



The city is hungry

Industrial-scale agriculture is the only way to feed the world's fast-growing megacities, says Alterra. 'Agroparks', with sustainability as a top priority.

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Aguascalientes in Mexico is one of the 20 fastest growing cities in the world. In 2000, this metropolis had 900,000 residents; now it has 1.5 million. Named after nearby hot springs, the city faces problems because the farmland around it is increasingly parched. And the problems do not stop there. Just four hours' drive to the south lies Mexico City, a megacity with 25 million inhabitants, and two hours away to the south-west lies Guadalajara, with 5 million inhabitants. The negative effects of increasing migration from the countryside to the cities are visible. Food production is hampered by the water shortages. 'There is no question of famine, but the city is certainly hungry. Importing food from elsewhere is expensive', says Madeleine van Mansfeld, landscape ecologist at Alterra, part of Wageningen UR. She is helping to develop a large-scale plan for feeding the population of Aguascalientes with sufficient, good quality, sustainable food.

THE EDGE OF THE CITY

The concept Alterra is working on is called a Metropolitan Food Cluster (MFC). It will entail high-tech farming on the edge of the city and a well-organized water supply combined with improved collaboration in the countryside. 'If you encourage small and medium producers located further away from the city to form cooperatives, food chains from the countryside to the city can function better', says Van Mansfeld. MFCs, or agroparks, are large-scale constellations of livestock farms, vast greenhouses full of fruit and vegetables, fish farms and algae farms, where food production and the processing of waste products go hand in hand. An important feature is that the vast amounts of organic waste such as manure, foliage and peels serve as feed for such products as algae, mushrooms or fish. The waste eventually gets processed into biofuel through fermentation, gasification or pyro-

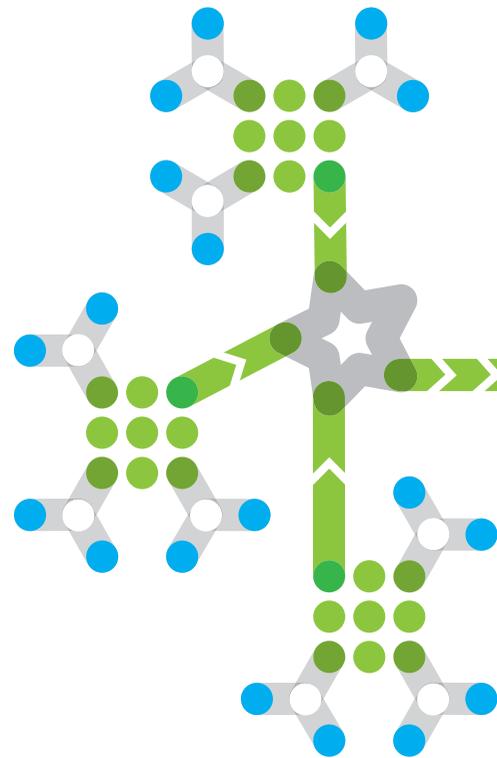
lysis. The electricity and heat generated are then used in the agropark. But, Van Mansfeld points out, an MF is not a readymade product that can go straight from the drawing board in Wageningen to a Mexican city. Alterra sees its role as that of instigator and source of inspiration. The development of the plan will be funded by two Mexican banks and the regional and national governments. In Aguascalientes, six large businesses are collaborating on the plan: a dairy producer, a dairy processor, two chicken farmers and two horticulturalists with plans for a large greenhouse complex.

The MFC will be established on a new location but links will be maintained with established companies.

