

# Sustainable Futures

Social Sciences Research  
at Wageningen University



**WAGENINGEN UR**

*For quality of life*



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at Wageningen University

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# For quality of life

the impact of Social Sciences Research  
at Wageningen University



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It is with great pleasure that I present to you a small selection of recent research findings from the Department of Social Sciences at Wageningen University.

The social sciences within Wageningen University are distinctive from those at other universities given their focus on people and society in relation to food, feed and biobased production, as well as on natural resources and living environment. In this domain, disciplinary studies, as well inter- and transdisciplinary research, are carried out in close connection with technical sciences and partners.

As you will read, we do not create or invent material devices, new plant varieties or healthier food – that is the task of our life sciences colleagues elsewhere in Wageningen University. We assess and design economic, political and social institutions as well as sustainable practices and behaviour. What we do may be less tangible but it is certainly of no less importance in advancing science and improving the quality of life.

You may well be surprised by the substantive and geographical breadth of our research, which spans topics ranging from economic models that calculate whether we should be concerned about the evolution of fish, to studies into the effectiveness of China's environmental policies. It is about science for impact.

Wageningen social sciences are flourishing and growing in education and research, as evidenced by the increasing national and international interest in our study programmes, the expanding number of young PhD students (at the moment more than 400), and the exponential growth of high quality publications in A-rated scientific journals. This is an organisation of which we are rightly proud. Read on to find out why.

Laan van Staalduinen  
Managing Director Wageningen UR Social Sciences Group





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# Green economy



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How do we address environmental change and natural resource use without compromising global poverty alleviation? The Green Economy contrasts the conventional economy by using production methods that support economic development through enhancing resource use and energy efficiency while reducing pollution and carbon emission and preventing loss in biodiversity and ecosystems. Wageningen University has an impressive track record in researching and promoting the greening of economies at a local, regional and global scale. Social scientists have studied the connections between the economic, social and policy domains, contributing to debates on greenhouse gas emissions, nature conservation, resource depletion and environmental pollution. What are the promises and limitations of the emerging bio-economy and how are its welfare effects distributed across societies and societal groups? How can one identify the right balance between adaptation and mitigation strategies in the face of climate change? The efforts of Wageningen University to study the Green Economy have received worldwide recognition and will be of great aid in addressing the challenges of the 21st century.

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# Choosing the best contracts

When should a company close a contract, and what kind? This is the subject of transaction cost theory. Several Wageningen-based researchers in business administration elaborated on the theory and won a prestigious award.



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Economists have thought a great deal about transaction costs, the additional costs that arise in conjunction with purchasing. It was the economist Oliver E. Williamson who formulated the transaction cost theory, for which he received the Nobel Prize in 2009. He developed a framework that determines which type of contract companies should create in which circumstances. The relationship between seller and buyer plays an important role. "This relationship can take different forms," explains Professor of Management Studies Onno Omta. "You can look for the most favourable price, choose fixed contracts, or opt for an intermediate form." For example, the Brazilian coffee producer Ipanema is the preferred supplier of a certain type of coffee for American café chain Starbucks. Starbucks has a contract for coffee exclusively for them, which stipulates that Ipanema carries out social and environmental projects such as reforestation and the building of schools. The contract is renegotiated every three years.

### **Opportunistic behaviour**

The transaction cost theory takes into account a number of elements, such as uncertainty. For instance, prices for commodities like gold and oil fluctuate substantially. The frequency of transactions is also important, as is the asset specificity of a company – i.e. the question of whether equipment and personnel are highly specialised or can be deployed in multiple uses. Controllability is also relevant says Omta. "The more precisely that contract agreements can be measured, the less risk there is of opportunistic behaviour." For instance, a Dutch slaughterhouse suspected at one point that ordinary pigs were being slipped in among the more expensive organic ones. This was possible as it was tricky to see the difference.

### **Interdependence**

With three colleagues in the Management Studies Group, Omta further elaborated on the theory.

"Williamson's framework is static, which is both a strength and a weakness," he explains. "We brought in more dynamic mechanisms by allowing several elements – such as the major uncertainty about commodities & volumes and limited measurability – to occur simultaneously. We also took changes over time into consideration, and looked at several parts of the chain." For example, if the market for organic pork becomes attractive, pig farmers might wish to switch to organic pigs. To cover the risks, they will want a permanent contract with the slaughterhouse. For the slaughterhouse, in turn, it is useful to have a permanent contract with a supermarket. "The original model only considers two parties, but interdependence in the chain means that you have to look at both buying and selling relationships," Omta explains.

### **Rocket science**

Scientists therefore recommend better communication between the purchasing and sales departments within companies. In addition, they suggest that companies agree on reference prices which are, for example, a percentage above the market price. This carries less risk than fixed prices should market prices fall. Another tip is to invest together with suppliers through joint contracting. "If you do more together, you create more lasting relationships, Omta explains. "In the longer term this is to your advantage."

The findings were published in the leading journal for the economic and business sciences *Journal of Supply Chain Management* in 2012. The article subsequently won the 2012 prize for the best publication in the journal. According to the jury, it offered an important theoretical contribution to the transaction cost theory, which simultaneously leads to practical recommendations within supply chain management. "It is not rocket science to realise that there are dynamic developments," Omta says. "But we took the trouble to work them out and look a few steps deeper."

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Onno Omta  
onno.omta@wur.nl

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www.wageningenUR.nl/mst

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“*The more precisely that contract agreements can be measured, the less risk there is of opportunistic behaviour*”



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# The computer power behind plastic collection

Ecology and economy usually go hand in hand when collecting waste, show models describing the logistics involved in plastic collection. The cheapest solutions often also result in the lowest carbon dioxide emissions.





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Waste collection is the logistical mirror image of the production of many goods. Where products are normally transported from factory to shop, it is the other way round for waste. Waste from millions of households has to be transported to the smallest possible number of waste processing companies as efficiently as possible. This is known as reverse logistics.

Modelling reverse logistics has its own pitfalls. The uncertainty with regards to supply is greater than in ordinary logistic chains. Where manufacturers of laundry detergent know the demand for their products per week, it is harder for processing companies to predict how much waste they will receive.

Over recent years, doctoral students have been working on models that calculate the costs and environmental impact of waste collection on a municipal, national and global level. The research was financed by technological institute TIFN, and commissioned by the Dutch Food Retail Association (CBL), the trade association for supermarkets, and the Federation of Dutch Grocery and Food Industry (FNLI), the organisation for food companies.

### Deposit fee

The collection of PET bottles is a controversial issue for the organisations and a political hot potato. Supporters and opponents of the deposit system have long fought each other with efficiency data. The logistic models are in favour of the supporters, says Professor Jacqueline Bloemhof. "Looking at the entire chain, the deposit fee is the best solution. It results in a high collection percentage, and a pure flow of PET. It may be more expensive than other systems for supermarkets, but socially speaking deposit fees are a proven stimulus for a high collection percentage." PET is one of the most valuable forms of plastic and it is essential that it is not polluted with other types of plastic

when recycled. The deposit system is an efficient way to achieve this.

The models also shed light on the collection of other plastic. Dutch municipalities responsible for collecting plastic are looking for the most efficient method. Should they ask civilians to bring plastic to containers, or do they pick it up with rubbish trucks? According to Bloemhof, the best solution depends on the location. In cities it is best for people to bring plastic to central collection points where they are already going, such as supermarkets. Calculations showed that in rural areas a system in which trucks pick up plastic from consumers performed better. "Stopping and accelerating is especially ineffective, but trucks don't stop so often in rural areas."

### China

Plastic processing could be more efficient on a global scale too, according to the model calculations. In Europe plastic is currently processed into granulate before being shipped to China. Although this is the only option as China prohibits the import of waste, it would be more efficient to transport unprocessed plastic waste to China. As well as being cheaper this solution would also be better for the environment. "The benefit of processing in China is that they can determine which quality they need, and how clean the recycled plastic should be," explains Bloemhof.

The fact that economy and ecology go hand in hand is not an exception in waste transportation. "In our model we use a carbon tax for the environmental impact. It can be increased or reduced in accordance with to what extent the environmental impact should be included. The current low carbon taxes mean that the wisest choice economically is usually also the best from an ecological standpoint."

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Jacqueline Bloemhof  
[jacqueline.bloemhof@wur.nl](mailto:jacqueline.bloemhof@wur.nl)

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[www.wageningenUR.nl/orl](http://www.wageningenUR.nl/orl)

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“*It would be more efficient to transport unprocessed plastic waste to China'*

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# The costs of irreversible environmental damage

Climate change, pollution, species going extinct – these and other irreversible environmental developments may cost us dearly one day. To help governments and businesses calculate how much, scientists have developed a way to bring irreversibility and uncertainty into the equation.



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Over the last decade, worldwide bee populations have been dropping alarmingly fast. If bees were to go extinct, we could lose plants which bees pollinate, animals which eat those plants, and animals further up the food chain. Since bees pollinate most of the crop species we eat, it could become difficult to feed the human population. The hypothetical extinction of bees is the perfect example of an irreversible event, says Justus Wesseler, Professor of Agricultural Economics and Rural Policy. “We would not be able to bring them back. This means that we would have to find other solutions, which might be very expensive.”

To prevent irreversible environmental shocks, the United Nations came up with the precautionary approach at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. “Basically, this establishes that states have to be more careful when dealing with threats of serious or irreversible environmental damage”, Wesseler explains. The Rio Declaration adds that states cannot use the lack of scientific certainty as an excuse to postpone measures preventing environmental degradation. “Research suggests that certain pesticides, such as neonicotinoids, may increase bee mortality. Even without full scientific proof, the precautionary approach would justify measures to regulate the use of neonicotinoids.”

### Uncertainty

“Irreversible costs weigh more than reversible costs,” Wesseler states. But irreversible benefits can also outweigh irreversible costs. If a forest makes way for agricultural land, society will profit from the crop yields. But then, there may be a food surplus and food prices may collapse. This example shows that irreversible events often contain uncertainty about future costs and benefits. Moreover, the effects can change over time. Governments, organisations and businesses usually use a cost/benefit analysis to assess the effects of a policy measure. But the costs of irreversible events, uncertainty and the time lapse

cannot be accounted for in the standard analysis. Wesseler and his colleagues have worked since 2000 to design tools that bring irreversibility into the equation. “It is a valuable instrument that enables decision makers to apply a precautionary approach and analyse policies beforehand.”

### Golden rice

The methodology also shows whether postponing an activity is a good idea or might cost too much. Wesseler looked into the health effects related to vitamin A deficiency in developing countries, such as growth disorders in children and blindness. “These effects cannot be reversed. Some people may even die,” he says. Scientists came up with golden rice – genetically engineered rice with extra vitamin A – as a solution. But environmental organisations strongly oppose genetically modified (GM) food because of perceived risks. Wesseler analysed the use of golden rice. “Standard assessments underestimate the benefits as they do not consider the irreversible effects. We saw that golden rice has enormous irreversible benefits. Delaying its introduction costs thousands of lives every year.” An article about this study was first published online in January 2014 and will soon appear in the scientific journal *Environment and Development Economics*. It generated a lot of interest and immediately became the most downloaded paper of the journal.

### Pesticides

Wesseler has conducted more studies on GM food, a controversial topic in Europe. “We often find it difficult to quantify or identify irreversible costs. This is why we developed a concept that takes into account the maximum amount of irreversible costs that we are willing to tolerate,” he explains. If GM maize was cultivated in Europe, it is unlikely that the irreversible costs would surpass the damage caused by pesticides used on normal maize, Wesseler says, even considering future uncertainties. “Not having full information about future effects and damages should not prevent us from addressing these issues.”

