



Agroparks ///

the concept, the responses, the practice

InnovationNetwork

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This varied collection of brief accounts, interviews and tentative evaluations seeks to place a new concept into the context of past, present and future. It describes the 'agropark', and some of the initiatives that this new idea has spawned. InnovationNetwork first introduced the agropark concept in 2000 with a view to promoting innovation in agriculture. It sparked immediate controversy and an extremely lively debate about the future of Dutch farming. Since then, the concept has gone on to inspire several new initiatives, with some elements now being seen in practice. Some people may be wondering what happened to the idea of the agropark. How has it developed since the initial suggestion? Has any progress been made? This publication provides the answers. It seeks to inform and to inspire further thought about the future of sustainable agriculture in the Netherlands.

The concept ///

At present, they exist only in the imagination: ‘agroparks’, in which agriculture is clustered with other activities. The heart of the concept is an area devoted to both the production and processing of meat, fish, eggs, flowers, fruit and vegetables, all at one and the same location and in such a way as to provide the greatest possible benefits for the environment, the landscape, people and animals. These parks can take on various forms, from multi-storey buildings in a harbour area, to ‘green industrial estates’ or multifunctional parks in the rural area.

Former pig-farmer Jan Simonse now ‘farms’ in Amsterdam’s docklands. Five days a week, he commutes by car between home and work. Today, as he nears the harbour he sees a large ship, which has just taken on a huge cargo of cut flowers. Those flowers were

If those who devised the concept have their way, there will soon be many ‘agroparks’ throughout the Netherlands, and indeed the rest of the world. The idea represents a system innovation which can resolve many of the problems inherent in current food production methods, at least in theory. The agropark described in this section remains an ideal. It is a concept which has yet to be tried and tested in practice. Only then will we know whether it actually works. The exact form of any future agropark will be determined by public opinion and private sector initiatives. Accordingly, the second and third sections of this booklet examine the public debate to date, and the various initiatives for practical implementation of the agropark concept.

This first section focuses on the opportunities that the agropark offers in terms of agricultural reform and development. This is followed by an account of the relationship between the agropark and other innovations which have occurred in agriculture in recent decades. The section concludes with a consideration of the concept’s potential as an export product.

What are the benefits of spatial clustering?

Spatial clustering forms the essence of the agropark concept. In practice, clustering can take many forms and there could also be extremely varied combinations of agricultural and non-agricultural activities. We shall return to this point later. First, we must ask exactly what benefits spatial clustering can provide¹. Seven possible advantages of agroparks can be listed.

1 / ‘Closing the cycle’

If various agricultural activities are concentrated in one place, it becomes possible to create a self-contained cycle: an ecosystem. Various components of the agropark can make use of each other’s waste and by-products. This saves both space and energy, and reduces environmental impact. ‘Closing the cycle’ can be achieved in both large-scale and small-scale agroparks. However, only on the larger scale will there be an adequate return on investment. For example, it is too expensive and hence impractical for every pig farmer with two thousand animals to buy an individual air scrubber. Only with a very much larger holding is such equipment cost-effective and only then is it possible to improve air quality in the desired way. Moreover, a larger agropark places agricultural activity on the same level of scale as industrial activity on an industrial estate, enabling certain linkages to be made. For example, the heat from an electrical generator can be used to heat glass-houses for horticulture. A form of symbiosis between the various companies is then created, and there is no longer any such thing as ‘worthless’ waste.

2 / Reducing transport requirement

A second potential advantage of spatial clustering is the reduced transport requirement. Of all the kilometres driven by heavy goods vehicles in the Netherlands, forty per cent are attributable to the production, processing, packaging and distribution of agricultural products such as fruit, vegetables, cut flowers, meat, dairy produce and fish. Agroparks will render a significant proportion of this transport unnecessary. If the agropark is well located, perhaps in a dockside area or close to road and/or rail hubs, this will greatly facilitate both the delivery of raw materials and the onward transport of the agricultural products.

grown in the glasshouses of a large agropark complex. The glasshouses stand atop a building, which houses one hundred thousand pigs. The pigs are free to roam around their pens, each of which has just thirty animals. They can root about in the straw and can enjoy

3 / Saving the countryside

A third advantage of clustering is that agroparks will improve the quality of the countryside, at least indirectly. Although many agricultural activities are already largely industrial in nature, they are still conducted in the rural areas. Think of the large-scale pig farms, with their huge unattractive buildings, their manure surpluses and their smell. Or the glasshouses, which are brilliantly lit day and night, and thus disrupt the biorhythms of plants, animals and people. Such establishments reduce the countryside to nothing more than the 'workshop' of the agricultural industry, to which nature, landscape, housing and recreation are secondary. By moving this sort of industrial activity to urban areas near to the logistical hubs, the rural areas will once again become available for more appropriate functions, such as recreation, nature management, extensive agriculture, housing and employment.

4 / Improving animal welfare

The fourth advantage of the proposed spatial clustering is that it will be possible to bring about tangible improvements to animal welfare. InnovationNetwork report 'Animal Care'² concludes that a well-designed agropark will certainly achieve this aim. The animals will enjoy greater freedom of movement, more daylight and will have a more stimulating environment. This is certainly a step forward compared to current intensive livestock farming practice, in which cost-efficiency is accorded a far higher priority than animal welfare. Because the agropark structure will represent considerable cost reductions and greater cost-efficiency, improvements to animal welfare become economically viable. Animal welfare is determined by the direct environment, including such factors as the composition of the group, the space available, and the manner in which the animals are cared for. Animal transport forms a particular threat to animal welfare. At present, animals are sent to an abattoir for slaughter. Live animals are also exported. The result is a considerable volume of livestock transport, which takes an extreme toll on the animals. The agropark, on the other hand, represents a completely closed, self-contained system: the animals are born on the premises, are kept on the premises and are slaughtered on the premises. Large-scale animal transport will then become a thing of the past.

5 / Restricting disease outbreaks

In recent years, livestock farmers have faced a number of outbreaks of animal disease, including foot-and-mouth disease, swine fever and fowl pest. The consequences were extremely serious. Because there is much physical contact between the various farms and businesses, and because airborne viruses are easily transmitted, diseases could spread at an alarming rate. It became necessary to cull millions of animals. Farms were sealed off from the outside world, and there was considerable public disquiet. Animal transport was impossible throughout entire regions. During the outbreaks of foot-and-mouth disease and fowl pest, even domestic animals (and not only those on the farms) had to be destroyed.

In an agropark with closed livestock farming systems, the likelihood of foreign pathogens entering those systems is extremely small.³ This is the fifth advantage. After all, no animals will enter the agropark from outside. Even within the agropark, animals will be kept in smaller groups, with no contact between the groups. It is essential that the various species - for example chicken and pigs - are strictly segregated from each other. Should there nevertheless be an outbreak of disease, the agroparks can be easily isolated. Despite the concentration of many animals in one place, far fewer animals will have to be culled than during the recent outbreaks, and there will be far less inconvenience for society as a whole.

6 / Bridging the gap between producer and consumer

One of the main criticisms of current agricultural practice is that food production is completely detached from the consumer, who therefore knows little or nothing of exactly what is involved. The majority of people do not know where their food comes from, and neither do they have any idea of the conditions under which it is produced. This situation is further complicated by the producers, who like to advertise their wares with such claims as 'natural' and 'traditional', without any mention of the industrial manner of production. For many years, consumer organizations have been calling for the food chain to be made more transparent, so that the public can determine exactly where a particular cut of meat or a food product comes from. The agropark can bridge the gap between the producer and the consumer, this being the sixth advantage. By virtue of their clustering, agroparks are able to produce in

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the daylight, which streams in from above. Simonse is one of the managers of this pig farm. He is responsible for purchasing the pig feed, some of which consists of waste and by-products from a nearby food processing plant. Most pig-farmers administer antibiotics to

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a socially responsible manner and can meet the general public's requirements in terms of respect for the environment and animal welfare. Agroparks can therefore also supply products which are recognizable to the consumer, such as those bearing an exclusive brand name, only produced in the agropark setting.

There are some products, intended for consumption by invalids, young babies or the elderly for example, which must be absolutely free of pathogens. Similarly, there are products which must be guaranteed not to contain certain allergens. These products demand an extremely well-controlled, closed production chain. The clustered production style of the agropark presents an ideal opportunity to provide just that.⁴ An agropark can be designed to be both spatially distinctive and attractive, perhaps with a particular style of architecture. The people who devised the 'Rural Park' concept (see Chapter 3) even wish to include a 'theme park', linking this to a brand name for exclusive quality products.

7 / Generating economic and social benefits

Dutch agriculture is going through a difficult time. Not only are economic returns poor, there is also much general criticism of the methods in use. The agropark concept attempts to resolve these problems by means of a profitable production process which is also seen to be socially responsible. The first question raised by potential operators is bound to be: 'can the agropark really return sufficient profit?' Research suggests that the answer is a cautious 'yes'. An agropark will indeed require substantial investments. Operating costs are also high. However, these high costs are offset by a number of savings. The clustering of several companies in one place produces advantages of scale, as it results in a reduced demand for transport, reduced energy costs and (in the case of livestock farmers), reduced costs for feed, manure disposal and loading. To rent space in an agropark will be commercially attractive, but the resistance on the part of farmers is likely to be great. They prefer to be owners rather than tenants. Taking all factors into consideration, agroparks can indeed be commercially viable. There could also be significant social benefits: food safety will be enhanced, there will be less congestion on the roads, environmental impact will be reduced, animal health and welfare will be improved, and the

countryside will be rendered far more attractive. These social benefits should be enough to prompt the government to assist the setting-up of an agropark with supplementary funding. After all, the government will also save in the long-term, if only because fewer new roads will be required.⁵

their animals. Not here. The likelihood of a foreign disease entering the building is so small that preventive medicine is unnecessary. All the pigs were born here, and all will be slaughtered on the premises. Transport, one of the major causes of animal suffering, is therefore

Intensive versus extensive farming

Agroparks are innovative in terms of the manner in which the various activities undertaken at one and the same location are linked to each other. They also build upon an agricultural tradition which seeks the intensification of production. It is perhaps appropriate to consider whether the Netherlands should continue to practise the current intensive forms of food production.

That current intensive farming methods cause major problems is a fact that will not have escaped even the most casual observer. Society is now taking a more critical stance with regard to the side-effects of these methods. And justifiably so. Because the worldwide demand for food, particularly meat, is great and continues to grow, the negative effects of farming practices are also becoming more apparent. The agricultural sector is using more and more energy and is therefore responsible for greater emissions of carbon dioxide. There is considerable environmental impact, not least due to the release of minerals in fertilizers and manure. Animal health and welfare are under serious threat due to transport movements and outbreaks of various diseases. Both animal welfare and the quality of the landscape are endangered by large-scale, intensive production methods. The Netherlands could opt to adopt only extensive methods, keeping all animals in the open air where the required feed is grown in situ. Agriculture would then once again rely on the land itself, and could be combined with other activities such as landscape management, recreation and care facilities for people with a mental or physical disability. This style of agriculture would certainly answer a need.

However, there are also disadvantages. Extensive farming in densely populated areas makes a significant claim on the available space and results in higher costs and prices. Moreover, production will be too low to feed the entire Dutch population, even if people are prepared to pay the higher prices. As a result, the Netherlands will still have to import its food from other countries and there is no guarantee that this imported food will have been produced in a responsible manner. In other words, this option serves only to export the problems associated with intensive food production.⁶

A return to extensive agriculture would not be economically sound. If we include the subsidiary supply sector, the Dutch agricultural industry currently provides employment for over four hundred thousand people. Productivity and yield per square metre are high. The agricultural industry accounts for twenty per cent of national exports, contributing some 19 billion euros to the Netherlands' annual trade balance. Food producers are able to maintain a high degree of quality and safety. Dutch farmers are far ahead of their counterparts elsewhere in taking measures which protect the environment and the welfare of their animals. It is also fair to state that the Dutch agricultural sector is among the most knowledge-intensive and innovative in the world.

The above considerations raise further questions regarding the firmly entrenched idea that countries must attempt to be self-sufficient in their food production. Is it wise to depend on non-Dutch, or perhaps even non-European sources? Since the Second World War, this question has had a major influence on agricultural policy in the Netherlands.

In the global perspective, we must also ask whether the world could manage at all without intensive food production, given that within the next ten to twenty years there will be a population of over nine billion people to be fed.⁷ The conclusion of countless studies is that intensification of agriculture remains essential, but that action to mitigate the negative effects should be taken wherever possible.

Will the Netherlands also continue to play a part in intensive food production in the long term? Or will agriculture go the same way as the country's shipbuilding, mining and textiles industries? These once thriving sectors eventually disappeared completely because other countries could produce far more cheaply.

In order to maintain the current relatively strong economic position, the Dutch agricultural industry must provide an adequate response to the ongoing liberalization of the world market and the discontinuation (or reallocation) of European subsidies for arable and dairy farming. There is fierce competition from other parts of the world. The Netherlands already imports beef from South America and Africa, chicken from Thailand and Brazil. Other countries may be able to produce these products at even lower prices. It seems likely that some

also unnecessary. The pigs are constantly monitored by CCTV. It is important to spot any signs of reduced health or welfare as quickly as possible. Stress has a negative effect on the quality of the pork product. Along with the waste from the glasshouses, the manure

sectors of the Dutch agricultural industry will be unable to survive this competition on the global scale. Restructuring is therefore necessary.