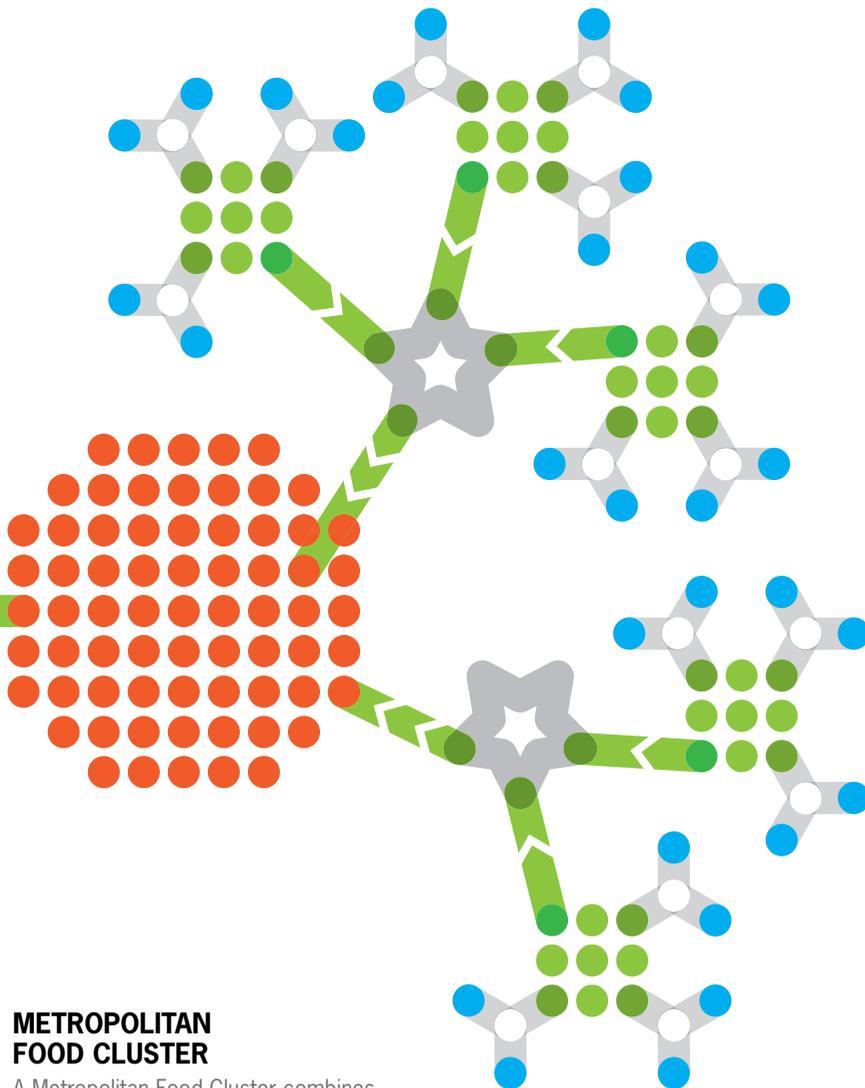
The first step is to persuade farmers to collaborate with the MFC by, for example, delivering agricultural products or processing waste and by-products. 'They either participate directly in the MFC or they organize themselves in separate cooperatives. By collaborating and pooling expertise they can obtain access to better seeds and seedlings as well as new techniques in the field of mechanization and irrigation', explains Van Mansfeld.

RINSING VEGETABLE CRATES

Suppliers and processing companies are welcome at the distribution centre. 'What we have in mind is a business complex where the vegetable crates are rinsed, one company that cleans the milk churns, others that cut the vegetables, and packers that deliver the appropriate packaging for all the farm products', says Van Mansfeld. A manufacturer of farm machinery is also considering moving close to the MFC. Aguascalientes is centrally located between Mexico's major cities and on the transport route to the United States. 'If it takes off, it could supply food not just to Aguascalientes but also to Mexico City, Guadalajara and perhaps even the United States. This is >



‘At present, live animals are the only way of guaranteeing freshness’



METROPOLITAN FOOD CLUSTER

A Metropolitan Food Cluster combines high-tech in agroparks with collaboration with small rural producers.

-  Metropolis
-  Distribution Centre
-  Agropark
-  Collaborating small producers



PHOTO GUY ACKERMAN

MADELEINE VAN MANSFELD,
Landscape Ecologist,
Alterra Wageningen UR

‘Farmers can gain access to better seeds’



PHOTO GUY ACKERMAN

PETER SMEETS,
Project director
Metropolitan Food Clusters
and Agroparks, Alterra
Wageningen UR

‘In modern barns you can do more for animal welfare’



PHOTO GUY ACKERMANS

MARCEL KUIJPERS,
Owner of Kuijpers Kip

'If you stop carting chickens around, the city can get better food'



PHOTO GUY ACKERMANS

HAN WISKERKE,
Professor of Rural Sociology,
Wageningen University, part
of Wageningen UR

'You cannot decide on an MFC in a top-down way'

the ambition of both the government and the entrepreneurs in the city', explains Van Mansfeld.