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Justus Wesseler  
[justus.wesseler@wur.nl](mailto:justus.wesseler@wur.nl)

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[www.wageningenUR.nl/aep](http://www.wageningenUR.nl/aep)

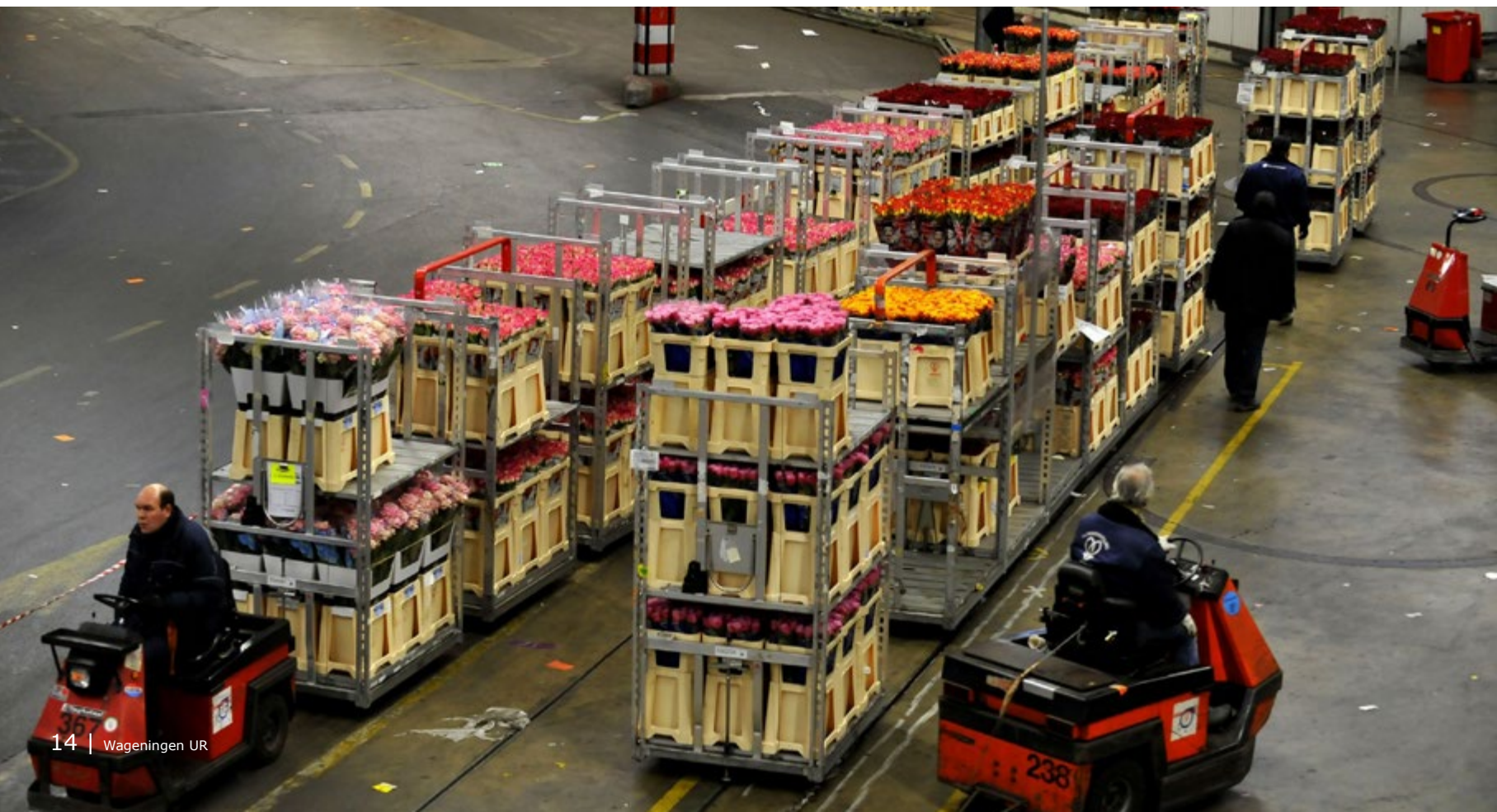
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*Delaying the  
introduction of  
golden rice costs  
thousands of lives  
every year*”



# Dutch flowers to conquer the world

Globalisation, the internet and new technologies are changing the playing field of Dutch flower growers and traders. The Dutch government and industry are looking to safeguard the future of the ornamental horticulture sector. A large-scale research project is set to lead the way.





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For a long time the sale of all flowers in the Netherlands was organised via flower auctions such as the one in Aalsmeer. But that is now history. The market has expanded from Western Europe across the continent, and Dutch flower growers have started companies in countries such as Kenya, Ethiopia, China and Columbia. "It is no longer always the most logical thing to transport flowers from Africa to the Netherlands first, before transporting them to Italy or Poland," says Jack van der Vorst, Professor of Logistics and Operations Research. Moreover, the flowers are increasingly sold directly via internet auctions and webshops. New technologies are also having an effect. "Initially flowers were dispatched over long distances by aircraft, but better conservation technologies mean they are increasingly transported in refrigerated containers onboard ships," Van der Vorst explains.

### Slip stream

Globalisation, digitisation and technological innovations have forced the flower sector to change its methods. A major research project called DAVINC3I, designed to secure the future of the Dutch ornamental horticulture sector, was started in 2011. In addition to the cooperative trade association FloraHolland it involves 30 companies, VU University Amsterdam, Eindhoven University of Technology and Wageningen University. The DINALOG institute for logistics is funding the project to the tune of a million euros, with the Horticulture Product Board, universities and industry contributing another million.

"The Netherlands is a frontrunner in the field of ornamental horticulture thanks to its extensive knowledge and superior logistics. But competition is increasing," says project leader Van der Vorst. Flowers from countries such as Kenya used to be transhipped to the rest of the world via Schiphol Airport and the port of Rotterdam, for instance. "In the slip stream we also sell Dutch specialities such as tulips, gerberas and chrysanthemums.

Should the bulk flow cease to go via the Netherlands, we may lose the opportunity to sell our special products and knowledge."

### Hubs

Two post-doc scientists and two PhD students are studying and designing transportation and information systems, business models and responsive logistic networks. The latter involves quick and accurate services to different types of clients. "Supermarkets have a limited and stable flower range, flower shops have a wide selection, and webshops want fast delivery. Logistics have to be adapted to these specific demands," Van der Vorst explains. The establishment of hubs outside of the Netherlands should also be looked into further. Hubs are locations where products and services such as packaging and flower arrangement come together – a trade park and distribution centre in one. With hubs in, say, Munich or Warsaw, flowers would no longer have to detour through the Netherlands.

### Cost reduction

Meanwhile, over 40 students from various disciplines and universities have performed thesis research into the sector. Where growers used to deliver flowers once a day, they must now respond to multiple small orders throughout the day. But with four daily deliveries, growers are unable to fill their trucks. One student studied models to resolve this problem and showed that growers must work more closely with other growers nearby. Van der Vorst: "Cooperation is increasingly important in the new situation; it may reduce logistic costs by up to 28 percent."

The students' research resulted in over 100 dos and don'ts, and learned lessons and best practices were developed based on all the research results. The project leader can be satisfied: "A lot of knowledge will become available that will help the sector adapt," Van der Vorst concludes.

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Jack van der Vorst  
[jack.vandervorst@wur.nl](mailto:jack.vandervorst@wur.nl)

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[www.wageningenUR.nl/orl](http://www.wageningenUR.nl/orl)

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“Cooperation between flower growers may reduce logistic costs by up to 28 percent”

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# Evolution as a boon to fishermen

Over-fishing pressures change the genes of fish, causing them to stay smaller and mature earlier. But the doomsayers predicting seas full of mini cod and micro herring have been wrong. In a well-managed sea, evolution can even be a help to fishermen



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For fish, life in a sea of many fishermen is a race against the clock. Those who get caught before they have had the chance to procreate are an evolutionary dead end. Fish that mature at a young age have a better chance of having offspring than fish which grow quickly in the first years of their lives but only become sexually mature later. The selective catching of larger fish therefore has implications for the genes of the fish population at large. Biologists are already seeing changes in overexploited areas. Cod, for example, reached sexual maturity at the age of ten in 1930; today maturation occurs after six to seven years.

### Balance

This might seem good news for fishermen as fish reproduce earlier, but there is also a downside: sexually mature fish invest part of their energy into making eggs and sperm, and therefore have less left over for growth. The fish are becoming increasingly small, and smaller fish produce fewer offspring per year. This can be bad news for fisheries and a cause for concern among biologists. If the fish multiply less well due to evolutionary pressures, this could represent a new motivation for stricter fishing quotas. Economist Andries Richter and four biologists published an article in the *Proceedings of the National Academy of Sciences* (PNAS) in 2013, in which they ascertained the balance between the two opposing effects on cod in the seas around Norway. The calculation was favourable to the fishermen. "What we have seen is that, as long as you fish in an ecologically responsible way, genetic changes will not have a major impact on the production of an ecosystem. They can even provide a small positive effect on fishing, as the fish grow faster."

### Catch quotas

The article triggered lots of discussion among scientists, and was discussed in prestigious journals such as *Science*. Richter wrote the piece together with fishery biologists from universities

in Norway, Austria, Canada and the United States. "I think the article caused so many waves because we were the first to couple biological knowledge with economic calculations," Richter explains. The calculations by Richter and his colleagues silenced those warning of an impending genetic disaster. But could they also reduce the pressure on governments to regulate fisheries? "They might, but there are other very good reasons for governments and fishermen to manage resources well," Richter continues. "We now know more about what we do and don't need to worry about. Furthermore, our article doesn't imply that the fishing industry can be left entirely to its own devices."

The genetic effect is only limited in case of reasonable and ecologically sound management. The higher fishing pressure on Norwegian cod over recent years would, in the long run, also cause genetic changes that lead to a less productive cod population. "In other words, our story is an additional argument for being careful with fish stocks."

### Mesh size

According to Richter, fishermen and governments should give evolution a push by better regulating the mesh size of the nets, which is still a relatively ignored issue right now. Richter underlines that most nets today are fine enough to catch fish which are just barely grown. Using a wider mesh would let more small fish escape, keeping evolutionary pressures under control, and enabling fishermen to work on a favourable genetic composition of the fish population.

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Andries Richter  
[andries.richter@wur.nl](mailto:andries.richter@wur.nl)

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[www.wageningenUR.nl/enr](http://www.wageningenUR.nl/enr)

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“ I think the article caused so many waves because we were the first to couple biological knowledge with economic calculations’



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# The history of Dutch agriculture

Dutch farmers have been leading the way for centuries. Not due to government agricultural extension services but thanks to the way their entrepreneurship has been combined with the latest scientific insights, says Jan Bieleman, author of the standard work on the history of Dutch farming.





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In 1985, publishing company Boom was looking for a historian to write about the history of Dutch agriculture. The task fell to Jan Bieleman of the Rural and Environmental History group at Wageningen. Bieleman, who had a degree in landscape architecture, was just completing his doctoral thesis on agriculture in the province of Drenthe in the seventeenth century.

The thesis gave nature organisations new insights into the history of heathlands and played a role in the introduction of Heck cattle and Scottish Highlanders into the Dutch landscape. Bieleman disproved the old notion that small farmers in Drenthe had survived for centuries on rye fertilised by sheep roaming the heaths. "In the seventeenth century, Drenthe produced beef and the heaths were home to small and lean cattle." This insight convinced the nature organisations to (re)introduce cattle into heath management.

### Paris

The commission to write the standard work on the history of Dutch agriculture determined Bieleman's career and from 1985 until his retirement he mainly worked on books. "Wherever possible, I managed to avoid the pressure to write scientific journal articles on behalf of the group. For me the books came first, not the bureaucrats!"

*The history of Dutch agriculture from 1600 to 1950* was finished in 1992. The book was a synthesis of the work of other historians but also included new information and newly developed ideas from Bieleman's own research, such as maps based on livestock breeding from 1811, which showed how cattle, horses and sheep had been divided over the country.

Over the years the data on the livestock census had become spread throughout the archives of Europe and Bieleman eventually found the information on the last missing regions in Paris. "I very much enjoyed working on this book.

Nothing similar had been written before so I had to spend time working out the structure and deciding which major periods the history should be divided into."

### Efficient production

Boom publishers contacted Bieleman again in 2004 as the first book was sold out: did he want to write an update that also included the period from 1950 to the turn of the century? This period was still very recent, and little material was available from fellow historians.

