise) is to find a market outlet. Evidence or support for their sustainability claims (environment and animal welfare) are currently at a lower priority.

A new route: a market share for improved commodity pork?

To finalise describing the Dutch situation, some attention will be paid to a recent initiative to come up with a new strategy

Despite application of the mentioned (mutually supplementary) innovation and diversification strategies, no substantial second chain or lively portfolio of alternatives has developed or is expected to at this moment. In contrast to this factual situation, current belief as expressed by the government and several stakeholder groups in and around the pork chain is that, for the Dutch context, added value alternative systems (farm level & market level) are required for a durable increase in sustainability (including economic perspective) of the pork system. Knowing the limited (quantitative / volume) success of earlier diversification efforts, the wide spread choice or even conviction now is to strive for a commodity based pragmatic extra chain, the so called '*tussensegment*' ('*intermediary segment'*). This comprises a system based on the conventional system, but with some improvements on key issues and with a maximal price increase of about 15-20% (based on empirically assessed

price elasticity, a.o. Meuwissen et al., 2004). For success, the volume would have to grow within a short time up to one million slaughtered pigs per annum, especially motivated from economics of scale. Besides this size requirement, the delicate search is finding the balance between economic farming opportunities and the limited willingness to pay extra from the market. Such development towards a substantial intermediary segment is advocated by especially farmers representatives, NGO's and not in the least the government & ministry (processors are reluctant, retail is silent). From the observation that the market is willing to take only limited increase in price relative to the commodity pork and that chain costs are the prime limitator of viability, this clear cut choice for a joint strategy was made as a consensus route. The exploration of this strategy is going on. The ministry has declared it to be a key aim in their sustainability ambition for the pork chain. First indications are that the development of this initiative is slow.

From an academic position, chances for a successful (~substantial volume) intermediary segment can be judged as limited, based on earlier experiences and recent developments. Three arguments can be raised for this. 1) There is no clear owner and the parties are quite independent. Despite the mentioned (joint!) plea by various stakeholder groups, a powerful consortium of stakeholders has not been formed to enforce a substantial market directed experiment. 2) The involuntarily nominated key player (slaughter/processor) is studying opportunities but is a regime player *pure sang* and does not show enthusiasm. 3) the pork system lacks a product-related item (such as meat taste) that can easily be improved at the same time. Such a product utility beneficial to the end consumer is seen as an essential element in creating and especially maintaining a market share.

An interesting but individual experience supporting some reserve in believing that an 'extra chain' may be developed is the fact that development of an added value chain in the UK (bacon from uncastrated pigs with gilts in group housing) was readily adopted as a production system in NL for export (having considerable farming system consequences), but until today formed no basis or even argument for market development in NL. The prime actors for that market opportunity (processors) are the same as those in charge now of evaluating the opportunities for a '*tussensegment*'. A more recent illustration of limited drive for diversification concerns the pig castration casus. There is a recent covenant between farmers, processors, retail and NGO's that no pork from non-anaesthetized-castrated pigs will be sold in NL by 2009. This collective intervention in the common practice requires explicit distinction between national and export pork. But (to the knowledge of the authors), this has not resulted in initiatives to exploit this for further NL-market directed sub-chain development.

Our view is that is not so much essential *how* that segment will be, but rather *who* will take the lead. The first fight is against the beliefs of the dominant main system. Primarily those of the key actor, the few institutions that deliver and develop the retail market. Such a central actor seems essential but seems absent. The widely advocated development of an extra chain is thus rather a socio-technical effort to bring the right people together and bring them into some arrangement than a technical-economic challenge. Individuality and (lack of) trust are keywords in this effort. This leads to the conclusion that designing a sustainable future for the Dutch commodity-driven Pork production system primarily requires elegant combinations. Combinations between systems development-strategies and combinations between parties. Such a socio-engineering effort requires both motivated key actors and promising (market) opportunities.

Discussion: Why is the Dutch pork chain so inert to diversification?

To finalise this contribution, some notions that may play a role in the lack of success of development of alternatives are shared. The description above indicates that there is not a lack of initiatives (both bottom up initiatives by private players and top down initiatives by public players) for diversification, but that these initiatives each fail to acquire a substantial (market) position. Two propositions provide arguments for a plausible explanation, and the combination of these to explains even more.

Proposition 1: There is hardly any integration in the Dutch pork sector. Thus, there is not one body that can organise a strategy that both adapts farm procedures and organises the farmers compensation for the associated costs.

Proposition 2. There is a principal discrepancy between the problem (which is social) and the believed solution (which is sought in the market). As long as the perceived (social) problems such as animal welfare and environmental impact) do not represent market value, why would the market pay for it? And why would market players work on it?

The point of lack of integration is probably a key difference of the Dutch situation compared to, for example, the Danish situation. A more detailed comparison between these two export directed systems may produce more information. Furthermore, it is noteworthy that in the 'intermediary segment casus', the role of the missing integrator seems to be taken over by a pseudo-integrator, the mentioned consortium of institutional representants: the 'innovation agenda group', consisting of high standing representants of farmers organisations, government and industry.