CHINA, SOUTH KOREA AND INDIA

The Mexico study is not an isolated case. Similar feasibility studies are being carried out near Beijing in China, in South Korea and in India, and there are already concrete plans for MFCs with input from Wageningen UR. For example Beijing wants to produce more food on the outskirts of the city so as to feed its 20 million mouths itself instead of importing food from other parts of the country or even from abroad, at great expense in transport costs.

Wageningen UR and the horticultural association Greenport Holland signed an agreement with Beijing in February on implementing the plans.

It is hardly surprising there is so much interest in the MFC concept. In fast-growing economies a mass migration to the cities is taking place. It is estimated that by 2050, 75 percent of the world's 9 billion people will be city-dwellers. The economic growth of countries such as China, India, Brazil and Indonesia has led to a demand for more and better quality food. The countryside, the traditional home of farming activities, is emptying out, but the radical innovation stimulated by an MFC will prompt the remaining farmers to innovate and thus to keep the MFC running, says Alterra.

It also makes it possible to run agricultural production along sustainable lines, with optimal attention to animal welfare, claims Peter Smeets, project director for Metropolitan Food Clusters and Agroparks at Alterra. 'Not only is an MFC or agropark a way of integrating several agricultural production chains, but it also makes it possible to generate energy in smart ways, to recover resources such as nitrogen and phosphate and to make good use of all the protein in waste products.'

Maximum use of technology leads to opti-

mal efficiency, according to Smeets.

Precision agriculture in which plants and animals receive tailor-made treatment keeps requirements for energy, pesticides, artificial fertilizer and water to a minimum. 'Megabarns such as those we are familiar with from the Netherlands are controversial because they have been located in the wrong places, not because there is anything wrong with them in terms of sustainability', says Smeets. 'In modern barns you can do much more for animal welfare as well as for emissions levels than in conventional barns.' The concept does have to be implemented in one fell swoop; you cannot gradually grow towards large-scale production, in Smeets' view. 'The smallest possible unit at the slaughterhouse determines the size of livestock farms; the limits of the dairy processing plant determine the size of dairy farms', says Smeets.

DEALING WITH BUREAUCRACY

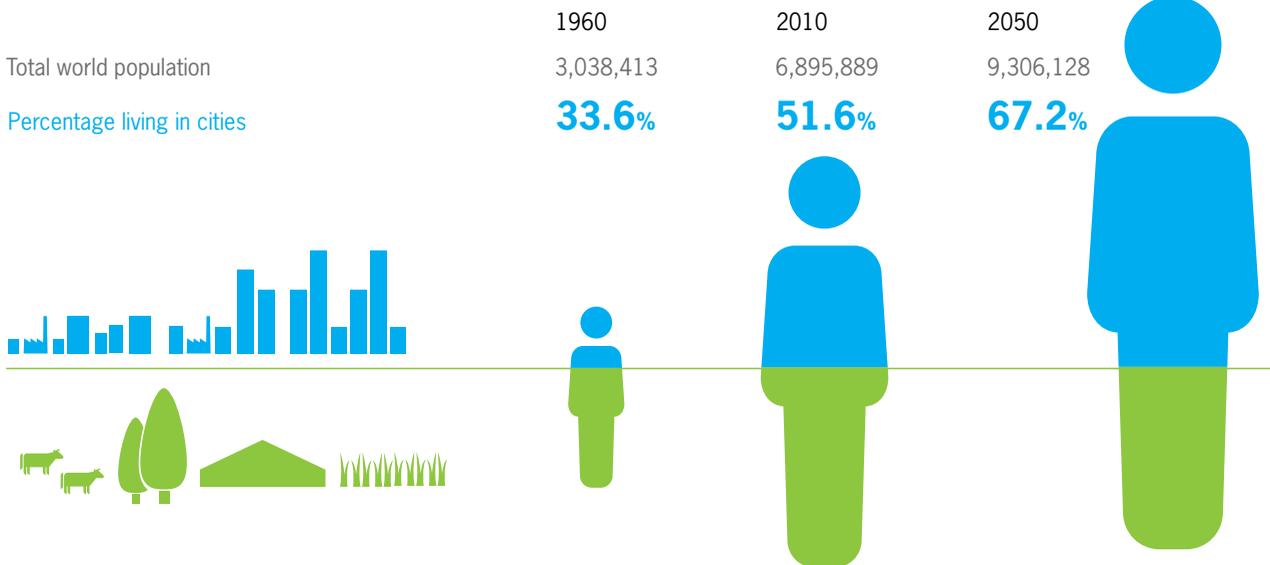
Just like Van Mansfeld, Smeets emphasizes that establishing an MFC is not a matter of working to a western blueprint. Smeets cites the example of India, where legislation prohibits companies from importing more than 150 cows per year. It would not be easy to establish an MFC with 10,000 cows under those conditions. 'The hardware at an MFC is relatively easy to design, but the software and orgware are a lot trickier', says Smeets. The orgware – the organizational capacity-building work of reflecting on networks among chain players, forging coalitions and dealing with the often massive bureaucracy – is much more complicated than building the MFC itself.

