



's-Hertogenbosch, 20th February 2006
AKK10.082/AM/ ts

CO-INNOVATION PROGRAMME

'PROFESSIONALIZING ORGANIC SALES CHAINS'

CONTENT

1. Improvement of Quality and Sales of Organic Fruit - phase 1 (ACB-01.005)
2. Adaptation and improvement of quality system Quality management Farmhouse dairy products (ACB-01.006)
3. Menubased Biocatering (ACB-01.009)
4. Weekly organic vegetable packs delivered through the food service channel (ACB-01.010)
5. Classy Apples (ACB-02.012)
6. Feasibility of the use of organic by-products in the feed of organic pigs (ACB-2.015)
7. Organic mushrooms (ACB-02.017)
8. Organic Flower (ACB-02.020)
9. Improvement of quality and sales of Organic Fruit – phase 2 (ACB-02.021)
10. Supply chain scenarios for organic Fruit and Vegetables (ACB-02.024)
11. Regional arrangements for organic pork - phase 1 (ACB-02.025)
12. Products from the Vecht valley, pure nature –phase 2 (ACB-02.025)
13. Organic pork chain, quality, service and logistical optimisation (ACB-02.026)
14. Safety guarantee organic pork (ACB-02.027)
15. Organic vegetables with a higher value (ACB-03.030)
16. Two know more than one (ACB-03.033)
17. Possibilities to optimize information flows in the Dutch organic sector (ACB-03.034)
18. Organic beef: supply and demand in equilibrium (ACB-03.035)
19. Marketing concepts for farm sale of organic meat (ACB-03.039)
20. Market development Organic (fresh)products in the business food chain (ACB-03.040)
21. Chain marketing for a successful introduction of an innovative biological product (ACB-04.041)
22. Images of Organic Quality (ACB-04.044)
23. Knowledge Development Regional Typical Food Production and Marketing (ACB-03.045)
24. Organic pork chain, quality, service and logistical optimisation - phase 1 & 2 (ACB-04.046)

Improvement of Quality and Sales of Organic Fruit - phase 1 (ACB-01.005 Verbetering Kwaliteit en Afzet Biologisch Fruit)

In an actual chain for organic apples composed of the growers union ‘Appelleren’, the co-operative ‘Fruitmasters’ and the retail organisation ‘ADN’, attuning has started between these individual partners and with two research organisations with respect to two clear bottle-necks i.e. losses during storage caused by rot, and loss of quality caused by moisture loss. Research was carried out by two different parts of Wageningen-UR, i.e. ATO and Applied Plant Research section Fruit (PPO-Fruit) . Aim of the joint project (‘improved quality and chain management of organic fruit’) is (1) to improve the efficiency of the management of the chain and (2) improvement of the quality and availability of organic fruit. Loss of fruit during storage, due to rot, may amount up to even 30% thereby considerably reducing availability of fruit of good quality and reducing the income of organic growers as well. The latter is a negative factor in the willingness to change from conventional to organic growing.

Growers of the union ‘Appelleren’ delivered their fruit to ‘Fruitmasters’. During storage losses due to rot varied from 3 to 12%, comparing favourably to the preceding season with losses up to 20%. Due to the withdrawal between times of the original retail organisation, attuning with the present retail organisation, ADN, started relatively late and was virtually restricted to a good planning of the second season, 2002-2003. In that approach central points are (1) analysis of purchase behaviour of consumers and (2) improved and more efficient management of (more or less constant) fruit quality. To that end Fruitmasters developed a new logo with the brand ‘Biomasters’ in order to market organic fruit more specifically.

PPO-fruit and ATO performed a coherent research programme aimed at improved quality and reduced storage losses, using apples of a 1st and 2nd pick of the variety Elstar. Concerning quality, the question was addressed (PPO-fruit) to what extent russetting (more prominent in organic apples) contributes to loss of moisture and thus to flaccidity and wrinkling. Surprisingly, results showed that russetting does not influence loss of moisture from the fruit, but that it does lead to increased incidence of rot. Thus, sorting of fruit according to degree of russetting would offer strategies for decreasing losses due to rot, aiming at relatively early sale of strongly russeted fruit. At low moisture loss (2% in 7 month) losses due to rot were increased and at high moisture loss (6%) apples were flaccid and showed wrinkling. Thus storage should aim at a moisture loss of 3-4% during 7 month (typically ‘long storage’ for Elstar).

Based on results in literature (mainly on other varieties) three methods were tested in order to reduce losses during storage due to rot. These were treatments directly following harvest with (1) warm water (ATO and PPO), (2) with ethereal oils (ATO) and (3) with calcium chloride (ATO). In addition ATO has tested the so-called DCS system (Dynamic Control System, product-regulated ultra low oxygen). Considering the moment of project approval, it was not possible to add effects of antagonists (especially yeasts) to the programme. Generally speaking, incidence of rot was still very low beginning of January, and increased considerably between January and March. Likewise rot was much more abundant in fruit from the 2nd pick as compared to fruit from the 1st pick. Warm water treatment was performed during 2 minutes at 52-53°C, according to results on other varieties.

In both experiments (PPO and ATO) this treatment induced damage to the fruit comparable to carbon dioxide damage and this led in the end to increased incidence of rot. Treatment with cinnamaldehyde was based on earlier result with tomato. Even what was considered as safe concentrations induced damage to the skin of Elstar apples and the same occurred with calcium chloride treatments based on earlier experience with Cox apples. DCS storage was not superior to standard CA-storage with respect to rot.

In conclusion, Elstar appeared to be very sensitive to a series of post harvest treatments. This does not mean that there is no perspective of such treatments but more precise attuning to the specific variety is necessary.

Adaptation and improvement of quality system Quality management Farmhouse dairy products
(ACB-01.006 Aanpassing en uitbreiding kwaliteitssysteem Kwaliteitszorg Boerderijzuivelproducten (KB)

The project ‘adaptation and improvement of quality system Quality management Farmhouse dairy products (KB)’ started in October 2002. In this project chain partners (farmhouse cheese makers, cheese manufacturers, administrators and product and process experts) and expertise institutes worked together towards strengthening the competitive and innovative capacity of the farmhouse dairy chain. This report can be regarded as an accountability of the activities executed to achieve the set aims. The project had a planned running time of 13 months.

Participating in the project were ‘Stichting Kwaliteitszorg Boerderijzuivelproducten’ in Rijswijk, ‘Bond van BoerderijZuivelbereiders’ in The Hague, RIKILT – Institute of Food Safety in Wageningen and University Department Marketing and Consumer Behaviour in Wageningen. The coordination of co-operation and management of the project is carried out by RIKILT, in association with ‘Voorlichtingsbureau Boerderijzuivel’ in Leiden. The project was part of the co-innovation program ‘Professionalisation Organic Farming Marketing Supply Chain’ from the Foundation for Agri Chain Competence (AKK).

The main aim of the project is to develop an adjusted and improved quality system KB, dedicated to the inclusion of the organic farming of cheese making and traceability as well as developing an education case applied to supply chain problem areas within the farmhouse cheese sector. It is essential to realise that the raw milk character makes specific demands on food safety of the final product. This fact has been crucial when contemplating to include organic farming in farmhouse cheese making, in connection with possible damage to the image of organic farming.

The project has resulted in the following outcomes, referring to the contents:

- Field work to encourage organic farmers of farmhouse cheese to take part in the quality system KB, whereby inspection and control activities are concentrated.

- Adjustments and improvements of the quality manual KB, especially the self assessment forms in close co-operation with interested parties and COKZ (auditor), emphasising on simplification and guarantees with regard to food safety.
- Demonstration model for registration of production and sale data of farmhouse cheese, capable for electronic use on the internet, as well as creation of commitment for the implementation of the ‘boerenkaaswijzer’ (registration program farmhouse cheese). Both methods are focussed on the realisation of tracking and tracing in the supply chain of farmhouse cheese.
- Education case has been developed about the area of tension between market demands and obstacles in the farmhouse dairy chain that inhibit the required adaptations. The case shows why the required co-operation between participants in the chain is hard to realise.

Besides this, some results are booked in the organisational sphere, like:

- Increased notion of the board of executives of organisations in the supply chain of farmhouse cheese makers, to show more transparency and commitment towards their rank and file.
- Creating trust between supply chain partners and expertise institutes in respect of knowledge transfer and completion of the project. In the area of quality the farmhouse cheese making companies are interdependent. The trade sector has showed more openness.

