



Knowledge with impact



LEI

WAGENINGEN UR

For seventy-five years now, LEI has been an independent and trustworthy socio-economic research institute. Operating within the 'healthy food and living environment' domain at Wageningen, we have not only developed high-quality economic knowledge for decision-makers in government and the commercial sector, but also applied it throughout the world. In this brochure you can find many facets of our work and its visible impact on our customers, society and sustainable economic development.

LEI is well-known and respected internationally. We have a high number of satisfied customers and partners. Our demonstrable scientific, societal and economic impact is noted with some regularity by external international scientific review committees. For many years, we have had an exceptionally high success rate with our research proposals in the competitive European R&D framework programmes. In short, LEI is a research institute to be proud of.

LEI's strength derives from the combination of up-to-date economic and sector-based knowledge, unique data and models. We follow the agenda in Brussels closely and have a significant international network of research institutes, companies, governmental bodies and other stakeholders. There are over 260 staff at LEI and they know the ins and outs, from the primary sector to the entire agro-complex, from the micro level to the macro level, and from economic and financial policy to food, nature and environmental policy.

I hope you enjoy reading this brochure, hoping you will be inspired and captivated by what we do. If you have any questions about what you have read, please don't hesitate to contact the appropriate LEI researcher listed in this brochure.

Laan van Staalduinen
General Director, LEI Wageningen UR



The search for a sustainable balance

The relationship between humans and the Earth is not sustainable. This implies we are facing two major, interrelated challenges. How can we ensure that everyone has access to sufficient fresh water and healthy food, adequate energy and a certain level of well-being? And how can we make sure that the Earth becomes vital, healthy and robust once again? We have a tendency to consider various aspects of the interaction between our planet and people in isolation. However, this does not help us to tackle those two challenges. We need to think and act in terms of the bigger picture to find the right balance, going from a fundamental understanding to applied research to arrive at design and implementation. Our technical colleagues at Wageningen UR understand the Earth and its physical preconditions, and LEI has specific knowledge of society and the principles behind its organisation. This knowledge supports the transition to a circular economy by designing institutions, encouraging behavioural change, developing and implementing new technology and by contributing to system-wide innovations.



Towards a bio-based, circular economy

"Organic waste and vegetable matter are mostly used as biomass for energy production. But biomass is worth more than that. We help develop business models and design supply chains that make it possible to get the utmost out of biomass. In addition, we give organisations a picture of the macroeconomic effects and social acceptance, as well as sustainability analyses, both at the company and at supply chain level."

Hans van Meijl (hans.vanmeijl@wur.nl)
Programme manager for the Bio-based and circular economy at LEI Wageningen UR

Successful recycling pathways

Compost or energy can be made from the organic waste from agricultural companies. "Recycling means we need less raw materials, and emissions often decrease too. It's good for the economy and the environment," explains LEI researcher Marie José Smits. She is studying the circular economy for the Ministry of Economic Affairs. "Recycling within a company is often the most efficient approach, because you can't store and transport everything equally easily. Think of heat, CO₂ and nitrogen." One example is the combination of livestock farming with algae or duckweed. Algae and duckweed need heat, nitrogen, phosphorus and CO₂ to grow and they provide high-protein animal feed. "There are all kinds of possibilities," says Smits. "The current key challenges are in the field of economic viability. That's why we're working on new business models and arrangements with companies all the way along the chain."

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Marketing horticultural waste

Residues and waste from horticulture are usually composted. The fibres from the leaves and stalks can also be used for producing paper and cardboard. Compounds for the chemical and pharmaceutical industries can be extracted from tomatoes that do not look good enough to make it to the shops. The Westland area is the centre of Dutch greenhouse farming. Together with horticultural companies and other local stakeholders, the municipality of Westland wants to develop a bio-based business parc for processing and commercialising vegetable materials. "This is promoting a sustainable regional economy, cutting transport costs and creating a possible source of income for the local greenhouse industry," says LEI researcher Theo Vogelzang. LEI helped determine the best location for a bio-based business parc: the Biobased Boulevard of Van Vliet Contrans in Hoek van Holland. "Bio Base Westland followed that advice and is now busy with the realisation phase."