Should the Netherlands continue with its intensive agriculture? Taking all the above arguments into consideration, the answer to this question is 'yes' – on the condition that there is a thorough reorganization to resolve all the problems currently caused by agriculture. In this perspective, the concept of the agropark can be seen as an attempt to bring about this reorganization. If the attempt is successful, it can serve as a role model for sustainable food production in other densely populated parts of the world. However, it should be remembered that not all food production will be undertaken in the agroparks: space will remain for more extensive forms of agriculture. The overall picture will thus be a varied one, with all the various social, cultural and economic needs being addressed.

produced by the pigs is fermented to form biogas, which is then used to heat the fish-farming tanks in the basement. Fish of all species and sizes swim here. The basement is also used to grow mushrooms, with pig manure used as the growing medium. The mushrooms produce

Intensification has always been with us

Agricultural reform and development goes beyond merely improving efficiency. In recent decades, many questions have been raised concerning agriculture's social position, about the development of specialized businesses and about their position in the production chain. A comparison of the proposed agropark and previous agricultural reforms -such as the consolidation or reallocation of farmland in the interests of efficiency, reveals that the agropark is both part of a tradition of agricultural innovation and a radical new approach to food production. Farmers have always been concerned with rationalization and improved production. The process began thousands of years ago when the hunter-gatherers started to keep and breed their own animals and to grow their own crops. A division of labour emerged.

While a small group of people concentrated solely on the production of food, others were no longer required to do the same. These farmers attempted to maximize their output and to intensify production. In arable farming, this meant that they had to grow plants with a good harvest yield and remove all others. Preparing the soil, adding fertilizer (in the form of manure) and protecting the fields against pests and predators: these were all ways of improving agricultural activity.

The farmers also did what they could to ensure the health of their livestock. They selected sheep, pigs, chickens and cows for their ability to provide the best quantity and quality of meat, wool, leather, eggs and milk.⁸

To spread the risks of disappointing output or low prices, and hence to achieve self-sufficiency, almost all European farmers had a 'mixed' business that combined various types of production. Dutch farmers were no exception.

These mixed-activity farms were rarely flourishing businesses. The combination of arable and livestock farming was generally just enough to support the farmer and his immediate family.

Agroparks compared to land consolidation

The twentieth century saw the demise of almost all the small mixed farms in the Netherlands, since they were no longer commercially viable. Encouraged by the government (and necessitated by the economy), larger agricultural undertakings emerged, each specializing in a particular product and adopting a far more intensive style of production.

This was made possible by a number of technological innovations. We may cite the invention of the tractor, which actually came into common use only after the Second World War and which eventually led to the widespread mechanization in agriculture. We can also cite the introduction of chemical fertilizers and pesticides, the introduction of the milk tank and the milking robot, improvements to animal feeds, advances in animal health care and animal husbandry.⁹

Besides such technical innovations, changes were made to the spatial structure of the agricultural sector. The mid-twentieth century saw the most drastic spatial 'reshuffle' in the history of Dutch farming: land consolidation. This was intended to put an end to the inefficient patchwork of small fields and pastures throughout the rural areas, with a vast number of different owners.¹⁰ Land consolidation introduced larger plots, which would be more readily accessible to large vehicles and machinery. Moreover, the traditional farmhouses were generally sited in the villages, at some distance from the fields they worked. Land consolidation served to move the farmer nearer to his land.

The process began in 1924 with the passing of the first Land Consolidation Act, and was completed only in the mid-1980s. It entailed many different activities, including the reapportionment of land to give farmers large and contiguous areas. Farmhouses were relocated, drainage improved, fertilizers applied on a large-scale basis, and the soil was levelled. There was a massive road-building programme: until the 1950s, less than a third of the roads in rural areas were metalled. Businesses were 'de-mixed', and began to concentrate on just one activity. The overall aim was to achieve maximum efficiency, with high yields and low labour costs.

Looking back on such a major innovation as the land consolidation process, and looking forward to the innovation inherent in the concept of the agropark, we can see a number of aspects

carbon dioxide, which is then piped upstairs into the glasshouses to promote the growth of the flowers. During his morning coffee break, Simonse goes upstairs to chat with his colleagues and catch up on recent events. Colleagues whom he sees every day - that is not

which lend themselves to comparison. It becomes clear that the agropark fits neatly into a tradition of innovations in agriculture, while also representing a radical new approach to food production.

Expansion of scale and restructuring

Land consolidation led to an expansion of scale in the agricultural activities that rely on the land itself. The agropark will also result in an expansion of scale, but more particularly for those sectors which do not necessarily rely on having a large expanse of land to work: poultry and pig-farming, glass-house horticulture, fish-farming and mushroom-growing, for example. As previously noted, there used to be a 'patchwork' of various land-reliant activities that had to be reorganized. Today there is a similar disparate variety of intensive agricultural activities which also call for reorganization. Land consolidation involved moving the farmhouses from the villages into the open areas: the agropark will involve moving the pigsties, poultry pens and the glasshouses into the urban area. In both cases, there is a physical restructuring of significant proportions. The nature and the direction of the restructuring are, however, different. Consider how many agricultural businesses are now fully 'industrialized' and largely self-contained: horticulture, pig farming and poultry farming, whether for meat or eggs. These activities do not require extensive areas of land and yet, just like the small mixed farms of yesteryear, they are still widely distributed throughout the rural areas. In many ways, the process will be one of land consolidation in reverse. The areas currently used by these industrialized sectors can and should be used for activities that are indeed appropriate to the countryside, such as extensive agriculture, recreation and housing. The industrial activities should be concentrated in the cities.

Just as land consolidation led to the rapid industrialization of agriculture, whereupon there was a massive increase in productivity and a far lower requirement for manpower, so the introduction of agroparks will have consequences for the people who currently work in agriculture sector. Because it entails a radical shift in scale, the agropark also calls for changes to the employment structures. If there is to be a spatial cluster involving several different activities, it will be necessary to devise new organizational forms for both financial and

human capital. There could, for example, be large cooperatives, providing employment and making large-scale investments.

Awareness of the social position

A second common feature of the two agricultural innovations under consideration is the awareness that agriculture occupies a certain position within society, and that the secondary, wider effects of the relevant activities must therefore be taken into consideration. It was during the 1960s that people began to be more aware of the negative effects of farming and food production, and there was significant opposition to the land consolidation process (which had by then been going on for forty years). The large-scale reorganization of agriculture had a price, and it was the landscape which had to pay that price. According to the critics, insufficient attention had been devoted to the spatial structure of the rural areas, despite many interests other than agriculture itself being at stake.

As a result, the Land Consolidation Act was superseded by the Land Use Act of 1985. The objective of this new act was not only to ensure that the rural areas would be structured in the most advantageous way for agriculture, but that natural and topographical values would also be enhanced in such a way as to do justice to the requirements of infrastructure, recreation and cultural history.

The people behind the concept of the agropark have addressed the demands of social awareness by basing their arguments on the consequences of current agricultural practice in terms of the landscape, animal welfare, the environment and people. Agriculture can no longer hide behind arguments that rely solely on 'competitive edge' and 'increased production'. In future, the priority must be *sustainable* production.

Mixed yet specialized

Land consolidation marked the demise of the largely unprofitable mixed farm businesses of the past. The agropark will give rise to a mixed cluster of specialist businesses. Specialization is essential: current production methods call for a high level of professional expertise, an efficient production process and a market of adequate proportions. This can only be achieved if the business concerned does not develop too many activities, but concentrates on – or restricts itself to – its core business. The various specialist sectors of the agricultural industry in

something he enjoyed as a pig farmer. Simonse has yet to get used to this change of working environment. He is no longer his own boss, he and his family no longer live 'on the job'. He does however enjoy a good steady income. He even receives a share of the profits

the Netherlands are currently to be found in different regions. Glasshouse horticulture, for example, is largely concentrated in the west of the country. Pig farming and poultry farming are centred in the middle of the country and the south-east. Dairy farming is to be found mainly in the north and the mid-west, while arable farming is predominant in the south-west and the north of the Netherlands. The Netherlands can therefore be viewed as one large mixed agricultural business. However, there is little contact or interaction between the various sectors, the degree of fragmentation and the distances between the different sectors being much too great. The agropark does away with the traditional geographic distribution by bringing together various types of highly specialized business at one and the same location, and by establishing linkages between them. It creates a 'mixed business' on a reasonably large scale – perhaps 30 to 100 hectares – without eroding the specialist nature of any of the individual businesses. Moreover, as previously noted, it presents the advantage of being able to 'close the cycle' efficiently, creating a largely self-contained ecosystem.

The mixed farm business of previous generations was frugal in its use of raw material and waste products. Everything had a use and value. "If the price of potatoes was low, you could at least slaughter another pig. The tops of the beets would be used to feed the cattle. Once the grain had been removed, the straw would be used as feed and bedding, and the husks of the flax would be used to feed the chickens. My mother used to boil up potato waste for the pigs, which would also eat pea flour mash. If there were any stray grains of corn under the haystack, the chickens would soon find them. Chicken manure could be dug into the clay soil to make it more fertile. Times were sometimes very hard, but it was unlikely that a farmer would go broke. He was always thinking about how to make the most of what he had."¹¹

Horizontal and vertical networks

There is one further aspect which invites a worthwhile comparison of the two innovations: the position of the farm within the production chain. Land consolidation was one of the developments that promoted vertical specialization in agriculture: from 'farming' to 'agri-industry'. For centuries, the farm had been an autonomous production unit in which the farmer and his family would process milk into butter and cheese, separate the corn and take the livestock to market. The distance between farmer and consumer was small. In the early nineteenth century, farmers started to combine forces in purchasing and sales cooperatives, thus marking the emergence of the complex production chain. Today, the farmer is just one link in a long chain of breeders, transporters, dairy cooperatives, corn merchants, fertilizer manufacturers, processors and supermarket purchasing departments. Increasingly, it is the large supermarkets that determine how farmers and processors will produce their products. They prescribe detailed requirements for food products. If the purchasing department of a large supermarket wishes to buy pork from pigs which have not been fed genetically modified soya and which are guaranteed to be free of pathogens, this will have major consequences for the entire pork production chain. It is certainly possible that there will be agroparks which produce specific products exclusively for the supermarkets. An agropark is able to address customer demand 'to the letter'.

Agroparks may encompass a larger part of the production chain than any current business is able to do, since the suppliers and processors will be working at the same location as the farmer. In addition to this 'vertical' collaboration within the chain from producer to point of sale, there will also be a completely new horizontal collaboration between the various chains. Businesses of very different types will use each other's waste flows. The resulting horizontal network will represent the 'industrial symbiosis' that the agropark seeks to create.¹²

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now that the agropark is performing well. Expansion of scale, reduction of costs and the re-use of by-products and waste have put the company into profit. Simonse's pig farm has now been sold. With the proceeds, he was able to buy a nice house with a large garden,

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The concept as an export product

Innovations such as the agropark concept will not only result in more efficient food production, but will also produce new knowledge. That knowledge can be used worldwide. China has already expressed keen interest in the agropark idea.

The Netherlands is unique in one respect: there is no other country in the world in which scientists and research institutes are so closely involved in agriculture. Similarly, no other country has achieved so much in terms of environmental protection, animal health and welfare and food safety, or has drawn up so many rules and regulations to safeguard these aspects. Moreover, Dutch farmers are relatively well educated. The Netherlands has a good scientific infrastructure, well-educated agricultural practitioners, a strong interaction between the cities and agriculture and an effective policy to address the negative effects of agriculture. The country therefore represents an ideal 'laboratory' in which to test radical new methods. The agropark concept is no exception. It is likely to provide a marked stimulus to innovation and knowledge development in fields in which the Netherlands is already a world leader.

Innovations in agriculture may result in a strengthening of the knowledge economy, which will involve not only innovations in technology but also in administrative, organizational and cultural knowledge. If we are to break the traditional link between agriculture and the rural areas, and to create new links between various types of activity, there will certainly be a demand for new knowledge. For example, the carbon dioxide produced by mushroom farming can, in theory, be used in glasshouse horticulture. However, making the step from this theoretical idea to a practical and practicable system demands considerable investment and technical knowledge.

There are many other aspects that must be researched in detail before they can be put into practice. The organization of a large-scale agropark, its spatial assimilation and the logistics involved: these are all issues which demand specific studies and practical experimentation. Similarly, it will be useful to investigate ways in which to promote the social acceptance of an innovation such as the agropark, given the conflicting interests and opinions regarding food production and agriculture that exist. The research will also result in knowledge and

experience that could be put to use in other areas.¹³

In other words, agroparks will not only produce tangible, edible products, but will also produce knowledge products that will certainly attract international interest. The agropark concept already appears to be a viable export product.

