



PROTEIN TRANSITION

**The planet is too small
for a meat-rich diet**



One quarter of the world's children suffer stunted growth due to protein-related deficiencies. Meanwhile, in the West we eat more animal protein than is good for the environment or our health. But it is misguided to believe that there is one paramount solution to this problem. 'We need to foster several lines of development in parallel.'

GLOBAL MEAT CONSUMPTION

The FAO predicts a doubling in global meat consumption by 2050. 70 per cent of agricultural land worldwide is currently used for livestock, more than half of it for growing livestock feed.



There is an almost linear link between a growing gross domestic product and consumption of animal protein,' says Stacy Pyett, Proteins for Life programme manager at Wageningen Food & Biobased Research. 'China is a clear example of that, with meat consumption having risen by a factor of 13 in the past few decades. Emerging economies are following in our footsteps, whereas you would really rather not export our worst habit – the Western diet.'

of the shopping list. In the West there is a growing realization of the problems caused by overconsumption of animal protein, and yet at the same time that pattern is spreading around the globe.

The problem is that overconsumption of meat contributes to environmental problems and health risks. According to Dutch online guide to sustainable living MilieuCentraal, 40 per cent of the country's climate footprint from its diet can be traced to Dutch meat consumption. Today's meth-

The proportions ought to be the other way round. Twenty kilos of plant material are needed to make one kilo of beef. If people eat more plant foods themselves, rather than via animals, the protein production system will automatically become more efficient and healthy.

Seventy per cent of farmland worldwide is currently used for livestock farming, not just for barns and pasture but above all for growing livestock feed. About 40 per cent of agricultural land is used to produce feed. The growing demand for animal protein and the expansion in livestock farming is therefore responsible for the destruction of forests and natural grasslands. Add a growth in population of at least two billion more people by 2050, and it is obvious that the planet is too small for a mainly animal-protein diet. If livestock farms were to feed their stock exclusively on waste flows from the food-processing industry and on biomass that humans do not eat, such as grass, hay and straw, you would produce animal protein much more sustainably, says Pyett. Wageningen researchers Hannah van Zanten and Imke de Boer have done some calculations on this. They concluded that a circular production system of this kind could provide 28 grams of animal protein per person per day. Pyett: 'That is the most sustainable scenario, even more sustainable than a world in which everyone eats vegan.' But it's no good just declaring that everyone should eat less animal protein, says Pyett.

'A tin of chickpeas is the perfect solution'

In a recent World Bank white paper on meat consumption, several graphs illustrate that meat consumption in China is growing particularly fast, and that the rest of Asia, South America and Africa have been rapidly catching up since 2000. The UN Food and Agriculture Organization FAO predicts a doubling in global meat consumption by 2050. The world population will be hovering around the 9.5 billion mark by then, and a fast-growing middle class will have a lot more money to spend. And meat, eggs and dairy products will consistently be at the top

ods of livestock farming cause methane and carbon dioxide emissions as well as producing an excess of nitrate- and phosphate-rich manure. Worldwide, a change to a healthy diet based on less meat and more fruit and vegetables would prevent 5.1 million deaths caused by chronic diseases by 2050. Meat consumption in the Netherlands has gradually doubled since the 1950s to nearly 40 kilos per person per year. And that is 30 per cent too high, says Pyett. Sixty per cent of the protein we eat nowadays comes from animals, and 40 per cent comes from plants.

‘Globally, distribution is unequal. Around the world, 23 per cent of young children suffer from stunted growth due to a deficiency of essential amino acids from proteins. If you already get enough animal protein, as we do in the west, to eat even more protein is unhealthy, but if you have deficiencies, extra protein from meat or milk is exactly what you need.’

These are all reasons to change the production, consumption and availability of proteins. This is the idea behind the decision to make the research theme of Protein Transition a priority in the strategic plan of Wageningen University & Research, including additional financing over the coming four years.

MORE EXPERTISE

‘Protein transition is highly complex. That makes it a suitable topic for us as a research institute to further develop our expertise on,’ thinks Pyett. ‘We can tackle it from almost every angle, from nutrition science to agricultural and production technology, and consumer behaviour.’

Wageningen researchers can submit project proposals on various topics on which they have already been working for some time. Projects, for example, that stimulate the use of local waste flows instead of imported soya to feed animals, tying in with ideas about circular agriculture. Extra funding particularly enables different disciplines to collaborate in new projects. ‘For example, we link up hardcore technologists who work on proteins from algae with social scientists and philosophers who seek to understand how consumers and society are likely to react to a new food product containing algae,’ says Pyett, who formerly worked as a chemical technologist on milk proteins at the dairy company Campina, but who now organizes research projects as leader of the Protein Transition theme.

