

The background of the entire page is a dark, textured grey. Scattered throughout are numerous white ceramic dishes, including plates, bowls, and a spoon, as if they are falling or floating in a chaotic manner. The dishes are rendered with soft shadows and highlights, giving them a three-dimensional appearance. Some are stacked, while others are single pieces. The overall effect is one of abundance and perhaps a sense of disorder or overwhelming quantity.

PRODUCING FOOD FOR A GROWING WORLD POPULATION

Nine billion people to feed

At the opening of this academic year, board chair Aalt Dijkhuizen made a plea for a doubling of global food production. The ensuing debate was shot through with strong emotions. Now, a number of scientists explain their views on the issue.

TEXT RENÉ DIDDE ILLUSTRATION RHONALD BLOMMESTIJN AND JENNY VAN DRIEL



‘An ox pulling a plough looks nice but is not remotely sustainable’

At the opening of the academic year in September, Aalt Dijkhuizen, chairman of the executive board of Wageningen UR, stated that food production will need to increase in order to feed the growing global population. ‘There will be nine billion people on the planet in 2050, two billion more than now,’ said Dijkhuizen, ‘and all those people will be consuming more meat and dairy products, especially in fast-growing economies like China and India.’ Food production will therefore have to double in volume, argued Dijkhuizen. ‘Doubling production while satisfying the precondition that you minimize the environmental impact is only possible with intensive farming, as efficiency means fewer emissions, fewer natural resources and fewer chemical agents,’ said Dijkhuizen. The Netherlands is the perfect example. ‘We are the Usain Bolt of the food sector.’ Dijkhuizen also expressed his views in an

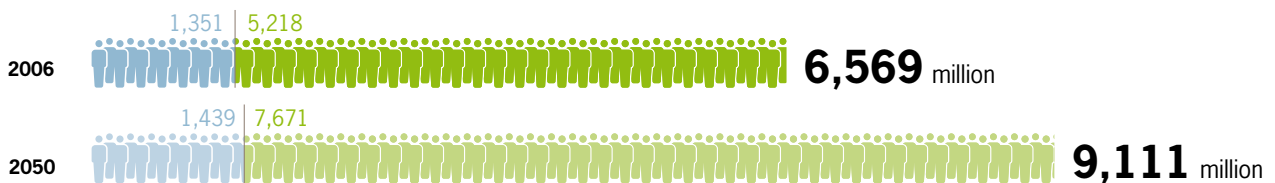
interview with Dutch national newspaper Trouw, and they were picked up on by television news and the rest of the press. There followed a flurry of letters to the press, some supporting and others critical of his stand. His plea was felt as an attack on the organic, small-scale farming that is all about more responsible production and consumption. In the main Dutch TV news, this viewpoint was represented by a farmer’s wife who stood cheerfully clapping her hands in a field full of cows. ‘We simply have to eat a bit less meat,’ she said. In retrospect, Dijkhuizen is somewhat astonished at the ideas ascribed to him. ‘I was amazed by the way what I said was changed, widened in scope and added to. For example, that agriculture in the Netherlands should become even more intensive, that I didn’t think animal welfare was important, or that I don’t give any priority to combating waste in supermarkets or households. I neither said nor meant any of that,’ says

the board chair. But he does believe that production per hectare and per animal must go up all over the world. To this end, the various agricultural systems around the world are all shifting in the direction of the Dutch-style system. ‘Both land and resources are getting scarcer, so people all over the world will have to raise their productivity and efficiency – just like in the Netherlands – in order to keep on feeding all those mouths. And that is good for the environment and climate at the same time – because per kilo of product you need less land and resources, and you generate fewer emissions and greenhouse gases – and you can definitely combine it with improving animal welfare.’