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The unknown is unloved

"Consumers don't have any idea of what bio-based products are. They suspect it has something to do with the environment," says LEI researcher Marieke Meeusen. "People say they need information and a quality mark to identify bio-based products." She is studying the acceptance of bio-based products for the European project Open-Bio. In this project, research institutes are developing quantification methods and indicators for environmental effects and studying the requirements for a consumer information system and labelling. "We're also going to investigate the expectations of companies and governmental bodies. If governmental authorities use a sustainable purchasing policy, it would give an enormous boost to the bio-based market," Meeusen emphasises. LEI has designed a new tool for companies and governmental authorities for consumer research into bio-based products.

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Good practices in the region

Availability of biomass, proper logistics, expertise centres close at hand and demand for biomass from the chemical industry or paper industry, for example. Complemented by political will, a strategic plan, innovative companies and incentives. These are key conditions for the transition to a successful bioeconomy. In the European project BioEconomy Regional Strategy Toolkit (BERST), LEI cooperates with regional parties to create a toolkit for developing the local bioeconomy. "It enables regions to determine what opportunities there are and what the best strategies are for utilising them," says Myrna van Leeuwen. She is a researcher at LEI, which is coordinating the project. "There will also be a list of good practices, so that regions can follow the example of competitors that perform well. In the Netherlands for example, that is Biobased Delta, with two large ports, a large chemical industry presence and plenty of biomass available."

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Better use of palm waste

Malaysia, the world's second largest palm oil producer, wanted to know how to get the most from that industry's waste and by-products. "There's a lot of waste material, such as palm leaves, trunks and empty palm bunches," says Hans van der Meijl of LEI. "Our study showed that the most favourable approach was to use them in the chemical sector." Using them for biodiesel or bioethanol is possible too. That is equal to compressing and transporting the biomass to the Netherlands by boat, where it is converted into green energy by large energy companies. Van Meijl: "The best thing to do is to optimise a mixture of different applications. Getting biofuel from vegetable waste rather than from food crops is pretty revolutionary and still under development." We are currently carrying out a similar macroeconomic assessment for the development of the Dutch bio economy sector.

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A bio-based, circular economy

In a bio-based and circular economy, food, energy and fuel are produced sustainably and efficiently, and the recycling loops are closed as much as possible. It requires close cooperation between companies, policy-makers, NGOs and researchers. We help our customers to design and organise supply chains and clusters, mobilise the surrounding area and the stakeholders, and do research into the market potential and the societal acceptance of the bio-based economy. This way we improve the competitiveness of companies, regions and the economy as a whole.

www.wageningenur.nl/lei/bio-based



Natural resources and living environment

The growth of the world's population and our current way of life have changed the climate, exhausted natural resources and increased pollution. Cities are growing, more food is needed and the risk of flooding is increasing in delta areas. In short, our environment and our way of consuming are coming under increasing pressure. Governmental bodies and companies can improve the sustainability of society and create economic value by affecting behaviour and providing financial and economic incentives. Socio-economic insights and recommendations let LEI help governments and companies to develop these incentives. LEI also helps organise things better, with suitable governance. This will let us produce more from fewer resources.

Green growth

Green growth means economic growth that affects nature and the environment as little as possible. "Decreases in greenhouse gas emissions may avoid sharply increasing costs in future, and recycling raw materials may help prevent shortages," says LEI researcher Floor Brouwer. "In the long run, this may become a precondition for economic growth." He studied examples of green growth for the Ministry of Economic Affairs. More collaboration between sectors and supply chains is crucial for this. In addition, the government can introduce more sustainable purchasing and cooperate more with provinces and municipalities. "There are also opportunities for sustainable innovation, energy savings at business park and decentralised generation of renewable energy by companies," says Brouwer. "The government can encourage this through legislation, regulations and financial incentives."