Protein science and research on meat substitutes have been a focus of interest in Wageningen for years now. Entomologists and food scientists see grasshoppers, mealworms and various insect larvae as an environmentally friendly source of protein for pig feed and for human consumption, especially if the insects are bred on waste that we currently compost or incinerate. Food technologists have developed prototypes of meat cuts based on legumes but with the structure of beefsteak. Research is also underway on whether it is possible to grow edible protein using water, sunlight and microscopic algae, and consumer scientists are looking at how people behave when they have the option of a meat substitute. The difficult thing about such diverse research is that you don’t know in advance which innovation will be successful. Pyett: ‘You can’t select the winners beforehand, so you have to foster several different lines of development side by side, from mealworms to meat substitutes.’ According to Pyett, it is actually misguided to believe in one paramount solution to the problem. She predicts that food production and consumption will become more varied in future. At the moment, 70 per cent of our food is based on just five animal and 15 plant species, says Pyett. That is quite an odd situation, given how much variation there is in biodiversity and geography around the world. The agricultural potential of a landlocked African country with low rainfall is quite different to that of the Netherlands. ‘There is no reason to plant protein-rich soya everywhere. We can grow a much wider variety of food crops.’

JUICY BURGER

The simplest solution for the west would seem to be to buy less meat and serve more fruit and vegetables. Pyett: ‘The ideal plant-based protein sources are indeed available. If you open a tin of chickpeas or lentils for your dinner this evening, you’ve got the per-



PHOTO GUY ACKERMANS

STACY PYETT

Proteins for Life programme manager

fect solution in your hands. Not all changes have to be high-tech. At the same time, we know that many people do not see pulses as the basis of a tasty evening meal. A lot of people want a steak or a juicy burger. I think you have to come up with a whole collection of solutions in order to cater to those consumers as well – using meat substitutes, for instance. So we need both high-tech and low-tech options.’

It would be easy to believe that the transition to a diet with less meat is going swimmingly in the Netherlands. The press and the TV are giving a lot of coverage to vegetarianism, veganism and flexitarians. Restaurants are starting to offer more meat-free options and even Allerhande, supermarket chain Albert Heijn’s magazine, offers tips for a more veggie-based Christmas dinner. So it looks as though we are doing well, but that is not reflected in the meat statistics. Production and sales have remained virtually stable for the past 30 years, and even in the last 10 years there is no sign of a change in that trend. ‘That discrepancy is getting bigger and bigger because attention for meat substitutes is increasingly prominent,’ says consumer sociologist Hans Dagevos, who works at Wageningen Economic Research in The >



EMELY DE VET

Professor of Consumption and Healthy Lifestyles

Hague. 'All the signals in the media and in the market give you the impression something really is going to change now. We have no good explanation for this.'

It is possible that the group of trendsetters and innovators is relatively small compared with the mass of consumers who buy cheap meat on special offer, Dagevos thinks. 'The broad group in the middle still eat what they have always eaten. Those people are not visible in the media, nor do they have a voice. So as a researcher, you should not let your perspective be warped by vegetarian menus in restaurants or hip vegan trends. It is not the case that the whole world is moving in the same direction.'

CONSUMER CULTURE

In the 1950s, meat was still a luxury item in the Netherlands, whereas nowadays it is within reach on a daily basis for almost everyone. But for many people elsewhere, meat is an enviable symbol of prosperity. The fact that people see meat this way all around the world is an expression of a certain consumer culture, says Dagevos. 'If a large hamburger is the way to show you are successful in life, then that determines how the market develops in Kenya and China as well.'

According to Dagevos, our social norms and ideals around meat are an export product in themselves. 'We're seeing a massive explosion in meat consumption and the sale of convenience food worldwide. We in the western world have helped make that happen technologically and culturally. There is every reason to give this a bit more thought, and if you ask me, not enough of that is going on. We often talk in terms of knowledge and technology. And it is certainly important to solve things technically, but we must also look at the kind of mentality and symbolism we pass on with the technology. What is the collateral damage of our consumer culture? We really do export more than just food.' Dagevos hopes that non-western countries

will not go as far down the meat-eating road as the west did. One thing he thinks you could try to encourage is an earlier switch to plant-based meat substitutes, rather like the way telecom in parts of Africa skipped the phase involving land lines to go straight to mobile phones. 'To make a success of that jump, meat and dairy substitutes must be excellent quality and affordable, and carry the right image and cultural value. That combination of technology, economic viability and cultural associations is incredibly complicated.'