The software, the organization of training and education and the R&D, all come in for attention from the Wageningen researchers too. Where formerly farmers tied 20 chickens to their mopeds and brought them to market, now truck drivers need to be trained in managing cooling systems. At the same time, MFCs need to be >

'Large scale can make you vulnerable too'

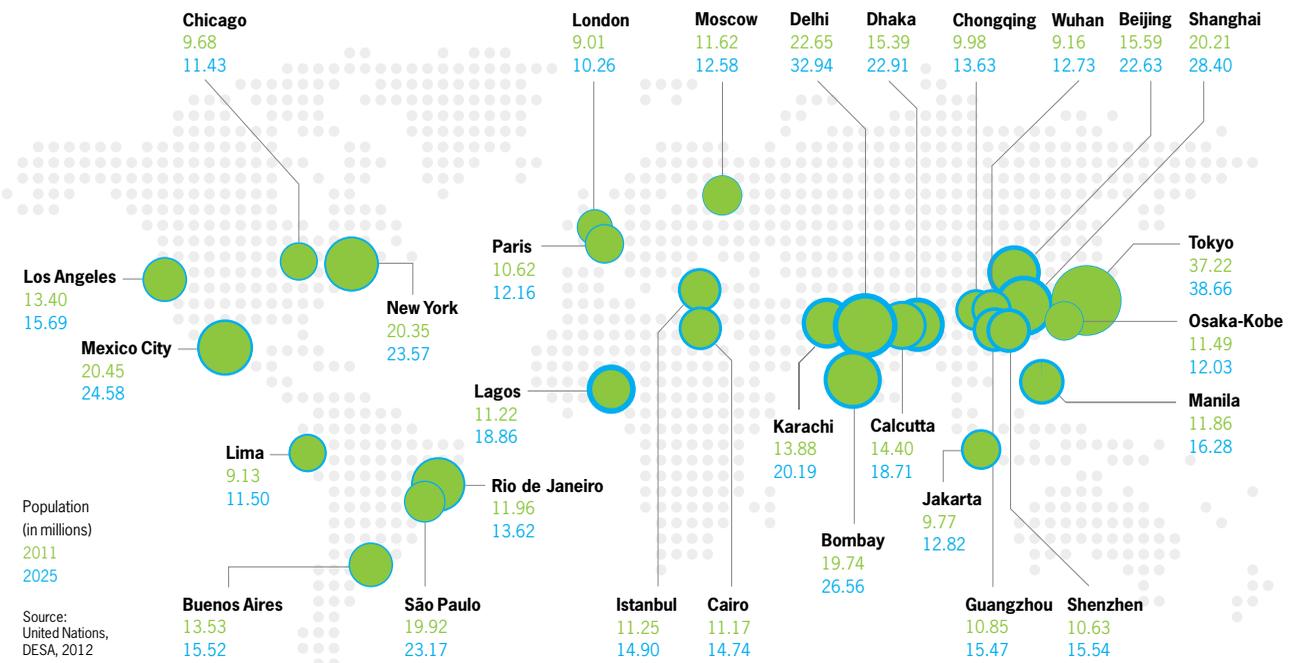
URBANIZATION

The worldwide shift to the cities

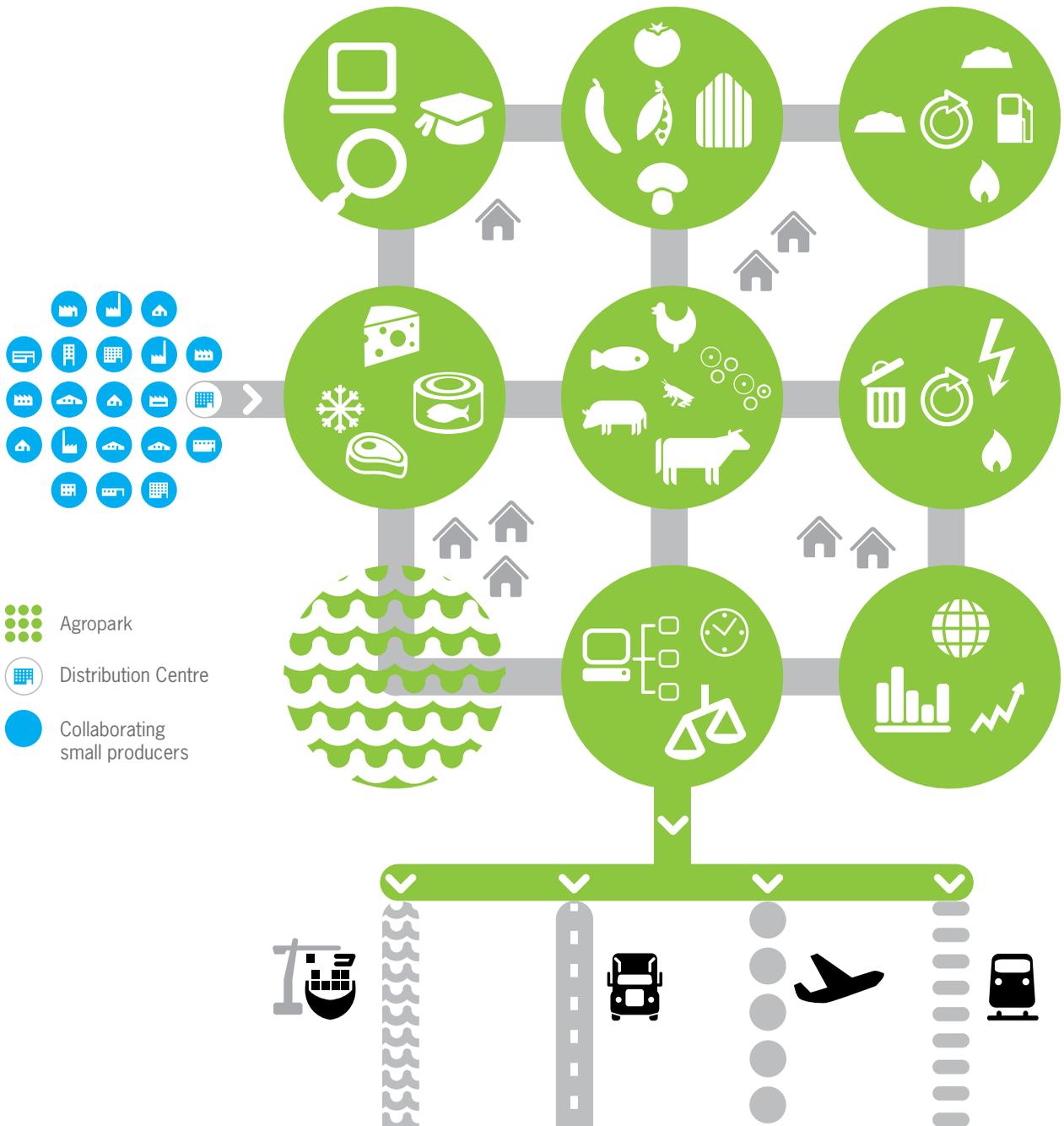


MEGACITIES

Urbanization in megacities with at least 10 million inhabitants expected in 2025



'We could achieve the most by stopping transporting animals'



AGROPARKS

Agroparks are large-scale conglomerates of food production and waste processing companies in combination with providers of services such as R&D, education, trade and logistical facilities, park management and buildings. Food, feeds and raw materials are produced by livestock companies, in greenhouses, on fish farms and in algae nurseries. Raw materials are processed on the spot into, for example, dairy products, preserves or chilled meats.