Agriculture changed faster than ever in the second half of the twentieth century, stimulated by a rapid expansion of the economy. This led to a major increase in wages, while the prices for agricultural products remained virtually static. The increasingly expensive agricultural workers therefore started to disappear from farms, followed by family workers, and eventually many small farmers too. The remaining family businesses were forced to produce more efficiently or quit; a process which was prevalent throughout the Western world, but in which Dutch farmers took the lead.

### Agricultural extension

"Dutch farmers have been leading the way in technology for a long time," says Bieleman. "Until a few years ago this was attributed to agricultural extension services that brought new technologies to farmers. In fact, the farmers themselves led the way." Government extension officers may have passed on and disseminated the successes, but they did not initiate them."

Shortly after the new version of the book hit the shelves in 2008, a shorter English language version was also published. Now retired, Bieleman is still regularly consulted by scientists, amateur historians and media. "I am very proud of my books."

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Jan Bieleman  
[jan.bieleman@wur.nl](mailto:jan.bieleman@wur.nl)

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[www.wageningenUR.nl/rhi](http://www.wageningenUR.nl/rhi)

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“*Nothing similar had been written before*”

# More market, more milk, more manure

Dutch dairy farmers are already building new sheds in preparation for the abolition of the milk quota in 2015. Some European countries will have more livestock, while elsewhere dairy farmers will disappear. Left to the global market, farmers are facing an uncertain future.



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European dairy farmers are used to producing a maximum amount of milk and getting a good price for their product. The milk quota implemented by Brussels in 1984 to reduce the dairy surpluses, milk lakes and butter mountains will end in 2015. "An increasing number of export subsidies was required to dump the growing European milk surplus onto the global market," says assistant professor Roel Jongeneel of the Agricultural Economics and Rural Policy group. The quota worked well, but the European support to farmers resulted in unfair competition in the eyes of the World Trade Organisation. It was no longer in line with the global trend of market liberalisation and placed growing pressure on the EU budget.

### Reforms

Around a decade ago, the European Commission decided to lift the milk quota. "Support was gradually reduced and the quotas increased to ensure a soft landing," Jongeneel explains. The Commission first asked his chair group to calculate and analyse the effects. "The Netherlands is a dairy country and we have been studying the impact of EU policy since the early 1980s," says Jongeneel, also senior researcher at the Agricultural Economics Research Institute LEI.

Together with the University of Toulouse and the INRA, the French National Institute for Agricultural Research, various options for reform were studied in a major research project that also included universities from, among others, Germany and Italy. "Dairy farmers will be more than ever at the mercy of the global market after the quota ends," predicts Jongeneel. "Prices of dairy products fluctuate quite a bit. When things are going well economically, people buy more luxury desserts and cheeses. In times of crisis, the demand falls. Dairy farmers are extremely dependent on the milk price and, due to investments already made, have few possibilities for switching over." The scientists saw that the quota had additional positive effects; in France, for instance, which

divided the quota per region. Whenever a farmer retired, the quota went to a start-up dairy farmer in the same region. "This helped maintain the smaller dairy farms in addition to the factory dairy farms that are concentrated in Brittany. In the French Alps, for instance, dairy farmers are also involved in nature management and produce special regional cheeses." Now dairy farms in less suitable areas will be facing difficult times, and may even disappear altogether. To prevent this, Jongeneel argues for targeted subsidies for these farmers.

### Cow quota

Farmers in the Netherlands were able to trade the quota among themselves. This was in line with the wish for further increases of scale as large companies purchased the quota from retiring farmers. Dairy farming moved from the Randstad region to the emptier and cheaper land in Friesland and Groningen. In 2015 Dutch farmers, like their colleagues in Denmark, Brittany and Germany, expanded their livestock in accordance with the expectations. More cows also means more manure and ammonia, however. "Perhaps measures should be taken to combat the environmental effects, such as implementing a quota for the number of dairy cows," says Jongeneel.

"The free market system has its benefits, but the environment, farmers' income and quality of life in rural areas also play a part. The market is a good servant but a bad master. Market failure can motivate politicians to interfere and restore the balance." Now the government is retreating, the power in the dairy market is shifting towards the dairy processing industry and retail sector. Jongeneel sees this reflected in the research requests. "Export subsidies are no longer an issue," he says. "We are now often working on market predictions and analyses of global supply and demand developments. This indicates that the playing field is changing."

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Roel Jongeneel  
roel.jongeneel@wur.nl

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www.wageningenUR.nl/aep

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“ *The free market system has its benefits, but the environment, farmers' income and quality of life in rural areas also play a part* ”



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## Rice to the occasion

A higher rice yield thanks to a different cultivation method. Scientists are sceptical but aid organisations swear by the System of Rice Intensification. It requires less water, fewer seeds and potentially less labour. This can make a big difference, especially in small-scale agriculture.





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Experts thought it seemed too good to be true: that a different way of growing rice could increase the yield just like that. In the System of Rice Intensification (SRI) the seedlings are replanted from the seed bed to the field earlier than in standard cultivation. Farmers plant the seedlings at greater distances, in a square grid or in rows, with one plant at a time instead of two or three. The result is reduced costs for farmers, as they need fewer seedlings and less water – and get more rice in return.

### Deadlock

The claim for higher yields is disputed by experts as the cultivation method was not based on scientific research. Nevertheless, many aid organisations argue passionately for the technique and it continues to be used. “Globally the use of the cultivation method is relatively small,” says Harro Maat of the Knowledge, Technology and Innovation group. “In our estimation SRI accounts for three to five percent of the rice acreage in the regions where the method has been introduced. But it is an important development in nearly all rice-producing countries and seems to be catching on.”

Maat and his colleagues tried to break through the deadlocked discussions by introducing a new perspective. “We believe a more interesting research focus is how farmers actually use the method in practice and what value they obtain from it.” Between 2010 and 2014 the scientists studied the system in multiple states in India, financed by the WOTRO Science for Global Development programme of the Netherlands Organisation for Scientific Research (NWO). The scientists analysed both socio-economic and agronomic aspects. “One part of the research focused more on the organisation of labour, while another looked at field management, and so on.”

### Cross-over

It was shown that there were major differences between regions, projects and aid organisations

involved. In Tamil Nadu, for instance, the method was combined with projects to reduce water consumption in rice cultivation. Another example of cross-over between projects was found in Odisha where it was recommended to increase the planting distance upon the introduction of expensive hybrid rice varieties.

Farmers also use the rules in a flexible way. Lots of rainfall makes it impossible to dry fields out, for instance, and a shortage of workers can make it difficult to transfer the seedlings at an earlier stage. “Farmers decide per field which techniques they will use and how much work they will put in,” Maat underlines. “This results in a mix of cultivation methods. The knowledge and management practices of the farmers determine their chances of success. It is in their hands.”

### Rediscovery

There is considerable interest in the results of the research, one of only few large-scale studies into the cultivation method, according to Maat. “We see that NGOs recognise our findings about variation and flexible implementation. Projects in India are already being adapted.” With regard to the higher yields, the final word has yet to be said. “It may increase yields in small-scale cultivation, but in the areas where rice growing goes well, the added value lies in cost reduction,” Maat explains.

It transpired that the idea for SRI was not entirely new. The French priest who introduced the cultivation method in Madagascar in the 1980s got his ideas for increasing the rice yield from colonial handbooks by agricultural scientists. “The System of Rice Intensification is actually a rediscovery,” concludes Maat. “These types of techniques have once again become highly relevant.”

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Harro Maat  
harro.maat@wur.nl

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www.wageningenUR.nl/kti

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“*The knowledge and management practices of the farmers determine their chances of success’*”



# Inclusive society



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An inclusive society is one in which all members have the right and the opportunity to play a meaningful role in social, cultural, economic and political interactions. Widely lauded as an ideal, the inclusive society remains far from reality. Large segments of the world's population have insufficient access to basic resources such as food, education or health services, and are excluded from decision-making on their future. Relations between groups in society are often characterised by disrespect, lack of mutual understanding or violent conflict. Why is it so difficult to make our social, economic and political systems operate in a manner that fosters inclusiveness in practice? Wageningen University works towards a better understanding of the basic mechanisms and processes underpinning inclusion and exclusion of different groups, ideas and values in the ordering of societies at local, national and global levels. In order to enhance accessibility, Wageningen social scientists develop, explore and evaluate innovative approaches to the organisation of societal interactions and push the boundaries of existing theories and conceptualisations of inclusive society, for example by raising questions about the role and place of animals in it.

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# Building bridges between healthcare and sports

Stimulating exercise among primary care patients and socially vulnerable youth helps reduce costs. After all, exercise is healthy. To build a bridge between healthcare and the sports sector, municipalities are increasingly using local sports coaches. Does this approach work?





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'A healthy mind in a healthy body,' wrote the Roman poet Juvenal in the first century AD. Two thousand years later scientists have found convincing proof of the beneficial physical, psychological and social effects of sport. Exercise resolves or reduces a number of issues, from back problems to obesity and depression, and can help people gain more confidence. In the Netherlands, sports are an increasingly important part of healthcare programmes. Although the current government sees lifestyle as an individual choice, and is relying less on information campaigns, it continues to recognise the benefits of sports. It is also decentralising healthcare and increasingly making municipalities responsible for healthcare. "Municipalities must spend their funds as efficiently as possible. Sports can be a way to prevent youth from going off the rails or chronically ill patients from needing long-term care," says assistant professor Kirsten Verkooijen from the Health and Society group.

### Sports clubs

Over recent years, municipalities have appointed local sports coaches as a bridge between the sport and healthcare sectors. To stimulate socially vulnerable youth to exercise, for instance, these coaches serve as intermediary between local youth care institutions and sports clubs. "They look at factors such as the available sports, or whether clubs need extra support or financial aid, for example from sport stimulation funds for low-income families," Verkooijen explains. In 2013 she started the Youth, Care & Sport project, a four-year research project with two PhD students into the organisational setup and effectiveness of local sports coaches. In addition, the chair group is involved in the research project Connecting Care, Sport & Exercise, led by assistant professor Annemarie Wagemakers, which studies the role of local sports coaches who have the task of connecting primary care to sports. Each of the nine participating municipalities has a different setup. Some coaches are linked to

a neighbourhood, others to a healthcare centre; some ensure that patients of physical therapists or district nurses visit a local sports centre, while others organise hikes, or exercise programmes for the chronically ill. Both projects are funded by the national government's Sports research programme.

### Action research

Whether the health of the participating youth and primary care patients actually improves can only be measured after a longer period, but the first research results regarding cooperation are already available: the scientists met with all parties involved and submitted their findings to the project leaders who then made amendments where necessary. This type of research, in which the scientists play an intermediary role, is called action research. In this way projects are gradually optimised. "Interviews with youth care workers showed that there was insufficient contact with local sports coaches. We passed this on, and the level of contact has improved," Verkooijen reveals.

### Perspectives

Both projects have been enthusiastically received by municipalities. Preliminary findings of the research into youth and sports were presented at a symposium in May 2014. It immediately resulted in more submissions from municipalities and organisations looking to have their projects evaluated. The effects of sports on, say, mental health have been studied before in controlled environments, namely experiments in which one group exercised while the other did not, but had not yet been studied in practice. "Society functions as the laboratory in our research projects," says Health and Society Professor Maria Koelen. The intermediary is indispensable in connecting healthcare and sports, Koelen underlines. "These are diverse sectors in which people have different ideas about success. One sector has the healthcare perspective, youth care workers aim to offer opportunities to youngsters, and sports clubs revolve around athletic performance."

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Maria Koelen  
maria.koelen@wur.nl

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www.wageningenUR.nl/hso

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“Sports can be a way to prevent people from needing long-term care”

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# Considering wild animals

Wintry images of starving wild horses and cattle in Dutch nature reserve the Oostvaardersplassen provoked a heated public debate. A philosophical approach provided ethical guidelines for managing the large grazers, defusing the conflict.



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On the rugged, flat grasslands of a marshy polder, half an hour from Amsterdam, wild animals that roamed in the Netherlands many centuries ago, have been reintroduced. Groups of Heck cattle, Konik horses and red deer were released in the nature reserve of the Oostvaardersplassen more than 25 years ago. Conservation organization Staatsbosbeheer manages the area with as little interference as possible and does not feed the animals to prevent starvation. But images of famished and dying animals have ignited heated public discussions each severe winter since 1996. Critics call the area 'the killing fields of the low countries'.