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The climate and food prices

The consequences of climate change will affect agriculture and food prices worldwide. LEI has developed a model to study various scenarios for the year 2050. "Depending on the temperature rise, we have looked at what the effects are on supply and demand in food production, and on the prices. In the more negative scenarios, there is a large impact and food prices increase," says Hans van Meijl, the LEI programme manager. "There's quite some debate about whether global market prices will rise or can remain stable, given the climate change. This study has let us shed a lot more light on this. We also refer to new research areas such as technology and consumer behaviour." The study, which was performed together with the OECD, FAO, IIASA and IFPRI, emphasises the importance of comparative model studies and taking measures in time, according to Van Meijl.

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Insight into all costs and benefits

LEI includes the positive and negative effects of a proposed intervention in its social cost-benefit analysis, expressing it in euros as far as possible. "When a dyke is constructed, the goal is to make sure that people can live more safely," explains LEI researcher Stijn Reinhard. "Investments are made and there are effects on the environment and nature." Such analyses are mandatory for major infrastructure projects, but the governmental authorities are using them more and more for other projects too. "We pay a lot of attention to communication with the stakeholders and interested parties about what we are going to do and what choices will be made," says Reinhard. "We developed an interactive cost-benefit analysis that we apply together with the stakeholders. They use a computer program to see what costs and benefits are important, which makes it possible to take efficient, well-substantiated and properly supported decisions."

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A pleasant working atmosphere

Greenery makes a city attractive, but municipalities have less and less money to spare for it. Trees, parks and gardens make companies more appealing for employees and customers alike, and fit in with the trend of corporate social responsibility. LEI studied the importance of greenery for small and medium-sized businesses. The researchers studied recent projects with large green areas such as Citymall Almere, the Ecommunity business park in Oosterwolde and the revitalisation of the inner city of Hoogeveen. The Green Value Pointer – an indicator for assessing the value of green areas – was developed for the purpose, giving a picture of the added value of green for companies. "It shows business people whether investments in green areas are useful and which stakeholders – such as local residents, other businesses and the municipality – also benefit from them and may want to contribute," says LEI researcher Marijke Dijkshoorn.

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Balanced decisions for complex questions

Consumers, producers and retailers make decisions about the products that they buy, make and sell. Take meat for example. If you want something you can cook quickly and easily, you will choose different ingredients than for a dinner party. The price plays a role and – increasingly often – so does the question of whether it is healthy, sustainable and animal-friendly. Many people are for instance prepared to pay more for milk from cows that are kept outdoors in the fields. “That looks nice in the countryside and it’s good for animal welfare, but it’s less good for the environment,” says Krijn Poppe, Programme Manager at LEI. “The animals’ manure can’t be processed then, for example.”

“You can only make a properly balanced decision if you take account of all the interests within society,” he continues. “Health, a prosperous society, sustainability, animal welfare and nature are becoming more and more important. Sustainable production raises questions about the best technology and production method, such as conventional or organic agriculture. And about the best way to organise things too. Should monitoring food safety be a job for the governmental authorities or for the commercial sector, for example?”

LEI resolves issues about agriculture, nutrition and the surroundings we live in that affect multiple parties with conflicting interests, both inside Europe and throughout the world. We have been helping the Dutch and European authorities to answer policy questions for a long time now. “That also makes our institute an interesting partner for the commercial sector,” adds Poppe. “The relationships between companies, farmers and the government are a recurring theme in our work. Where the manuals don’t have the answers, we’re the ones they come to for help solving complex questions.”

We are an independent party who can sit down with all the stakeholders and think up solutions. We take an objective approach in which we extract the arguments and identify stakeholders’ interests. “If the evaluation process is properly organised, it’s easier for the parties to reach a deal with each other,” says Poppe. “An essential part of that is using simple concepts and indicators.” For example, we help the global market leaders in agricultural machinery, IT companies and retailers to exchange data. Information about crop protection products, for instance, no longer has to be exchanged merely between the tractor and sprayer manufacturers, but also with accountancy firms, cooperatives, supermarkets and the authorities. Poppe adds, “We work in international teams designing systems for data exchange and indicators for sustainability that encompass the entire supply chain.”