Organic waste is used as feed for algae or fish, or as horticultural fertilizer. Remaining residues are used to generate electricity and heat for the agropark, through fermentation, gasification or pyrolysis. Suppliers and processors are concentrated at a distribution centre. These include companies that rinse the vegetable crates, haulage companies and suppliers of agricultural machinery and of packaging material for farm products.

as compatible as possible with the farming culture in the country concerned.

To this end, Smeets and Van Mansfeld organize regular excursions to put young, enterprising people from Mexico, India and China in touch with Dutch experts. One such expert is Marcel Kuijpers, owner of Kuijpers Kip chicken company in the Dutch province of Brabant. Kuijpers regularly welcomes students from home and abroad and shares his knowledge about poultry farming with them. 'I don't really see the concept of an MFC as an exercise in upscaling', says Kuijpers. 'In our company we are actually trying to scale down by shortening chains, in transport for example. We could achieve the most in terms of sustainability, animal welfare and above all in the quality of the meat in the chicken industry, by stopping transporting the animals. This also saves a lot of money, energy and time and makes the meat more traceable.'

BUILDING A SLAUGHTERHOUSE

In order to cut back further on transport, Kuijpers wants to build his own slaughterhouse right next door to his chicken barn in Horst aan de Maas. He calculated that the smallest viable slaughtering unit would be one for 4000 chickens per hour or 32,000 per day. A standard slaughterhouse is much bigger than that, processing 400,000 chickens per day.

Kuijpers thinks that under the right condi-

tions, a similar concept would be viable in countries such as China, India and Mexico. With meat consumption in these countries increasing at a rapid rate, the logistics in the chain have got to be better organized. 'At present, bringing live animals to the market is the only way of guaranteeing freshness. They are often slaughtered on the street, which is unhygienic when the turnover increases', says Kuijpers. 'If you stop carting live chickens around and farm them, slaughter them and store them closer to the city, it can be supplied with better quality food.'

Kuijpers' company in Horst aan de Maas is set to grow into a sort of mini-MFC. Feed will be grown at the location or shipped in; waste products such as manure will be used in horticulture and on fish farms or will be fermented to make biogas. Two pig farms and a technical company in Horst aan de Maas are collaborating as well. 'The long-term aim is to have more companies linking up with us.'

EUROPEAN CITIES

Han Wiskerke, professor of Rural Sociology at Wageningen University, part of Wageningen UR, is doing research on the food supply for European cities. He received a 4.5 million euro EU grant for this research in March. He believes that when you develop MFCs you must take a good look at the situation in the region. 'Sometimes an MFC

provides the answer, but not necessarily always. In countries in the sub-Saharan region 70 to 80 percent of the population still depend on agriculture for their livelihood. It seems to me that you cannot concentrate all that production in an MFC and you certainly cannot make the decision to do so in a top-down manner.'

Doctoral research in Dar-es-Salaam, the fast-growing capital of Tanzania, has demonstrated that the main bottleneck for a good food supply is inadequate infrastructure, explains Wiskerke. 'The largely small-scale agriculture on the outskirts of the city could be more efficient, of course, but the system of production in small units and sale in small shops or street stalls functions reasonably well and makes food accessible to poor people. Improving the roads would work wonders, though.'

In principle, Wiskerke has no objections to large-scale agriculture such as an MFC. 'But I do have some reservations. Large-scale farming can be vulnerable as well: there is the danger of an epidemic or a disease that can cripple the entire production at a blow. And market forces could at any point make it more lucrative for the entrepreneurs at an MFC to export their products elsewhere. Then the local city would suddenly have its food supply cut off.' ■

www.metropolitanfoodclusters.wur.nl
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