The project has resulted in a number of reports, articles, interviews and CD-ROM's. This underlying version has the status of a public report.

Menubased Biocatering (ACB-01.009 Menugestuurde Biocatering)

The focus of the project "Menubased Biocatering" was realizing a maximum growth of turnover of organic products in company catering. During this, a structural solution in the fields of logistics and marketing was researched for multiple product categories. The research was divided into three phases. In the *inventory phase* insight was gathered in the market demands & wishes (consumer research was performed in this phase), in the current market situation and the mismatch between the two was described. Also, practical learning effects from different sources were collected.

In the *development phase* the chances of success of the different categories were estimated. As a consequence of that estimation, a decision was made which categories would participate in the pilot of the last phase of the project. In this *pilot phase* the chosen categories were tested. About twenty catering locations were selected who would - in a period of eight weeks - test new organic products, supported by several means of promotion.

The evaluation of this pilot led to the following conclusions:

- The introduction of a new organic product should be supported by a push into the channel on one hand and an intensive logistical process on the other hand. This greatly improves the chance of success and leads to the necessary product volume in much shorter time.
- Communication is of great importance with regard to organic products. This applies for both 'functional' communication (informative such as ordering procedures, dealing with organic products) and 'promotional' communication (which has enthusiasm as its most important goal). By optimally informing all the links in the chain, the chance of maximum growth is greatly enhanced. Especially the catering managers have a crucial part in this process; during the pilot it became clear that turnover is mostly driven by supply.
- Also, consumers still have a lot to learn about organics. Moreover, the (unknowing) consumer has different expectations of organic products. Finally, most consumers (with the exception of the 'idealist') find that organic products must have a certain added value like a certain taste or shape to justify the higher price.

The focus of the project "Menubased Biocatering" has led to a higher awareness of organics with all the participants. The intensive introductory support is still being used and searching for solutions together has led to a higher understanding in the chain of each others problems but also to better products. Finally, partly as a result of this project, the Company Restaurant of the Future was founded. This is a joint initiative of A&F and Sodexho and will be realized in the summer of 2005 within Wageningen Food Valley.

Weekly organic vegetable packs delivered through the food service channel (ACB-01.010 Verkoop en uitlevering biologische groenteabonnementen via het catering kanaal)

Within the project "Weekly organic vegetable packs delivered through the food service channel" a new product-market-combination is tested. This combination is formed by the purchase of fresh fruits and vegetables at the workplace (through a membership) for consumption at home.

After the development of new promotion material, an internet site and the organization of the new delivery canal, the sale of weekly organic vegetable packs was tested in six large companies. Those pilots have been started with a introduction period of two weeks, after which the delivery started. Subscribing and cancelling membership, as well as reporting changes was done through the internet site. During the pilot, member were asked two times to fill in a questionnaire.

The high expectations at the beginning of the project turned out to be aimed too high. The membership number did not reach the preset goals. Therefore, the project has only slightly contributed to increase of the consumption of organic products in general. Offering products 'more nearby' is obviously not enough to induce consumers to buying organic products.

Should we conclude that offering a membership for weekly organic vegetable packs at work is useless? No! But we definitely should realize that the 'new' consumer that is reached through this approach is far more critical than members that visit organic shops. Although, 'critical' is probably not the right word, 'demanding' is more appropriate. This 'new' consumer is asking for a complete product that is available at the desired place, at the desired time, with the desired content, and that at the desired moment of consumption has the desired quality. Quality then not only refers to normal product quality, but for instance also to preparation time needed and the appetite of the moment. Surprise and convenience are important key words for this.

Classy Apples (ACB-02.012 Appels van Stand)

The purpose of the Classy Apples project was to reduce the gap between the desired quality and delivered quality of organically grown apples in the various market segments in the Netherlands.

Although it is treated in this report as a single continuous undertaking, the Classy Apples initiative in fact consisted of three successive projects:

1. Classy Apples (Jan '01 - Dec '02) funded by the Rabobank, Ministry of Agriculture, Nature and Food Quality and the sector.
2. Classy Apples in the Chain (March '03 – June '04) funded by the Rabobank, Ministry of Agriculture, Nature and Food Quality, Agriculture Chain Knowledge Foundation (AKK), and the sector
3. Classy Apples 2004+ (June '04 – June '05) funded by the Ministry of Agriculture, Nature and Food Quality, AKK and the sector.

The project was based on:

- Chain discussions with the actual trading partners in the different segments of the market.
- Monitoring of cultivation results with Elstar and Santana, each over two years.
- Monitoring the quality of different organic apple varieties in the shops (2003-2004 sales season).
- Trials and demonstrations in commercial orchards to assist cultivation practice.

Our basic assumption as researchers was that the gap between supply and demand can be bridged from both sides. Growers can do their best to supply (even) better quality and the buyers can do their best to respond (even) better to the differences in quality which confront them. We reviewed the quality of Dutch organic apples on the tree, in storage and in the shops, we responded to points for improvement with research and awareness campaigns and we helped to progress discussions between the partners in the chain about quality and how to improve it. What conclusions can we draw after a more than three years' work on this theme?

Generally speaking, partly thanks to the activities arising from the Classy Apples initiative, many growers now have greater quality awareness and are more market-oriented. At the same time many buyers have gained greater insight into the day-to-day problems faced by the growers. This is seen in, among other things, a more sympathetic attitude to the introduction of new varieties, which in the first instance benefit the grower. This improved culture of cooperation may prove very valuable in the further development of the sector in the coming years.

Good cooperation rarely arises spontaneously; it requires effort and investment. The project was able to improve cooperation, and we have seen good examples of partners in the chain who have looked behind the scenes of each other's operations and so developed a greater mutual understanding. Open discussions about opportunities and hopes on both sides can gradually lead to real chain mentality, with partners working together to achieve optimum quality and a corresponding improvement in turnover. Monitoring of product quality in the chain is an essential precondition for soundly-based and credible chain discussions and harmonisation.

The quality standards set for organic apples are essentially the same in the different market segments. The main considerations are size, colour and skin damage. There are however clear differences in the way retailers respond to deviations from the norm. The health food chains are generally more willing to accept a wide variety of sizes. There is still too little attention to taste, shelf life and the less familiar added values that could be achieved in relation to the production method, such as consideration for the landscape and maintaining soil fertility. (See Report no. 7)

The feasibility of meeting the many requirements remains a concern. Organic fruit growing is beset by technical difficulties. Increasingly high standards put further pressure on the growers' profit margins. Crop monitoring and trials have shown that there is still some scope for improvement with Elstar, which is currently the leading variety. However, it seems inevitable that growers will gradually have to change over to easier to grow, scab-resistant varieties.

Information work and research can contribute to meeting the increasing market requirements. These activities are more effective and efficient if they are embedded in chain structures. In this way it is clear to all the participants that the ultimate aim of technical research in fruit growing is to provide the chain with a product of optimum quality.

Individual partners in the chain still often have a very limited perception of quality throughout the chain. A poor chain can wipe out a good product. Partners in the chain who only look out for themselves, who have no perception of quality and the quality process in their chain and who do not join in discussions about quality are missing a great opportunity to improve their profit margins.

Our retail monitoring indicates that the quality of Dutch organic apples on the shelf is generally very good. Barring a few exceptions the product measures up well to conventional apples and organic imports. The skin quality though is often just a little less good, mostly due to russetting. In the first round of monitoring in November 2003 it was already clear that there were many batches

of Elstar from the second and third harvests which did not meet the minimum requirements for firmness. Not all chains were suitably equipped to cope with this rather weak product.

The subprojects started in 2004 on the new scab-resistant variety Topaz have produced the following interim results:

- An inventory of experience with picking times and storage elsewhere in Europe showed that the variety has potential as a storage apple but that it requires considerable attention to the timing of picking.
- The initial results in December of the Dutch storage trial at four farms showed apples which were ready to eat, but were far from being of consistently high quality. The first retail monitoring round gave the same impression. The variety scored well in terms of firmness.
- We worked with the growers association which is going to market a red mutant of Topaz on an analysis of the organisation and marketing plans. Here we found a small group of growers with potential, but who still have a long way to go to ensure the success of the introduction of their new product from 2007.
- A pilot chain of three growers, one wholesaler and six retailers, who are to conduct further research into the management of Topaz in the chain, will not be fully operational until January 2005.