Behaviour is crucial in the considerations associated with an innovation. “LED lights do use less energy, but not if everyone then puts up loads of LED lighting in their gardens in the winter,” he adds by way of an illustration. In addition, people do not necessarily embrace every technical innovation – just think of GMO food or the plans for charging for road use in the Netherlands that keep being scrapped. “If you work with the public at an early stage to gain broad social acceptance and make allowances for changes in behaviour, you reduce the risk of failures.”

“LEI Wageningen UR is known throughout the world for quantifying and evaluating agricultural interventions. LEI is the world leader in this field. That gives us extra confidence in the research – its high quality and reliability and its lack of bias.” They’re also wonderful, committed people to be working with. LEI provides the evidence that shows us that the investment in this public-private partnership is working and helps demonstrate the benefits of Unilever’s support for sustainable agriculture.”

Mark Birch, Sustainable sourcing manager at Unilever



Sustainable tea

"LEI has important skills available in house that you do not find at the consultancy agencies, such as the credibility of being an independent research institute, with academic underpinnings and a solid knowledge of the methodology. On top of that, LEI is capable of mobilising good local partners. Along with Unilever and LEI, we're going to start up a similar project for tea farmers in Tanzania."

Dave Boselie, Senior manager learning & innovation IDH, The Sustainable Trade Initiative

A major project is under way in Kenya with 'farmer field schools' to teach tea farmers more about tea cultivation. Impact assessments by LEI show the success of the project. It started with a pilot involving 121 tea farmers. At this moment, no fewer than 96,000 tea farmers are following the training course.

Approximately half a million farmers grow tea in central Kenya. In the past, agricultural advisers told the farmers the best way to grow the crops. However, a pilot started in 2006 with 121 growers in farmer field schools. The farmers got together in groups of thirty for a few hours every two weeks for a year. They learned the best methods for weeding, pruning and fertilisation there, as well as e.g. how to keep records of how much fertiliser they used and how big the harvest was.

The pilot was set up by the Kenya Tea Development Agency (KTDA) and Unilever (Lipton). The aim was to make the cultivation more sustainable, improve tea quality and obtain Rainforest Alliance certification for nature and environment conservation and sustainable labour practices. Since 2010, the IDH Sustainable Trade Initiative has been involved in the public-private partnership with KTDA and Unilever. Because of its methodological expertise and its status as an impartial organisation, LEI was asked to evaluate the impact of this cooperation.

After these evaluations by LEI, the project was extended from 744 farmers in 2007 to 18,000 farmers in 2012 and finally to 96,000 in 2015. Ultimately, all the tea farmers in the area will benefit from the project. "There is a spill-over effect," says Yuca Waarts, a researcher at LEI. "If twenty per cent of the farmers receive training, the estimate is that eighty to ninety per cent will start working more professionally and more efficiently because they learn from the trained farmers."

Waarts explains that these farmers spend less money on labour. "You also see that they are more likely to follow the manufacturer's recommendations and use the knowledge from the training courses and their own records to help make decisions." In addition, trained farmers do more to diversify their incomes by growing other crops as well or by keeping chickens. Waarts says, "That is important because of the fluctuations in the world market price for tea, which hit the farmers directly in their pockets."

Numerous studies have been done into the effectiveness of farmer field schools. In 2014, 3ie (the International Initiative for Impact Evaluation) compared these studies. Our study was assessed as being one of the few studies that was underpinned by good methodology. "We are delighted with that recognition," says Waarts, "and of course it's nice to see that based on your research nearly 100,000 farmers are receiving training." yuca.waarts@wur.nl



Number of tea farmers joining the farmer field schools

WWW

wageningenUR.nl/lei/projects

More trade with the US
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The USA and the EU want to sign a trade agreement called TTIP. Simpler export procedures and greater harmonisation of the rules for food safety will result in more trade and greater prosperity. Within the Dutch agricultural sector, the dairy sector in particular will benefit. According to LEI researchers, the meat sector will face greater competition.