Regarding the market relation of the sustainability issue, the fundamental question has to be raised whether the Dutch pork consumer market is, like the Dutch pork production sector, fundamentally a commodity market. In other words: pork is pork for consumers, all pork is equal. This would imply that the societal concerns regarding production methods are not related to the personal values regarding food choice. When this is true (and that is defendable), any diversification effort that brings pork away form 'standard' will fail because of price effects. The proposition of Carpentier (2003, Green Piggery project, pers.comm.) that ' willingness to pay for extra sustainability should be regarded as a donation rather than as a payment' is then important. On donations, one cannot build an economically durable production system. An exit to this disappointing analysis would be the identification of 'individual interest' product utilities (such as taste, status, convenience) that go along with societal interest attributes like environmental impact, animal welfare and mondial equity. The described search effort for the opportunities of an 'intermediary segment' are in that area: what mix of 'own interest' and 'common interest' attributes provides a market entry that is both economically sustainable and valuable for societal issues at the same time.

The combination of point 1 (limited integration) and point 2 (no market issue) provides even more sense to the observed inertia: it is unlikely that a player representing at most a part of the responsibility would take up initiatives that do not have a reasonable promise of economic return on investment. And that is also our observation on the behaviour of large actors higher up in the chain. In the form of a one liner: the lack of integration results in the situation that there is no direct (institutional) link of the production system to a market position of the product. With all consequences of that.

A third point is the deep rooted robustness of commodity systems themselves. Convictions and behaviour of commodity players are framed within that system. In other words, it is difficult to think 'out of the box' if you are part of that box. It is obvious that this holds for individual farmers, but there is enough information that advisers, institutional representants of farmers organisations, of industry etc. also think within this frame. Resulting in a narrow search space and abundance of 'idea killers'. Despite this all, the point remains that, whatever the views and convictions are, the commodity systems exists within a demanding society. And the societal unease is a key point to farmers. This actor group experiences and expresses sense of urgency But this does not so much result in reflection on their farming processes and procedures. They rather point at the citizens not being informed well and making unbalanced judgements (see De Greef et al., 2006). From a lay mans psychological point of view, this could be explained as being a coping style of the accused. But it can also be a deep rooted aspect of being part of the commodity system: "Producing pigs is at it is", it is beyond thinking that alternatives are rational or "We do good if we follow the rules", the issue is not on our side. A noteworthy observation with this is that farmers do adapt their norms, but not so much on the public standards, but rather on interventions of an accepted actor in the system: the government with its regulations and directives (de Greef et al., 2006).

Socio-technical engineering?

A somewhat deeper analysis will reveal that lack of problem ownership and the related absence of responsibility taking highly interacts with the lack of integration. And there is no clear cut strategy thinkable to solve that. It is fairly easy to design and develop production systems. But design and development of chain arrangements is a tedious (if not impossible) task. And the design and development of beliefs, convictions and problem adoption processes is unthinkable. Albeit that the Dutch situation seems to choose for the latter: a consortium of institutional representants is active in mobilising processors and retail and convincing them that they are also responsible and should take a role accordingly. And the latter parties demonstrate the described reluctance. If chain arrangement shave to be developed (bringing the two contrasting theories in mind again), arrangements for (multi-level and multi-actor) collaboration on production system & market strategies rather develop bottom up than that they can be designed top down. Albeit that deliberately designed process contexts such as communities of practice could be factors to enhance mutual understanding and trust and result in

arrangements. A (sociological/philosophical) study on the role of values and convictions of key players would possibly deliver food for thought and may be even instruments to enhance the reflectivity of these actors. The authors' expectation is that this will reveal complex strategies of actors to deal with the conflicting values like autonomy of farmers (private entrepeneurs!) and societal responsibility, within the context of the political choice / conviction that improvements should be harmonised within the market economy system. But is questionable whether such an academic exercise would contribute to a successful strategy.

It thus seems as if there are quite clear but fundamental mechanisms that explain the lack of success of diversification efforts. Such as commodity-wise thinking and dispersed responsibility which explain the absence of enthusiasm of especially the key actors beyond the farming phase: processors ('retail should ask') and retail ('not our issue'). It seems that there is no actual 'problem ownership' in that part of the chain. A position that can be expected for world market players; a position that is defendable for the non-agro-related retail. But it is a striking observation to observe such a position for the predominantly farmers owned slaughter-segment.

Wrap up

- Role of quality assurance: does it meet a need? Yes, it allows alternative systems to ascertain and communicate their contrast to the criticised regular system.
- Stimulation of existing initiatives (niches) and development of alternative systems: does it serve a function? Yes, alternatives do develop and are being developed, producing a port folio of opportunities for diversification.
- Does the combination of societal demand, availability of alternative systems and quality assurance systems lead to new chains? No, as the key actors do not identify a substantial market opportunity. Resulting in absence of support for the extra costs.
- An alternative strategy such as the joint institutional plea for a segment in between: does it have a fair chance? This is the question that is to be answered by observing developments in the near future in Dutch practice. But it is difficult to defend that the chance of success is high.

Conclusions

The Dutch pork system, a typical large scale, highly developed commodity good oriented production system seems virtually inert to diversification initiatives. Two related developments in the Dutch pork production system: niche formation and QA application have not effected in an increase in diversity. Its viability under market and societal threats is predominantly based on enhanced production efficiency combined with adequately and pragmatically adhering to superimposed governmental regulation. Standardisation is supported, illustrated by a standardizing QAS initiative (IKB) gaining high penetration in a short period, whereas diversifying initiatives remain at microscopic level.

The industry-driven route of increase in size and efficiency (framed by public regulation for environment and animal protection) further uniforms the system. Initiatives driven by individual actors and public & collective bodies towards diversification fail to find consortia effectively guiding them. The latter not in the least because of distrust in the Dutch market's willingness to pay for improved characteristics. This all likely resulting in continuation of the superefficient, relatively sustainable but locally disguised export system the Dutch pork sector is.

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