Feasibility of the use of organic by-products in the feed of organic pigs (ACB-2.015 Haalbaarheid van het gebruik van biologische bijproducten in de voeding van biologische varkens)

In late 2001 it became clear that there would be rapid growth in sustainable pig farming in the years that followed. At that time it was also already clear that both availability of raw materials and quality of feed would play an important part in the success of this growth. In order to increase the chances of success, the project 'Feasibility of the use of ecological by-products in the feed of sustainably kept pigs' was launched. This project was aimed at discovering what ecological products and by-products exist within the humane food industry and how they can be made available to sustainable pig farmers. There was also an initial attempt to test these products in an actual company by means of a number of feed experiments but partly due to market conditions this did not turn out to be possible. Adjustments were therefore made in the course of the project and the effects of feeding strategy on the technical results and slaughter quality were examined.

The project has led to the addition of a number of by-product flows. It has also established that many more flows exist. In order to ensure their future availability, it is probably best to approach the marketing departments of the companies in question.

The system of paying out for slaughtered pigs has turned out to be an effective means of managing the desired slaughter qualities. Slaughter quality of pigs can be positively influenced by the composition of feed, feed management, choice of breed, and separate housing. Contrary to expectations the feeding system was not an influential factor.

Organic mushrooms (ACB-02.017 Biopaddestoelen)

A limited number of exotic mushrooms is currently grown in The Netherlands. Exotic mushrooms are mushrooms different from White Button mushroom (*Agaricus bisporus*). Examples of exotic mushrooms are Oyster mushroom (*Pleurotus ostreatus*) and Shiitake (*Lentinus edodes*). The majority of the Dutch mushroom growers grow mushrooms in a conventional way; the other part applies ecological growing. Particularly, Oyster mushroom and Shiitake are grown ecologically in The Netherlands.

In The Netherlands, the diversity of ecological grown mushrooms is relatively low. However, consumers become more and more interested in exotic mushrooms, because these consumers like to eat something that differs from White button mushrooms. To meet the growing interest of consumers, exotic mushroom are imported into The Netherlands including species that are currently not grown in The Netherlands. Also, the mushroom growers have become interested in exotic mushrooms the last few years, because the growth of White button mushroom is under pressure. An important reason for this is the competition from various countries outside The Netherlands. Therefore, the mushroom growers believe that the growth of exotic mushrooms additional to the growth of White button mushrooms has more economic value than the production of just White button mushrooms.

The main aim of the project was to improve and enlarge the ecological growth and the consumption of exotic mushrooms in The Netherlands. Therefore, it was needed to raise insights in ways to increase the consumption and to increase knowledge for improvement of the growth of exotic mushrooms. Investigations to the interest of the consumer were needed for insights in the desires from the market and the personal interests of the consumers to exotic mushrooms. This aim was supported by the mushroom growers and a chain approach was taken. Companies involved in this chain approach comprised a substrate producer, mushroom growers and traders. This project was carried out by various companies, including Ekotwente, Verbruggen Paddestoelen, Banken Champignons, Eosta, Meezenberg, Van der Wert, Habets, Rademakers and two research institutes, the Mushroom Unit of Applied Plant Research (PPO) and the LEI within the time span ranging from January 1, 2003 to January 1, 2005.

The results of this project are innovative. The research to the interests of consumers have resulted in increased insights in the desires of the consumers to exotic mushrooms. In fact, the consumers are more interested in (ecologically grown) exotic mushrooms than expected and they are certainly willing to pay reasonable prices for the exotic mushrooms. Experiments to the growth of mushrooms have increased the knowledge about optimization of the ecological growth of exotic mushrooms. Furthermore, this project shows that exotic mushrooms can be grown commercially and if needed, in systems that can be easily automated. This shows that there are possibilities to scale up mushroom growth in order to meet the requirements of the market.

Another important results of this project is that the participating mushroom growers have formed a group to bring (ecologically grown) exotic mushroom directly to the market and the consumers. This group will start to sell mushrooms in 2005.

Organic Flower (ACB-02.020 BIOBLOEM)

Organically grown cut flowers in The Netherlands have market demand but development of the sector faced major difficulties in growing and marketing. The “Biobloem” project was started to find solutions for the following issues:

- small scale and lack of professionalism of biological cutflower production;
- poor chain performance;
- lack of consumer insight;
- unreliable pre and post harvest quality and absence of ‘organic’ flower feed.

The Biobloem project was carried out by the research institutes Applied Plant Research and Agrotechnology and Food Innovations, biological flower wholesaler Florganic, flowerprovider Intergreen, manufacturer of flower and plant care products Pokon & Chrysal and biological flower bulb grower Hoogeveen, and was financially supported by AKK (Agri Chain Competence foundation) and the Dutch Ministry of Agriculture.

This project has contributed to the growth of the production area of biological cutflowers, both in protected and open cultivation in The Netherlands and also in France. Reactivation of the producers union “Biosfeer” and production cost analysis contributed to raising the level of professionalism of outdoor growers. Correct timing of potassium fertilizer application in summer flowers can reduce the occurring quality problems in summer flowers. First practical experience with the important crop Chrysanthmum was obtained and varieties suitable for organic growing method were identified. Supply chains were analysed on temperature, humidity and ethylene concentration, which in some cases resulted in practical advises to improve chain conditions. Research on suitable preservatives for organic flowers resulted in two products with potential: gibellerine acid and aluminium sulphate.

Consumer research in UK supermarkets learned that individualistic motives were more important than idealistic and societal considerations when buying organic flowers. Based on these results some promising marketing concepts were developed, with special attention for scent and colour. In The Netherlands, Biobloem and related project Bioflora contributed to the penetration of new markets (a.o. Shell petrol stations and Intratuin garden centres).

Biobloem created a load of positive media attention. This has improved the image of biological cutflowers and biological cutflower production, and contributed to development of production and markets. The Bioflora project, focused on practical market issues, will continue and a new

project financed by the Dutch Product Board for Horticulture (“Productschap Tuinbouw”) has recently started.

Improvement of quality and sales of Organic Fruit – phase 2 (ACB-02.021 Verbetering kwaliteit en afzet Biologisch Fruit)

A lower cost price and a uniform good quality can boost considerably the sales of organically grown apples. One of the important factors in the high cost price is the loss caused by decay during the storage. Foreign research shows that there are a number of possibilities to fight storage decay in fruit (permitted according to the standard ‘organic’). In addition russetting is an aspect of fruit quality that could involve a strong loss of liquid, followed by wrinkling and loss of crunchiness. Finally, storage decay and russetting have a negative influence upon sales toward retail trade and the final consumer.

The business community and two knowledge institutions have carried out a biennial project in order to tackle the two above -mentioned problems. The project has been financed by the business community and AKK (Stichting Agro Keten Kennis) (Agro Chain Knowledge Foundation). The partners within the project are Fruitmasters, AND en Appelleren/Prisma, PPO-fruit en A&F. The main object of the research is: *To come to a tight chain of growers, sales cooperative and retailers who want to enhance the quality and increase sales of organic products and reduce losses, on the basis of agreements about the quality of organic products.*

This means that a chain control has to be achieved by which organic fruit of good quality can be offered to the consumer all year round.

The definite results of the project are:

- The treatment method for the reduction of decay of apples /fruit has to be worked out for each specific variety.
- Waste by decay during storage can be reduced with 80% using a water treatment method of 50 degrees Celsius (2 minutes).
- The found reduction involves a saving of 3.600 € per hectare per year.
- Russetting has no influence upon loss of liquid but it does influence the start of decay: more russetting causes more decay.
- The hot water treatment no requires a special permission and technical possibilities are available at the moment.
- A warm air treatment (‘curing’) has not shown clear positive results.
- A post crop treatment with the plant restorative as made available by the PRI in Wageningen showed only in some cases a slight positive result.
- The quality process between organic and common Elstar apples is the same with the exception of small skin spots on organic apples.
- Especially the information supply to the consumer about the *image* is important for the sales of organic fruit.

- Growers and retailers together coordinate production, quality and sales. As a consequence of this the information about the quality of the product toward retail trade and final consumer on the one hand and production on the other is deepened.
- Organic fruit can be offered for a longer period improving the storage condition.
- Pilot at fifteen ADN points-of-sale.

The results of the project are partly definite but also show that follow-up research within fruit / specific varieties is essential. In addition to this a better insight on the part of the consumer is necessary for a good marketing of organic fruit in general and apples in particular. The project partners took the first step toward market and consumer starting a pilot at the end of 2003.