EU agricultural policy
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LEI is investigating the consequences of reforms to the EU's Common Agricultural Policy for farmers, food prices, the world market and nature, as well as developing and calculating new scenarios for policymakers.

Oyster reefs against flooding
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Artificial oyster reefs in Bangladesh are contributing to sustainable coastal defences. They are not only a rich food source but also a stimulus for the local economy, according to the international pilot project ECOBAS.

A better future for farmers
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LEI trains dairy farmers in Poland, Slovenia and Lithuania to help them make the most of changing market conditions, such as the consequences of joining the European Union. Using an innovative methodology called Interactive Strategic Management (ISM), farmers develop skills such as entrepreneurship, strategic thinking and how to convert a strategic plan into an action plan.

Milk cooled by solar power
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It is economically important for farmers in Ethiopia to keep the milk from their cows cooled until it is collected for further processing. LEI examined the possibilities together with Mueller (a supplier of milk cooling tanks) and other local parties involved in the supply chain. The solution: small-scale cooling using solar energy.

Food policy for stability and peace
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The establishment of the Agricultural Information Center in Saudi Arabia, with support from LEI, is crucial for the development of agricultural policy in the country. In the future, proper food supplies will contribute to social and economic stability and peace.

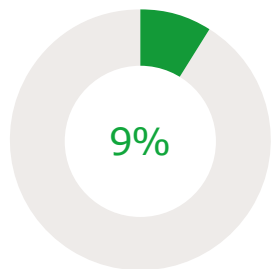
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Seventy cents of every euro is earned through Dutch exports



Added value of the agribusiness complex to the Dutch gross national product



www.agrofoodportal.com

Current facts and figures and the latest research results from LEI about agriculture, horticulture and fisheries in the Netherlands can be found on agrofoodportal.com. Interactive graphs and maps give a clear picture of information about e.g. prices, sustainability, the environmental impact or innovation. Visitors can also compare performance figures in various domains for different sectors such as greenhouse horticulture, dairy farming and poultry farming.

One of LEI's specialist fields is market intelligence, i.e. using data from the world outside the organisation or company itself to obtain insights. "We look to see what developments, opportunities and threats there are in the market so that companies can base their decisions on hard facts," says Arjen Daane, programme manager at LEI. Insights into potential customers, new and conventional technologies, emerging economies and competitors let companies improve their competitive positions and focus their innovations on the future.

Business people often take decisions based on a gut feeling. A fruit grower may for instance get the idea that China could be an interesting sales market for his fruit. "Before he invests in a new variety of pear, for example, and spends money on Chinese packaging or a Chinese agent, it is a good idea to have the best possible picture of this new sales market," explains Daane. "That provides the facts to back up the businessman's gut instinct." LEI can develop early warning systems and opportunity spotting: pointing out the trends and opportunities, as well as disruptions such as trade wars, animal diseases, boycotts and the weather. "Our aim is to provide businesses and policymakers as quickly as possible with insights into the events and developments that are relevant for them," says Daane. "If Dutch fruit traders know early on that the mango harvest in Brazil is going to fail, for instance, they will have time to look for alternatives."

"Because LEI works for both governmental authorities and the commercial sector, we are able to switch quickly for example between developing new policies and looking at the potential choices for individual companies. To give an example, we investigated the consequences of dropping the European milk quotas in 2015. We then provided support for the FrieslandCampina cooperative in their investment choices for production capacity and production locations." Daane adds, "Because we are thoroughly familiar with the policy considerations of national and international authorities, we are better able to help businesses respond."

LEI knows the global agricultural sector inside-out and backwards. This means that we are also able to provide advice about emerging markets by looking at the infrastructure, climate, location of suitable land, reliability of the authorities and the presence of other foreign investors. We have recently studied the possibilities for growing melons in Africa for one business, for example. We have also estimated the chances of success for a development cooperation programme for shrimp farming in Burma. Our researchers work according to the latest scientific insights. Publicly available information from e.g. trade figures is linked to our own research data. Daane adds, "We know what varieties of tomatoes fit the requirements of French consumers and how that market is going to develop over the coming years. And of course what companies can do to maximise their benefit from it."