HURRYING UP

It is obvious how hard it is to cut down on meat or replace it with substitutes from the difficulty of changing eating habits in the Netherlands. And this is in spite of numerous advisory bodies emphasizing the urgency of change. In 2018, the Dutch Council for the Environment and Infrastructure appealed for fast action. It said that by 2030,

'Radical change is not necessary. You don't have to ban meat'

the Dutch diet should be in line with the government's new dietary guidelines, with much more protein coming from plant sources and less meat – a maximum of 70 grams per person per day, half a kilo per week, or 26 kilos per year. Dagevos: 'Now we eat an average of 38 kilos per person per year. So we need to cut down by 12 kilos and we have 12 years in which to achieve that goal. There is work to be done.'



HANS DAGEVOS

Sociologist of consumption



Changing our diet will inevitably have an impact on the livestock sector and meat processing industry. So, besides introducing new products, the government needs to shrink the existing sectors in a controlled fashion, says Dagevos. ‘You can’t reduce meat consumption without paying attention to the production side. Sectors and activities will be lost.’

The meat industry is already thinking about this and taking action, says Dagevos. Various meat processing companies at home and abroad are targeting the development of plant-based meat alternatives. ‘As well as that, government could make more strenuous efforts to push people in the right direction. It can help just to run a traditional publicity campaign that simply explains clearly that half a kilo of meat per week is enough. Not many people realize this, but on half a kilo a week, you are already eating 2030-style. Radical change is not necessary. You don’t have to ban meat.’

If you want to tempt consumers, it’s important to understand what drives our eating habits, says Emely de Vet, professor of Consumption and Healthy Lifestyles. Eating behaviour is largely unconscious and routine, she points out. ‘Our preferences are the product of our habits, culture and upbringing. At the same time, your eating habits show who you are, and which group you belong to. And what is available in the supermarket and catering outlets also determines the choices you have. Because so many factors influence eating behaviour, only a limited effect can be achieved by informing and persuading consumers.’

CREATURES OF HABIT

Also, people are creatures of habit and there is little point in preaching revolution or radically banning products. ‘Small adjustments are much simpler to introduce than major changes of diet. A few more vegetables and

PROTEIN CONSUMPTION IN THE NETHERLANDS

60 per cent of the protein consumed in the Netherlands today comes from animals, 40 per cent from plants. It should really be the other way round. The Dutch eat 38 kilos of meat per person per year. 26 kilos, or half a kilo per week, would be enough.

a bit less meat might not make a vast difference, but if a lot of people do it, it adds up. And by taking small steps you avoid the resistance a radical turnaround meets with and the effort and cost of getting people on board.’ People respond more emotionally to the idea of cutting down on meat than to advice to eat less fat or sugar, says De Vet. ‘Some groups of consumers are very attached to meat. It’s part of their identity. These groups will not be inclined to change their consumption pattern and will resist attempts to push them in that direction.’ There are strong links between meat consumption and culture and identity. That’s why it is such an interesting subject from the nutrition and social sciences points of view.’

In her research, De Vet looks at ways of steering eating behaviour so as to avoid resistance and controversy. ‘The question is how you can design the environment to nudge people towards healthier decisions, without too much effort or making them feel their freedom of choice is being restricted. Especially when people are very attached to a product, as is the case with meat.’ In countries outside Europe and the United States, consumers are currently eager to eat more meat, from a starting point of scarcity. Changing that mentality might require a different approach to that for reducing meat

consumption from excessive levels in the Netherlands, says De Vet. ‘I think that is an interesting subject to invest in. The question is whether the way we try to influence consumer behaviour here would also work in China and South America.’

POOR REPUTATION

Food production and consumption form a complex ecosystem, says De Vet. Europeans have gradually begun to eat more chicken and less beef, probably because red meat and beef cattle farming have gained a poor reputation. ‘That shift is a nice example of how a change in one preference affects another one,’ says De Vet. ‘Chicken seems more sustainable than beef, so in itself it is not an undesirable change, but if the total consumption of chicken goes up enormously, that will cause environmental problems. It would actually be good to develop computer models in which you could study such processes. If you really want to work towards protein transition, you’ve got to look at how factors interact. It’s all very well for me to study consumer behaviour, but that is just one of several factors. An overview of that whole system, how everything hangs together: that is part of what we want to aim at in the next few years too.’ ■

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