"In the Serengeti in Africa some 300,000 wildebeests die every year, but people in the Netherlands are not used to this. Cattle and horses are usually kept and fed at the farm or the equestrian centre," Jozef Keulartz explains. Until his retirement in 2013, he was associate professor of Applied Philosophy in Wageningen and is today emeritus professor Environmental Philosophy at the Radboud University Nijmegen. "There are huge advantages of population regulation by food availability," Keulartz points out. "Animals usually don't bear young after harsh winters."

### Shelter

"Animal protectionists, animal ethicists and veterinarians put individual animal welfare first, while ecologists and conservationists consider animals as part of a bigger picture, of populations, species and ecosystems. For them, periodical distress is acceptable as a consequence of ecological management" Keulartz says. Together with colleagues, he found a way to close this gap within a project for the Ethics and Public Policy programme of the Netherlands Organisation for Scientific Research NWO during the 1990s. The scientists began by looking into the distinction between wild animals and domesticated animals on farms and in houses, laboratories and zoos. "Wild animals should be left alone, with our only

responsibility being to provide a good habitat. With domesticated animals it is the other way around: we have the duty to take care of them," Keulartz states. Many animals are somewhere in the grey zone, like stray cats, or wild animals that are captured and released elsewhere because their habitat became endangered. For the Oostvaardersplassen, the scientists drew up a policy plan to shift gradually from a duty of care to a duty to refrain from intervening, and included indications that show whether animals can fend for themselves. This policy framework was the basis for a 'Large Grazers Policy', which was adopted by the Dutch parliament in 2000. It has led to some adaptations in the way the nature reserve is managed. Animals that are too weak to make it through the winter are nowadays proactively shot, and some shelter is provided in the otherwise empty landscape.

### Black and white

"The common ground may have been animal welfare after all," continues Keulartz. "There is a chance of early death in harsh times, but animals can live up to thirty years in the Oostvaardersplassen and spend their full life cycle in complete freedom. Early opponents, like the Society for the Protection of Animals, have come to understand this benefit in terms of animal welfare too." The success of the Oostvaardersplassen has inspired other European countries, like the UK, to reintroduce large herbivores in nature areas as well. The debate about the Oostvaardersplassen has mostly subsided. However, the same kind of discussion arises whenever issues such as exotic species, zoo animals, wolves or hunting are involved. There is a role here for environmental philosophers, suggests Keulartz. "This kind of debate quickly turns into black-and-white thinking, as we also see in the debate on climate change. But it all boils down to a consideration of the whole range of moral responsibilities and values involved. Philosophers are used to thinking along those lines."

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Jozef Keulartz  
jozef.keulartz@wur.nl

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www.wageningenUR.nl/phi

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*“ Wild animals should be left alone. Our only responsibility is to provide a good habitat ”*



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# Cultured meat from the urban farm

Meat from a laboratory sounds strange to many people. But cultured meat could be an alternative to current meat production, with its associated environmental impact and animal suffering. Merely contemplating the idea can help stimulate the debate on meat consumption.



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The very first hamburger made of in vitro or cultured meat was presented in London on 5 August 2013. It consisted of some 20,000 tiny muscle fibres cultured from muscle stem cells of cows. Mark Post, Professor of Vascular Physiology at Maastricht University, intended the hamburger to attract attention to and funds for research into cultured meat. Proponents think that cultured meat will benefit animal welfare and may considerably reduce the amounts of water, land and energy required to produce meat. In addition it is expected to diminish greenhouse gas emissions, another problem of meat production.

### Strange

Cor van der Weele, special Professor of Humanistic Philosophy at Wageningen University, first heard about in vitro meat via the work of an artist.

“I thought it was a morally promising idea.”

Van der Weele studies the way in which people interact with nature and also focuses on broader issues of knowledge and ignorance. Scientists from Utrecht carried out stem cell research into cultured meat, including the social and ethical aspects related to the subject. A joint project was financed by the Dutch Ministry of Economic Affairs and ran from 2010 to 2014. In this project, Van der Weele studied how people thought about cultured meat; not by organising large-scale surveys, but by talking about the subject in small focus groups.

Many people think cultured meat is a strange and alienating concept; some also associate it with genetically modified food. In discussions people initially ask: ‘Isn’t it unnatural?’ This is usually followed by the response that current meat production is also unnatural, says Van der Weele. “In vitro meat is having a major impact before it is even on the market. It stimulates debate.”

### Homely

During discussions in a focus group, the idea emerged of urban farms where animals have

ample space to walk around. Every couple of weeks, a few stem cells could be taken from these animals and cultured into meat in an adjacent factory. This concept did not seem alienating to group members. “On the contrary, people had an image of personal contact with the animal that supplied the food. This way the technology almost seems homely,” Van der Weele explains.

Most people enjoy meat and do not see themselves as animal activists. Nevertheless many seemingly happy carnivores have serious reservations about animal suffering, as was shown during research among elderly people in rural areas. The latently present critique among this group surprised Van der Weele, and will be the subject of further study in the future.

### Wishful thinking

Many ethicists and consumer scientists consider the behaviour of people who put their wallets first to be hypocritical. “This is a normative stance, which may be based on wishful thinking about how they think things should be,” says the professor. “And it underestimates the ambivalence with which people struggle. They have trouble dealing with contradicting values, especially when difficult choices are involved. But with cultured meat as a collective solution in sight, people are willing to consider it.”

It may be ten to twenty years before cultured meat is available in supermarkets. The research takes time, and it is not yet certain whether in vitro meat will be sufficiently affordable and sustainable. Van der Weele: “Eventually there will not just be a single way that leads to Rome. Eating less meat is inevitable. We are facing various sustainability issues worldwide, and in looking for solutions we have to be pragmatic about the processes and accept the complexity of human motivation.”

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Cor van der Weele  
cor.vanderweele@wur.nl

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www.wageningenUR.nl/phi

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“*Even before it has entered the market, in vitro meat is stimulating new perspectives on meat’*”

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# Educating African female leaders

A major Wageningen project saw seventeen African women earn their PhDs in research into the impact of HIV/AIDS on rural households. In addition to substantive knowledge, this project also aimed to ensure important positions for these women in the field of rural development and policy. It was a success.





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Women in Africa have played a crucial role in agriculture since time immemorial, taking on the lion's share of the work. Moreover, they are increasingly left as heads of households as the men leave to work elsewhere or succumb to AIDS. In addition, women take care of sick family members and AIDS orphans. They often struggle to make ends meet for their families. Women who hold influential positions in government and universities could strengthen the overall position of women in rural areas through research and policy making. This is the idea behind a large-scale project by Wageningen University, the American aid organization Winrock International, and the African Women Leadership in Agriculture and Environment (AWLAE) network, which is based in Nairobi but has chapters in fifteen African countries.

### Twenty women

"As the impact of HIV/AIDS on women in rural areas became visible at the end of the 1990s, we decided to explore this more closely," says Anke Niehof, emeritus professor of Sociology of Consumption and Households. "The idea was to simultaneously train African female graduates as PhDs so that they could take on influential positions in policy and research." The project started in 2002 and its three-million-euro budget was provided entirely by the Dutch Ministry of Foreign Affairs. Twenty women with the right academic diplomas, leadership potential and interest in gender issues were selected from eleven African countries. Three residences in Wageningen were rented for the new PhD students, and the first started in 2003.

### Climate of mistrust

One of the PhD studies, carried out by Carolyne Nombo, examined social networks in a Tanzanian village. "Relatives and the local community are an important social safety net in Africa," Niehof says. "But families affected by illness and death due to AIDS had no time or money to contribute to

the community, and therefore received no aid in return. It was very confronting to realize this." Furthermore, at the time there were no cheap anti-retroviral drugs available. "Communities were afflicted by a climate of distrust and fear of witchcraft," Niehof continues. "For example, people stopped giving each other food as they were afraid of being accused of poisoning. This caused irreparable holes in the social fabric." Research in Uganda, however, showed that not all households affected by AIDS, collapse. Those which had achieved a certain level of wealth before AIDS struck could usually cope. It was especially the poorer households, in which, for example, one female adult had to provide for many children and sick people, which ran into difficulties and often fell apart. This was confirmed by research in Zimbabwe.

### Old boys' network

The project ended in 2011, but has continued to produce major publications until today. Meanwhile, seventeen of the PhD students have graduated, the remaining two will follow and one dropped out. The women got more challenging new jobs or better positions at the ministries, research institutes or universities where they were already working, or are doing further research as post-docs. Two of the PhD students are working as gender experts at the World Bank in Senegal and the African Development Bank, respectively; another is active in a large EU project about Africa. "Their shared experiences led to a close relationship between the women across national, cultural and religious boundaries," Niehof says. "Their cooperation is a type of alternative old boys' network." Unfortunately, it has not all been good news. In 2013, the women mobilized the network to protest the brutal murder of one of them, the Nigerian women's and human rights activist Ekaete Udong, who received her PhD in Wageningen in 2011.

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Anke Niehof  
anke.niehof@wur.nl

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www.wageningenUR.nl/sch

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“*Their cooperation is a type of alternative old boys' network*”

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# Having a say on urban renewal in the favela

In the Brazilian city of Recife slum residents had to move to make way for a new canal. They were given free new housing nearby. But problems soon arose. The municipality and residents had conflicting interests and the participatory procedures failed.



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In the run-up to the World Cup finals in 2014, Brazilians took to the streets in protest at the billions being spent on a football tournament instead of education, health care and housing. Brazil is one of the world's fastest growing economies, and a third of all big city residents live in favelas (slums). Recife is a poor city of millions with a high crime rate, and the municipality started a major urban renewal project ten years ago. To make way for new roads and drainage canals along the Beberibe river, residents of the Chão slum were offered free housing half a kilometre away. The World Bank partially financed the project, and the residents were promised participation.

### Safer

"When slums are demolished the residents are often forced to move way out to the edge of the city, so this social rehousing project was very progressive," says scientist Monique Nuijten, who was awarded a prestigious research grant by the Netherlands Organisation for Scientific Research (NWO) to study the process. Together with a PhD student from Wageningen and a local student, Nuijten studied the role of politicians, architects, planners and slum residents, as well as community leaders – engaged and influential local people who facilitated contacts with municipal officials. For this research Nuijten lived with a family in the slums for several months. "It is safer to be part of a family and enhances one's understanding of life in the area. I wanted to gain insight into the perspective of all those involved." Residing among people in their unique conditions for a longer time is part of ethnographic research, Nuijten explains. Traditionally, anthropologists and sociologists use this method for agricultural regions. Its application in urban areas is newer, and is gaining interest among scientists from fields such as social geography and urban planning.

### Own fault

Ultimately the slum upgrading project was not about the residents, Nuijten saw. "It revolved

around urban modernisation, with an attempt to protect the interests of the poor as much as possible within the conditions set by the project." City officials and administrators often blamed slum residents for any failures. "They claimed that the residents wouldn't listen, didn't show up to meetings and were uncivilized. But nobody was listening to the residents either."

This method of thinking fits into the global trend of retreating governments which increasingly places increasing responsibility with residents, Nuijten believes. "Citizenship in Brazil means looking after yourself, and if that goes wrong, it is your own fault."

### Openness

In their old neighbourhood, people had a property with trees, sheds and horses to collect garbage. They were given tiny terraced houses without land, which did not fit in with their way of life, and randomly placed between criminal families. Within two years, 20 percent of the residents had sold or abandoned their new homes, and many large families left even sooner. Participation had little effect as the plans were predetermined but residents still found it to be valuable. "Being included in the process was new to them. Even the mayor visited the neighbourhood." Party political interests also played a part; after the establishment of a new city council, the project was on hold for months.

Favelas are a dilemma in urban renewal projects. "For people with no money or work, slums are a solution for the lack of affordable housing. But governments want to regain control over these areas and create a modern cityscape without slums." Nuijten argues for increasing the focus on conflicting interests in city renovation, with more attention for the position of the poor. "It is impossible to meet everyone's demands, but more openness leads to more sensible participation procedures."