China has expressed keen interest in innovations in intensive agriculture. At the request of the Chinese government, Dutch businesses, researchers and designers are working on a large-scale permanent exhibition sited on the Wujin peninsula near Shanghai. This will show the latest developments in agricultural practice, including a large agropark involving predominantly Dutch businesses. The exhibition is intended to familiarize the general public with the latest methods of food production. The agropark will represent the first large-scale experiment since Dutch entrepreneurs, whose initiatives are often thwarted by Dutch and European legislation, now have the opportunity to put their ideas into practice. The creation of a 'real life' agropark will generate a considerable body of knowledge which can then be used in the Netherlands and throughout the world.

not too far from his work. The former pigsties were demolished, much to the relief of the neighbours who had been complaining about the smell for many years. The site is now part of a nature reserve.

From concept to design

Some years ago, InnovationNetwork commissioned four provisional designs in order to explore the scope of the agropark concept. The designs unite theory and practice by thinking on the basis of spatial clusters of businesses that can make best possible use of each other's waste flows. The proposed agroparks are described below, demonstrating that there can be extremely varied combinations of activities, as well as huge differences in scale and in the degree to which they rely on the land itself.¹⁴

Attachment 1 / The Delta Park

The Delta Park represents a combination of non-land-reliant intensive sectors with industrial processing, located on an industrial estate in the urban setting (design location: the Rotterdam harbour area). It combines glasshouse horticulture and other forms of self-contained cultivation, protein production (pigs, poultry, fish and insects), abattoirs, meat processing, waste sorting and recycling, product processing, bio-refinery, the production of organic fertilizers, and support activities such as storage and packaging.

The interaction between sectors has a hi-tech basis, relying on both ICT and biotechnology. The principles of industrial ecology are addressed by means of the exchange of natural fertilizers (i.e. manure), organic waste, methane, carbon dioxide and heat between the various sectors. The dockside location is important in terms of energy supplies and livestock transport. The local population centre provides a sales market that can be supplied with fresh produce without logistic complications. Effective use of the relatively expensive space is achieved by means of stacking the various activities one above the other, for example in glass pyramids.

Attachment 2 / The Agri-specialty Park

This variant provides industrial processing of bulk products into specialty products such as pharmaceuticals, cosmetics, biodegradable packaging and eco-friendly semi-manufactures. It is sited on an industrial estate within a harbour area with an agricultural hinterland (design location: Eemshaven). In this design, the main raw material is sugar, which is delivered as a bulk product and processed into a wide range of food

and non-food products (e.g. fine chemical applications, paper and bio-composites). To ensure optimum year-round capacity utilization, other inputs (such as potatoes, wheat, flax, grass, chicory, hemp and soya) are also used. The park comprises a combination of three self-contained industrial undertakings: a sugar refinery, an alcohol producer and a bio-refinery.

Attachment 3 / The Green Park

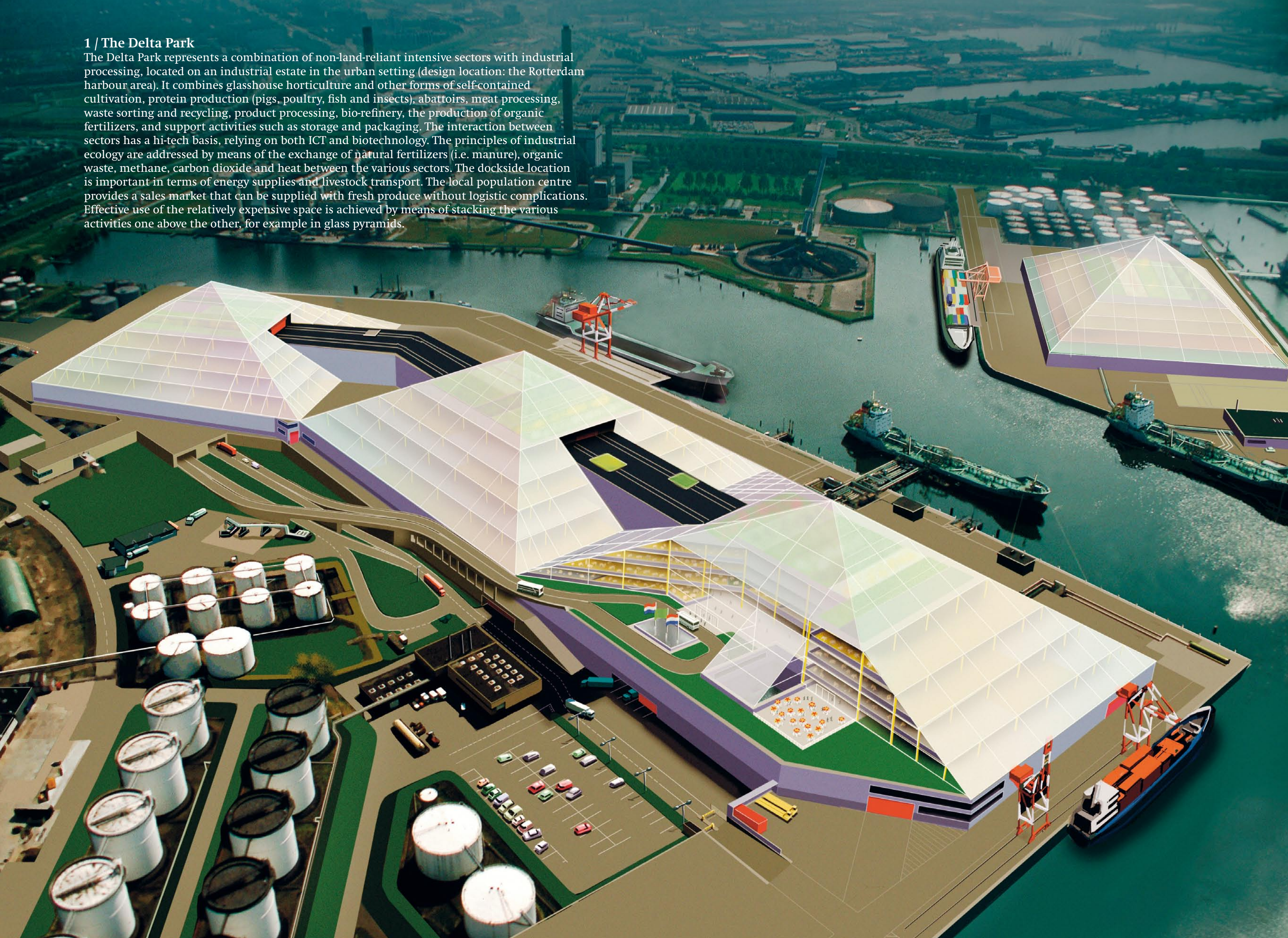
The Green Park includes land-reliant animal and plant production sectors with concentrated industrial processing in a rural setting (design location: the Noordoostpolder). The clustering of production and processing results in the reduced transport of raw materials and semi-manufactures. Production includes fibre, protein and starch crops, bulbs, grass, clover and extensive livestock farming. The processing activities focus on the extraction of high-value (food) components and the use of low-value components in separation technology, waste sorting, and the organic fertilizer industry and energy generation.

Attachment 4 / The Rural Park

The Rural Park is a spatial cluster in which pigs, poultry and cows are kept, and flowers and vegetables are grown in a topographically attractive rural setting close to an urban area (design location: Twente). It would also be possible to combine forestry activities (production and/or recreation) and energy production (biomass from wood, chicken manure and horticultural waste). The key aspect, however, is the consumer's perception of food and food production. In the Rural Park, the general public will experience various aspects of food by sight, feel, smell and taste. In short, they will take part in the food chain. There will be exhibitions, markets, tastings and catering facilities, as well as offices and a knowledge centre. The Rural Park offers a branding, distribution and 'experience' concept. It decreases the distance between producer and consumer.

1 / The Delta Park

The Delta Park represents a combination of non-land-reliant intensive sectors with industrial processing, located on an industrial estate in the urban setting (design location: the Rotterdam harbour area). It combines glasshouse horticulture and other forms of self-contained cultivation, protein production (pigs, poultry, fish and insects), abattoirs, meat processing, waste sorting and recycling, product processing, bio-refinery, the production of organic fertilizers, and support activities such as storage and packaging. The interaction between sectors has a hi-tech basis, relying on both ICT and biotechnology. The principles of industrial ecology are addressed by means of the exchange of natural fertilizers (i.e. manure), organic waste, methane, carbon dioxide and heat between the various sectors. The dockside location is important in terms of energy supplies and livestock transport. The local population centre provides a sales market that can be supplied with fresh produce without logistic complications. Effective use of the relatively expensive space is achieved by means of stacking the various activities one above the other, for example in glass pyramids.



2 / The Agri-specialty Park

This variant provides industrial processing of bulk products into specialty products such as pharmaceuticals, cosmetics, biodegradable packaging and eco-friendly semi-manufactures. It is sited on an industrial estate within a harbour area with an agricultural hinterland (design location: Eemshaven). In this design, the main raw material is sugar, which is delivered as a bulk product and processed into a wide range of food and non-food products (e.g. fine chemical applications, paper and bio-composites). To ensure optimum year-round capacity utilization, other inputs (such as potatoes, wheat, flax, grass, chicory, hemp and soya) are also used. The park comprises a combination of three self-contained industrial undertakings: a sugar refinery, an alcohol producer and a bio-refinery.



3 / The Green Park

The Green Park includes land-reliant animal and plant production sectors with concentrated industrial processing in a rural setting (design location: the Noordoostpolder). The clustering of production and processing results in the reduced transport of raw materials and semi-manufactures. Production includes fibre, protein and starch crops, bulbs, grass, clover and extensive livestock farming. The processing activities focus on the extraction of high-value (food) components and the use of low-value components in separation technology, waste sorting, and the organic fertilizer industry and energy generation.



4 / The Rural Park

The Rural Park is a spatial cluster in which pigs, poultry and cows are kept, and flowers and vegetables are grown in a topographically attractive rural setting close to an urban area (design location: Twente). It would also be possible to combine forestry activities (production and/or recreation) and energy production (biomass from wood, chicken manure and horticultural waste). The key aspect, however, is the consumer's perception of food and food production. In the Rural Park, the general public will experience various aspects of food by sight, feel, smell and taste. In short, they will take part in the food chain. There will be exhibitions, markets, tastings and catering facilities, as well as offices and a knowledge centre. The Rural Park offers a branding, distribution and 'experience' concept. It decreases the distance between producer and consumer.



Footnotes

- ¹ *Agroparken: perspectieven en dilemma's* ['Agroparks: perspectives and dilemmas']. InnovationNetwork report, October 2000.
- ² *Animal Care: beelden van diergezondheid en dierenwelzijn in agroclusters* ['Animal Care: images of animal health and welfare in agriclusters']. InnovationNetwork report, December 2003.
- ³ The report 'Animal Care' provides evidence to suggest that clustering in agroparks will dramatically reduce the risk of diseases entering this closed environment.
- ⁴ This idea is further elaborated in the design for the High Care park. See: 'Animal Care: images of animal health and welfare in agriclusters', InnovationNetwork report, December 2003.
- ⁵ General business plan for an agri-centre: InnovationNetwork report, April 2003.
- ⁶ See article by Ger Vos in *Agrarisch Dagblad*, 17 June 2003: 'Emoties versluieren debat agroproductieparken' [Emotions cloud debate on agri-production parks], in which he rebuts a number of the arguments against agroparks. Arguments in favour of retaining intensive methods (in the poultry sector) are to be found in '*Wees aardig voor de kippen. Hou de bio-industrie in Nederland!*' ['Be nice to chickens: keep the bio-industry in the Netherlands] by Frans van der Helm in *NRC Handelsblad*, 26 June 2004. This article was in turn refuted by Jan Terlouw and Dirk-Jan Verdonk in *NRC Handelsblad*, 12 July 2004: '*Kippen zijn in Nederland niet beter af*' ['Chickens are no better off in the Netherlands'], an article in which the authors state that there is no evidence to suggest that animals are less well treated in the non-developed countries. Animal welfare and compassion are not exclusive to the west.
- ⁷ This argument is presented in a light-hearted film with a serious message: 'Pig City'. See www.mvrdrv.nl
- ⁸ Diamond, J. *Guns, Germs and Steel: the Fates of Human Societies*. New York/London: W.W. Norton & Co., 1997.
- ⁹ For a summary of twentieth-century developments in Dutch agriculture, see: *Techniek in Nederland in de twintigste eeuw*, part III: landbouw en voeding. Zutphen: Walburg Pers, 2000.
- ¹⁰ *Ibid.*, pp.47-63.
- ¹¹ Interview with Rinus van de Waart, Director of KnowHouse BV.
- ¹² These ideas are drawn from the theory of industrial ecology, also known as industrial symbiosis. The core belief within industrial ecology is that nothing is 'superfluous' or 'worthless'. Everything has a use and an intrinsic value, just as there can be no worthless waste within a closed biological (eco)system. See: Graedel and Allenby, *Industrial Ecology*, Prentice Hall, 1994.
- ¹³ See: *Leren over grensverleggend vernieuwen* ['Learning about ground-breaking innovation'] InnovationNetwork, October 2004.
- ¹⁴ The examples are described in the InnovationNetwork report *Agroproductieparken: perspectieven en dilemma's*. The summary of the four designs is taken from L. Sterrenberg & Rutten H: *Agroparken en dilemma's rond een poging tot systeeminnovatie*, in: *Tijdschrift voor wetenschap, technologie en samenleving*, no. 4, 2001.