NOT A GREAT LIFE

Because have those twelve hens bound by the feet and transported live on a scooter to the market in Indonesia really had such a great life? ‘Of course that’s not a great life, any more than it is for the cows in India and

GROWING DEMAND FOR FOOD



World population in 2006 and 2050

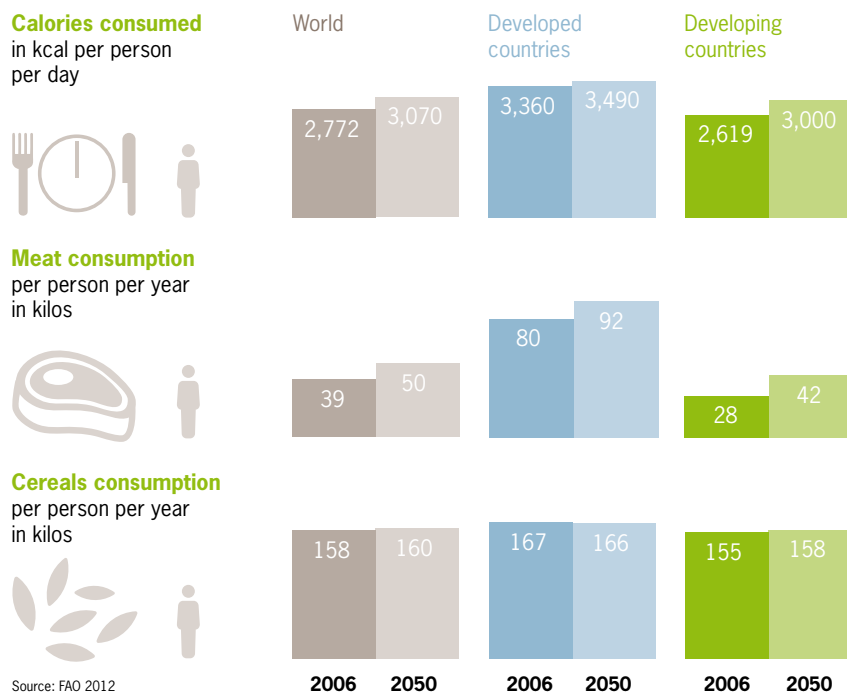
Developed countries Developing countries



Food consumption world population in 2006 and 2050, per day

Source: FAO 2012

INCREASE IN CONSUMPTION



parts of Africa that are fed only on straw, ending up malnourished thanks to a protein deficiency,' says Theun Vellinga, a researcher at Wageningen UR Livestock Research in Lelystad.

Simple improvements in the feed for cows in Africa, Asia and Latin America can raise milk and meat production levels and improve public health, says Vellinga. 'In many places this would enable milk production to increase by a factor of four, sometimes from a mere 250 litres per cow per year to 1000 litres, sometimes from 1000 litres to 4000 litres,' explains Vellinga. 'I am convinced that this would give you the doubling in milk production by 2050 that Dijkhuizen wants to see.'

In other words, intensification and more efficient production are compatible with improvements in animal welfare. And these advances in efficiency do not require any Dutch-style mega-barns or cubicles. 'This is possible within the existing agricultural system. The key is sustainable intensification. The main thing developing countries can learn from the Netherlands is how we made huge improvements after the Second World War with our triad of research, extension and education. But when it comes to technology they should find solutions that suit their own countries,' thinks Vellinga. 'Those countries shouldn't try and imitate our excessive system of 10,000 litres per cow.' Vellinga thinks the reason Dijkhuizen's re-

marks caused so much commotion may be that he overturned the romantic image of sustainability and organic farming. 'An ox pulling a plough looks nice but is not remotely sustainable. Farming in Africa is often pure overcropping because the manure from the animals doesn't go back onto the land; it is burnt as fuel for cooking, for example. So the nutrients and carbon are being taken from the soil and not being replaced,' explains Vellinga. 'Until the 1960s, Dutch cows spent large parts of the year outdoors, even when it was boiling hot, or they were tied up in a barn. Now they are much more likely to be able to decide for themselves whether they stay indoors or outdoors.' >



Aalt Dijkhuizen, chairman of Wageningen UR executive board



Teun Vellinga, researcher at Livestock Research Wageningen UR

‘We need agricultural systems that can manage the decathlon’

Yet Wijnand Sukkel, a researcher of agricultural systems at Applied Plant Research, part of Wageningen UR, does think that the debate sparked off by Dijkhuizen has created a caricature of organic farming. ‘I like Dijkhuizen’s description of Dutch intensive farming as a Usain Bolt,’ he said in Resource. ‘A sprint of 100, perhaps 200 metres – record speeds but only for a few seconds. But what we need is agricultural systems that can manage the decathlon with ease,’ says Sukkel.