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"We look to see what developments, opportunities and threats there are in the market so that companies can base their decisions on hard facts."

Thinking ten years ahead

For the dairy company FrieslandCampina, LEI has worked on a ten-year forecast for the milk supply from dairy farmers in the cooperative of the same name. The company also wanted to know what the global market for dairy products would look like in ten years' time. "Predictions like those are useful for orientation," explains Ruud Krimpenfort, Director Dairy Market Intelligence at FrieslandCampina. "LEI has the scientific knowledge that is needed for assessing the models that are used throughout the world. The researchers are also able to get to their knowledge and insights across quickly and effectively. LEI has contacts with research institutes in Europe and worldwide. It is an impartial research institute that takes an objective view of the various market developments. We value that independence highly."

Ruud Krimpenfort, Director Dairy Market Intelligence FrieslandCampina



wageningenur.nl/mi



Enough healthy food for everyone

extreme rainfall and floods as a result of the climate change will create increasing problems for food production. We therefore have to produce in a smarter way. "Solutions for the food issue will then come from the relief of poverty, from innovation, cooperation and policy improvement," says Thom Achterbosch, who is a development economist at LEI.

The EU wants to create more cohesiveness in its policy on food security. From 2012, European research institutes have therefore started gathering knowledge for a period of five years about the relationship between food security and the policy areas of agriculture, trading, development cooperation, energy and climate. LEI is coordinating this project, which is called FOODSECURE, which also involves organisations from Brazil, China and Ethiopia. "These countries are dealing with malnourishment or food insecurity. Brazil is a major food producer and China is a large-scale purchaser on the international market," explains Achterbosch.

Within the project, LEI researchers are developing advanced computation models and content-related knowledge about future scenarios "We're studying the consequences of economic developments for agricultural production, and the effects of poverty and income development on the quality of nutritional patterns," explains Achterbosch. In addition, we are exploring what

the future may bring together with companies, NGOs and other parties. "Large companies often have a long-term vision and want to outline an effective future strategy. We at LEI are good at that."

In addition to production and consumption, nutrition and health play important roles in FOODSECURE. For instance, it turns out that households in Eastern Europe were eating less vegetables, fruit and meat during the financial crisis and more staple foods such as potatoes, wheat and rice. On the other hand, overconsumption and obesity in north-western Europe are primarily caused by a preference for convenience food.

The effect of consumers' behaviour on nutritional patterns is the key theme in the European project SUSFANS, which is running for four years from April 2015. "We're investigating consumer choices and want to determine a desirable European nutritional pattern, with healthy and sustainably produced food," says Achterbosch. The Dutch Dairy Association and European companies such as DSM and Unilever are actively involved in the project. "Nutrition and sustainability are core business for large companies. Combining these two is new. Companies want to know what else they can do to make sure their products score better in terms of health and the environment.

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Food security

It is expected that the Earth will have nine billion inhabitants by 2050. More food must be produced to feed everyone. At the same time, water and energy will become more scarce and market prices for crucial food crops will start to fluctuate more and more. LEI is developing new knowledge to increase the security of food supplies. We are using our knowledge of the world food markets and sustainable developments, which contributes to keeping people and animals healthy and combating poverty worldwide.

Customised nutritional advice

A growing number of people in the Western world suffer from obesity, diabetes or other diseases of affluence. Nutritional recommendations to reduce the risk of such diseases mostly apply to large groups of people, e.g. all men in a certain age category with jobs. But everyone has their own ideas about healthy food. That is the basic principle of personalised nutrition. In addition to physical differences, nutritional advice also looks at differences in character, habits, social environment and financial situation. "All these factors together determine what is healthy and feasible for someone," explains Amber Ronteltap, a consumer researcher at LEI. "Vitamins are important, but they're not the only thing. Whether what you eat makes you happy matters too."