The responses ///

InnovationNetwork introduced the concept of the agropark using the four provisional designs described above. A lively discussion ensued. In this section, we present and evaluate the responses to the concept, the social dilemmas, and the underlying values.

‘The agropark provides employment to farmers’

The launch of the agropark concept

The idea of agroparks was first mooted in 1998, when the National Council for Agricultural Research (NRLO) suggested that clustering agricultural activities could resolve a number of the problems experienced by the industry.¹ On the basis of this idea, researchers from the University of Wageningen and the Netherlands Organization for Applied Scientific Research (TNO) developed four provisional designs, which were then discussed with government organizations, the private sector and societal groups. The designs and the responses to the idea were included in the report *Agroproductieparken: perspectieven en dilemma's* [‘Agri-production parks: perspectives and dilemmas’], published jointly by InnovationNetwork and the Technology Assessment Steering Group, an advisory body to the Ministry of Agriculture, Nature and Food Quality. The report sparked a lively debate that drew considerable interest both at home and abroad.

Exactly how was the idea launched? On 3 October 2000, InnovationNetwork presented its report to the then minister of Agriculture, Laurens Jan Brinkhorst. He expressed keen interest, praising the ideas and calling for the four proposals to be explored in more detail. He found the Delta Park design, located in a harbour area close to an urban region, to be particularly promising. The minister acknowledged that there could be some opposition to keeping pigs in ‘multi-storey apartments’, but did not wish this to prevent further studies. “Innovation is always controversial,” he remarked. “If the Netherlands is to maintain its leading role in food production, certain difficulties will have to be overcome.” The minister believed that a social debate about the ethical acceptability of the ideas was called for, to be based on one of the provisional designs. He then announced that he would tour the Rotterdam harbour area the very next day, accompanied by director of the Port of Rotterdam Authority, Willem Scholten, their quest being to find a suitable location for the proposed Delta Park.

The public debate

InnovationNetwork wished to gain widespread publicity for the report. After its presentation, Mr Brinkhorst remarked, “I think I have probably unleashed the debate now,” a comment which proved to be something of an understatement.

The report’s authors had hoped for a small item to be included on the news wire, and could not have foreseen just how much commotion the minister’s words would cause. The front page headline on the following day’s edition of *NRC Handelsblad* was ‘Brinkhorst wants trial of pig flats’². Journalists who had attended the presentation of the report consistently referred to the concept as ‘pig flats’.³ The general concept of the agropark was then irretrievably linked to just one of the proposed designs included in the report: the Delta Park, in which the most conspicuous feature is the large-scale intensive pig keeping and the unconventional architectural style of the animals’ accommodation. Within a very short time, a fierce discussion between the supporters and opponents of the concept was being conducted in newspapers and journals, on radio and television. Supporters cited the innovative and integrated character of the idea, while critics slated the large-scale industrial character of the activities, and in particular the way in which animals would be treated. Journalists showed particular interest and the staff of InnovationNetwork were swamped with requests for interviews.

The concept also drew considerable international interest. In the United Kingdom, *The Guardian* saw the potential for large-scale biological agriculture.⁴ Discovery Channel interpreted the idea as the ultimate form of self-sufficient agriculture. The German certification organization Vitacert recognized the concept’s large potential for ecological agriculture, with appreciative remarks concerning the ‘typically Dutch’ character of the agropark concept, emerging as it did from ‘the drained swamp in which nature itself was created by man’. The famous aphorism, ‘God created the world, the Dutch created Holland’ would now apply to agricultural practice as well. The idea was seen as very much in keeping with the Dutch culture of highly concentrated farming which is both knowledge-intensive and hi-tech, and with the highest productivity in the world.

The minister’s comments caused such a commotion that he was called to account for them in the Lower House of Parliament. Here, he said that he could understand the negative responses, but that he considered the concept of the agropark, and more particularly the Delta Park, to be interesting enough to justify further research and practical experiments.

‘It sounds like something out of ‘Animal Farm’’

A number of political parties (including the PvdA, D66 and LPF) expressed support for the Delta Park, the most radical of the four proposed designs.

There were indeed many positive responses. On the other hand, there was also fierce opposition to the agropark idea. Here, we present just a few of the editorial comments published in the media:⁵

‘A terrifying design’. ‘Strongly felt opposition’. ‘The message is: the pig is an object’. ‘A technocratic fiasco’. ‘Unworkable’, ‘Undesirable’, ‘A misconception’. ‘Ludicrous’, ‘Wishful thinking’, ‘Doomed to failure’, ‘Utopian’. ‘Dream on, Brinkhorst!’ ‘Does the minister want to keep only a swamp with a few trees?’ ‘A repulsive idea.’ ‘We are livid’. ‘The fixation on technological solutions leads to idiotic drawing board projects such as multi-storey pigsties. No one wants them.’ ‘Intensive livestock farming is comparable to the holocaust’. ‘A second-rate abattoir’. ‘It sounds like something out of Animal Farm’. ‘Ridiculous.’ ‘How many pigs does it take to keep a pensioner warm?’ ‘Stacking renders everything anonymous: the production process will disappear out of sight... around it will be a fringe of token farmers, selling their attractively packaged cheese to the townies. They will be used as the cover-up, the window dressing. Behind the cheesemonger’s stall will be bulk agriculture.’

Taking stock of the arguments

In 2004, InnovationNetwork co-commissioned an independent communications consultancy to make a full inventory of the responses to the agropark concept that had appeared in the media.⁶ The fervour of the opposition immediately following the launch of the concept was particularly noteworthy. The most frequently cited arguments against the agropark were:

- Consumers have an aversion to the picture of animals stacked in a multi-storey arrangement.
- The stacked concept is an example of intensive livestock farming that has gone too far: an abomination.

- The agropark will not put an end to animal suffering in the bio-industry: quite the reverse.
- Farmers prefer to keep their independent family business in the familiar rural setting.
- The agropark will be unworkable in practice. Legislation will be too great an obstacle. Moreover, farmers and the general public will put up effective opposition.
- The risks of viral infections are too great given the large concentrations of animals in an agropark.
- Agroparks, OK – but not in ‘flats’. Biological or ecological farming is preferable.

Most of the negative responses came from special interest groups such as the Dutch Organisation for Agriculture and Horticulture (LTO), the Wakker Dier Foundation (which champions animal rights in the bio-industry), the Netherlands Society for Nature and Environment, and the National Society for the Prevention of Cruelty to Animals. The newspapers carried many, usually negative, editorials about agroparks. The most common topic was animal suffering in the bio-industry, followed by the view that farms and farmers belong in the country, not in the towns.

The majority of positive comments came – not surprisingly – from InnovationNetwork and from Laurens Jan Brinkhorst. Other positive responses came from various departments of Wageningen University, the Dutch MP Harm Evert Waalkens, the Rathenau Institute, the Ministry of the Environment and Spatial Planning (VROM), the Dutch Consumers’ Association, the Pig-farmers’ Think-tank, the Wijffels Commission and, again, the Netherlands Society for Nature and Environment (which is not opposed to clustering as such, but would prefer biological agriculture).

The most frequently cited arguments in favour of agroparks were:

- Compared to current methods of livestock farming, agroparks are better able to meet the sometimes conflicting interests of animal welfare, environmental management, food safety and food quality, and can do so at the best possible price.

‘Good idea, pig flats’

- Agroparks are better for the environment by virtue of their closed ecosystems.
- Animal transport will no longer be necessary, thus sparing considerable suffering.
- Agroparks minimize the risks of animal disease: having farms spread out across the countryside may be idyllic, but encourages outbreaks of disease.
- Agroparks save space and therefore provide a more attractive landscape.
- The concept is good, but it should now focus more on animal welfare and not so much on saving space, on scale or on technology.

‘The agropark concept is not yet ripe for debate’

Reading the above arguments for and against the agropark alongside the description of the concept given in Section 1, we see that the debate so far has concentrated on the intensive livestock farming component. The various other aspects, such as the potential to save space, environmental gains, the avoidance of animal diseases and the reduced requirement for animal transport, were largely ignored. The public seems to be judging the proposals for the agropark solely in terms of animal welfare and whether it provides solutions to the problems of intensive livestock farming.

“It is very clear that the social embarrassment is greatest with regard to the way in which animals are treated,” concluded researchers Sterrenberg and Rutten in their interim evaluation of the debate, conducted six months after the concept’s presentation.⁷ Sterrenberg and Rutten also note that only the most controversial design – that of the Delta Park – was included in the discussion, and no mention was made of employment conditions or spatial consequences. The researchers feel it inappropriate to speak of a ‘debate’ at all, since only a limited number of organizations contributed to the discussion. Each was extremely quick to adopt a standpoint, whereby there was no opportunity for negotiation or compromise, for both sides of the story to be put forward. To oversimplify, the animal rights campaigners’ criticism was based on the animals, that of the environmental organizations based exclusively on environmental interests, while the farmers feared the end of the farm business as we know it. “Political sensibilities, emotions and taboos seem to form the obstacles

to a serious discussion about innovations. Many stakeholders are eager not to lose the support of the voter or consumer, and will therefore not align themselves with the concept of the Delta Park,” state Sterrenberg and Rutten. With the benefit of hindsight, they conclude that the concept was not yet ripe enough for rigorous debate. There was no firm evidence to support the claims made with regard to environmental gain, economic efficiency, improvements to animal welfare, attractiveness to investors or the reduced likelihood of outbreaks of animal disease.

The values held by sections of society

Prompted by the public debate, InnovationNetwork is introducing various initiatives whereby some components of the concept have been elaborated to produce input for a further discussion. In the first instance, this involved research to provide firm evidence on which the arguments, both for and against the concept, can rely.

For example, researchers have analysed the values that people attach to food and food production, to agriculture itself, to the environment, to technology and to animal husbandry.⁸

This study reveals that these values vary greatly between different societal groups. The idea that the agropark concept is something with which the Netherlands can achieve a strong international position appeals most to the groups described by the report as ‘upwardly mobiles’ and ‘cosmopolitans’.

Together with the ‘new conservatives’, these two groups are in favour of efficient, commercially viable production methods that rely on new technology. By contrast, the ‘post-materialists’ and ‘traditional citizens’ maintain a romantic ideal of nature, in which the beauty of the landscape is the dominant concern. These groups are the most critical of technological innovations, including the agropark. There is a positive side to this critical approach: these groups attach greatest importance to ensuring the beauty of the rural areas. Agroparks can help to do just this. The research into the range of values applying to agriculture and food is important with regard to the public communications about the agropark concept. These values can also serve as a source of inspiration for modifications to the actual design of the parks.

Alongside this study, the economic viability of the agropark (see Section 1) was also assessed⁹ and researchers examined

'A technocratic fiasco'

how the agropark would affect animal health and welfare. The primary life requirements of pigs were identified: food, water, exercise, social contact, rest, opportunities for self-care, etc. A set of design requirements was then produced. The conclusion is that agroparks can indeed fulfil stringent demands in terms of animal health and welfare, provided that explicit attention is devoted to these aspects during the design phase. Agroparks will then be superior to the current methods of intensive livestock farming in this respect.¹⁰

The importance of images

In the first few weeks following the launch of the agropark concept, the form of the discussion was largely determined by the absence of any images. One of the most common questions was, 'what does an agropark look like?' Journalists frequently asked InnovationNetwork for illustrations, but little material of any value was available. As a result, the newspapers used stock photos of current livestock farms, showing precisely the sort of situation that the agropark is intended to prevent.

Moreover, the lack of images encouraged everyone to form his or her own mental impression of an agropark, often influenced by the newspapers' favoured term, the 'pig flats'. This may well have invoked associations with the film *Pork Plaza*, produced by the Rathenau Institute in 1999 to show that current methods of intensive livestock farming have to change. It presents two scenarios. The first is biological farming in which the pigs are allowed to roam at will, rooting in the mud. A farmer appears on camera to express his love for the countryside and for his animals. The second scenario is a large-scale clustered pig-breeding facility known as *Pork Plaza*. This part of the film is set in the year 2015 and recounts the failed attempts to set up *Pork Plaza*, together with images that call to mind a poorly lit indoor car park. The commentary for this segment is provided by a businessman whose vocabulary is limited to 'management-speak' and production figures. A far more acceptable picture of the 'pig flats' was provided by the final edition of the television programme *Van Gewest tot Gewest* ('Region to region') in 2002.¹¹ Pigs were shown roaming amid the straw on an immense balcony. Their keeper, a paid member of staff, arrives each morning in the lift and tends to their needs until it is time for him to go home again in

the evening. When he looks outside, he sees an urban setting. While caring for the pigs, however, he can easily imagine himself in the country. The commentary for this item was provided by InnovationNetwork.

'At last, a real pig flat', trumpeted a headline in the *NRC Handelsblad* the next day.¹² Television critic Maarten Huygen wrote: "Everything is possible. The crux of the concept is not the 'flat' itself, but the way in which the pigs are kept. If we had been told about this sooner, all that commotion would have been unnecessary."

