

GLOBAL PERSPECTIVE ON INTEGRATED PORK PRODUCTION

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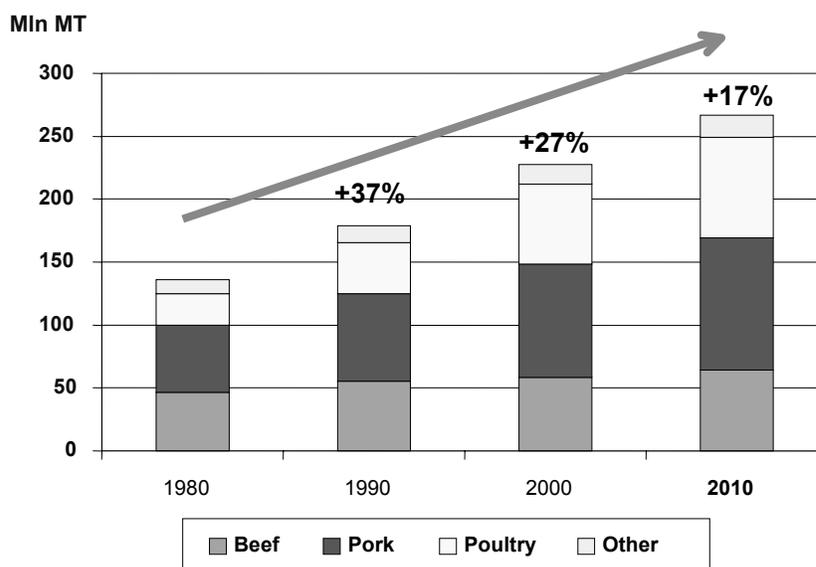
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ABSTRACT

Total Quality Management through the whole production chain is the only way to fulfil the demands of consumers and to offer them safe, nutritious and attractive meat products for a fair price. Food safety and a customer oriented supply chain are the issues now and for the future.

The world's population has increased during the last decades and will increase further during this century. Due to this fact and increased meat consumption per person, global consumption of meat will rise. Over the last 40 years, global pork production has increased by a factor of 3.5, from 24.7 million tons in 1961 to 86.6 million tons in 2002. Figure 1 shows the world market demand for meat including pork.

Figure 1. The world market demand for meat (Rabo N.D. Mulder, Projection Fapri 2001, FAO).



PRODUCTION AREA

The main production areas for pork are East Asia, North America and Europe. In eastern Asia there is a shortage of land and feedstuffs for animal production. Japan is a major importer of

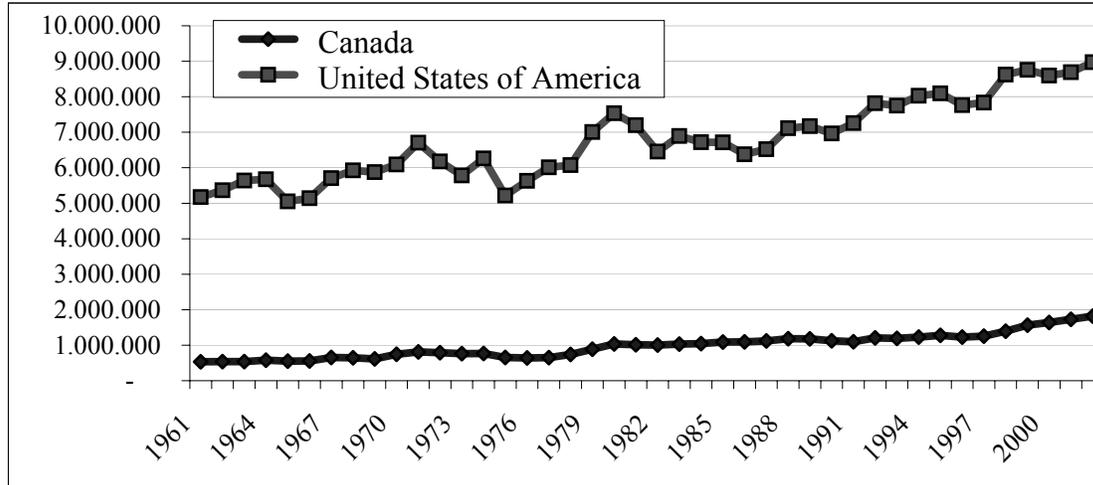
pork. China however contains nearly 50 % of the world pig population. As China continues to increase pork production, more than 50 % of the world pork production in the future will occur in this country. Table 1 shows pork production per country.