Supply chain scenarios for organic Fruit and Vegetables (ACB-02.024 Dynamische Ketenscenario's voor de biologische AGF)

This report gives an overview of the research activities and results of the project ‘Supply chain scenarios for organic Fruit and Vegetables’. The project that started in 2003 is a cooperation between leading Dutch enterprises in the agribusiness and research institutes: Albert Heijn, a Dutch supermarket, Bakker Barendrecht, supplier/packer of potatoes, vegetables and fruits, Holland Crop, a group of vegetable, fruit and potatoes growers related to Bakker Barendrecht, The Agricultural Economics Research Institute, (LEI) and the Nyenrode University. The project was co-funded by the Dutch Foundation ‘Agro Keten Kennis’.

Research activities focuses on two main areas: organization of organic supply chains and consumer behaviour with regard to organic potatoes, vegetables and fruits in 2015. Based on a benchmarking study of few successful supply chains specialized in organic potatoes, fruits and vegetables, the project team identifies points of improvements for the supply chain Albert Heijn, Bakker Barendrecht Holland Crop. The benchmarking includes the analysis of Waitrose (UK), Migros (Switzerland), COOP (Denmark) and Albert Heijn (Netherlands). The study highlights organizational differences among selected supply chains in terms of safeguards, role and function of chain members and gives an assessment of related performance in terms of cost efficiency, responsiveness, flexibility, product availability, reliability and use of resources. Results of the study stress the importance of strategic embeddedness for the success of the category organic potatoes, fruits and vegetables. There is no ‘one fits all solution’ for a successful distribution and merchandising of organic potatoes, fruits and vegetables as optimal organization of the supply chain is depending on supermarket formula, available resources, clientele characteristics and development stage of organic agriculture in the country. The analysis of the selected supply chains shows three viable models of chain organization for organic potatoes, vegetables and fruits: a price-oriented, a focus-oriented and a quality oriented model of supply chain.

Based on desk research and workshops, the project formulated several mid-term scenarios of the socio-economic and technological situation of the Netherlands with specific attention for food consumption in 2015. Visualization of the scenario’s with help of virtual reality technology

provides insight in midterm consumer behavior with regards to organic potatoes, fruits and vegetables. Results shows that fresh fruit and vegetables becomes less safe in the eyes of consumers in 2015. The prosperous part of the consumer attach less importance to vegetables and fruits and find them less tasty. However, in comparison with the rest of the consumer, the prosperous consumers find fruit and vegetables more tasty and more healthy than the rest of the consumers and attach more importance to it. Also the willingness to purchase fresh organic fruits and vegetables is higher, especially for pine apple, kiwi, banana's and iceberg salad. The price perception is the same for both group consumers. Heavy users of organic products are more positive concerning the taste, the safety and the health of organic potatoes, fruits and vegetables in 2015. They also are more willing to purchase organic potatoes, fruits and vegetables than non users.

Both results of the consumer behavior research and the supply chain benchmarking are integrated into two midterm scenario's for organic supply chain of potatoes fruits and vegetables. The first scenario is strongly price-oriented and seeks to merchandise a small assortment of organic products at a low price. Such supply chain will incorporate multiple suppliers in order to simulate competitive behavior among suppliers To fully benefit of scale advantage, retailers will prefer to work with large scale suppliers. Marketing activities, innovation, and cooperation among chain members are limited. Suppliers are contracted on transition basis. Because of ad hoc transactions, there is a few chain specific investments. This price-oriented medium term scenario seems uninterested for the supply chain Albert Heijn, Bakker Barendrecht, Holland Crop as it strongly diverges with exiting organization and strategic choice.

The second mid-term scenario focuses on safety, taste and convenience. The assortment of organic potatoes, fruits and vegetables is large and includes two separated lines: safe-tasty and safe-convenience. To comply with these requirements the supply chain is organized according a dedicated partnership model, including a few selected producers and a service-provider/packer. Relationships among chain members are stable and opportunistic behavior is limited. The service provider performs productive functions like quality control, washing, packaging, processing and replenishment. The limited amount of producers ensures homogeneity and certainty of product quality, taste and safety. Producers complies with private certification schemes developed by retailers and keep set of records to monitor production and performance in terms of safety, quality, taste and cost efficiency. In order to comply with high standards and requirements in terms of taste, safety and convenience, chain members are closely cooperating. Assets such as infrastructure, technology and resources are strongly chain specific. As such, growers and service providers deliver customize-made products and services. Information exchange in terms of planning, consumer needs, product quality, and tracking and tracing is intensive, partly due to well implemented information systems among supply chain members. Planning is long-term oriented and based on reliable forecasts of demand. Marketing and innovation get high priority. Terms of transition are reliable and explicit. Logistics issues focuses on lead time reduction and transport consolidation among organic and main stream products, and among growers. Also waste and shrinkage reduction are an important issues.

Current organization of the supply chain Albert Heijn, Bakker Barendrecht, Holland Crop fits in this last scenario. However, to anticipate on midterm consumer needs, the supply chain must maintain investments in the following areas:

- improving positioning of organic potatoes, fruits and vegetables based on convenience and taste by developing two separated product lines
- enhancing quality and safety guarantee by improving certificates schemes, introduction of producer monitoring and benchmarking, and set up of integrated chain quality information system
- further development of convenience oriented products within the assortment of organic potatoes, fruits and vegetables
- further development of taste-oriented products within the assortment of organic potatoes, fruits and vegetables
- further consolidation of logistics

Regional arrangements for organic pork - phase 1 (ACB-02.025 Regio-arrangementen voor biologisch varkensvlees, fase 1)

The aim of the project is to increase the production and sales of organic pig meat to consumers by using – not standard – channels, that are associated with nature and recreation (rural area) and that already know the consumers. The aim of Phase 1 was mainly to bring together the parties and when possible and necessary introducing even more parties than were mentioned in the proposal.

In Phase 1 all parties were visited and discussions took place. Two new partners were identified, amongst with one is an organic pig farmer. A broad network from different parts of the chain, ‘green’ parties and government bodies are involved. Through the interviews and the various feed backs partners listened carefully to each other. Creative contributions and challenging propositions contributed to the willingness to co-operate. Trust increased and commitment was shown, the formulation of a common vision came closer. From the stakeholder analysis a clear picture appeared about what the partners expect from the project and what the partners want to invest in the project. Clear win-win situations were noticed. This information is elaborated in the concept Report ‘De Vechtdal droom’.

In Phase 1 also a literature study was carried out, in which market analysis and (model)-arrangements were studied and brought together in the Report: ‘Het Vechtdal concept’. It was observed that the innovation power of chains may increase by co-operation between agro-chain parties and other parties (‘green’ parties) in the rural areas. By making these relationships explicit other co-ordination mechanisms than price can be used to reach the common goals. In fact we can not speak of a linear chain, but parties work together in a chain/network setting. More perspectives were made visible for possibilities to market the Vechtdal products. Discussions took place with the ‘Keurslagers’ organisation, which will be introduced in Phase 2 through the regional members.

Also lessons were learned from two other AKK-projects, i.c. 'Innovation processes' and 'Heuvelland' and from other initiatives tied to regions. Especially co-ordination took place within the Vechtdal region with plans of LEADER+-projects and plans of the 'Fonds Ontwikkeling Duurzame Landbouw' of GLTO. This already is a noticeable spin-off of the project.

With regards to the link between the Vechtdal values (both at the input side as well as at the output side) and suitable ways of production in Phase 1 attention was paid to the process of making ideas. This forms the basis of the further development of the regional arrangements in Phase 2. At this moment little can be said about the quantitative results of the co-operation. Four working groups were established to elaborate the Vechtdal Covenant, that will be concluded among partners at the end of 2003.

Products from the Vecht valley, pure nature –phase 2 (ACB-02.025 Vechtdalproducten, een puur stukje natuur)

In the two years of the project, with an interruption of there months, the whole trajectory of chain formation is passed through. All objectives of the project were realized, from the early beginning of developing a common vision and developing ways of co-operation up till and including the effectuation of the sales of Vechtdal meat in butcher's shops. Also is the Vechtdal pork meat on the menu of restaurants. Furthermore some public arrangements are developed. E.g. interested people can register for the 'Delightful Vechtdal arrangement' that makes a part of the arrangements bundle 'Extraordinary tasting' in the provinces of Gelderland and Overijssel.