One year earlier, in 2001, the architects of MVRDV (best known for the Dutch pavilion at the World Exposition in Hanover) had taken part in the discussion prompted by the film 'Pig City'. This animated cartoon showed the stacked landscapes – multi-storey fields in effect – which would be necessary if the current intensive farming methods were to be entirely replaced by biological pig breeding. Pigs would then occupy three quarters of the Netherlands! The film also showed animal-friendly, forty-storey 'flats', with outdoor balconies and trees on every floor.¹³ In 2004, InnovationNetwork released the film *Agroparks: perspectives for the future?* in which both the advantages and risks of the concept were set out.

‘Agroparks are bound to come’

The unpredictability of disruptive innovations

Innovations will inevitably lead to discussion. The launch of the agropark concept was no exception, prompting as it did a fervent, if relatively short-lived, debate. We now ask whether this debate could have had a different outcome?

In 1943, IBM chairman Thomas Watson said, “I think there is a world market for maybe five computers.” In 1839, French surgeon Alfred Velpeau dismissed the use of general anaesthetics with the words, “The escape from pain in surgical operations is a chimera... ‘Knife’ and ‘pain’ are words which are always inseparable in the minds of patients.” In 1939, The New York Times stated that the average American family would never have enough time to sit still and stare at a television screen. Computers, anaesthetics, television: all inventions which no one could imagine becoming such a part of our everyday lives. Each met with considerable aversion at first. The list can be easily extended to include countless other innovations which prompted fierce responses when first suggested.¹⁴ If a referendum had been held to determine whether certain innovations should be introduced at all, we may now be living in a world without railways, air travel, computers or telephones! Innovations antagonize public perceptions. They prompt opposition, mistrust, fear and, of course, fierce debate.

InnovationNetwork has described the agropark as a ‘system innovation’: a deliberate attempt to bring about radical change, shifting boundaries and addressing the existing problems of agricultural practice from an entirely new angle. It represents a paradigm shift, a ‘turnabout in the thinking’.¹⁵ Anyone who makes such a radical proposal can be sure of opposition.

The people who devised the agropark concept were perfectly aware of this. Nevertheless, they had a number of objectives. They knew that they were presenting only an idea, not a finished design. They wanted to engender social debate, and were certainly helped in this by Laurens Jan Brinkhorst’s announcement that he wanted to start a practical trial immediately. This was rather too precipitous for the concept’s inventors. After all, it was only an *idea!*

Innovation in the societal context

The concept of the agropark has many of the characteristics

of a ‘disruptive’ innovation: one which is not in line with established ideas and interests.¹⁶ For example:

- Agroparks resolve certain problems (such as environmental and spatial planning issues) which are currently not dominant in the public discussion. At present, the public seeks compactness of scale and concern for nature, neither of which is apparently offered by the agropark.
- Agroparks entail new business structures for farmers. There will be new ownership forms, alliances and working relationships. This is a radical departure from the traditional family business that is owned by the farmer himself, who is assisted by members of his immediate family.
- Agroparks will drastically change the current relationship between town and country. Certain forms of agriculture will move into the urban areas. They include specialist sectors such as pig keeping, poultry farming and glasshouse horticulture, which have traditionally been located at some distance from each other in various parts of the Netherlands. In the agropark they will be ‘mixed’ with each other and with other sectors at one and the same location.

Looking back to the launch of the concept, a recurring question is, ‘could it have been done differently?’ According to Sterrenberg and Rutten, yes... and no. Yes, the concept could have been given more substance before being presented, with a greater body of evidence to support claims for environmental gain and economic viability. There should have been a more thorough exploration of possible objections and discussion points, they state. However, they add that the concept of the agropark is one of a number of disruptive innovations, which are so contrary to established interests that they will always meet considerable opposition. The researchers also point out that several aspects of the Delta Park idea are not innovative at all. It merely represents a logical progression in large-scale, intensive agricultural production and the ‘objectification of the animal as a production resource’.¹⁷ Lastly, it is notable that there are several social issues which are not addressed by the agropark. Only later were studies conducted into the likely effects on animal health and welfare. More fundamental ethical questions, such as whether we should be eating animals at all, were not considered during the development of the concept.¹⁸

'A second-rate abattoir'

If the agropark is so contrary to established interests, how will the concept hold up in the arena of producers, consumers, public authorities and commercial operators? Some of the established interests are bound to change as time goes on. The market will force many businesses to seek alternative production methods. The Dutch government has published many policy documents in which it supports clustering with a view to resolving environmental issues and making the countryside more attractive. The likelihood of further outbreaks of animal disease is so great that the agropark is now increasingly put forward as a good alternative. The recently published Policy Document on Animal Disease calls for the regionalization and clustering of the food production chain.¹⁹ Similarly, the Dutch government's policy document on Logistics in the Agricultural Sector centres on clusters, linkages and centralized direction. The agropark concept fits seamlessly into this structure. The National Environmental Policy Plan cites the agropark as one of the most promising approaches to sustainable agriculture. Overall, we may state that the central idea of the agropark has, five years after its introduction, gained a firm place within government policy.

Will the consumer have the final word?

The most common argument in favour of intensive livestock farming is that the consumer wants inexpensive meat. In fact, surveys reveal that consumers are more concerned with animal welfare than with price. Clearly, there are various issues at play, and they are difficult to reconcile. What approach should be taken?

When the outbreaks of swine fever led to large-scale culling of livestock holdings, the media carried images of mounds of dead pigs, causing a major public outcry. Suddenly, a taboo had been broken, and the manner in which our society keeps animals with the sole purpose of eating them became visible to all. Producers feared a mass public conversion to vegetarianism, or at least to the consumption of biologically produced meat. This fear proved ungrounded. After just a few months, sales of meat had recovered to the pre-outbreak level. This apparent impassiveness on the part of consumers does not mean that they are insensitive to animal suffering. Far from it. However, research shows that there are other motives that influence consumer choices.²⁰

The limited availability of 'animal-friendly' meat, doubts concerning the claims made by certain products, and price all play a part. Nevertheless, there is a conspicuous disparity between what people say concerns them as a 'moral citizen' and what they actually buy as a consumer. Consumers like to eat meat, and they prefer to be able to buy inexpensive meat. In their role as concerned citizens, however, the same consumers have different values. Their priority then becomes animal welfare. The majority (67%, with women outnumbering men) are willing to pay 15% extra if there is some guarantee of good animal welfare in the production chain.²¹ This disparity between 'citizen' and 'consumer' is regularly raised during any discussion of the agropark. To quote from the report *Agroparken: verguld en verguisd*: "Animals are increasingly kept indoors, in stalls with little room for movement. Almost everyone knows that, but prefers not to be reminded of the fact." People state that they would indeed prefer to eat only biologically produced meat, but the hard fact is that biological products represented only 1.6% of overall meat sales in the Netherlands in 2003.²² "The consumer does not understand the consequences of his

‘Agricluster in Limburg not pie in the sky’

or her own preferences,” states Peter Smeets, a researcher at Wageningen University and one of the people behind the agropark concept. “If we continue to eat meat at the current rate, we must seek ways in which to produce all that meat.” Smeets believes that a certain level of support for intensive livestock farming does exist. “In effect, agroparks address consumer preferences in the most complete way possible. They combine concern for the environment and animal welfare with a means of meeting demand for relatively inexpensive meat.” In a study conducted by the Rathenau Institute, members of the public were asked for their views on current livestock farming methods. Most had a rather low opinion. Following visits to a fish farm, a dairy farm and a rabbit farm however, most respondents were able to revise their opinions, taking a more favourable view. While they still considered improvements to be necessary, they were able to understand the dilemmas faced by the farmers.²³

It is said that more information engenders greater understanding, but this does not always hold true. This was illustrated by the popular Dutch entertainer Youp van ’t Hek, who publicly supports the pressure group *Varkens in Nood* (‘Pigs in Need’). With a television crew in tow, he visited a regular pig farm. He had been invited by the operators who clearly thought, ‘if we are open and honest, we can put an end to the bad publicity’. Van ’t Hek walked off the farm with the words, “It is even worse than I thought.” This illustrates that openness about the current methods of livestock farming is not enough. The methods themselves have to be changed, not just the PR process surrounding those methods.

‘Naturally’ produced food

Many people, even in their role as ‘consumers’, are shocked by the concept of the agropark because it makes explicit the intensive production methods of which many consumers had previously been unaware. The agropark confirms the very image of industrially produced food that the producers vigorously deny in their advertising. Many manufacturers like to suggest that their products are ‘natural’ and ‘traditional’, produced according to time-honoured methods. They attempt to reinforce the romantic image of farming, which anyone over thirty will remember from their childhood. That image is one which advertisers, politicians, policy-makers and farmers alike

would like to sustain, but agroparks open it to discussion. This is one reason that the agropark has met such opposition. A Dutch consumer affairs television programme (Keuringsdienst van Waarde) regularly attempts to show viewers the disparity between the advertising claims and the reality. Eggs do not come from chickens that forage for corn under the haystack, as shown on the packaging. ‘Fresh’ fish is likely to be at least two weeks old, although it may have been ‘freshly’ thawed. ‘Filet Americain’ is actually made from African beef that could well have spent the last two years in a British cold store before being blended with waste fat from Dutch cows.²⁴ This sort of ‘revelation’ does not overly please the producers. They prefer to collaborate in creating ‘organized ignorance’, as Cees van Woerkum, professor of Communications Management at Wageningen University, terms it.

Organized ignorance ensures that poorly informed *consumers* make purchases that they would avoid as well informed *citizens*. They cannot consider the wider consequences. Perhaps we would prefer not to have a bio-industry of our own in the Netherlands, but we are perfectly content to eat the cheap cuts of meat from Thailand and South America without question. In effect, we are exporting our moral indignation, but are also forgetting that we ourselves create the market for cheap foreign meat from animals that have certainly not enjoyed the most comfortable of lives.²⁵ There is a parallel with the issue of nuclear energy. The Dutch public does not want any nuclear power stations in the Netherlands, but has no objection to importing twenty per cent of the country’s energy requirement from French nuclear plants.

Given this dualistic attitude, the private sector has to be very cautious. With international competition so fierce, producers are not eager to change their production methods and hence make their products more expensive. Suppose that Dutch agriculture were to bow to public pressure and adopt animal-friendly, biological and (preferably) extensive livestock farming methods. Who can guarantee that consumers will buy the far more expensive meat rather than turning en masse to the cheaper, though distinctly animal-unfriendly imported meat, thus bringing about the demise of these accommodating Dutch businesses?

‘Fierce and impassioned resistance’

‘Unfamiliarity breeds mistrust’

Frans Evers is the former director of a leading Dutch nature conservation trust. During his long and distinguished career he has frequently been called upon to steer complex social processes. He has a good explanation for the uproar that the concept of the agropark has caused. “The fierce negative response to the ‘pig flat’ idea is hardly surprising,” he states. “From the expert’s point of view, the idea represents a rational improvement to current pig-keeping methods. Consumers, however, are unaware of this. They do not know that the majority of animals never see daylight, never even venture outdoors. People are unable to make the connection between the pigs on the farm and the cellophane-wrapped pork chop on the supermarket shelf. This is also why sales of biological meat are so poor. Only those who can indeed see the link between animal welfare and the meat on the plate buy it.

If you come up with an idea that will improve the current system, you will meet mass opposition. Why? It is opposition to the to the current situation which the people do not know. You have to take people’s opinions seriously: feelings are facts. Apparently, people feel a certain empathy towards pigs, although it is directed towards the animal they remember from their childhood or the petting zoo. In communicating an improvement such as the agropark, I see two possible strategies. The first is to begin by telling consumers about the current situation. This reminds me of our campaign against acid rain, in which we simply showed people the terrible effects. We did not suggest any solutions at that stage, but the public – and parliament – soon came to us to ask for solutions. This had an enormous effect. You could conduct a similar campaign for the agropark: first show how problematic the current pig-farming methods can become if nothing is done.

A second possible strategy is to act outside the broad social discussion. Make agreements with the opinion formers, the environmental and nature lobbies, the farmers’ organizations and so on. Agree that if the project is launched, we will then support it as a good solution to the current problems, and we will say that we know that because we have done the research. People do not then have to immerse themselves in all the background detail, but will place their trust in the societal organizations.”

Is there a future for the agropark in the Netherlands?

Yes, says Jan de Wilt, project manager with InnovationNetwork, the organization that launched the concept in 2000. No, says Leo den Hartog, Director of Research & Development with Nutreco Agriculture and visiting professor of Livestock Business Development at Wageningen University.

“There is still vast room for improvement in Dutch agriculture,” says Jan de Wilt of InnovationNetwork, opening the debate on the agropark concept. “Can you remember how rapidly fowl pest was able to spread? That was because the country smallholder lives next door to the intensive poultry-farming business. The Gelderland Valley and the south-east of the country were in the grip of an epidemic within days. Is this a professional way to run the agricultural industry? No – it can be made far more efficient, both spatially and economically.