Table 1. Pork production per country in 2003 (million tons).

Country	Pork Production
China	43.46
USA	8.93
Germany	4.12
Spain	3.20
Brazil	2.60
France	2.35
Poland	2.20
Canada	1.91
Vietnam	1.80
Denmark	1.76

In the USA and Canada, pork production has increased during the last decade. (Figure 2).

Figure 2. Development of pig meat production in the USA and Canada across 40 years (tons/year, Source FAO).



The USA has changed from an importing country to a pork exporting country. Export of pork is 4 times more profitable than the export of grains. In South America, especially Brazil, the production circumstances are favourable - feedstuffs are available, labour is cheap and there is enough land available for manure. Animal production is developing rapidly in this part of the world. Several changes have also occurred in Europe. The EU, for example, has expanded. This means an increase in the EU member state population by about 110 million people. The surface of the EU will increase by about 33 % but the area of fertile agricultural land will only

be enlarged by 55 percent. The Eastern European countries have relatively cheap labour and land prices are also relatively low.

Tables 2 and 3 show the amount of imported and exported pork in 1990, 2000 and 2002. It can be concluded from these tables that the biggest increase in pork export has occurred in North America and Brazil.

Table 2. Import of pork per country (x 1000 ton carcass weight, Source GIRA 2002).

	1990	2000	2002
Japan	497	847	962
US	483	745	842
Russia	489	486	817
CEEC	201	227	303
Mexico	-	185	291
S. Korea	-	182	173
China	-	149	141

Table 3. Export of pork per country (x 1000 ton carcass weight, Source GIRA 2002)

	1990	2000	2002
EU	807	1321	1163
Canada	380	886	1079
US	109	600	735
Brazil	-	155	522
CEEC	323	266	323
China	443	59	188

The West European market is characterized by:

- Change from production oriented to market oriented
- Critical consumers with wishes concerning production methods
- Large market consisting of consumers with a relatively high income
- High production costs compared to other areas.

COST PRICE

Western Europe has approximately 3.2 million swine operations. In total, 110 desks buy pork for 170,000 selling points in order to serve 160 million consumers. The pig operations in Western Europe are mostly privately owned. The number of farms decreases while the number of pigs per farm increases. Differences in cost price between EU countries are relatively small. The difference in cost price between farms in a country is much bigger than cost price differences between countries. For several years now, the use of meat and bone

meal, meat meal, feather meal, poultry meal, hoof meal and blood meal for feeding to pigs has been prohibited, although feeding of fish meal is allowed.

Table 4 gives a comparison of cost prices per kg slaughter weight between countries on different continents.

Table 4. Cost price in euro per kg slaughter weight (source Rabobank, 2004).

Country	Cost price
Brazil	0.99
Canada	1.13
USA	1.15
Poland	1.18
Netherlands	1.30
China	1.35

Table 4 shows that production costs of pork in Eastern Europe, the USA and Canada are 10% lower than in Western Europe. The cost price in Brazil is 25 % lower. However, welfare and environmental issues will increase production costs in these countries in the future.