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Monique Nuijten  
[monique.nuijten@wur.nl](mailto:monique.nuijten@wur.nl)

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[www.wageningenUR.nl/sdc](http://www.wageningenUR.nl/sdc)

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“For people with no money or work, slums are a solution for the lack of affordable housing”



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# Innovation through consultation reduces poverty in Africa

Discussions about agriculture in innovation platforms between farmers, traders and agricultural consultants in Africa can help reduce poverty. This has been illustrated by an economic experiment which allows scientists to measure what is working in development aid, and what is not.



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Traditional agricultural consultancy in which farmers are offered solutions is often ineffective. As a result, the Forum for Agricultural Research in Africa (FARA) started a decentralised approach in eight countries in West, Southern and Central Africa in which farmers, traders, scientists, consultants, NGOs and policy-makers come together once every two months in an innovation platform to discuss agriculture and possible improvements. The goal is to find local solutions to local problems.

### Moderate intervention

The new method for disseminating knowledge among farmers was studied by development economist Erwin Bulte. Together with scientists from his chair group Development Economics he looked at, among other things, the influence of development projects on the economic development in African countries which had recently seen conflicts. In recognition of his use of economic experiments, Dutch trade magazine *De Economist* named Bulte the best economist in the Netherlands in 2014. Aid organisations and policy-makers follow his work with great interest. Bulte is also carrying out research into the FARA innovation platforms in Africa. "To be honest I initially had doubts concerning this moderate kind of intervention," he admits. "I thought farmers would benefit more from better seeds. The good thing is that it's what we measure that is important, not what we believe. And the approach was shown to be effective."

### Less poverty

Bulte can back up his statement with proof as the complete programme of the FARA was established as an experiment according to the guidelines of a Randomised Controlled Trial (RCT). This means that there was a random selection of villages in which a platform was established, other villages in which traditional consultation was offered, and villages where nothing was undertaken. Basic data was collected in all villages, including on poverty.

A total of 3,000 households in 320 villages were interviewed and follow-up measurements were performed two years later. The villages in which a platform was established showed less poverty after the two-year period, while the control group and the group that had received traditional consultation had made no progress. An unambiguous reason for the reduction in poverty was not found; it varied per case. Bulte: "A decentralised approach in fact seems to result in a multitude of solutions that match the local situation. It is important, however, that the platform is actually participatory. We also saw platforms being hijacked by the chairman of an external organisation who thought he knew the solution. That is ineffective."

### Rebuttal

Not all the news from Bulte's economic laboratory is good news for development workers, however. In another experiment, one of Bulte's PhD students looked into the effect of training in financial issues for farmers. The underlying thought was that the trained farmers would start training other farmers. Although the trained farmers did improve their bookkeeping, savings and investments, thus improving their personal conditions, when the scientist measured whether other farmers had gained any knowledge this did not appear to be the case. The trained farmers used their knowledge for their own benefit but had no interest in sharing. "The *training of trainers* idea, which is very popular in the aid world in many contexts, needs to be reviewed," concludes Bulte. It is not the first time that Bulte has refuted a tried and tested idea. In an article in *Science* in 2008 he rebutted the 'curse of natural resources' concept of Oxford University economist Paul Collier, who stated that countries with many raw materials are more susceptible to corruption and conflict. Bulte showed that it actually works the other way around: countries with lots of corruption and conflict undermine their own economies, as a result of which all that remains is dependence on raw materials.

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Erwin Bulte  
[erwin.bulte@wur.nl](mailto:erwin.bulte@wur.nl)

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[www.wageningenUR.nl/dec](http://www.wageningenUR.nl/dec)

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“*The good thing is that it's what we measure that is important, not what we believe'*”



# Leave the sweets machine alone

Policymakers and school boards looking to tackle obesity among pupils need not be too strict. The daily lure of a sweets machine helps students build resistance against other temptations and thus continue to eat healthily.





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It's easy to put on weight in the Netherlands. Those who manage to resist the smell of fresh bread at the bakery might fall for the fried haddock at the fish stall or chocolate from the vending machine. This is what we call an obesogenic environment. The design of cities, offices and schools makes it all too easy to over-eat, and hard to get enough exercise. While agreeing with this analysis, scientist Emely de Vet believes that the response of governments and administrators has at times been counterproductive. "The natural reaction is to change the environment – banning vending machines from schools, for example, or radically altering the range of products in the cafeteria. But this doesn't always achieve the objective. Seeing overly strict rules as an infringement on their freedom, people tend to resist them. If a school board decides to sell only healthy foods in the cafeteria, pupils will go to the supermarket or the snack bar instead, over which you have no control."

### Candy jar

De Vet examines the impact of communication on healthy behaviour and sees another effect which causes well-intentioned measures to backfire. Exposure to temptation may help build resistance. Those who regularly say no to the lure of sweets or fatty snacks develop strategies that help maintain a healthy diet De Vet and her colleagues tested the hypothesis on several subjects, including children. They were given candy, and the choice to either eat it or give it back in return for a bigger reward later. Another group played the same saving game, but with toys instead of candy. After several days, all children took a taste test in which they were allowed to eat as much candy as they wanted. Particularly the girls who had played the saving game ate less candy during the test than the children who had played with toys. The importance of learning such strategies was also shown in another study performed by De Vet and her colleagues into the strategies of

3,000 youths from the Netherlands, the UK, Poland and Portugal. It showed that those who had easy access to candy and soda at home and in school ate more than those who did not. However, there is also a group that eats less; they consciously place the candy jar out of sight and avoid the kitchen when they are bored. De Vet: "This indicates that there are possibilities for learning how to deal with food temptations."

### Chocolate factory

With three fellow scientists, De Vet wrote the book *Fluitend door de Chocoladefabriek (Whistling through the Chocolate Factory)*, published by *Voedingscentrum*. The book interprets the results of the European research programme TEMPEST for teenagers and their parents. TEMPEST (Temptations to Eat Moderated by Personal and Environmental Self-regulatory Tools) was a research programme in which scientists from nine European countries examined ways to boost self-control. 'Willpower' is the key word in *Whistling through the Chocolate Factory*. The book advises using it sparingly, for instance by avoiding the sweets aisle in the supermarket. Other tips are aimed at reducing temptation by training oneself or getting used to finding distractions. "If I were a school administrator, I wouldn't remove the sweets machine," De Vet summarises. "I'd move it further away – to the top floor, for example – and stock it a little differently. In addition to candy, I would add a healthy product at eye level. But filling it with vegetables or removing it entirely is counterproductive."

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Emely de Vet  
[emely.dev@wur.nl](mailto:emely.dev@wur.nl)

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[www.wageningenUR.nl/com](http://www.wageningenUR.nl/com)

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“*Those who regularly say no to the lure of sweets or fatty snacks develop strategies that help maintain a healthy diet'*

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# The second African wave

The African economy is currently the world's fastest growing economy. Over the course of several years, Africa appears to have changed from a continent with insolvable problems to the latest growth market for investors. But how surprising is this actually? There is nothing new about African growth as the African economy made a great leap forward between 1880 and 1960.



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It is only slowly dawning on the general public that Africa is no longer solely a continent of Ebola and civil war, but also has the fastest rate of economic growth and technological advances. This 'revolution' has led to so many surprised comments and superlatives that you'd be forgiven for thinking that Africa is joining the world for the first time. Not so, says historian Ewout Frankema. "The continent was also economically dynamic from 1880 to 1960."

### Living standards

There were no statistical organisations in the colonial age to record gross national product. Frankema studied the economic development of Africa from the colonial age until today by searching in archives for the real wages of unschooled labourers. By comparing these with the prices of food and other primary needs, Frankema and Marlous van Waijenburg (Northwestern University, Chicago) estimated the living standards of Africans. Their research found a significant improvement during the colonial age. Until 1960 Africa was not lagging behind other parts of the world. The real wages in Accra (Ghana), for instance, were considerably higher than those in Calcutta (India), and for a long time even kept pace with real wages in Tokyo (Japan). This innovative study caught the eye of some major research funders and in 2012 Frankema was awarded a European ERC grant of 1.5 million euros, as well as a VIDI grant from the Netherlands Organisation for Scientific Research (NWO) to further expand the research programme.

### Cities of millions

Frankema sees a warning from history that the current growth will not necessarily continue. Many countries depend on the export of raw materials today, just like in the colonial age. Then the export went to mother countries, now it is going to China. If the demand should cease, this could affect the foundations of economic

development. There are also major differences with the colonial era. Take urbanisation, for example. In 1900 Kampala was a town with 3,000 residents, and Nairobi was a transshipment station along the railway line from Mombassa to Victoria Lake. Now these are cities of millions. This urbanisation goes hand in hand with social developments that are occurring faster now than they ever did in Europe. "In the Netherlands it took centuries before the majority of the population was literate. In Africa, it took just half a century."

### Development aid

What do the decades of stagnation and decline in Africa between 1960 and 2000 say about the effects of development aid? According to Frankema's calculations, many Africans were doing better during the age of 'colonial suppression' than in the times of self-governance and development aid. "You could say that the damage of colonisation mainly came to light after the Europeans left. The power vacuum that developed after independence created a breeding ground for long-term conflicts. But it is justifiable to ask what part development aid played in this context. Aid is not always given with the purest of intentions, and even when it does come from a good heart this is no guarantee of good results. The benefit of acute food aid, refugee relief or medical support is beyond doubt. But why, for instance, do we build schools or roads in Africa? It would be better to leave that to the locals."

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Ewout Frankema  
ewout.frankema@wur.nl

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www.wageningenUR.nl/rhi

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“ *Why do we build schools or roads in Africa? It would be better to leave that to the locals'* ”



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# Throwing light on behaviour through computer modelling

Tail biting by pigs, playing children, and farmers joining forces against potato disease. Insights into these and other types of behaviour can be gained using a social simulation computer model. This in turn can help improve systems and resolve problems.



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Children in a school yard play according to the ideas with which they were raised; for instance, whether it is appropriate to use physical strength, or whether to adapt to the group or find their own way. Behaviour partially depends on the rules and circumstances in the community – or, in other words, the system. To gain more insight into how such systems function, associate professor Gert Jan Hofstede of the Information Technology group and his colleagues develop agent based models. “The agents are segments of software which pretend to be a person and can observe, interpret and react,” he explains.

### Virtual school yard

With these models Hofstede studies ‘complex adaptive systems’ in which the behaviour of individuals as well as the system in which they function play a role. “When individuals adapt to their environment it creates a unique dynamic, making it difficult to predict what the system will do.” Take a pigpen in which some pigs start nibbling on others’ tails out of boredom. This may result in injuries, or a pig may bite and taste blood. This increases stress and unrest in the pen to a tipping point where more pigs start biting.

“These models have an incredibly high level of complexity so this is pioneering work,” Hofstede continues. The Netherlands Institute for Advanced Study (NIAS) awarded Hofstede a grant in 2013, giving him six months to design a model that reflects the development of gender differences in social status on a virtual school yard. It is linked to Hofstede’s previous work on culture, and based on scientific insights into play behaviour in children and theories on power, status and cultural differences.

### Nature versus nurture

One simulation model has been completed. Demonstrating how it works, Hofstede first enters the extent to which the culture is individualistic or group-oriented, and whether it is more masculine

or feminine. The agents, i.e. the children, start with the same social status, but differ in levels of kindness, physical strength and charisma. The model is started: the children play in groups, get into fights and form different groups until some children achieve a higher status. Hofstede: “The model shows that the average status of girls is considerably reduced in a masculine culture that promotes fighting. Cultures where fighting is condemned have smaller status differences between the sexes.” So nurture beats nature; the model and theory correspond.

### Improved design

“Although the model is a simplification, it offers more insight into mechanisms and processes that enhance our understanding of the system as a whole,” says Hofstede. Under his guidance, six PhD students from various disciplines are currently performing research using agent based models. This includes research into tail biting in pigpens, innovations by pig farmers, and food safety.

Also in development is a model that reflects the spread of the rapidly mutating potato disease late blight (phytophthora), which has resulted in disputes between organic and regular farmers. A proper distribution of resistant crops on the fields may help prevent the disease from spreading. “The model allows us to show farmers and breeding companies how dissemination occurs, and what happens when the distribution is organised in a different way.” Countless sectors could benefit from the model, according to Hofstede, both for solving problems in systems and for designing new systems or changing existing ones. “Logistic chains are often developed in an ad hoc way. If people can see in advance in an exploratory study how a model might behave, they may well design something more effective.”