Agroparks will serve to concentrate agricultural activity, thus relieving the pressure on the rural areas. The key terms are ‘chain integration’ and ‘spatial concentration’. If you do it properly, animal diseases will have less opportunity to spread. Moreover, there will be fewer animal transport movements required, and hence less animal suffering. There will also be environmental advantages, especially if we devote enough attention to reusing the waste flows. The concentration of agriculture in the agroparks will leave more space for other activities to flourish in the rural areas: recreation, nature and water storage, for example.”

Leo den Hartog, research director with Nutreco Agriculture and visiting professor at Wageningen University, disagrees. He is far more dubious and summarizes his objections thus: “Firstly, the agropark idea assumes that you are going to relocate existing businesses. That will be extremely expensive and the money would be better spent on innovation. Secondly, I have to wonder what happens when a business in the agropark wants to expand. If one expands, the others are trapped without any room to manoeuvre. Thirdly, what about ownership structures? Suppose that an incident occurs: who owns what? Who is responsible? This is certainly not a simple matter. And lastly, the susceptibility to disease. One minor flu epidemic

‘Minister Veerman wishes to promote the development of agroparks’

and the whole agropark grinds to a halt.” Den Hartog leans forward to add weight to his words. “To clear up one possible misunderstanding, I am not saying that the expansion of scale is necessarily contrary to the interests of animal welfare or the environment, both of which could indeed be improved within the agropark setting. However, the businesses within the park would be extremely vulnerable. And then there’s the question of image. A hundred thousand pigs on an industrial estate – what sort of impression is that going to make?”

Jan de Wilt listens politely before countering these arguments. “In effect, you have no objections to the principle. Your objections are purely practical in nature. To prevent disease, we can keep the pigs in compartments, living together in small groups with ventilation shafts between them. Large-scale outbreaks can be prevented using technological solutions.²⁶ Moreover, millions of pigs had to be slaughtered during the most recent outbreak of swine fever, with entire regions closed to countless social activities. In the worst case scenario, an outbreak in an agropark would affect a few hundred thousand animals at most, and there would be no disruption to the surrounding area. The ownership structures can be easily arranged. The size of any agropark is open to discussion beforehand. We support small-scale initiatives such as ‘Family Business Plus’, in which pig-farmers cooperate with each other, because they lead to spatial concentration. I only want to ask Professor Den Hartog whether he finds the agropark an attractive proposition.” The professor is swift to respond. “No. The agropark is not the future of the Netherlands. Look at our position on the global scale. We are invisible! All we see are the large world trading blocs such as the USA, Brazil, the Middle East, the Far East and the European Union. In this perspective, the Netherlands is nothing more than a small region. We used to import eighty per cent of the raw materials required for animal feed and we exported seventy per cent of our production. Today, we can no longer compete even at cost price. Other countries can produce far more cheaply.”

With world trade as it is, Den Hartog sees four possibilities for Dutch businesses: “First, they could produce for larger specific markets, perhaps for a supermarket chain that has specific requirements. This is the first group. The other possibilities will be attractive only to a limited number of businesses. Producing niche regional products or biological products,

for example. A third possibility is to expand the business to include other services, such as door-to-door sales. The fourth possibility is also only realistic for some businesses, and that is to cease trading altogether.”

Jan de Wilt interjects: “And in which group are the agroparks?”

Den Hartog: “If the agroparks are able to develop according to your plans, they will produce on a large scale and will therefore be in the first group. But I do not expect these parks to get off the ground. I do believe that there is added value to be had by linking different sectors and through cooperative alliances, but this does not have to be in one and the same location! Spatial clustering has nothing but disadvantages. Why force a farmer to use a particular abattoir merely because it is on the same site? That is an incursion on free enterprise.”

Jan de Wilt replies: “The concept must be such that it is commercially unattractive for the farmer to supply other abattoirs.

The proximity will make a huge difference in transport costs and in moving animals hither and thither. That is what we want to avoid, isn’t it? And what about traffic congestion?

The transport of animals and food products accounts for a third of all kilometres driven on our roads.” Den Hartog shakes his head. “That is not realistic. Not all livestock farmers deliver their animals to the nearest abattoir. It’s a question of money. It’s that simple.”

“Free enterprise is all well and good,” retorts Jan de Wilt, “but if it means that you go out of business within ten years, it is not such an attractive notion. We would do better to work towards new cooperative structures that provide clear advantages. Why be afraid of cooperation on the same site?”

Den Hartog: “Because unnecessary relationships will be a waste of money. I think it would be preferable to designate certain ‘agricultural development areas’, where farmers will be allowed to business and expand if they wish, but under strict conditions. There will be limits on smells and ammonia emissions, and so forth. Then innovation will emerge automatically. I always compare this with the six petrol pumps around my village. The authorities introduced stricter requirements for those pumps that required large investments. Three of the operators decided to cease trading. The other three made the necessary investments and now have flourishing businesses.”

Jan de Wilt nods. “Agricultural development areas are a good idea. When setting up the agroparks, you have to be careful

‘A terrifying design’

to avoid destruction of capital. So, no expensive relocations. Instead, we can create room for businesses that wish to develop further but are unable to do so at their present location. But then, they should not be allowed to spread over three-quarters of the country. That merely results in spatial fragmentation. Keep them small, as in the horticultural sector. Restrict them to ten per cent of the total area. Choose the location carefully, with a view to efficient logistics. Keep everything compact, with stacking if necessary. Then expansion is not hindered by the next-door neighbour being in the way. It makes no difference to the animals. As long as they have their social contacts, sufficient space, a mud bath and daylight, they will be content. Include an abattoir on the site: the extra costs of doing so will be offset by the reduction in transport costs. That is a fact.”

Den Hartog still considers the proposal to be idealistic. “Abattoirs are already so specialized that they would have too little trade just from the agropark itself. I do think that cooperation is important, however. We must conduct more research in this area. And let us not forget that it is a lack of clear policy that has prevented businesses from innovating. For many years they simply did not know what the future would hold. Livestock holdings were to be wound down drastically at times, and less so at others. Even bad news is better than no news at all. Clarity – that is the greatest requirement of all.”

What is the future of Dutch agriculture as a whole?

“I believe that the number of livestock farms in the Netherlands will continue to dwindle,” says Den Hartog. “However, the expansion of scale will also continue. Businesses will start to concentrate on producing for certain specific markets. Livestock farming must be assimilated into the rural area. The keywords will be ‘fresh’, ‘convenient’, ‘healthy’ and ‘tasty’. As society changes, so do our eating habits and requirements. Those changes must be addressed. We are currently going through a significant dip, but we are perfectly capable of producing for all of north-western Europe. Here, we can compete with the international market, not on price but by producing distinctive products which meet the requirements of the region’s extremely discerning consumers.”

Jan de Wilt: “I believe that the Dutch agricultural sector will diminish in size. There will be greater diversity to include other functions. Large-scale companies producing for the world market will eventually no longer be accepted in the rural areas. They will have to relocate to an urban setting with good logistics, such as the area around Schiphol airport or the outskirts of Venlo. The Netherlands will then become one large thinly-populated city, with a few nature areas dotted about. Think of New York and its Central Park. There, you imagine you are in the middle of the countryside, while in fact you are in the heart of a very busy metropolis.”

‘Pig flat is VIP lounge with a panoramic view!’

Footnotes

- ¹ Initiatief Duurzame Voedselvoorziening [‘Initiative for Sustainable Food Provision’], National Council for Agricultural Research, September 1998.
- ² NRC Handelsblad, 4 October 2000.
- ³ See *Verguld en verguisd - agroparken in de media*. [‘Lauded and lambasted: agroparks in the media’], InnovationNetwork report, August 2004.
- ⁴ ‘Farm of the Future?’ in: The Guardian, 22 August 2001.
- ⁵ *Verguld en verguisd - agroparken in de media*. InnovationNetwork report, August 2004.
- ⁶ Ibid.
- ⁷ *Agroparken en dilemma’s rond een poging tot systeeminnovatie*. [‘Agroparks and the dilemmas presented by an attempt to achieve systems innovation’] Sterrenberg, L. & Rutten, H., in: Tijdschrift voor wetenschap, technologie en samenleving, no. 4, 2001.
- ⁸ Landbouw en voedselproductie: inzicht in beleving van burgers. [‘Agriculture and Food Production; understanding public perceptions’] InnovationNetwork report, May 2003.
- ⁹ General business plan for an agri-centre. InnovationNetwork report, April 2003.
- ¹⁰ Animal Care: Diergezondheid en dierenwelzijn in ruimtelijke clusters. [‘Animal health and welfare in spatial clusters’], InnovationNetwork report, December 2003.
- ¹¹ *Van Gewest tot Gewest*, broadcast by NPS on 20 June 2002.
- ¹² NRC Handelsblad, 21 June 2002.
- ¹³ For an edited version of Pig City, see: www.mvrdrv.archined.nl/pig_city/index.php
- ¹⁴ Laura Lee, *Bad Predictions*, Elsewhere Press (MI), 2000.
- ¹⁵ *Leren over grensverleggend vernieuwen*. InnovationNetwork report, October 2004.
- ¹⁶ C. Cristensen: *Het innovatiedilemma: kansen en risico’s van nieuwe technologie* [‘The innovation dilemma: opportunities and risks of new technology’] Amsterdam: Contact, 1999.
- ¹⁷ L. Sterrenberg, & Rutten, H: *Agroparken en dilemma’s rond een poging tot systeeminnovatie*, in: Tijdschrift voor wetenschap, technologie en samenleving, no. 4, 2001, p.7.
- ¹⁸ The inevitable question is whether we are entitled to eat animals at all. For an attempt at an ethical justification for the consumption of meat, see: Michiel Korthals *Voor het eten. Filosofie en ethiek van de voeding* [‘For dinner: philosophy and ethics of food provision’] Amsterdam: Boom, 2002, p.132-138.
- ¹⁹ *Dierziektebeleid met draagvlak* [‘A supported policy on animal disease’], report by the Council for the Rural Areas and the Council for Animal Affairs, February 2004.
- ²⁰ A German survey of persons who do not purchase ecological products (which isare not the same as biological products) revealed that 57% of respondents consider the prices to be too high, 46% are unconvinced by the claims made and do not consider there to be a proven difference between these products and the conventional versions, 20% are not convinced of the quality and/or flavour, and 15% are unable to buy the products in the local area. *Burgers en consumenten. Tussen tweedeling en twee-eenheid* [‘Citizens and consumers; between a distinction and a disparity’] Dagevos, H.& L. Sterrenberg. Wageningen Academic Publishers, 2003, p.113 ff.
- ²¹ *Opvattingen en meningen over het platteland*. [‘Views and opinions about the countryside’] NIPO survey for InnovationNetwork, 2001, p.26.
- ²² *Agroparken: verguld en verguisd*, InnovationNetwork report, August 2004, p.23.
- ²³ *Burgeroordelen over dierenwelzijn in de veehouderij* [Public conceptions of animal welfare in the livestock farming sector’] Rathenau Institute, November 2003.
- ²⁴ These examples are taken from the television programme *Keuringsdienst van waarde*, RVU, 2004.
- ²⁵ Ger Vos in *Agrarisch Dagblad*, 17 June 2003. ‘Emoties versluieren debat agroproductieparken.’
- ²⁶ InnovationNetwork has studied various designs in which large numbers of animals are to be kept, together with the consequences in terms of animal health and welfare. See *Animal Care. Beelden van diergezondheid en dierenwelzijn in agroclusters*.

The agropark in practice ///

The need to update agricultural practice is felt in many quarters. Both in the Netherlands and elsewhere, several initiatives have been inspired by the concept of the agropark and the underlying idea of spatial clustering of agricultural activities. These initiatives are now in various stages of preparation.

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“When does a businessman think about innovation? When he is shaving in the morning, when he is at the business club or when yet another meeting has failed to reach any firm decisions.”

Rinus van de Waart

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Completing the cycle, improving animal welfare, creating a spatial concentration to reduce transport requirements and to render spatial and other investments more viable, producing in or near the urban environment in order to spare the countryside. These are all motives that are reflected to some extent by the four Dutch initiatives described in this section, all of which have been inspired by the agropark concept. They are:

- The ‘New Mixed Farm’, in which various large companies in the poultry, pig, mushroom and glasshouse horticulture sectors in Noord-Limburg are to use each other’s by-products and waste.
- The ‘Family Business Plus’, in which several clusters of four pig-farming businesses are to cooperate in the Salland reconstruction area (Overijssel).
- The ‘Rural Park’, a project linking clustered food production to recreation. The project also hopes to establish a new brand name for high-quality Dutch food products.
- The ‘Agricentre Amsterdam’, in which pig farming, glasshouse horticulture and perhaps also fish farming are to be combined in one building. The Agricentre will ‘close cycles’ in interaction with a feed processor, a waste incinerator and a fertilizer production facility.