In Phase 1 (Dec. 2002 - May 2003) a common vision was developed by the partners, that says that it is not only worthwhile to produce and sell pork meat but by keeping pigs in a natural environment it is in fact selling the region Vechtdal that matters! This 'Vechtdal dream' is further developed into the 'Vechtdal concept'. This concept describes the ways in which agro-production firms and 'green' parties in the Vechtdal region co-operate with each other in order to realize the common goal of production and sales of meat combined with production of nature and landscape. The co-operation is gearing towards mutual advantage of both groups: win-win situations.

In Phase 2 (Sept. 2003 – Dec. 2004) the participating partners showed first that they want to co-operate in a regional chain network of co-operation in a binding way. The parties undertake the development of high quality products that are tasty and delicious, tied to a region. These are produced in a sustainable way with an eye for nature and landscape. A particularity of the co-operation is the fact that the agricultural entrepreneurs keep the direction of the chain. In the middle of 2004 this was confirmed by the signing of the 'Vechtdal Covenant'. To realize the Vechtdal concept, it is planned to develop a combination of an ideal and a commercial organisation. The ideal organisation was established in the project period: the Dianthus Foundation, that a.o. has the objective to implement and keep uptight an environmentally, nature and animal friendly agricultural production system in the Vechtdal and make and keep this accessible for citizens and consumers.

Since Dec. 1, 2004, the Vechtdal pork meat is for sale in the butcher's shop of Haverkort in Zwolle. Weekly Haverkort takes 3 pigs. At the end of January 2005 this number has increased already to 5 pigs per week. The price formation is brought about by negotiations between primary entrepreneurs and the butchers (who sell the meat to the consumers). Deals are made about the price per kg cold slaughtered weight of pigs according to a certain standard cutting out in technical parts and delivered Franco butcher. All stages in-between (slaughtering, transport, etc.) are put out to contract by the agrarian entrepreneurs. Organic pigs are used, produced by SKAL-certified farms. In the butcher's shop the Vechtdal meat has no EKO-label, because butchers want to offer fresh meat, along other (non organic) meat and meat products. The meat is also available with restaurants. The restaurant De Agnietenberg in Zwolle was the first restaurant where Vechtdal pork meat is on the menu.

In the framework of this project also a sensory consumer research with Vechtdal pork meat was executed in 'Herberg De Klomp' in Vlisteren under 53 consumers and 15 butchers and restaurantkeepers. In the research of the attractiveness of the Vechtdal meat in comparison with regular meat it came to the forefront that the Vechtdal pork meat looked better, was more crispy and contained less fat than regular meat and was at least as delicious. The Vechtdal concept appeals to about 90 % of the respondents.

In Phase 2 also public arrangements were elaborated, that become operational in 2005. The 'Delightful Vechtdal arrangement' makes a part of the 10 arrangements in the booklet 'Extraordinary tasting' that describes culinary arrangements of the provinces Gelderland and Overijssel. Two other arrangements: 'Country wares arrangement' and 'Pure Nature arrangement' will be commercialised in co-operation with the local VVV.

In the project period also preparations were made for the future. Apart from pork meat in the future also other products, like Vechtdal beef and milk products, will be produced (www.vechtdalproducten.nl). All Vechtdal products are characterized by their origin and are produced in a sustainable way with an eye for nature and landscape. The establishment of a commercial organisation is the keystone of the Vechtdal concept. A project to realise this trajectory has started in December 2004 with the Wetenschapswinkel Wageningen UR (Development of the Vechtdal Co-operation structure: the Vechtdal marking Co-operation) in charge of the Dianthus Foundation. Finally a communication trajectory was prepared to scale the project towards a larger amount of pork meat, more different products and services and towards being an example for other regions in the Netherlands.

Organic pork chain, quality, service and logistical optimisation (ACB-02.026 Bio-varkensketen, kwaliteit, service en logistieke optimalisatie)

Dumeco, De Groene Weg and Albert Heijn want to reduce loss in the organic pork chain at the retailer. Loss is defined as price loss. Price loss is created due to price reduction at the 'best before' date, which indicates that the shelf life of the product has ended, and the returning of products as soon as the 'best before' date has expired. At product level loss in the organic pork chain is four times higher than in the regular pork chain! This is due to low and strongly

fluctuating product flow of the organic pork assortment. The most important aim in this project is to reduce loss in the chain.

In phase 2 of the project this is specified as a loss reduction at the retailers. The aim is to reduce the loss of organic pork with 20% in the end of 2004. In this case loss is defined as a percentage of the sales. Only under condition that the service level remains equal or improves (among others availability and full range of products) this reduction can take place.

To realise this activities are carried out in the field of:

- logistics
- quality
- display management

Extending the shelf life of the product seems to be one of the most significant ways to realise a loss reduction at the retailers. In this project both absolute and relative shelf life extension are studied in detail.

An absolute shelf life extension can be obtained if the microbiological shelf life is extended. From the results obtained in this project can be concluded that for a part of the organic pork product range a *shelf life extension of 1 day* can be realised within the actual chain conditions and (initial) product quality.

Within this project an innovative concept has been developed and analysed by simulation, which gives the opportunity to realise relative shelf life extension at the retailer on branch level. This relative shelf life extension appears to be feasible if *chain logistics are managed on the ‘best before’ date*. The developed concept of relative shelf life extension implies that branches with a high product flow receive products with a short ‘best before’ date and branches with a low product flow receive products with a longer ‘best before’ date (= shelf life), by utilising differences in shelf life per meat batch, which may arise due to variation in initial meat quality and in chain conditions. Under present circumstances this concept is not put into practice yet, however the company participants consider this concept as very interesting for the (near) future. Within this project is extensively described what methods could be used to realise both absolute as relative shelf life extension.

Besides above-mentioned scenarios a third scenario concerning loss reduction has been formulated and worked out. Within this scenario the so-called FEFO concept has been developed. FEFO means First Expired, First Out and implies that by adequate and optimal display management, the selective behaviour of the consumer can be reduced. This concerns reducing selective behaviour on the basis of ‘best before’ dates to realise that the products with the shortest remaining shelf life (First Expired) are selected by the consumer (First Out) instead of the products with the longest remaining shelf life as is the case at the moment.

Within this project is described in detail which methods are adequate to realise both absolute as relative shelf life extension and how the FEFO concept can be put into practice.

From the results obtained in this project can be concluded that for a part of the organic pork product range a shelf life extension of 1 day can be realised and can be implemented without any problems (in the field of product quality and safety). Moreover, in the pilots is accomplished that the selective behaviour of the consumer has been reduced from 80% to 22%. However, loss reduction due to this reduction in selective behaviour could not be established yet. These pilots have demonstrated as well, that a loss reduction at retailers level can be realised in particular by extending the shelf life of organic pork. The shelf life extension of a product of one day seems to realise the given 20% (at sales level).

Besides, the project, though-chain specific, has resulted in the development of a simulation model as well as a shelf life application. For the development of the simulation model innovative steps are taken by arranging the simulation process in such a way that the supply-driven chain, as is available nowadays, becomes a demand-driven chain. Accordingly, consumer demand is leading, as it is in reality. Further, consumer behaviour on purchasing is modelled in more detail as regards the influence of selection behaviour. This implies that model wise is described with which probability patterns the consumers, which are potential buyers of organic pork, purchase the product based on price reductions and/or 'best before' date. The simulation model is not one of the objectives, but it gives the opportunity to calculate, analyse and test the scenarios concerning loss reduction, which are developed within this project.

The developed shelf life application is a tool based on chain conditions, as temperature and time, which can be defined by the user. This tool can be used to determine the maximal shelf life of the concerned product. This involves the development and implementation of a quality decay model for two organic pork products. This development is very innovative. Possibly, this application could be further developed to be used as a tool for certain education purposes.

Safety guarantee organic pork (ACB-02.027 Borging veiligheid biologisch varkensvlees)

An earlier study performed by Wageningen UR concerning the presence of *Toxoplasma gondii* infections in organic and free range pigs confirmed the suspicion that a transfer to animal friendly livestock production systems might lead to a re-emergence of toxoplasmosis. Of interest was the observation that a large number of farms were able to grow toxoplasma free animals, indicating that possibilities were available to counter the problem. The goals of this AKK project included the following: identify infected farms, establish the risk factors and set up a control program so that infection of humans can be limited.