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Gert Jan Hofstede  
gertjan.hofstede@wur.nl

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www.wageningenUR.nl/inf

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“The model shows that the average status of girls is considerably reduced in a masculine culture that promotes fighting’



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# War makes people more altruistic

Exposure to conflict influences how much people trust each other. Behavioural experiments in Burundi show a greater willingness to work together among war victims than among people from conflict-free areas. Policy makers and development organisations can benefit from these findings.





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Behavioural experiments involving games with money were introduced into the economic sciences by psychologist Daniel Kahneman. He was awarded the Nobel Prize in 2002 for his research into decision-making processes and behavioural economics. Wageningen development economists frequently use this method as the basis for 'lab in the field' experiments in developing countries. The idea was developed during a project in Burundi where, in 2007, the Development Economics group participated in a large-scale survey into the impact of the 1993-2005 civil war. For his doctoral research, Maarten Voors added questions about social capital – the willingness of people to work together.

### Games

"I spent many days travelling from hill to hill in Burundi on my way to villages," he remembers. "Eventually we ended up talking to some 1,500 people." Many of those interviewed experienced atrocities during the civil war. They saw people being killed and tortured, and have lost family members and co-villagers. The survey showed that the victims worked together more often and trusted each other sooner. "But we weren't sure if people had given socially desirable answers. We wanted to explore another way to study this phenomenon, using experiments," Voors explains. Together with colleagues, he set up a series of lab in the field experiments in 2009 among 350 randomly selected people in 35 villages. Some of the villages were in former conflict areas, others were not. The scientists asked the villagers to anonymously play games with actual money. The participants were given various choices; for instance to share a sum of money, or to keep it for themselves.

### Reconstruction

The results of the experiments confirmed the survey findings. While on average, people were willing to give 30% of their money to others,

victims and people from villages with many victims were willing to share considerably more than those who had not seen conflict. Additionally, victims were willing to take more risk in gambling games, and also they preferred receiving a lower amount immediately than a higher amount in the foreseeable future. In economics, the traditional point of view is that social preferences are fixed. But this study shows that circumstances, such as civil war, may cause preferences to change. "The shock people experienced in the conflict resulted in a new perception and more altruism," says Voors. "This was surprising, as the common idea is that war causes trust to disintegrate, and is seen as 'development in reverse'. But my father immediately referred to the post-war reconstruction in the Netherlands in the 1950s when everyone was willing to work hard and support each other." Voors' research caused a sensation, especially after an article was published in the leading journal *The American Economic Review*. Since then, other scientists have performed similar studies in Sierra Leone, Nepal, Tadjhikistan and Israel and found the same patterns.

### More income

The research in Burundi also showed that there is less trust in national government and institutions in former conflict areas. In addition it looked into the impact of ethnic violence, and of violence between rebels and the army. Violence by external parties seems to increase trust within groups, and reduce trust in outsiders. "This could further increase animosity between the groups involved," Voors continues. Whether that will increase the chance of renewed conflict needs to be studied in follow-up research, as should the question whether higher social capital translates into more income. "Experiments are now widely used," adds Voors. "For policy makers and development organisations looking to set up or evaluate projects in former conflict areas, it is important to know how the people view each other and their institutions."

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Maarten Voors  
[maarten.voors@wur.nl](mailto:maarten.voors@wur.nl)

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[www.wageningenUR.nl/dec](http://www.wageningenUR.nl/dec)

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“*The shock people experienced in the conflict resulted in a new perception and more altruism*”





# Responsible governance

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The era of national governments as the principal actors in managing major societal challenges has drawn to a close. Increasingly, responsible governance of climate change, food security, human health or nature preservation requires wider coalitions, partnerships and networks, involving a wider variety of governance instruments. Wageningen University investigates the governance processes of international sustainability challenges in local communities, in national and transnational value chains or in river basins and flood plans. To what extent are they effective in delivering desired outcomes? Are they fair in allowing different constituencies equal access and participation? And to what extent are they trusted and supported by the people who are directly affected by new rules and regulations? In addition, Wageningen social scientists also contribute with experiments into the design of new governance arrangements in different parts of the world. This includes equitable global eco-labelling schemes, new modes of value chain governance and new information disclosure policies. As such, they contribute to responsible governance as we face the numerous challenges of tomorrow.

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# Biofuels, sustainability and development

While many African countries were willing to provide Europe with crops to use for biofuels, they struggled with the EU's sustainability criteria. With support from Wageningen, Mozambique designed criteria which also benefit the country's economic development.



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Due to high fuel prices and concerns about climate change, many Western countries became enthusiastic about biofuels in 2008. Made from materials such as sugar cane, corn and palm oil, biofuels provided an alternative to fossil fuels such as oil. While Europe had insufficient land to grow biofuel crops on a large scale, African countries like Mozambique welcomed the potential investment. “Mozambique is twenty times the size of the Netherlands and has a population of over twenty million people,” says Marc Schut, scientist in the Knowledge, Technology and Innovation group. Growing crops for fuel instead of food garnered much criticism, however. Another point of concern was changes in land use, such as cutting down trees to make way for plantations. Europe therefore imposed strict sustainability criteria. However, these criteria faced resistance from developing countries for failing to contribute to economic development. “In Mozambique for example, the cutting of sugarcane is traditionally done manually by large groups of people,” Schut notes. “This is dirty and heavy work where the cane is burned first. The EU wished to promote mechanical harvesting, which avoids the need for burning. This is healthier for the plantation workers and produces less CO<sub>2</sub> emissions. But for Mozambique it was also important to create as many jobs as possible.”

### Big gaps

The Mozambique government decided to set up a policy framework for sustainable biofuels by itself, one which would serve both European interests and its own. A working group was created with people from ministries, who worked closely with farmers’ organisations, companies, development agencies and NGOs. For his PhD research, Schut investigated how these partners looked at the sustainability of biofuels and wrote a report for the government. “There were many conflicting interests and big gaps between them. The government, for example, wanted to give employment and infrastructure in rural areas a boost, while biofuel companies wanted to be

in developed areas with good infrastructure for communication, transport and export.” Schut’s report clarified many things, and the government asked him to advise the working group. He therefore became an ‘embedded’ researcher. The working group considered questions about sustainability and the economy, nature, environment, technology and social issues. Many of these questions Schut funnelled to colleagues in Wageningen. A multidisciplinary support team was eventually formed, supported by the Dutch government. Additionally, four PhD students and twenty students from Wageningen University and the local Eduardo Mondlane University did research related to the four-year project, which ran until 2012.

### Transparent

The working group first identified the key topics, such as food security and assurances that people would not be expelled from their land. Criteria and indicators were developed next. Schut: “You can require that only financially healthy companies get involved, but how can you check this?” The outcomes were tested repeatedly during workshops throughout the country to involve provincial policymakers and other local stakeholders in the process early on. The final policy proposal was presented to the Council of Ministers in 2012. Unfortunately, the sense of urgency had gone by then. Coal and gas had been found in Mozambique and the biofuel sector collapsed, partly because of the economic crisis in Europe. Yet the work was not in vain. “Mozambique is the first country in southern Africa where a process such as this has taken place,” Schut points out. “Several other countries have followed its example. Furthermore, the cooperation among ministries and between ministries and other stakeholders has been enhanced and procedures for the approval of investment proposals are more transparent.” The policy framework may even be translated to large-scale agriculture. “Many of the sustainability criteria are still useful, whether you are cultivating sugarcane for biofuels or for sugar.”

Marc Schut  
[marc.schut@wur.nl](mailto:marc.schut@wur.nl)

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[www.wageningenUR.nl/kti](http://www.wageningenUR.nl/kti)

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“*Mozambique was the first country in southern Africa to set up sustainability criteria on biofuels*”



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# Co-creating climate adaptation policy

Together with representatives from municipalities, provinces, district water boards and government ministries, researchers have translated the latest scientific insights on climate adaptation into action strategies for policymakers.





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“These presentations by experts involved in climate adaptation are all very interesting,” said the programme manager of the Rotterdam Climate Proof initiative at the end of a seminar on the results of the Knowledge for Climate research programme. “But it remains all abstract; how can I apply this information in the City Hall tomorrow?” This astute question led to a co-creation trajectory in which senior scientists and policymakers together analysed how recent scientific insights can be applied for handling everyday problems.

### Residual water

Professor in Public Administration and Policy Katrien Termeer is leading the Governance sub-programme of the national Knowledge for Climate research programme. Together with water-board chairman Lambert Verheijen she wrote a chapter on organising cooperative partnerships for climate-proofing water systems. An example is cooperation between beer brewer Bavaria and farmers to ensure clean and sufficient water in the area around the brewery. The farmers have agreed to use precision techniques for pesticides and fertilisers. In exchange the water-board and other governmental institutions promised farmers more leeway in using residual water from the brewery for irrigation. This is crucial for the farmers at times of water shortages, while the brewery saves on investment in a water purification system. The public administration literature calls this type of partnership a self-organising collective. Imposing self-organizing collectives from above is ineffective, but public administration provides insights into the type of partnership parties should make under different circumstances.

### Rotterdam

The critical Rotterdam administrator whose question triggered co-creation collaborated with a public administration expert from Erasmus University to write a chapter on possibilities of involving citizens in tackling flooding and water scarcity. Rotterdam has long been a frontrunner in climate adaptation, but currently has fewer funds

due to the economic crisis. The city is therefore exploring the possibility of letting enthusiastic residents and companies contribute to combating flooding and water scarcity. One of the proposed strategies was to give neighbourhood residents the opportunity to compete in tenders for activities aimed at minimizing water management problems in their neighbourhood.

Governance of climate adaptation is a relatively new field, as Termeer explains. “This is an issue that policymakers are struggling with.” As long as no accidents occur, adaptation to the changing climate is not of direct concern to most citizens. When neighbourhoods flood during heavy rainfall, however, these same citizens become angry that politicians have failed to prevent floods. “This won’t win politicians an election, but the issue may lead to their defeat.”

Scientific literature on the issue challenges policymakers. Most public administration experts believe that climate adaptation feasibility increases when connections are made to urgent issues in other domains, such as nature, recreation, public housing, agriculture, spatial planning or parking policy. This can lead to win-win situations, innovations, awareness raising and more support for climate adaptation.

### Small wins

Termeer: “We take a different approach than the dominant climate literature; our research shows that a pragmatic approach of ‘small wins’ is the best method.” One can include an obligatory paragraph on climate adaptation in all policy memorandums but that often remains a dead letter. “You have a better chance of actually achieving something if you connect to more mainstream developments. Try, for instance, to include an innovative concept for water storage in ongoing city renovation, or partner and synergize with nature organisations that have to realise their goals with too little means. Working with people who are enthusiastic about a small plan may allow you to achieve more than when you try to keep everyone on board.”

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Katrien Termeer  
katrien.termeer@wur.nl

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www.wageningenUR.nl/pap

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“*This is an issue that policymakers are struggling with’*”

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# Erasing borders to combat swine fever

European borders are not as open as one might expect. It is cheaper to transport a piglet from the southernmost Dutch province of Limburg to the northernmost Dutch city of Delfzijl, for instance, than to the nearby city of Aachen in Germany. A better alignment of animal disease control regulations could have economic benefits both sides of the border.



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With over two million piglets transported from the Netherlands to Germany each year, the pig farming sectors in the two countries are increasingly intertwined... Until disease breaks out. Then the borders are closed and each country applies its own policy. Wageningen business economist Helmut Saatkamp and his colleagues mapped the similarities and differences between the countries, and concluded that collaboration can be improved in many aspects. This would help during future outbreaks of swine fever, and remove barriers that already exist.

### Illegal

Saatkamp studied the cooperation between the Netherlands and two adjoining German states: North Rhine Westphalia and Lower Saxony. The research was performed in close cooperation with German and Dutch policy officials, and resulted in a long list of differences and similarities.

For example, while the Netherlands expects to apply vaccination as one of the ways to control a swine fever outbreak, German states do not. The slaughter compensation for pig farmers varies either side of the border - a potential stimulus for illegal transportation of livestock across the border, facilitating the spread of the virus.