Although the four projects are very different in terms of content and ambition, they all include some features borrowed from the agropark concept. They also have something else in common: they are all currently in the planning phase. People are now busy negotiating, calculating, researching and lobbying. Before these plans can be implemented, however, there are many obstacles to be overcome, a process that will require much patience. The projects must find funds and investors, the required technology has to be developed, the necessary permits must be acquired and local area development plans must be amended accordingly, and the exact form of the future cooperation has to be defined. Yet despite the risks inherent in such pioneering innovations, the four plans stand a reasonable chance of coming to fruition within the next few years. Various innovative entrepreneurs are willing to back each of the plans, but until it is absolutely certain that the plans will indeed be implemented, the people concerned

prefer to remain in the background. Accordingly, this section is based on interviews with intermediaries. There is no direct input from the entrepreneurs themselves. In some cases, the names of the commercial organizations involved have also been omitted.

1 / The New Mixed Farm

Of the four initiatives, the New Mixed Farm is currently the most advanced. It has been set up by a group of companies, inspired by the agropark concept. The participants are a large poultry producer with 1.2 million chickens, Europe’s largest mushroom grower, one of the largest pig-farming concerns in the region, a large glasshouse horticultural business, and a technology company. They have joined forces to make use of each other’s by-products and waste flows.

These businesses are fortunate in that they are located close to one another, some even in the same street. Their plans for cooperation are straightforward and the risks involved are not prohibitively great. Should the partnership fail for any reason, each can resume ‘business as usual’. The plan allows for gradual growth, and the partnership itself does not represent any major expansion of scale compared to the current situation. These businesses are already among the largest in their respective sectors. Provided the initiative proves viable over time, the members of the New Mixed Farm intend to relocate together. The initiative will then become an important role model.

2 / The Family Business Plus

The Family Business Plus project is much smaller in scale. It is the brainchild of Johan Pegge, former managing director of an animal feed cooperative, who is now taking the first step on the road from vision to reality. The Family Business Plus involves the clustering of a limited number of pig-farming concerns to form closed, self-contained units. No pigs will ever enter the premises from outside, thus greatly reducing the risk of disease outbreaks. The primary aim is to improve the efficiency of production and to enhance the opportunities for the development of each member company. Expansion at their current premises is not possible, since each is sited alongside a nature reserve. Relocation and cooperation will resolve this problem without requiring a major reorganization

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“We are literally mobilizing the pig farmers. After centuries of farming by successive generations, they are moving to new locations. And they are going to cooperate with each other. That is truly innovative.” Johan Pegge

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of the business structure. The Family Business Plus addresses both the pig farmers’ commercial and social requirements. They will remain self-employed, the family company will remain intact, and will continue to operate in the rural area. Although this initiative may appear to be far removed from the original concept of the agropark, it raises practical issues that are extremely relevant to the realization of an agropark. They include the formal cooperation arrangements, the choice of location and the manner in which spatial assimilation can be achieved. The Family Business Plus will meet some of the same obstacles as the more ambitious forms of clustering. It will therefore provide interesting and valuable experience, which other agropark-type projects can draw upon. The Family Business Plus offers not only the prospect of a marked improvement to the current situation, but also provides a workable model upon which future developments can be based.

3 / The Rural Park

The Rural Park project offers a very different perspective, centring on the public perception and ‘experience’ of food products and food production. It seeks to entertain and educate visitors, including younger children, introducing them to all aspects of food. The Rural Park combines the spatial clustering of various agricultural sectors with other activities, such as educational events and one or more restaurants. Visitors will be invited to experience aspects of food production and preparation at first hand. Building upon this experience and tapping into a desire for greater transparency in food production, the project also hopes to introduce a new and distinctive brand for high-quality products that will be marketed either through a new retail chain or in a separate ‘store within a store’ in existing supermarkets. The Rural Park is intended to close the gulf between agriculture and the general public. It hopes to give a more realistic impression of current food production methods and hi-tech farming. Given their spatial concentration of extremely diverse sectors, agroparks are also highly suited to this concept, with much to see at a single location. Large companies have already expressed support for the Rural Park idea. Representatives of the supermarkets, restaurants, building contractors and events organization industry are currently helping to develop the plans.

4 / The Agricentre Amsterdam

An initiative whereby a large-scale agropark will be built in the Amsterdam harbour area may be seen as extremely daring, but many stakeholders would benefit from the realization of this ‘Agricentre Amsterdam’. Perhaps the most obvious beneficiary would be the food manufacturing firm Cargill, which currently faces an ever-worsening waste management problem. Fertilizer manufacturer Amfert is also interested. To date, Amfert has imported the phosphates it uses from Israel. It would be considerably less expensive and more economically responsible to derive those phosphates from the nearby pig manure. For pig-farmers who are not afraid of taking risks, there are great opportunities here. Given the current economic climate, they will eventually have to make a choice: cease trading, emigrate to somewhere like Eastern Europe, or develop their business in the way offered by the Amsterdam harbour project.

Other types of business, such as glasshouse horticulturalists, will also be able to modernize their operations here. As a bonus, they will be able to purchase inexpensive heating from the nearby waste incinerator. In other words, the project is extremely promising, assuming that the government proves willing to facilitate it.

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“The building should be such that people think, Wow! You built that just for pigs?” Frans Evers

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Agroparks in the international perspective

A study commissioned by InnovationNetwork and the Ministry of Agriculture, Nature and Food Quality (LNV) reveals that concentrations of agricultural production can be seen at over seventy locations worldwide.¹ Notably, most initiatives involve some form of clustering, but few if any have any significant degree of linkage between different sectors. Neither is there significant recycling or re-use, and attempts to restrict the transport requirements are also rare. One exception is the ADM project in Decatur, Illinois, where horticulture is combined with fish farming. The fish are reared in water previously used in the glasshouses and containing high levels of nutrients. There is also a high-efficiency coal-fired incinerator in which old tyres – some six million per year – are burned.

The Kalundborg site in Denmark forms a textbook example of industrial symbiosis. Over the years, cooperation between extremely varied, mostly non-agricultural businesses has developed here, with one company using another's waste as its raw materials. There is also a large fish farm which makes use of excess heat, while pig feed is produced from the by-products and waste of an enzyme plant.

The results of the international study suggest that the areas with greatest potential for intensive agriculture are to be found in Southeast Asia. There is already considerable interest in the agropark concept from this region, particularly from China and Thailand. As described in Section 1 of this report, the Chinese government has invited a Dutch consortium to design an agropark as part of a larger complex, which will include recreation, housing and eco-industrial activities.

A permanent exhibition will be set up on the 210-hectare state-owned site, showing traditional, current and future farming methods. This exhibition will serve as the motor for further tourism and recreation. The agropark will be the focus of the exhibition, presenting a model of modern architecture. Several Dutch companies, including Alterra, Grontmij and KnowHouse, have been retained to realize the project.

The New Mixed Farm

‘Innovation is a bottom-up process’

Five companies have joined forces and will use each other's waste flows as their raw materials. This, in a nutshell, is the New Mixed Farm project, which the participants hope to have operational by the end of 2005. Rinus van de Waart, director of the KnowHouse consultancy that is guiding the project, looks back on the history of an agropark in the making. “When does a businessman think about innovation?”

Rinus van de Waart asks in a rhetorical tone. “When he is shaving in the morning, when he is at the business club or when yet another meeting has failed to reach any firm decisions. These are the moments at which he thinks, ‘this is not good: there has to be another way.’ And these are the moments at which we have to be there.”

The ‘we’ in this instance is KnowHouse, a consultancy that guides innovation in the agricultural industry. In Van de Waart's experience, innovation has to be a ‘bottom-up’ process.

He sees it as his job to create demand, and does so by informing businesses about new developments, perhaps during the regular ‘Innovation Café’ meetings. At one such meeting, he explained the possibilities of using waste flows as raw materials and of combining various sorts of business at the same location. Van de Waart is a proponent of ‘new mixed businesses’.

“Compartmentalization in agriculture is no longer efficient. It costs too much energy, produces too much waste and requires too much transport. Businesses of various types must enter into partnerships and work together.”

At that meeting, Van de Waart succeeded in ‘creating demand’ on the part of a large company that cultivates, processes and distributes mushrooms. This Innovation Café sparked an idea. The firm suddenly realized that a direct link with the ‘next door neighbour’, a company producing tomatoes under glass, could provide mutual benefits. Mushrooms produce large quantities of carbon dioxide as they grow. Tomatoes grow much better if they have additional carbon dioxide. One plus one is two! By linking the two firms, one can benefit from the by-product of the other.

This was just the first in a string of ideas. Energy can be stored. In the winter it can be used for heating, and in the summer for cooling. What if you add a poultry-farming company into

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“Did you know that three hundred varieties of pear grow in the Netherlands? Unfortunately, the supermarkets only sell one. It is grown on the basis of cost price, appearance and shelf life. What a pity that it is virtually inedible.” Twan Goossens

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the equation? Then you can use the chicken manure as compost for the mushrooms. And with pigs as well, the body heat and carbon dioxide generated by the animals will support several large glasshouses. Their manure can be treated to reduce smells and ammonia emissions, and this too will produce energy. Having combined this many businesses thus far, why not add a fish farm? That would also be able to use the heat generated by the pigs. The mushroom-grower then invited four counterparts from the region to talk about a major innovation. They included the owner of a large pig farm, the owner of a poultry farm, a tomato grower and the managing director of a logistics technology company.

‘Substance flows’

The idea of the New Mixed Farm was born. The five companies then thrashed out the conditions for their alliance. Independence and personal responsibility would be paramount: this would not be a collective in the Eastern European mould! If one member were to perform poorly, it must not be allowed to drag the others down with it. Similarly, if one company were to be affected by a virus or bacteria, the others must be able to continue regardless. The cooperation between the five firms was given further form by KnowHouse, which commissioned a study of the ‘substance flows’ connecting the various members. It was then decided to form a separate company to oversee the trade in these flows. As Van de Waart explains, “If the mushroom company grows faster than the other members, this will not be a problem. The market will decide how the flows are to be used. If the price of energy falls too low, for example, then the process of generating energy from pig manure will be discontinued. And if a tax is imposed on carbon dioxide emissions, which is certainly not impossible, it will become even more interesting to use the CO₂ within the cycle rather than allowing it to escape into the atmosphere. The same goes for the nutrients.”

It’s not possible – it’s not allowed – yes it is!

How did the government react to the plans? At first, the response was, ‘it’s not possible, it’s not allowed’. That is hardly surprising, since the rules were drawn up to cover existing situations, not new ideas. “Meanwhile, the project now has the support of various government departments,” reports Rinus van de Waart. “Central government is financing some of the required studies. The Minister of Agriculture has recently given the project special status, which will probably make it easier to create room for experimentation.

A pig-farmer once told me that his production loss is twenty per cent in warm weather. Twenty per cent! I asked him why he didn’t apply some form of climate control, like the glass-house companies do. You can seal the building and use air conditioning to ensure a constant temperature. Too expensive. However, if you can reduce other costs through links with other types of business, it becomes possible to provide a better living environment for the animals, while also reducing smells and waste flows.”

This is one of the lessons that Van de Waart has learned:

“For innovative projects such as setting up an agropark, you need businesses which have their affairs in order, which are fully open to innovation and which are not afraid to take a central place in society”. Those who automatically consider every change ‘too expensive’ will never take the lead.

No more bad smells

When explaining his ideas, did Van de Waart suffer from the negative image associated with ‘pig flats’? After all, this has dominated the agropark discussions since the very beginning. He raises his eyebrows and replies, “No, never. If someone brings it up, I then have something on which to base my case. I can explain that we are not going to build multi-storey piggens such as those conceived by the ‘suits’ in The Hague. We are ‘on the spot’ and have far better plans. That always works,” he grins.

Becoming serious once more, he adds, “The converse works too. Because InnovationNetwork is supporting the plans, there is political support and sometimes opportunities for funding regional plans. More people are then made aware of the ideas, which increases general support.”

“We could start giving real cooking lessons. Teach children that chips come from potatoes and that potatoes have to be harvested, sorted, washed, peeled, sliced and then fried.” Twan Goossens

Van de Waart is not afraid of opposition. “If people say that pigs smell, I simply agree and add that we really should do something about it. We must go over to a system of self-contained premises with no smells or emissions, in which the animals have a better quality of life than is currently the case. Not that animal welfare is an end in itself for us. It is not. But in this plan, animal welfare goes hand in hand with commercial opportunity.”

Governments are slow

The plan for this unorthodox clustering of businesses is contrary to current policy. There are so many obstacles that have to be overcome. Will the pig and poultry farming businesses be allowed to operate at the intended location? What taxation arrangements will apply with regard to premature depreciation if they move to the new location? Will it be possible to obtain all the necessary permits on time?

Once all these administrative hurdles have been overcome, the practical trials can begin. After all, we already know which flows are commercially viable on paper, but the theory has yet to be tested in practice. For example, is it possible to pump the carbon dioxide from mushrooms directly into the tomato glasshouse, or are there unknown problems involving, say, variations in humidity? Can food safety be guaranteed? Will production be commercially viable?

Overcoming all these obstacles will take time, and time is perhaps the greatest enemy of the project. “The companies concerned wish to press ahead as quickly as possible but the government departments which must facilitate the project tend to work very slowly,” Van de Waart points out. He is however pleased that the minister has accorded the project special status, since a positive attitude on the part of the government is essential. “Businessmen are not patient people. The project members wish to start construction in 2005. If things take too long, they will adopt other strategies to strengthen their market position.”