‘In addition to the technical aspects of food production,’ he emphasizes, ‘there are also ethical aspects such as animal welfare, socio-economic factors, culture and nature. Sustainability is symbolized by an athlete’s



Wijnand Sukkel, farming systems researcher at PPO, part of Wageningen UR



Han Wiskerke, professor of Rural Sociology at Wageningen University

stamina, because we will still need good agricultural land in 50 years’ time.’ And that is precisely what concerns Sukkel. ‘Far more than extensive systems, the current large-scale intensive farming system is leading to frightening degeneration in the soil quality of farmland all around the world, mainly due to erosion and the deterioration of organic compounds.’ Furthermore, says Sukkel, the global animal feed trade – especially in soya – means that here in the Netherlands we have been landed with an enormous surplus of nutrients in the form of a manure problem while other parts of the world have a shortage. ‘If he had said that farming around the world, including the Netherlands, needs a more knowledge-intensive agro-ecological approach, he would have had me on his side,’ says Sukkel. Our food production systems will need to become more stable and resilient, says Sukkel. ‘We need to shake off the strict segregation between agriculture and nature. Farming needs to make better use of the diversity in production crops. We need to move towards productive agro-ecological farming rather than intensive farming. Organic farming is ahead of the current conventional intensive farming in this regard. But organic farming could in turn make better use of the latest technological expertise.’

HUNGRY FOR MEAT

Dijkhuizen also warned of the additional demand from the fast-growing economies of China and India. They will almost automatically shift to a more meat-dominated diet. That is inevitable and a cause for concern, according to Dijkhuizen. ‘In broad terms that’s right, but there are big differences between countries,’ argues Han Wiskerke, professor of Rural Sociology at Wageningen University, part of Wageningen UR. ‘The differences between China and India are huge. In 1960 both countries were consuming 3.5 kilograms of

meat per person per year. The figure now is 5.5 kilograms in India but 55 in China. It’s not likely that meat consumption in India will grow to western levels of 80 to 120 kilos a year in just over 35 years.’

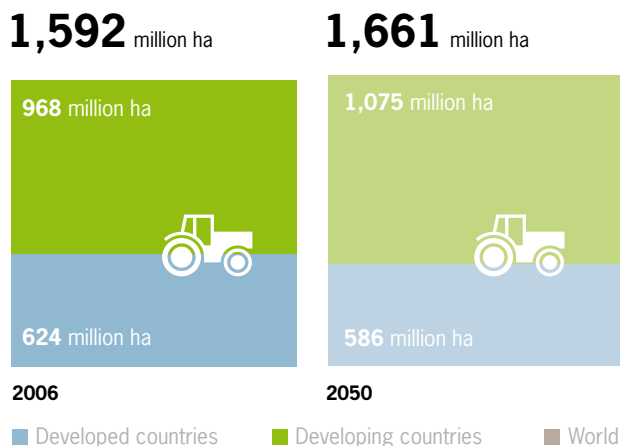
Besides, there are other trends. ‘We are seeing meat consumption in Europe and the United States levelling off or even falling. If people also learn more about the disastrous effects of obesity in children and this leads to a change in dietary habits, the global demand for food in 2050 may not require a doubling in current production levels at all,’ argues Wiskerke.