Classical swine fever is a highly contagious disease of livestock. The last outbreak in the Netherlands in 1997 lasted more than a year and had an economic impact of several billion euros. At least 437 farms were affected, and movement restrictions were established in a large part of the country. This made the slaughter of more than 10 million animals inevitable. The latter in particular had an economic impact, resulting in major price fluctuations both during and after the outbreak.

### Competition

The border does not only have an effect in case of outbreaks. Cross-border transport leads to extra

checks, and the double regulations create additional costs for exporters. Saatkamp: "It is still cheaper to transport pigs over long distances within the Netherlands than short distances over the border." While a better alignment of the regulations may have benefits for Dutch pig exporters, won't German pig producers face greater competition as a result? "This is true," Saatkamp admits. "But in many sectors it is the other way around. In poultry farming, for example, Germany would benefit from better alignment. It would be beneficial to look at the issue from a multi-sectoral perspective."

### Brussels

Closing the borders of infected regions after a breakout is currently part of EU policy and they are only reopened when Brussels lifts transport limitations. If regulations were to be synchronised, the Netherlands and its German neighbour states could request an exemption from the policy which would limit the economic losses.

### Give and take

According to Saatkamp, the process of obtaining the research results was at least as important as the resulting publications on differing regulations. "As we met with scientists and policy-makers twice a year, people became acquainted with one another and learned to understand each other's' positions." On the Dutch side the meetings generated more knowledge on the role division between German states and the federal government in Berlin, for instance. "People know each other now and that is important. Making agreements on these issues is a matter of give and take, which can only be realised when people trust each other."

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Helmut Saatkamp  
[helmut.saatkamp@wur.nl](mailto:helmut.saatkamp@wur.nl)

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[www.wageningenUR.nl/bec](http://www.wageningenUR.nl/bec)

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“*Agreements on these issues can only be realised when people trust each other*”



# Innovation can be learned

The Netherlands has many years of experience with innovation networks in agriculture, giving farmers, companies and scientists a framework for cooperation. Innovation brokers bring these different partners together, and support the innovation process. There is a great deal of interest in this concept abroad.



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At the end of the previous century, industrial agriculture in the Netherlands had accumulated numerous excesses. Scandals piled up, from water pollution by fertilisers to the excessive use of antibiotics and animal welfare issues. There was a need to design more sustainable farming systems. "At the same time, in the 1990s, the traditional partnerships between industry, farmers' associations, government and research institutions had broken down due to the privatisation of the knowledge infrastructure," says Laurens Klerkx, associate professor in the Knowledge, Technology and Innovation group.

Klerkx' research group has been studying innovation for fifty years. He obtained his PhD in 2008 on research investigating the role of intermediary organisations in innovation. His research has garnered interest among colleagues from both agricultural and innovation sciences, as well as organisations such as the World Bank and the Organisation for Economic Cooperation and Development (OECD).

### Chickens

The relationship between parties such as researchers and farmers is important for generating new ideas, business processes and technologies. This is why the Dutch government – often together with parties from the agricultural sector – has supported the development of innovation networks and platforms through the establishment of so-called innovation brokers. A network provides space for all kinds of parties to collaborate, such as farmers, researchers, advisors, policymakers, advocacy groups, consumer organisations, suppliers and wholesalers. "Innovation brokers enable innovation by bringing together the right partners and fostering understanding between them," Klerkx explains. As an example, Klerkx mentions the *Rondeel*, a round pen for free-range chickens that improves their wellbeing. Wageningen scientists began developing this system in 2004, and, after a number of companies joined the initiative, the first *Rondeel* became operational in 2010. The eggs are sold at

a large supermarket chain, and there are now four *Rondeel* sites throughout the country. "Innovation brokers such as the organisations Transition & Society and TransForum, that brought together the partners, lobbied the government and ensured funding, played a crucial role," Klerkx points out. In his study of innovation brokers, Klerkx lines up the conditions for success, such as independence. Initially, the intermediaries were often linked directly to research institutes. This didn't work very well. "The intermediaries were quickly seen as extensions of the knowledge institutes, looking to win orders," Klerkx explains. Furthermore, as companies cannot bear all the costs in an uncertain process such as innovation, it is important that core funding for the intermediary function is provided by the government or the farmer organisations. Moreover, innovation brokers need to have a certain autonomy. "Innovation needs to change existing structures, so you can't always remain on the beaten track," Klerkx says.

### Global trend

"In the Netherlands, innovation networks and innovation brokers are now considered as an obvious solution, but policymakers and researchers around the world are very interested in our experience," Klerkx notes. He was recently in Australia and New Zealand, where the relevant actors wish to switch from the old-fashioned system of agricultural research and advisory services to a network model for innovation. And the EC has already included innovation brokers in its policy as a way to facilitate networks in agriculture. Today, the possible deployment of innovation brokers is also being investigated in countries like Chile and Kenya. "Promoting agricultural development on the basis of networks fits into a global trend. In Africa, actors such as farmers, policymakers and the agricultural industry also face challenges that require cooperation." The concept does need to be applied flexibly, however. "While a network approach might work well within the Dutch polder model, other cultures can be less focused on cooperation."

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Laurens Klerkx  
laurens.klerkx@wur.nl

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www.wageningenUR.nl/kti

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“Innovation brokers need a certain amount of autonomy”



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# Laying the ground for soil extraction

Although soil extraction along major rivers is essential for construction, there are certain risks. The Wageningen UR Science Shop analysed the dangers and found flaws in the current legislation, including the need for more checks for water and air pollution.





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Along the rivers in the provinces of Gelderland, North Brabant and Limburg, soil is extracted for the construction sector, including for the production of concrete and masonry sand. In addition to the building industry, extraction also benefits the regional economy as companies pay councils significant sums to be allowed to extract soil. Local residents, however, often have to endure years of noisy trucks going by, as well as dealing with possible damage to houses and changing landscapes as well as water and air pollution. There is also an increased risk of flooding and the collapse of dikes.

### Concern

To counteract these scenarios, a license procedure is in place in which the province weighs all interests and risks. As compensation for the inconvenience, the newly created water pool must also have 'social added value', for instance developing it into a recreational lake or nature area. Due to its highly suitable soil, the village of Deest in the so-called 'land of Maas and Waal' in the province of Gelderland has a long history of soil extraction. A group of residents was worried about four new soil extraction projects. They did not want the landscape to change any further, and indicated that the combined consequences of the four extractions had not been analysed. Moreover, one of the extractions was located near an old rubbish dump, causing concerns about ground water pollution. United in the 'Goeie Gronde' foundation, the residents challenged the development plan for soil extraction before the Council of State in 2012. To fully prepare for the case, the foundation approached the Science Shop of Wageningen UR. "Social organisations with few financial resources can come to the Science Shop with their research questions," Professor in Regional Economics Wim Heijman explains. The research into the consequences of soil extraction was in line with the activities of social sciences. "It involves a mix of technical issues, economic interests, social problems and environmental effects."

### Dual role

Two groups of students studied the planned soil extractions. Scientists then evaluated existing extractions in Deest and other locations. They mainly looked into technical and cultural historical aspects as well as the different views of the stakeholders. It showed differences between extractions on the land and river side of the dikes: extractions on the latter result in fewer problems as there are not so many direct neighbours. Public support is always crucial but will crumble when relationships are disrupted, as was the case in Deest. Wageningen know-how mitigated the differences in Deest and enabled the discussion to be revitalised. Heijman: "The scientists were able to bring the local problems to a higher level." In addition, license application procedures were shown to vary per province. "The province of Gelderland is relatively transparent, but the officials who decide on the licenses also negotiate with the soil extraction companies during the many years of preparations. This essentially made them a stakeholder themselves," says Heijman. Following the Science Shop report, the government has now better separated the dual role of the province as consultant and license provider.

### Wishes

The scientists also argued for stricter checks of aspects such as water quality and fine particle emissions. "There are currently too few checks during and after the activities. This means we have insufficient insight into the effects of soil extraction", states Heijman.

Eventually, the *Goeie Gronde* foundation was victorious; the Council of State decided to cancel the development plan in Deest. There may be follow-up research into the wishes of residents and municipalities with regard to the landscape after soil extraction. Heijman: "We want to develop a procedure that results in soil extractions with minimal inconvenience and maximum social added value afterwards."

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Wim Heijman  
wim.heijman@wur.nl

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www.wageningenUR.nl/aep

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“ There are currently too few checks during and after the activities. This means we have insufficient insight into the effects of soil extraction’

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# The limits of a label

Certification is a promising way to make aquaculture more sustainable, but it has limitations. For now, only a happy few in rich countries can afford to pay attention to labels. Cooperation between governments and NGOs can improve the impact of certification.



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South East Asia has become the world's fish farm over the last twenty years. Vietnam and Thailand are now major producers of a wide range of species, including shrimp, pangasius and tilapia. This rapid growth has not been without problems, however, leading to the pollution of rivers and coastal areas with nutrients and antibiotics, and the degradation of numerous ecosystems. NGOs have tried to combat the negative effects of fish farming by means of certification. Farmers who operate according to certain standards receive a certificate that opens up lucrative markets for their products in places like Europe, North America and Australia.

### Western hobby

Certification has its limitations, however, says Simon Bush from the Environmental Policy group at Wageningen UR. It is criticised for excluding poorer small farmers, who are unable to make the investments needed for a certificate. Certification based on environmental criteria alone therefore often proves effective but inequitable. But the most important factor is the small proportion of the world production that is now certified. While rich Western consumers may be interested in buying certified fish, the overwhelming majority of consumers elsewhere take no notice of labels. Only 4.6 per cent of the world's aquaculture production is certified. "This has to change," Bush says. "The biggest gains can be achieved not with the best performing five per cent, but with the worst performing half of the farms."

### Science

Bush attempted to formulate a solution to these problems in a paper he published with a group of international colleagues in the renowned journal *Science*. He proposes a larger role for governments in the certification process – a counterintuitive step for a lot of the people currently involved in the process. In general, there are two reasons why certification initiatives arise. The first is government failure: when governments are unable to regulate production, interest groups

try to find other ways to create and enforce standards. The second reason is fear of overregulation in the industry, which causes companies to introduce voluntary standards to prevent this happening. Both these reasons explicitly reject government interference.

Why then does Bush promote government as a means to improve the effectiveness of certification? "Governments have historically faced limitations of their own in regulating aquaculture, but the claims that we need certification because governments cannot manage are outdated in many cases. Major producing countries such as Vietnam and Thailand demonstrate strong regulating capacity by governments, as shown by the development of their own standards." This does not mean that there is no place for private certification, he continues. "It simply means that we have to look at how state and private certification can complement each other – private certification picking up the best performers and state standards supporting improvement in the rest."

### Holistic

The paper sparked debate among scientists and other stakeholders, especially its apparently weak prospect of certified products. There is some hope that big markets like China and Japan will also become more interested in certification, perhaps focused more on food safety and less on sustainability. But there are no clear signs yet that rapid development is around the corner in those countries.

A number of certification schemes contacted Bush to discuss the possibilities of overcoming their limitations in supporting smallholders. "They would like to develop alternative approaches to certification, such as ecosystem or landscape certification," Bush explains. "This is likely to facilitate a more holistic view of both social and environmental impacts." Bush and his colleagues submitted a project proposal to the Dutch research finance organisation NWO to follow up on this latter point in collaboration with industry partners.

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Simon Bush  
[simon.bush@wur.nl](mailto:simon.bush@wur.nl)

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[www.wageningenUR.nl/enp](http://www.wageningenUR.nl/enp)

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*The biggest gains can be achieved with the worst performing half of the farms’*



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## Negotiating 'patents on life'

There is widespread unease with 'patents on life' in Germany. Wageningen researcher Peter Feindt played an important role in the discussions leading up to the decision of the German parliament to clarify the conditions under which agricultural plants and animals can be patented.



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The right to patent living organisms has been hotly debated since the beginnings of modern biotechnology. In 1980, the US Supreme Court decided that a patent could be granted on a bacterium able to digest crude oil that had been cultivated by a genetic engineer working for General Electric. The court decided that the bacterium was a product of human ingenuity, and could therefore be patented. Since then, there has been an ongoing debate on which biological material can be patented, and under which conditions.