The Family Business Plus ‘Working together to reduce costs’

The Family Business Plus will bring together clusters of four pig-farming businesses at one location. They will then be able to undertake some joint activities, such as manure processing and disposal. All around the cluster, it will be possible to create a ‘pig free zone’. The advantage for the farmers is that they have a larger business, enhancing their market opportunities and reducing the risk of animal disease. The advantage for society as a whole is that there will be more space for nature and recreation, and less environmental impact. Johan Pegge, former director of a large animal feed cooperative, does not wish there to be any misunderstanding. The Family Business Plus plan is a direct response to government legislation (the Reconstructiewet Concentratiegebieden or ‘Reconstruction Concentration Areas Act’) passed following the 1997 outbreak of swine fever with a view to reorganizing the Dutch pig-farming sector. The Act designates certain areas in which the development of agriculture is to be encouraged. In some areas, agricultural activity is to be permitted on only a limited scale, while other areas will accommodate a combination of nature, housing and extensive agriculture.

Detailed agreements

The Family Business Plus has been set up for the concentration areas in the provinces of Gelderland and Overijssel. Pig-farmers currently located in the areas in which more extensive agriculture is to be encouraged will move to one of the concentration areas and will work alongside three others in a sort of owners’ cooperative. They will make detailed agreements concerning cooperation in such areas as manure processing, energy, feed systems and health management. The exact nature of those agreements is up to the farmers themselves. The basic principle is to work together in order to reduce costs and hence improve profits. The farmers will retain full control over their own business, but ‘smart’ cooperation will enable them to achieve a substantial expansion of scale. Why is the plan known as the ‘Family Business Plus’? “To emphasize the fact that the businesses will remain in family hands,” explains Pegge. “The work will still be done by the farmer, helped by his partner, son or daughter. This is in

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“This is probably the ultimate consequence of the increasing demand for meat which is ‘animal-friendly’ and which poses no threat to human health.” Frans Evers

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line with tradition. Having paid employees is somewhat more difficult. It is essential that there is a farmer who is fully committed and involved if the business is to be commercially viable.” Under the plan, every farmer can run a relatively small business of 2,500 porkers and 300 sows on this basis. The required investment is in the order of two million euros per company, of which forty per cent must be personal equity. “Of course, the basic principle is that pig-keeping will once again become a profitable undertaking. The operations must not rely on grants and subsidies,” states Pegge. “Sustainable commercial activity is the priority. We are literally mobilizing the pig farmers. After centuries of farming by successive generations, they are moving to new locations. And they are going to cooperate with each other. That is truly innovative.”

The Family Business Plus is an initiative by the animal feed cooperative feed ABCTA, with assistance from meat processing firm Dumeco, the Rabobank and the Regional Organization for Agriculture and Horticulture.

Allocation system

The Family Business Plus project must be in keeping with the reconstruction plan for Overijssel, which has yet to be ratified. “Final approval has been postponed by nine months,” explains Pegge. “That has affected the progress of our plans. This is the one major problem still besetting the project. The plans were devised in 2001, the calculations were made, there are farmers willing to take part and there are suitable locations. All that is lacking is an appropriate legislative framework and the financial resources.”

Various government departments are currently drawing up the arrangements for the relocation of farming businesses, but no firm decisions have yet been made. There are also problems with regard to the number of pigs to be permitted at each business. “A ridiculous scheme, anyway,” says Pegge. “It would be far better to set the limit on a province by province basis. The allocation system was supposed to be abolished in 2005, but this has been postponed and may indeed never happen. It results in considerable financial uncertainty which makes the implementation of the plans very much more expensive.”

Not a one-day wonder

When the final plans are presented to the farmers themselves, a number of issues will have to be made perfectly clear. This demands time, since so many parties (government, regional and local authorities, societal organizations and the private sector) are involved. Pegge does not appear to be frustrated by the slowness of the process. “You cannot determine the tempo yourself, it is a joint undertaking. If you can’t live with that, you should go and find something else to do!”

Pegge is confident that construction work for the first pilot project can begin in 2005. The Family Business Plan has gained support from many quarters. Nevertheless, there is still a large gap between talking and making decisions. If the pilot is successful, further clusters will be formed. Family Business Plus is certainly no ‘one-day wonder’, but is intended to make an ongoing contribution to agricultural reform. “It has to be done in such a way that other farmers will want to follow. Only then can the business structure of the pig-farming industry really be changed.”

“For innovative projects such as setting up an agropark, you need businesses which have their affairs in order, which are fully open to innovation and which are not afraid to take a central place in society.”

Rinus van de Waart

The Rural Park 'Experience food and its production'

A group of influential stakeholders has spent over two years developing the idea of the Rural Park. Their overall objective is to launch a strong brand name for food products that have been produced in spatial clusters according to sustainable methods. 'Agroparks offer opportunities to build a new bridge between the producer and the consumer.'

Consumers are largely unaware of exactly how the food they eat is produced. They assume that the government will ensure that food is safe and is produced in a sustainable manner, but exactly how the food on the plate has arrived there is a closed book to them. The people behind the Rural Park project wish to rectify this situation. They intend to set up a number of theme park-style attractions centring on food production. Visitors – adults and children alike – can then learn about such aspects as flavour, where food comes from and how it is grown. The underlying idea is that the Rural Park will help to create a brand name that will give sustainable products a recognizable face. The law of supply and demand will then do the rest, and sustainable production will be encouraged.

Combining initiatives

Twan Goossens is programme coordinator for the Agrotechnology and Food Innovations department at Wageningen University. Together with Paul Bleumink of Buck Consultants International, he is the driving force behind the Rural Park concept. Vegetable growers, fish farmers, and suppliers of meat and dairy produce often develop new initiatives. They then face the question, 'how do I introduce my products to the general public?' That is certainly not easy, as illustrated by the low sales of biological products in Dutch supermarkets. "It is still very much a niche market," comments Goossens. "We wish to combine all the various initiatives and focus on the consumer perception of food. People should once again know what it is to 'eat with the seasons'. Or to appreciate the real flavour of vegetables grown in the open field. Did you know that three hundred varieties of pear grow in the Netherlands? Unfortunately, the supermarkets only sell one. It is grown on the basis of cost price, appearance and shelf life. What a pity that it is virtually inedible! If you let people

taste the better varieties, they will start asking for them. The growers and supermarkets will then take a more proactive approach and will ask themselves, 'what can we offer the consumer next?'"

Teach children where chips come from

The consultants at the firm of Walas the Maverick, international experts in 'experience concepts', have now turned their attention to the Rural Park concept. Their task is to devise an inspirational theme park all about food. "Many companies wish to become more accessible to the general public," says Goossens. "They can present themselves to the public in the Rural Park, which has benefits for all concerned. We could start giving real cooking lessons. Teach children that chips come from potatoes, and that potatoes have to be harvested, sorted, washed, peeled, sliced and then fried. These are just some of the ideas. The main thing is that the Rural Park must be a real attraction at which people will want to spend a day out."

The Rural Park intends to profile itself with food produced in the Netherlands. This is a gap in the market, believes Goossens. "With local produce, you can beat off the competition from further afield. After all, locally produced food is, by definition, the only thing that the international competitors cannot supply." The Rural Park also wishes to establish a strong and recognizable brand name, which will enable Dutch products to gain a more prominent position. The brand will then bring together Dutch products of high quality, produced using sustainable methods. Eventually, Rural Park hopes to gain a ten per cent share of the market for fresh produce.

Give the process time

The exact form of the Rural Park is something that can be decided later. At the moment, Goossens is concerned with developing the main outline: a marketing concept that brings producers and consumers closer together. "We are thinking about our own chain of outlets, or a 'store within a store' concept in existing supermarkets. There would then be a distinctive section of the supermarket devoted to the tasty Rural Park products. It may also offer samples of new products and perhaps cooking lessons. This would give the products a whole new appeal, far removed from the image of biological products, for example. Biological products

“The plan for this unorthodox clustering of businesses is contrary to current policy. There are so many obstacles to be overcome.”

Rinus van de Waart

are currently to be found dotted about the shelves between non-biological products which are not only cheaper but often look more attractive.”

As Twan Goossens admits, the plans are very ambitious.

Has any progress been made in their realization? Innovation-Network and the Province of Overijssel have arranged funding for the development of a business plan that can be used to attract investors. According to Goossens, establishing the concept in the marketplace will cost some forty million euros. The key to success will be finding good locations and a retail partner who sees the concept’s potential. “You have to give the process time,” says Goossens.

To date, he has been working with a series of influential partners and businesses that can indeed see the potential of the Rural Park idea. They include the directors (or former directors) of a large supermarket chain, a beef production company, a chain of restaurants and a bank, who have now formed an Advisory Board. “We are now being approached by companies who see the commercial possibilities. We are building a new bridge between the primary producers and the supermarkets.”

The Agricentre Amsterdam

‘The ultimate consequence of the increasing demand for meat’

Amsterdam’s harbour has long been a major landing and loading dock for food, animal feed and raw materials for countless food products. In 2002, the Port Authority decided to design an agropark to be sited to the west of the Africa Dock.

The transport of live animals is always problematic. It is bad for animal welfare, bad for the environment and increases the risk of the spread of animal disease. The plan to construct an agropark in the harbour area of Amsterdam offers a solution to these problems. Pigs will be born here, they will be able to roam with a reasonable degree of freedom here, and they will be slaughtered here. “This is probably the ultimate consequence of the demand for meat which is ‘animal-friendly’ and which poses no threat to human health,” says Frans Evers, the independent chairman of the project group that has adopted the plan. “In fact, there is no alternative. Either you ruin the landscape and environment in the Netherlands, or you leave all production to other countries, whereupon you have absolutely no control. If neither of these options is acceptable, the only remaining way forward is the agropark.” Representatives of business organizations, local authorities, farming federations and financial specialists have been discussing the plans for some time. The process is now nearing the end of the ‘definition phase’ and the outline of the agropark is now clear. The most likely design is a large two-storey building with windows and various indoor and outdoor areas, able to accommodate a large number of pigs. “The building should be such that people think, ‘Wow! You built that just for pigs?’” There should also be a glass tunnel through the building, as in a large aquarium, so that visitors can see how the pigs live but cannot introduce any germs or viruses.”

In the most conservative version of the plan, there will be one hundred thousand pigs in the Amsterdam harbour. This is the minimum required to render the accompanying abattoir profitable and to supply the surrounding urban areas with pork. By including various factories and installations in the immediate area, it will be possible to close certain cycles in

“It has to be done in such a way that other farmers will want to follow. Only then can the business structure of the pig-farming industry really be changed.” Johan Pegge

a commercially viable way. The body heat produced by the pigs, for example, can be combined with the heat from the existing waste incinerator at the location and that from the nearby power station. Together, they will produce enough heat to sustain fish farms or glasshouses for indoor cultivation. A nearby fertilizer factory will be able to make use of the minerals in the pig manure, while a co-fermentation installation can produce energy from the manure and waste from the agropark. The carbon dioxide emitted can also be used in the glasshouses, although there are some complications. “Here we can see how all these various sectors have undergone a development independently of each other,” says Frans Evers. “They cannot be combined just like that – some technical modifications are required.”

An immediate advantage of the dockside location is that waste products can be transported to nearby processing plants by water. Animal feed will also be readily available, being largely the waste products of the neighbouring Cargill factory, which produces semi-manufactures for the foodstuffs industry. The transport requirement will be greatly reduced since the food processing industry is well represented in and around the Amsterdam harbour. Heat and other by-products can be used to support fish-farming.

During the definition phase, various potential partners discussed the processing of the by-products. They included the energy company Nuon, representatives of the food-processing industry, the nearby fertilizer manufacturer and the waste incineration plant. “The knowledge of these parties has helped us to get a very good picture of the chain,” says Frans Evers. “The project can now proceed to the next phase, that of design.” Evers thinks it likely that a non-profit company will now be formed to oversee this phase. “It will probably apply for the necessary permits, and I think that one or more businesses eager to take over the running of the agropark will come forward soon. If it were up to me, I would like to hold talks with one of the large supermarket chains, since we will soon have extremely high quality, home-produced meat. It will be possible to demonstrate that it has been produced

under good conditions, with no environmental impact, with every concern for the animals, and at a reasonable price. A market definitely exists – there can be no doubt about that!”

Footnotes

¹ For further information see www.agrocomplex.nl.

“Agroparks offer opportunities to build a new bridge between the producer and the consumer.” Twan Goossens

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The future of agroparks is by no means certain. It is difficult, if not impossible, to make any predictions. Perhaps the agropark will join the list of seemingly improbable innovations, which have eventually become part of our everyday lives. Perhaps we will eventually come to regard agroparks as nothing out of the ordinary. We may even look back in disbelief on the time when we left such an essential societal undertaking as food production to a disparate array of small farming businesses dotted throughout the country. By the same token, agroparks could become yet another addition to the list of imaginative ideas which eventually come to nothing, simply because the technical, organizational, psychological and cultural barriers prove too high. Only time will tell.



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