SUBSTANTIAL SAVINGS

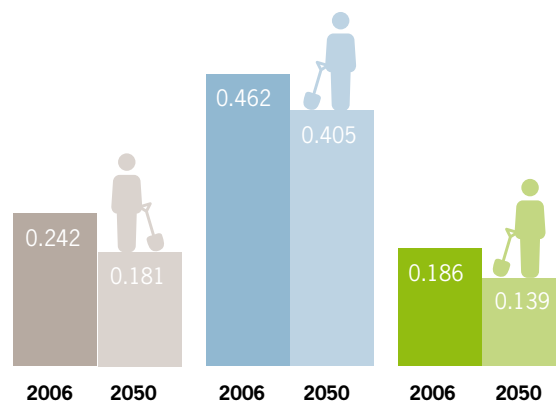
Like Vellinga and Sukkel, Wiskerke too thinks there is plenty of room for improvement in existing agricultural systems all around the world. And substantial savings are possible as well. ‘About 30 percent of food bought in the United States and Europe is thrown away while in Tanzania a lot of food doesn’t reach the cities because of the poor infrastructure,’ says the sociologist. Studies there show that small-scale poultry farmers are perfectly able to supply most of the inhabitants of the fast-growing city of Dar es Salaam with eggs. ‘Farmers with about a hundred free-range hens on the outskirts of the city cycle into the centre three times a week. They slalom past the traffic queues and supply the corner shops where the poor can buy a single egg if necessary rather than the standard boxes of six in the supermarket. That system works like a dream; the farmers earn more than a teacher. And guess what the farmers are asking for? Better cycle paths! That will reduce their losses. Fewer eggs will break because the farmers won’t have to cycle along the bumpy verge when delivering their produce.’ So not intensification at all, just small-scale, local improvements. That is why Wiskerke does not agree with the impres- ➤

INCREASE IN FOOD PRODUCTION

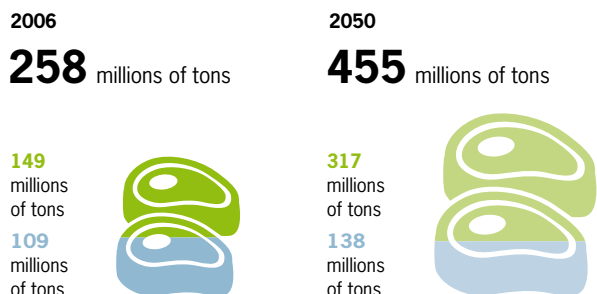
Total farmland in use



Farmland in use per person in hectares



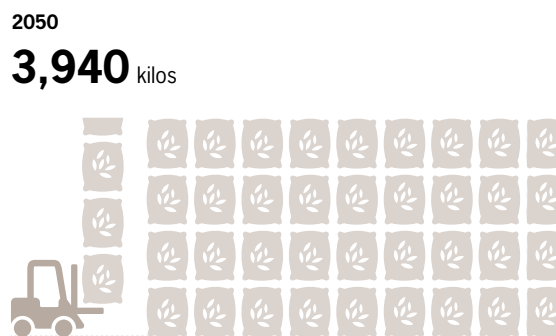
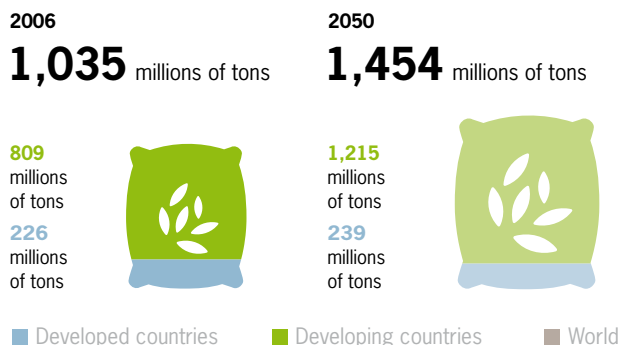
Global meat production



Grain yield per hectare, average global harvests



Global grain production for consumption



Source: FAO 2012

sion given by Aalt Dijkhuizen that hunger or global food shortages are a production issue. ‘That’s simply not the case. Hunger is mainly related to affordability and the availability of and access to food. So hunger is a question of poverty and distribution. You don’t solve the problem by doubling the production, and especially not by adopting Dutch-style farming practices. The challenge is to deliver tailored solutions everywhere and implement genuine sustainability, for example by becoming less dependent on oil and other increasingly scarce resources. Unfortunately, intensive



Martin van Ittersum, professor of Plant Production Systems at Wageningen University

farming in the Netherlands is very far from being a shining example to the rest of the world in that regard.’

