



Founding ceremony of the agropark in Nellore, India.

## Agroparks deal with scarcity

**Water, energy, arable land and raw materials are scarce. The spatial clustering of different agricultural activities within agroparks enables us to tackle scarcity issues and contributes to reliable food-supply chains for fresh products. Researcher at Alterra, Peter Smeets, is involved in setting up agroparks worldwide.**

**PETER SMEETS**

The increase in purchasing power among the urban middle classes has caused a revolution in food consumption, in terms of both quality and quantity. The flipside of this process is the marginalisation of rural areas due to depopulation, population ageing and brain drain. Still, these rural areas are largely responsible for the world's food production. A radical innovation of the agrofood system and an increase in sustainable agricultural productivity is necessary – not only to

feed the world but also to minimise the contribution of food production to climate change.

### **Climate problems**

The advantages of large-scale agroparks are obvious: achieving a reduction in the use of water, energy and raw materials, as well as minimising waste, is easier when different forms of agriculture are integrated into one agropark. High-production, industrial agriculture can offer

an important contribution to the solution to current climate problems and related water problems (figure 1, page 18). Agroparks are spatial clusters of multiple food production chains in an industrial set-up, situated close to large cities. The basic principle of agroparks is to minimise the use of fossil fuels and to work with closed cycles: for example, the water cycle and the nutrient cycle. Waste cycles and by-products of one process are converted to be used as the input of another one. Rest

## Agroparks

Agroparks are integrated systems of greenhouse agriculture and/or animal production of meat and dairy products combined with the industrial processing of agro products. Energy production, as well as waste and water management, are integrated within the business model. An agropark delivers products throughout the year as efficiently as possible, independent of season and soil.

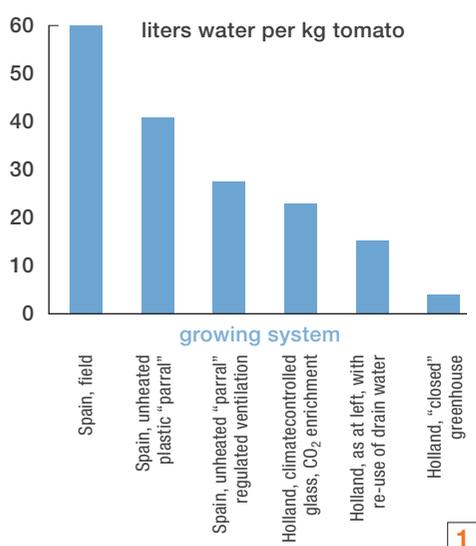


Figure 1. Water-use per kilogram of product is compared in different tomato-production systems, from traditional open-field systems to high-tech systems in closed greenhouses

product goes straight into the digester, to supply energy to the park. By integrating as many production processes as possible, there will be a decrease in transportation, and hence in the use of energy. Despite these benefits, there are many social, political and financial obstacles to overcome. Experience in recent years, however, offers useful lessons. The agropark concept is aimed at sustainable development. It evolves from a 'creative research-by-design' process (co-design), in which knowledge institutes, entrepreneurs, non-governmental and governmental organisations cooperate.

Co-design focuses on the 'hardware' of the agropark, such as buildings and machines, as well as on time-consuming 'software aspects', such as education, training and communication. The more complicated aspects, such as co-operation structures and business development, are also taken into account in the co-creation process.

### Problems to overcome

Our co-design practice in recent years clearly shows that problems concerning business development and cooperation structures are the most complex to

solve. To establish an agropark, we have to convince entrepreneurs of the worth of different value chains in terms of collaborating in the industrial ecology of the park. They have to give up some of their independence in order to benefit from cost reductions. In Nellore, in India, we have learned how helpful the formation of joint ventures of Indian investors and international entrepreneurs is. (Example 1)

Another challenge is to stimulate small farmers to move away from existing subsidy schemes. How can they be convinced to change a lifelong learning attitude in



Figure 2: The founding ceremony of Agropark IFFCO Kesan Nellore on 21 March, 2008. The ceremony was attended by 5,000 farmers. The agropark provides new employment in modern food production and processing.