The following steps were undertaken:

- Establishing a control program
- Developing a test method to determine the Toxoplasma infection status of a pig or pig farm
- Determining the toxoplasma infection status of a farm, analysis of the on farm risk factors and implementing control measures

Control Program

A control program was set up using the HACCP methodology. Using this control program the risks of Toxoplasma infection on the farms were identified and corresponding control measures were listed. Subsequently a questionnaire was made whereby the farmer could easily identify the risks of toxoplasma infections of the pigs on his farm.

Test Method

During the project two test methods were established. The first method was based on classical ELISA methodology and makes use of the competition between a monoclonal toxoplasma antibody and circulating toxoplasma antibodies in the blood of possibly infected pigs. The choice of this test method leads to a test with a high specificity, which is necessary in view of the low prevalence of toxoplasma infections in organic and free-range pigs. The second test system was based on biosensor technology. The biosensor technology enables the testing of a large number of samples in a short time period and can be used to test the serology of various pathogens during the same run. The proof of principle of the biosensor technology for toxoplasma serology was made in this project.

Implementation Control Measures

When combining a combination of serological toxoplasma monitoring with the identification of risk factors we were potentially able to reduce the number of toxoplasma-infected pigs by almost 50%. This means that at present approximately 1% of organic pigs will be infected with toxoplasma. Further studies are needed to show whether the infection can be further reduced by additional management measures.

Organic vegetables with a higher value

(ACB-03.030 Biologische Groente met meer Waarde)

In order to position organic fresh produce with a clear and distinguished identity, during the 2002 season, Dutch wholesaler EOSTA has established a pilot with 'Wild Wonders' tomatoes. This concept is inspired by the American 'Heirloom' tomatoes and consumers experience it as the 'taste of the old days'. Despite the successful start, various difficulties surmounted, such as inconsistent taste levels, high packaging cost and limited insight in consumer perception.

Purpose of the project is to develop an added value concept of tomato and cucumber, through integrating various areas of expertise. Five companies (two growers, a wholesaler, a retailer and a health shop supplier) cooperate with two institutes (PPO glasshouse and A&F).

The project consists of three major elements:

- Selection of suitable varieties (taste, storability and productivity)
- Consumer research
- Packaging

Three tomato varieties with a low mean fruit weight and a different colour and/or shape were such an addition to the concept that these varieties will be grown for the concept in 2005. Two cucumber varieties were distinctive but were found to be difficult to cultivate, just like the other cucumber varieties. The taste of the tomatoes was very diverse; it was possible to divide the varieties into three groups (positive taste, neither positive nor negative, negative taste characteristics). Four of the five cucumber varieties tested were found to have a positive taste.

Experimental consumer research showed that the individual varieties were rated as more attractive by consumers when they were similar with standard tomatoes. This means that a successful concept should consist of a mixture of standard and distinctive tomatoes in order to increase the acceptance. It was found that Wild Wonder tomatoes were more often eaten as snack.

An overview was made of all available sorts of environmental friendly packaging types. Interviews learned that in supermarkets protection of the product is the priority, while consumers in health shops pay value to the environmental friendliness. The concept has proven to be successful in 2004. The limited number of data shows signs that the concept generates repeat buys. Particularly in the retail outlets, the sales are additional to the existing organic market share. Planning for 2005 foresees a double area of Wild Wonder tomatoes to be produced.

Working together in all aspects of the chain requires commitment of all parties. In the end it does supply more knowledge than the partners can achieve individually.

Two know more than one (ACB-03.033 Twee weten meer dan één)

The AKK project “Twee Weten Meer Dan Een” wants to identify the major knowledge areas in biological chains and the relevant target groups. In addition, we investigate which activities for knowledge transfer are most effective, both within projects and in the biological production chains. Distinct need and interest from the sector are the starting point for all activities. A need analysis performed in desk research and personal interviews with project participants, agents and companies in the biological chain have identified three major need areas for

information and tacit knowledge: which information do they need and how does the target group want to acquire this information?

The major need areas are:

1. Consumer: What is the added value of biological products, consumer needs and how to connect to these needs during shopping; communication in the chain.
2. Quality: Chain and quality control
3. Cooperation: Processes for cooperation in chains

The project also investigated methods and preferred tools for knowledge transfer. Concerned parties favour mutual exchange of knowledge and experiences, preferably in networks and focused on current issues. The major need areas are important as long as they are based on current issues and tailored for specific target groups.

Based on these requirements, we have based all activities within the project on ongoing initiatives and meetings. In addition, we offer background information through written channels. Evaluation of all activities shows that we optimally respond to the needs of the target groups by answering to their sense of urgency and their own strategy and objectives. This also improves participation and commitment, especially in meetings and conferences organised by third parties and intermediates. Own initiatives are not easily organised due to lack of time, other priorities and organisational issues.

Another major factor for success is adaptation to the target groups time span, which is very often much longer than the duration of a project based cooperation.

We thus recommend that all activities aiming at knowledge transfer should include not only concrete initiatives but also scripts and checklists to organise activities, preferably started by the companies themselves. Project directors also can improve knowledge transfer by cooperating with project coaches and experienced participants from the biological chain itself. This will enhance process knowledge and tacit experiences on chain processes.

The key to success in chain-based project is the utilisation of both content and process.

Possibilities to optimize information flows in the Dutch organic sector (ACB-03.034 Mogelijkheden voor het optimaliseren van informatiestromen in de biologische sector)

The legislative requirements concerning food safety management in the area of tracing have been increasing gradually.

In 2005, such requirements within the EU community have further been tightened up.

For the organic sector, guaranteeing the organic quality in the chain plays an essential role, in addition to food safety. Some recent cases have shown that a calamity within one specific product can have enormous consequences for a large part of the organic chain. The expansion of the organic chain has led to an increase in risks. For the organic sector to expand further,

strengthening or guaranteeing organic quality and food safety is necessary. The sector has a common interest to realise a transparent chain which can react rapidly and can provide information concerning origin, production method and processing steps of a product.

For this reason, the organic sector believes that optimising information flow in this sector using present capabilities in Information and Communication Technologies (ICT) can convert the aforesaid worries into possibilities. In this way, the position of the sector can be strongly improved to guarantee continuity and growth. To reach this goal, four ambitions have been formulated:

- Provision of information and guaranty of product quality
- Reduction of administration
- Management instrument
- Marketing and image improvement

These ambitions stand for improving the current position of the organic sector and are conditions for the continuity and the growth of the sector. However, besides vision, initiative and perseverance are necessary. A supporting organisation with a sufficiently strong representation in the sector has to be set up and it has to be committed to realising the said vision. This organisation must also take the initiative to set up projects related to the said ambitions.

One can conclude that the project has progressed differently from what the parties concerned had in mind in the first place. However, this does not mean that no results have been achieved. The mutual social learning process experienced by the participants is the main outcome of this project. This has resulted in a jointly developed vision with respect to the possibilities which the organic sector can offer in optimising information flows.

During the project, it has become clear that a well-formed vision is needed when it concerns optimum information flows in the organic sector. This vision has been developed in two intensive work sessions. The vision document is therefore the most important tangible result of this project and offers a good starting point for continuation activities and projects.

Keywords: organic sector, transparency, administration reduction, Information- and Communication Technology, tracking & tracing, social learning process, chain information system

Organic beef: supply and demand in equilibrium (ACB-03.035 Biologisch rundvlees: vraag en aanbod in evenwicht)

Introduction

The objective of this project, initiated by 'Natuurweide' (the association of organic dairy farmers), *De Groene Weg* and Dumeco Retail, is to better attune the supply of organic beef from dairy cattle to demand. The possibilities offered by the operational management of the dairy farmers occupy a central position in this. In order to achieve this objective, we have investigated the market demands and the factors that influence the classification of the animals.

Supply and demand

An analysis of the market revealed that there is generally speaking a demand for two types of beef. On the one hand, cuts of meat such as lean steaks, stewing steak etc, and on the other hand the 'processed products': mixed and smaller meat products such as mince, burgers, meat rolls and strips of meat. Different qualities of beef are used for both types: dual-purpose (milk and meat) animals and beef breeds (at least SEUROP class O+) are generally used for cuts of meat, while animals of dairy breeds with a lower classification are also suitable for processed products. This preference is linked with the relative differences in the quality of the meat cuts per carcass. This is expressed in the classification. On average, the beef breeds have a score of U, the dairy breeds P - O and the dual-purpose breeds O - R. The Netherlands therefore can-not fulfil the total need for organic beef simply through the slaughter of former milking cows of dairy breeds.