### Broccoli and tomato

In 2002, a British company was granted a patent on a method to breed a new variety of broccoli. A similar patent was granted to an Israeli research institute for a method to breed tomatoes containing less water. In 2008, after protests by farmers, NGOs and groups affiliated with churches, the issue became a subject of public debate in Germany. The country's largest newspaper, the *Süddeutsche Zeitung*, devoted a great deal of attention to patents on life. Wageningen researcher Peter Feindt was asked to clarify the matter in a report for the German ministry of agriculture. This was a complex issue as the legal framework for biopatents is determined by national law as well as EU legislation and international treaties.

Opinions on the subject were divided within the German government. The Ministry of Agriculture, led by a Christian Democrat and traditionally favourable to small and medium-size companies, wanted stricter regulations preventing patents on traditional breeding methods. The Ministry of Economic Affairs, led by a Liberal, was never in favour of specific rules for agriculture and stressed the importance of patent protection for the German industry. A similar divide emerged in the Netherlands, with its numerous medium-size plant breeders. Most of them are opposed to patenting their varieties and are happy with

the current '*kwekersrecht*', according to which they can use the varieties of other breeders to breed new ones without paying royalties. They fear that patenting will slow down innovation.

### Friendly letter

The report by Peter Feindt and his colleagues formed the basis for a ministerial strategy on biopatents. In 2010, a ruling by the European Patent Office clarified that traditional breeding methods cannot be patented. The German government had submitted the report by Feindt to the court as an *amicus curiae* brief, a 'friendly letter to the court'. After the ruling, the debate shifted to 'product-by-process patents', an attempt to get a patent on the broccoli and tomato via a process other than the breeding method. Together with law professor Matthias Herdegen from Bonn, Feindt wrote another expert report to explain the potential problems for agricultural plant and animal breeding. In 2013, the German parliament changed the patent law, reinforcing the exclusion of traditional breeding methods from patentability and ruling out product-by-process patents.

Peter Feindt was closely involved as an advisor in the policy process. He gave presentations at government symposia, wrote reports, and gave testimony at the German federal parliament. A month after his presentation, the five major parties published a joint statement on biopatents that included some of the key arguments he had made. The document formed the basis for an amendment of the patent law that made it impossible to grant process patents on living organisms. What was Feindt's role in all of this? Was he an impartial researcher, a lobbyist, or a consultant? "The role of the policy advisor is to clarify the options and what is at stake. And for me it was also participatory research," he says with a smile.

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Peter Feindt  
[Peter.feindt@wur.nl](mailto:Peter.feindt@wur.nl)

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[www.wageningenUR.nl/com](http://www.wageningenUR.nl/com)

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“*Plant breeders fear that patenting will slow down innovation*”



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# A recipe for healthy cooperation

Various professional groups are joining forces to handle complex health issues. Some collaborative projects fail, while others do very well. What is the secret behind the success of health alliances?





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For health issues such as cardiovascular diseases, age-related diseases, obesity, cancer and addictions there is no such thing as a quick fix. Prevention, treatment and care of these issues can, in addition to physical, psychological and cultural factors, also involve social environments or economic factors such as unemployment. Dealing with these complex issues is increasingly in the hands of health alliances that may include prevention employees, home care workers, family doctors, officials, civilians and scientists. Twenty years ago Maria Koelen, now Professor Health and Society, and her colleague Lenneke Vaandrager, performed research for the Healthy Cities project in which eight European cities aimed to create a healthier food supply under the slogan: 'making healthy choices easy choices'. Parties such as health professionals, government officials, supermarkets, restaurants and scientists worked together in each city, to promote a healthy diet. "Supermarket customers were provided with healthy recipes, information on product compounds, tours by dieticians and cooking demonstrations. This was still very new in 1991," says Koelen. Establishing joint projects and keeping them afloat turned out to be tricky, however. The involved scientists mapped the challenges and pitfalls of collaboration.

### Agree to disagree

At the end of the nine-year European programme, Koelen and her colleagues identified seven organisational preconditions for successful collaboration, marking the start of the Health Alliances Framework (HALL Framework). Some conditions were obvious, such as proper project management and good formal and informal communication. "Sometimes the importance of having a coffee together is underestimated." A flexible timeframe also helps. "If you plan a meeting in the morning, family doctors won't be able to attend. But around four in the afternoon, municipal health service employees are off duty." A decisive factor for successful cooperation is the shared mission, and allowing space for people to

agree to disagree. "You can't agree on everything, but you must agree on the goal of the project. In the Healthy Cities project the health of the residents was the main goal. At the same time, supermarkets wanted to make money, while universities hoped to stimulate research."

### Conflicts

Sometimes the policy, mission and working method of the organisations are too different, concluded the scientists after studying a failed collaboration project focused on health promotion among asylum seekers. This insight helped to further develop the HALL Framework. In an alliance the organisations determine the organisational preconditions based upon their policy, mission, funding and work methods. Koelen saw major conflicts on occasions. "Conflicts are not always a bad thing as they can create more clarity... As long as there is room for discussion." At least as important as the organisations are the individuals involved. "When someone leaves, a successful project may start to falter. It is something we have seen often," says Koelen. Good relationships are crucial. People often think that collaboration requires money, but once an alliance works, finances are not of the essence. "People will continue working together after the project period if they see the importance, as we have seen on a number of occasions."

To find scientifically sound information, Koelen and her colleagues developed new research setups and measurement tools, such as the Coordinated Action checklist. This participatory action research tool produces evidence about ongoing change processes, contributes to changing the studied situation and promotes learning among the people closest to change. Making the elements of the HALL Framework measurable is work in progress, Koelen underlines. "The factors on an individual level are especially difficult to measure. By combining the development of abstract theory with action research in practice we are increasingly successful."

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Maria Koelen  
maria.koelen@wur.nl

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www.wageningenUR.nl/hso

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“ You can't agree on everything, but you must agree on the goal of the project' ”

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# Is the smartphone cleaning Chinese air?

Over recent years the Chinese central government has been publishing data on air quality in cities and on factory emissions. This enables residents of Beijing, Shanghai and other large cities to see how polluted the air is on their mobile phones. Wageningen environmental experts are studying whether this is helping combat pollution.



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As of 2006 it has become much easier to protest about polluting factories or failing officials in China. The central government decided to give civilians many more options to access data on pollution, polluters and environmental quality. This new transparency is being fully used. Examples include an app that indicates in real-time how polluted the air is, websites that provide hit lists of the most polluting companies in China, and an interactive website developed by an environmental organisation which lists emission and environmental quality data throughout China.

There is much more transparency with regards to environmental issues than in other areas. Bloggers and journalists, for instance, still have to be very careful when writing about issues like Tibet or Taiwan. By allowing more transparency on the environment, the central government hopes to counterbalance local governments and companies that are not too interested in the environment. Moreover, transparency also results in more reliable environmental data. Data from local governments and companies often includes 'information distortion', where data is manipulated to fulfil environmental norms.

### Smog

Research into China's environmental policy is an important pillar of the Environmental Policy group of Wageningen University. It is co-financed by the Dutch research financiers KNAW and NWO as well as Chinese government ministries. Transparency on urban and industrial air and water pollution and food quality is a major research priority. Professor in Environmental Policy Arthur Mol: "We analyse the available information disclosure policy, which information is actually being made available, to what extent citizens trust the data, and which behavioural changes may result from it."

### Transparency

Air pollution is particularly high on the agenda in major cities such as Beijing. According to Mol

this is because polluted air in cities generates considerable discontent among residents, who see and experience on a daily basis the government's failure to protect their health. Severe smog therefore damages the legitimacy of the government. How much the new transparency policy contributes to cleaning the air in cities like Beijing is not easy to establish, says Mol. "It is difficult to identify a causal relation at high aggregation levels such as cities or countries. But we have shown that transparent environmental data leads to public pressure, which results in polluting companies being shut down."

### Democracy

The research into the Chinese environmental policy also contributes to the scientific debate on whether countries with authoritarian governments handle environmental problems better or worse than democratic countries. The notion that transparency and citizen participation are essential to effectively combat pollution is under discussion among scientists. In the debate China is used as an example of the administrative power of authoritarian states to improve environmental quality. For example, China planted trees across enormous areas to prevent soil degradation and erosion, and the central government managed to make China global leader in the production of solar panels and wind turbines within just a few years. Several Chinese cities are limiting the number of cars by the capping and auctioning of license plates, which obviously results in only the wealthiest residents being able to purchase a car. Mol: "Our research contributes to the debate on the pros and cons of authoritarian environmental governance. Can one shop selectively and combine the strong points of democracy with the strong points of authoritarian systems, or is it a total package?"

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Arthur Mol  
Arthur.Mol@wur.nl

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[www.wageningenUR.nl/enp](http://www.wageningenUR.nl/enp)

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“We have shown that transparent environmental data leads to public pressure, which results in polluting companies being shut down’



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# The unexpected storm involving a high-rise pig farm

Professor Katrien Termeer supported an alderman who became caught up in a row between ambitious farmers and angry citizens. It resulted in various follow-up commissions, including from the Agri & Food top sector which is looking to strengthen public support for agriculture.



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In 2008 the alderman of the small village Horst aan de Maas was stunned by a sudden wave of protests about a plan for a 'mega farm' of which he had initially been rather proud of. A new mixed company, he called it in his memoranda; an innovative company in accordance with the latest sustainability insights from Wageningen UR on closed production systems. Two innovative entrepreneurs were willing to invest millions of euros in the plan.

### Mega pig farm

Objectors, however, called it a high-rise mega pig farm, and the alderman was heavily criticized in the local and national media. After a decision had been taken in the municipal council, the alderman contacted public administration Professor Katrien Termeer. "I had just given a lecture on discussions around mega-farms, and the alderman called me to talk about the administrative process," Termeer explains. Together with the chairman of the local social-democratic political party, who objected to the project, he wanted to review the decision-making process of the municipality. Together they asked Termeer to investigate the municipal decision-making process, and how they could learn from it.

The position of Dutch aldermen is often difficult, Termeer continues. On the one hand, the national government demands cooperation with national plans, and aldermen are blamed for not looking further than their own regions in deviating from these plans; on the other hand, local people expect them to represent their interests.

In accordance with the regulations, citizens were involved in the development of the concept of the new mixed company, and local information and consultation meetings were organised. However, the protesting citizens had not attended these meetings. In the end, the protest was led by the residents of Grubbenvorst, the village in which the company was due to be established. "It is difficult to involve the population in the decision-making

process at the right time," says Termeer. "Do it too soon and nobody shows up as the plans seem too vague. Do it too late and people are angry because they feel ignored."

### Research report

"We also concluded that at a certain moment, presenting more research is no longer effective to solve controversies," adds Termeer. The municipal council responded to worries about fine particles and odour nuisance with research reports. But scientific reports obviously list uncertainties as well. For the people who lacked trust in the local council, the reports that were intended to put them at ease only made them more suspicious. The scientific uncertainties acted as new fuel for their protest.

The small study for Horst aan de Maas resulted in Termeer becoming involved in more research projects into administrative issues related to consumer confidence and intensive breeding. Recently, for instance, Termeer concluded research for the Agri & Food top sector on how to increase public acceptance of intensive livestock breeding. "We stated that they had to pay attention to three factors: the relationship between farmers and citizens, trust in the livestock sector as a whole, and the constraints of business models."

The latter two issues were not as well-received as the first, according to Termeer. "Many administrators like to hear that farmers are improving contacts with their neighbours, and think that this is all that's required. This is not the case. When farmers don't have the financial resources to fix possible complaints from local people they really don't have anything to offer as a resolution. And individual farmers may organize a nice barbecue with the neighbours, but if the entire sector is shown in a bad light, due to Q fever, for instance, they will never be able to convince them there is nothing to worry about."

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Katrien Termeer  
katrien.termeer@wur.nl

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www.wageningenUR.nl/pap

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“*It is difficult to involve citizens in the decision-making process at the right time*”

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## Green Economy

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**Contact**

directiessg@wur.nl

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