SIXTY PERCENT MORE

Martin van Ittersum, professor of Plant Production Systems at Wageningen University, cannot say exactly how much more food we need to produce to feed an extra two billion people. ‘Nobody knows,’ he says. Apart from the expected increase in meat consumption, it also depends on the volumes of biomass and agricultural products we will be producing as raw materials for a bio-based economy. ‘Let’s stick with the FAO estimate for now. It is assuming a 60 percent increase, so 1.6 times the current production rather than twice as much,’ says Van Ittersum. But that is no foregone conclusion either. ‘There is most definitely a need for intensification and increasing yields, and let’s not forget reductions in post-harvest losses in many parts of the former Soviet Union, Asia and Africa. That means improvements to infrastructure, packaging and cold storage. In the West, and in America in particular, we should throw away less food marked as ‘past its sell-by date’ in supermar-

kets and uneaten food in fridges. When all those losses are added together, 30 percent of agricultural production is squandered. ‘We could perhaps halve that figure.’

However, the major advances need to come from narrowing the gap between actual yields and the theoretical yields. ‘That gap can be closed by better management of nutrients, water and crop protection products and by the use in some cases of modern genetic techniques,’ says Van Ittersum.

SIMPLE MODIFICATIONS

Van Ittersum expects that some places will see the development of highly intensive farming along Dutch lines. But in other places, such as many African countries, traditional farming will be able to improve through simple technical modifications, schooling and development of the markets, says Van Ittersum. ‘Incidentally, Dutch farming over the past twenty years has consistently shown that it can become slightly more productive while simultaneously reducing the environmental impact. For instance, volumes of phosphate fertilizer have fallen in Western Europe since 1980 without this having an adverse effect on yields. This has been made

USE OF GRAIN FOR BIOFUELS

Global use in 2006 and 2050, in weight and in percentage of total grain production

2006
65 million tons
3.2%



2050
182 million tons
6.1%



Source: FAO 2012

‘There is no single
universal solution’

WWF: ‘THE MORE INTENSIVE FARMING IS, THE BETTER’

‘If you have to choose between a tree and enough food for your child, the tree will always lose out,’ says Jason Clay, vice president for market transformation at the World Wildlife Fund (WWF) in the United States. He regularly meets with senior executives at multinationals to persuade them to give biodiversity a bigger role in their supply chains.

His claim: the more intensive farming becomes, the more nature and biodiversity will be left in 2050. That is why the WWF is supporting Aalt Dijkhuizen’s plea. According to Clay, we need to produce

just as much food in the next 40 years as we did in the last 8000 years. ‘That means doubling production. If nothing else changes, we will then need 70 percent of the earth’s land area for farming rather than 35 percent.’

Isn’t a plea for more intensive farming rather strange coming from a nature organization?

‘Business as usual isn’t enough anymore. Forty countries are currently using land in national parks for farming activities; they are sacrificing nature conservation.

In other words, the productivity per unit of land will need to increase dramatically while at the same time waste production and the burden on the environment will need to fall. We will also need to improve degraded soils and unproductive land. What is more, I’m convinced that modern genetic technology could help get better yields from local and regional crops in Africa and South-East Asia.’

Is the Dutch farming system the way to go?

‘None of the systems are functioning now in the way they will need to in 2050. We will need to produce twice as many calories with half the volume of water, half as much pesticides and half as much fertilizer. To achieve that, we need to develop new knowledge and improve its application. Wageningen is among the world leaders in that area and is unique in its global perspective.

‘The information gained in practical applications then needs to spread more quickly. In this information age it is unacceptable to have great ideas taking eight years to put down roots. That should be possible in two to four years. We have no time to lose.’



Jason Clay.

possible by using the phosphate accumulated in the soil.’ And so previous mismanagement is turned into a benefit.

Van Ittersum thinks there is no point polarizing things, with organic farming on one side and conventional farming on the other. ‘They are both necessary, they can learn from one another and converge to a certain degree. As Wageningen, we need to make sure others have access to our technical expertise in farming and our knowledge of markets and organizations, such as cooperatives.

That knowledge should be applied around the world in a form tailored to local requirements. There is no single universal solution.’

Dijkhuizen agrees on this point. ‘Every region will have to go about it in its own way. Different measures will be needed in the Ukraine than in Brazil or China. I think it is a pity my words have been interpreted so one-sidedly but I am happy that the issue of the global food supply is well and truly on the agenda again.’ ■

For further information see the internet dossier at www.wageningenUR.nl/hoefvoeden-we-g-miljard-mensen

Data source: World agriculture towards 2030/2050: the 2012 revision. FAO.