A further analysis of the demand for organic beef with the aid of data on household purchases reveals that 53% of the organic beef sold in 2003 consisted of processed meat products. Expressed in tonnes of slaughter weight, this amounted to almost 1,400 tonnes. If this had all been from dairy breeds (SEUROP class O0, with an average slaughter weight of 318 kg), then more than 4,300 animals would be needed per year to satisfy the demand. In the Netherlands, however, dual-purpose cows and beef breeds are also slaughtered, and it is also necessary to import and bone carcass meat from such animals. Shreds of meat are produced in the course of this process, which are then used in processed products. The need for meat from dairy breeds originating from the Netherlands is therefore not as great as suggested by the total size of the market. However, the calculation made does make it clear that the sub-market of processed meat products is quite large. According to the *Ekomonitor*, 4,100 organic dairy cows were slaughtered in 2002, of which 20% were sold as conventional meat, mainly due to an inferior classification. The market for processed products is expected to grow still further. In fact, 70% of all the beef consumed (conventional and organic) consists of processed meat products.

Influences on classification

An analysis of slaughter data concerning cows from organic dairy farms revealed that the breed, the parity and the lactation period all influence the classification and weight. On average, dual-purpose cows have a higher classification, and therefore also a higher carcass yield than Holstein-

Friesian cows. Furthermore, older cows have a better classification than heifers. This is probably due to the fact that slaughtered heifers are not yet fully grown (prematurely slaughtered). A longer lactation period also has a positive effect on the classification.

On farms that are comparable in terms of breeds, parity and lactation period, 20 to 25% of the unexplained differences between classification results can be traced back to the operational management. Differences of up to 71kg slaughter weight and 2.2 sub-classes of conformation are possible between enterprises at the two extremes of the scale. A cattle farmer can therefore exercise great influence on the classification through his management methods. It is not easy to specify the management style that brings the best results. Factors such as company strategy, objectives, the will to supply good quality animals, the extent of final fattening and the proactive attitude of the cattle farmer are all significant in explaining the differences between enterprises.

An average Holstein-Friesian cow with a classification of 284kg and O⁻³ brings a carcass yield of €99. An average dual-purpose cow with a classification of 295kg and O030 brings a carcass yield of €64. The maximum carcass yield for a Holstein-Friesian at farm level with a classification of 334kg and O030 is €78. With the aid of these average and maximum achievable results per breed group, a cattle farmer can determine his position in relation to fellow cattle farmers and can also calculate how much money he would be passing up if he supplies cows under the average and maximum feasible classification. This should act as a stimulus to supply cows with a better classification through the choice of breed used and the final fattening of dairy cows once they have been taken out of production. Lastly, a better increase in value can be achieved by taking advantage of the seasonal nature of the payment price, the peak being in the summer and the low point occurring in January.

Conclusions and recommendations

Supermarkets' purchasing is based on the shop image. Only products that fit that image will be included in the range. For this reason, the organic chain should only implement changes in the flows of meat in consultation with the retail trade.

An investigation of the extent to which advantage could be taken of the trends in consumer demand for healthy, tasty and easy to prepare meat by means of developing new processed products is also recommended. The interest of the meat products industry in the development of a range of organic meat products also represents an opportunity to expand the sub-market of dairy breed slaughter cattle in the long term.

A better classification of the cows could be achieved through the use of more beef breed animals or through the final fattening of cows before delivery. Whether or not this would be an interesting prospect is of course dependent on the final fattening potential of the cows concerned and the fodder position of the enterprise. This requires cattle farmers to make a strategic choice with regards to the optimum ratio for them between the dairy and meat yields of their milking cows.

Cattle farmers would be advised to determine their position in relation to fellow cattle farmers using the average and maximum classification and carcass yield per breed group. If a lower than average classification is supplied, it is advisable to investigate ways of supplying a better classification. The increased yields resulting from a better classification provide a certain amount of financial scope to take measures. A sound assessment of the final fattening potential of the animals is important in order to exploit this scope.

In short, the dairy farmer is able to better attune his supply to demand by means of his operational management. The most important variables that he can use to achieve this are the choice of breed, the points in time during the season at which the animals are supplied and the possibilities relating to the final fattening of the animals, for which a good assessment of the final fattening potential is essential.

Marketing concepts for farm sale of organic meat (ACB-03.039 Marketingconcepten voor huisverkoop van biologisch vlees)

The project "Marketing Concepts for Farm sale of organic meat " has started to make farm sale of organic beef and pork meat more available both for farmers as consumers. The main concept is not new, but only available on small scale and ad-hoc base.

In practise, this means that there is little co-operation which results in different implementations. Furthermore, a lot of time has to be spent to see through a swamp of regulations, which leaves (too) less time for real entrepreneurship by the farmer. To lift the shop to a higher level however, the latter is most important.

Generally, it can be said that farm sale has to compete with supermarkets, health stores and speciality shops. This asks for a distinguishing concept; "it is not a picnic"; if you want it to be a flourishing business. The shop has to concentrate on social trends like "health", "enjoy life", "variety" but strongly linked to region and farm. Apart from this the farm sale shop has to deal with a lot of regulation to comply with.

Basis of the project has been the long term goal to implement a national concept which (new) farm vendors can join with. Another precondition was that the sale activities have to match with normal farming activities. This has resulted in the choice of the relative simple concept where the farmer sells his own product in frozen consumer units. Possibly he can extend his range of products with either beef or pork, and chicken. Using the calculation model KOREMO, it has been made transparent that in most cases this implies a sound economical scenario.

To support farmers that consider to start with farm sale, part of the project has been used to develop a special guide for them. In this guide a short description is given of regulations that are applicable to farm sale in the Netherlands.

Market development Organic (fresh)products in the business food chain (ACB-03.040 Marktontwikkeling Biologische (vers)producten in de bedrijfscatering keten)

Company catering should fulfil an important role in the nationwide objective to let 5% of consumer expenses be on organic products. During the working week, millions of consumers have lunch in the company restaurant. Introducing organic products in company catering reaches a large group of consumers and this is interesting for two reasons; on one hand the consumer who eats organic at home, wishes to find organic products in his company restaurant, on the other hand positive experiences with organic products during lunch can lead to an increase in consumption at home .

Originally this project was submitted as a "package deal". Because of circumstances this constructions has changed to a combination of a co-innovation part (AKK) and a package deal part (promotion and training). The co-innovation part is the subject of this report.

The co-innovation research consists of two parts:

1. Consumer research study of introduction strategies for organic cold cuts and cheese
2. Analysis of promotions

Within the consumer research the following objectives were realized:

- Insight was gained in purchasing behaviour of individual consumers and the way in which consumers judge the price, physique and taste of their cold cuts and cheese as a result of the introduction of organic products in this category
- Research was done to identify the difference between introduction strategies and the way judgement and purchasing behaviour change over a certain period of time
- Insight was gained in the change in sales in relation to several behavioural variables that were obtained through a questionnaire, interviews and actual behaviour

The consumer research handled as follows:

1. Sensory consumer research that studied the appreciation and flavour qualities of organic cold cuts and cheese
2. Research on location (i.e. in company restaurants) on the most succesfull introduction strategy for organic cold cuts and cheese.

The objectives of the analysis of promotions were the following:

- Analysis, description and evaluation of promotional processes in the company catering chain (in general as well as with regard to organic). To accomplish this a theoretical process model was formed and then was tested by conducting several interviews with companies in the underlying chain.
- Recommendations towards the type and content of organic promotions within the company catering chain

Chain marketing for a successful introduction of an innovative biological product (ACB-04.041 Ketenmarketing voor succesvolle introductie vernieuwend biologisch product)

In the project “Chain marketing” for a successful introduction of an innovative biological product’ chain partners and research institutes worked together towards a stimulation of integral chain marketing. So that product introductions better connect to consumer needs, which increase the sales chances of biological products. This project concentrates on the case: the introduction of the biological stuffed mini pumpkin.

In phase 1 research was carried out, in which an inventory of tools and methods for stakeholder analyses, consensus and commitment realization were made. Also methods for consumer research were studied. On the basis of the literature a methodical path has been developed. In this phase also conversations with all of the participants took place, so that critical success factors could be retrieved on behalf of integral chain marketing. Finally the structure of the ‘Guideline Retail introductions of Innovative products’ has been specified.