Figure 3: Agropark IFFCO Kesan Nellore. From bottom to top: residential areas, R&D and training facilities (left) greenhouses (right), processing and livestock production; reserve space and logistic facilities (top left)

## Example 1

Agropark Nellore (figure 2 and 3) in India, covering 1,100 hectares, is designed to serve local as well as export markets. Figure 3 shows a 3D animation of the design. The agropark is an initiative of the Indian Farmers Fertilisers Cooperative, which had the land available in Andhra Pradesh. Its most critical success factor is the formation of joint ventures between Indian investors and international entrepreneurs. They add their operational knowledge to the project by supplying manpower such as technology assistants, trainers and professional coaches. At the same time, this joint venture has to cope with the stifling bureaucracy of the Indian government.



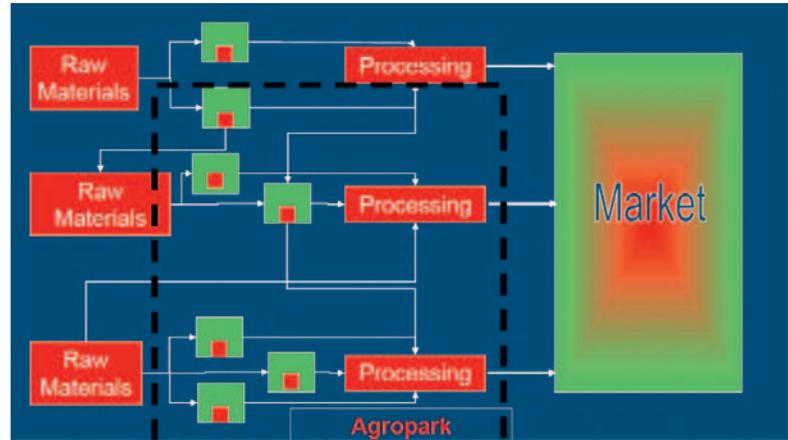
Figure 4: Artist's impression of Greenport Caofeidian in China, with residential areas, service areas and urban function areas in the middle surrounding a large water-storage lake. Greenhouses and closed fish production on the right, livestock production on the left and logistic functions top left and top middle.

## Example 2

Figure 4 shows another example of a greenfield design: Agropark Greenport Caofeidian has been designed as part of the industrial and metropolitan development area in Tangshan City in China, 300 kilometres east of Beijing. The agropark is situated around a new eco-city and a water reservoir. Once implemented, approximately 10,000 employees, can live with their families in the eco-city situated at the heart of it. Greenport Caofeidian is an initiative of the Caofeidian District government, which assigned the whole new industrial area south of Tangshan City. The government is now looking for private parties worldwide who are willing to incorporate the design as a starting point for further development and implementation.

order to become preferred suppliers in a strongly integrated chain? In Nellore, the Indian Farmers Fertilisers Cooperative played an important role in keeping local farmers on board. Farmers were motivated by the prospect of new employment and better prices for their products. The opening ceremony of the MFC was attended by 5,000 farmers. Another big challenge is to determine how best to stimulate governments to allow experiments with innovative processes concerning energy production and waste and water management. These experiments are often not covered by existing legislation, precisely because they are experimental. Example 2 shows how the Chinese government has created possibilities for private investors to invest in an agropark. We also have to find ways in which to

convince environmental pressure groups that industrial high-production agriculture can actually help solve climate-change problems to an even greater extent than the idealised conceptions of agricultural models of days gone by – models that never really existed in the first place. Solutions to this problem became clear during the development of the New Mixed Company, an agropark that is planned near the Floriade site in Venlo. (Example 3). At the same time, the software issue of training and education is, in many cases, the most critical success factor as far as time is concerned. It is possible to speed up the implementation of hardware structures, such as a greenhouse, by adding more resources. This is, however, not the case in the education of the workforce who operates these structures.



Concept Agropark  
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## Example 3

The New Mixed Company is part of the Greenport Venlo. This agropark has a focus on high-production industrial livestock. Its planning process has taken over eight years and has been dominated by heated discussions about the acceptability of industrial livestock production. The Floriade area can also be regarded as part of Greenport Venlo, as can the nearby greenhouse concentration areas and the consolidation centre Freshpark Venlo. Implementation of the New Mixed Company is expected to start in 2013.

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## Not a blueprint

Because each agropark design has to integrate these highly specific elements, it can never be an exact copy of an existing general model. In recent years, a number of agropark co-designs have been developed in growth economies such as China, India, Mexico, South Africa and South Korea. These designs often have the characteristics of jump innovations in a greenfield situation. This is contrary to the situation in the Netherlands, where the implementation of these systems focuses on innovation and modernisation of existing industrialised systems. Each agropark design is tailor-made and needs to address the physical, social and cultural characteristics of the metropolitan area in which it is situated. ●