MARKET

Markets are changing from production to market oriented, which means that we are moving more and more towards a consumer oriented production. This means that we should be aware of the wishes of the consumer concerning products and production practices. Because there is a variety of consumers and therefore in products, different supply chains should be built. The consumer expects attractive, nutritious and safe food from environmentally responsible and sustainable sources for a fair price. The keys for the successful future of pork production are:

- Food safety
- Quality assurance and transparency
- Sustainability in production
- Variety of products which are easy to prepare

In pork, for example, the following production chains have been developed:

- The “*Welfare chain*” was developed for the production of bacon for the English market. This chain includes, for example, group housing of sows.
- The “*Greenline chain*” delivers products for the retail and food service. In this chain no antimicrobial growth promoters are used in diets for finishing pigs.
- The “*Organic chain*” is a niche market and follows the international regulations for organic production.
- The “*Global pork chain*” is the basis for products for the food industry.

These supply chains are differentiated and continuously innovated by market demands. Additional demands in the supply chain have an effect on the cost price of the meat. Therefore economic simulation models for pigs and poultry are used as tools by the supply chain manager to calculate different “what-if” scenarios. For all the mentioned concepts, there are guidelines formulated. Farmers that want to join a certain concept have to adhere to the guidelines and standards and are audited by an independent company.

SUPPLY CHAIN

In order to fulfil the market demands, several companies have developed supply chains in which breeding, feeding, husbandry and processing are related. Optimization of the supply chain and specialization of the processing plants are used for further improvement of the product quality for bacon, industry, retail and food service. This means that breeding companies develop different breeding lines in order to fulfil the requirements of the production chains.

In Europe, pork is mainly consumed in a processed form, especially in the UK, Germany and Italy. The share of fresh prepacked meat purchases is also growing steadily. The percentage of fresh prepacked meat increased in the Netherlands from 42% in 1990 to 82% in 2004. The supermarket share in retail meat purchases keeps growing from 61% in 1990 in the Netherlands to 82% in 2004. The importance of prepacking, processing, fresh products and supply chain management will increase in the future. In order to differentiate in the EU from non-EU pork producers we have to stay close to the consumer and focus on the aforementioned aspects.

The five basic items which may affect the supply chain are:

- Food safety
- Quality
- Production circumstances
- Cost price
- Information

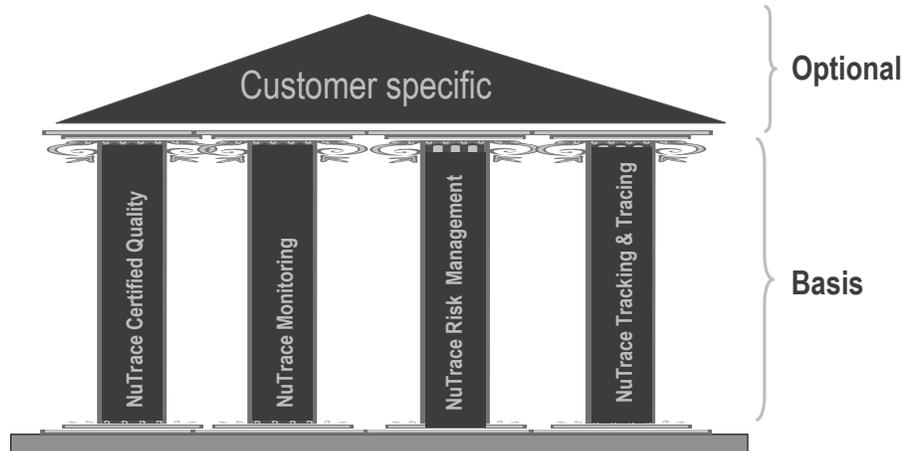
FOOD SAFETY

Food safety is a priority in all parts of the production chain nowadays. The first essential step in a food safety program is a good risk analysis (actual and perceived risk) which consists of risk assessment, risk management and risk communication. EU legislation demands livestock to be free of forbidden substances and imposes self control measures at the producer level. EU legislation on control of zoonoses is the basis for monitoring and control of salmonella in the pork production chain. At the Dutch national level, a salmonella surveillance programme has also started. This surveillance is based on examination of blood samples taken every 4 months on all pig farms.