In phase 2, three workshops were carried out. Two consumer workshops, in which the product “biological stuffed mini pumpkin” was the starting point and one stakeholder workshop.

The main conclusions of the workshops are:

- The concept has certain possibilities in the matter of positioning and target group;
- Food safety is no hindrance to the introduction of the product concept and
- Concept needs further details.

The project ended premature, because Albert Heijn quit their participation to the project after phase two, because of the lack of confidence in the product concept and in market chances. Another retail organization was interested, but time was passing by and December was not the best month to carry out a pilot in a supermarket.

Also lessons were learned from this project. Commitment is of vital importance during co-operation within an innovation path. By working together in a project with producers, retailers and research institutes the mutual understanding, the focus on the common goal of the project, the willingness to share information and willingness to co-operate is crucial for the success of the project.

Images of Organic Quality (ACB-04.044 Beelden van Biologische Kwaliteit)

New techniques for the production of images, such as chromatography and crystallization, were used to visualize product quality. During this project, with a duration of 4 months, the companies NWO, EOSTA, Verbeek and BLGG, assisted by the institutes PPO, LBI and LEI, investigated the possibilities to use these images for communicating the specific qualities of organic food. The attitude of consumers was assessed by means of group discussions and face-to- face interviews in

health shops and regular supermarkets. The images were new to the consumers and at first instance they reacted surprised, yet interested. The crystallization technique had a stronger appeal and appeared to be easier to interpret. Compared to heavy users, the category of light users was more interested to receive further information on the methods and on food quality in general. A pilot of tomato showed that the crystallization technique could distinguish better between the fruit samples than the chroma's, but the chroma's could discriminate between different soil samples. Some correlations between the images and the classical parameters were identified. However, because of the small number of samples no conclusions could be drawn. When communicating the images to consumers, provision of additional information will be of crucial importance.

Knowledge Development Regional Typical Food Production and Marketing (ACB-03.045 Koepelproject Kennisontwikkeling Streekgebonden Productie en Vermarkting)

The project *Knowledge Development Regional Typical Food Production and Marketing*, (in Dutch shortly Koepelproject), has been initiated by the Dutch Foundation for Regional Products (SPN) and the national farmers organisation (LTO). This as part of the Agro Chain Knowledge co-innovation programme's Professionalizing Organic Food Chains and Sustainable Agro-Food Chains. The project has been co-financed by the Project Fund of the national Rabobank and efforts in time spending of participating entrepreneurs and collective farmers initiatives involved in the supply of regional typical food.

The background of this project lies in the mutual wish of SPN and LTO to stimulate and professionalize the national sector of regional typical food produce. Both organisations share the following problem perception: "*actual lack of systematic knowledge, experiences and practical applicable strategic concepts are major barriers to professionalize the national sector of regional typical food produce and to come to successful marketing strategies and chain configurations*".

The project has been executed by researchers from the Wageningen University and Research Centre, directed by a steering committee with representatives of both project owners, the national Foundation Agro Chain Knowledge and participating Knowledge Centres. Practical marketing skills have been mobilized by establishing a forum with representatives of small and medium enterprises (SME's) that advised the project team and steering committee on the research activities and provided an active contribution in the meetings with individual and collective farmer's initiatives.

The project started with an inventory study among regional farmer's initiatives to identify their specific knowledge demands. This study included a Quick Scan with a SWOT analysis on Dutch regional typical food produce that concluded that the supply of as well as national consumer demands for typical food with origin guarantees are both growing rapidly.

The Quick Scan identified also the following marketing channels with potentials for an up scaling of the commercialization of regional typical food: 1) farmers retail; 2) out of home catering; 3) specialty food shops and 4) super markets. This has been followed by the development of action-plans with chain specific marketing concepts and marketing strategies. These action-plans contained concrete suggestions for process steps to realize identified potentials or to resolve current constraints to commercialize regional typical food in the distinguished most promising marketing channels.

Subsequently the action plans have been used as building blocks for the development of a final advisory document. The focus of this document focus is the need for new strategic coalitions between the growing number of national organisations actively involved in defending and strengthening regional specific distinctive food qualities. In essence this advisory document suggests creating a national Task-Force Marketing Regional Typical Food Produce that can facilitate the crucial step from knowledge development, the central focus of underlying project, towards active marketing approaches that will strengthen the Dutch sector of regional typical produce.

Organic pork chain, quality, service and logistical optimisation - phase 1 & 2 (ACB-04.046 Bio-varkensketen, kwaliteit, service en logistieke optimalisatie, fase 1 & 2)

Dumeco, De Groene Weg and Albert Heijn want to reduce loss in the organic pork chain at the retailer. Loss is defined as price loss. Price loss is created due to price reduction at the ‘best before’ date, which indicates that the shelf life of the product has ended, and the returning of products as soon as the ‘best before’ date has expired. At product level loss in the organic pork chain is four times higher than in the regular pork chain! This is due to low and strongly fluctuating product flow of the organic pork assortment.

The most important aim in this project is to reduce loss in the chain. In phase 2 of the project this is specified as a loss reduction at the retailers. The aim is to reduce the loss of organic pork with 20% in the end of 2004. In this case loss is defined as a percentage of the sales. Only under condition that the service level remains equal or improves (among others availability and full range of products) this reduction can take place.

To realise this activities are carried out in the field of:

- logistics
- quality
- display management

Extending the shelf life of the product seems to be one of the most significant ways to realise a loss reduction at the retailers. In this project both absolute and relative shelf life extension are studied in detail.

An absolute shelf life extension can be obtained if the microbiological shelf life is extended. From the results obtained in this project can be concluded that for a part of the organic pork product range a *shelf life extension of 1 day* can be realised within the actual chain conditions and (initial) product quality.

Within this project an innovative concept has been developed and analysed by simulation, which gives the opportunity to realise relative shelf life extension at the retailer on branch level. This relative shelf life extension appears to be feasible if *chain logistics are managed on the ‘best before’ date*. The developed concept of relative shelf life extension implies that branches with a high product flow receive products with a short ‘best before’ date and branches with a low product flow receive products with a longer ‘best before’ date (= shelf life), by utilising differences in shelf life per meat batch, which may arise due to variation in initial meat quality and in chain conditions. Under present circumstances this concept is not put into practice yet, however the company participants consider this concept as very interesting for the (near) future. Within this project is extensively described what methods could be used to realise both absolute as relative shelf life extension.

Besides above-mentioned scenarios a third scenario concerning loss reduction has been formulated and worked out. Within this scenario the so-called FEFO concept has been developed. FEFO means First Expired, First Out and implies that by adequate and optimal display management, the selective behaviour of the consumer can be reduced. This concerns reducing selective behaviour on the basis of ‘best before’ dates to realise that the products with the shortest remaining shelf life (First Expired) are selected by the consumer (First Out) instead of the products with the longest remaining shelf life as is the case at the moment.

Within this project is described in detail which methods are adequate to realise both absolute as relative shelf life extension and how the FEFO concept can be put into practice.

From the results obtained in this project can be concluded that for a part of the organic pork product range a shelf life extension of 1 day can be realised and can be implemented without any problems (in the field of product quality and safety).

Moreover, in the pilots is accomplished that the selective behaviour of the consumer has been reduced from 80% to 22%. However, loss reduction due to this reduction in selective behaviour could not be established yet.

These pilots have demonstrated as well, that a loss reduction at retailers level can be realised in particular by extending the shelf life of organic pork. The shelf life extension of a product of one day seems to realise the given 20% (at sales level).

Besides, the project, though-chain specific, has resulted in the development of a simulation model as well as a shelf life application.

For the development of the simulation model innovative steps are taken by arranging the simulation process in such a way that the supply-driven chain, as is available nowadays, becomes a demand-driven chain. Accordingly, consumer demand is leading, as it is in reality. Further, consumer behaviour on purchasing is modelled in more detail as regards the influence of

selection behaviour. This implies that model wise is described with which probability patterns the consumers, which are potential buyers of organic pork, purchase the product based on price reductions and/or ‘best before’ date. The simulation model is not one of the objectives, but it gives the opportunity to calculate, analyse and test the scenarios concerning loss reduction, which are developed within this project.

The developed shelf life application is a tool based on chain conditions, as temperature and time, which can be defined by the user. This tool can be used to determine the maximal shelf life of the concerned product. This involves the development and implementation of a quality decay model for two organic pork products. This development is very innovative. Possibly, this application could be further developed to be used as a tool for certain education purposes.