In order to guarantee the consumer that the products are safe, four key characteristics in the Nutreco quality program NuTrace® (Figure 3) are defined:

- Development of food quality assurance programs (certified quality).
- Development of tracking and tracing systems.
- Effective risk management and preparedness.
- Monitoring the whole food value chain.

Figure 3. Nutrace®, based on four pillars.



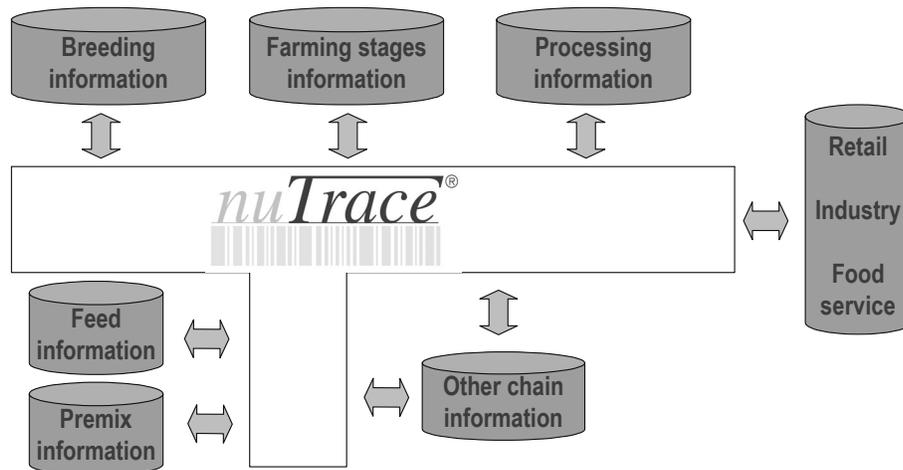
QUALITY SYSTEMS

The food quality assurance program fits with the specifications of the Global Food Safety Initiative. This initiative was launched by a group of international retailers and is a market oriented approach to assure food safety. However, in several countries, national requirements are involved as well. For this purpose not only a good relationship with customers is needed but also intensive communication with non-government organizations, governmental organizations and politicians is necessary.

TRACKING AND TRACING

Tracking and tracing through the whole chain and also to the suppliers is necessary in order to state the guarantees. Therefore NuTrace® tracking and tracing was developed which contains information concerning the product and the production process regarding, for example: breeding, farming, feeding, delivering, processing and packing (Figure 4). This means that the NuTrace® tracking and tracing system contains all the integrated information from feed raw materials through to processed products all in one database. This makes it possible to trace back within a few minutes from meat to, for example, the feed ingredients used to produce that meat. NuTrace® starts with traceability, evolves into transparency and leads to trust.

Figure 4. Nutrace®, Tracking & Tracing.



An example of a new technology that has been installed to track and trace meat products during processing is the DOT code system. The DOT code is put on the hams, backs, bellies and shoulders of the carcass by an advanced robot. Also the boxes with the smaller meat cuts can contain this code. In this way the customer has not only access to information of the product but also to the production process like breeding, feeding, health inspection and classification. This is the way to completely transparent production. A comprehensive administrative system which allows tracking and tracing of batches of products and product inputs at the press of a button is fast and accurate.

RISK MANAGEMENT

In order to build confidence with customers and to react in an adequate and accurate way, effective risk management policies and procedures are necessary.

INTERNAL AND EXTERNAL MONITORING

Monitoring all parts of the chain is essential. Suppliers are audited and raw materials checked rigorously at company laboratories. The traffic light procedure for suppliers is used. Only suppliers with a green light are allowed to deliver their products to Nutreco companies. Suppliers with a red light are not allowed to deliver and those with a yellow light have to be double checked. All the results of the monitoring procedure are communicated to the supplier. Detection methods for rapid and accurate indication of the presence of contaminants or undesired micro-organisms are developed. An example is the Calux analysis for rapid dioxin analysis.