Companies are becoming more and more interested in personalised nutrition. Over the last decade, companies have increasingly responded to the needs of consumers, supported by the rapid developments in information technology. LEI has joined a public-private partnership called Intelligent

Consumer Systems, which explores the possibilities of personalised nutrition using IT. The target groups are people with food allergies, the elderly and people from lower income groups. "Within the project, smart applications have been developed that let people see quickly what product is suitable for them, for example by scanning barcodes in a supermarket using an app," says Ronteltap.

Together with other European institutes, LEI is also looking for viable business models for personalised nutrition in another large research project called Food4Me. Options include recommendations from district care centres and advice paid for by employers or health insurers. The distinction between the medical sector and the food sector must be blurred. "When people are asked what is important in life, they always place health in the top three," emphasises Ronteltap. "Yet prevention – particularly through nutrition – has always been a more or less neglected subject in the Netherlands. Personalised nutrition can mean a turnaround."

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"Research into food security requires a broad perspective. Malnourishment among children in India often turns out to be caused by diarrhoea because of the unhygienic latrines. In Ethiopia, for instance, the poor roads are the sting in the tail that affects food supplies. Solutions for improving the security of food supplies are therefore not always to be found in the domains of agriculture and food production. Interventions and investments in other domains are often important too. This means you may need to look beyond your own field of expertise."

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Food Security programme manager at LEI Wageningen UR

Food from the local farmer



Local initiatives in Amsterdam centred on food are bringing the public closer to the farmers and letting the city-dwellers see where our food comes from. This is done with cultural projects, for example, or with mushrooms being grown on city waste, or a traditional sausage-maker, local herb gardens and a greenhouse project for homeless people that provides vegetables for restaurants. There is also the small-scale zuiderMRKT initiative supported by Rabobank Amsterdam: a market where people buy the produce of local farmers. LEI helped Rabobank formulate a vision for a sustainable food supply for Amsterdam. "In addition to the small-scale initiatives, we have also involved farms from around Amsterdam in it, farms that traditionally focused more on export," says LEI researcher Jan Willem van der Schans. "The next step for Amsterdam is now to create the necessary infrastructure and transport options for these local links."

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Sustainable Metropolitan food clusters

Throughout the world, people are migrating to the cities and congregating in the metropolises that are expanding in river delta areas in particular. Urbanisation brings new challenges for the food supply chain, energy, transport and the surroundings we live in – issues such as fair distribution of food, a balanced selection of foods and 'climate-clever' food production and storage options. LEI Wageningen UR explores, analyses and evaluates the possibilities for smart cities: towns and metropolitan areas that have close links to the rural surroundings through new types of connections, creating closed cycles for a healthy and resilient society that is good to live in.

www.wageningenur.nl/lei/foodclusters

"LEI understands the complete food chain. They have the knowledge and the authority to contribute to improvements in the complex chain from the field to your plate."

Marc Jansen, director of CBL, the association for the supermarket and food service sector

Sustainable purchasing by multinationals

The members of The Sustainability Consortium (TSC) include multi-nationals, from Walmart and Coca-Cola to Ahold, Unilever and BASF. "About a hundred companies have joined up. They want a global standard so that the sustainability of all consumer products can be measured consistently," says LEI researcher Koen Boone. He is also TSC's European director, because LEI coordinates its European activities. Together with universities and NGOs such as the WWF, the consortium sets out guidelines for assessing and improving the sustainability of their products and those of their suppliers. The consortium links information about sustainability directly to the demand from companies' purchasing departments. "It's the most powerful tool I've ever seen for enhancing sustainability," emphasises Boone.

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Diabetes in the EU

"In the USA, they now have an overview of the increases in for instance obesity and diabetes over recent decades," explains Karin Zimmermann, a researcher at LEI. "But Europe isn't that far yet. The records and measurements made by the countries here are all different, and some of the countries don't measure anything." She is coordinating the EU project EuroDISH, in which health and nutritional institutes and scientific bodies are developing an infrastructure for research into nutrition and health (DISH-RI). Together with governmental authorities, researchers and companies, LEI is examining aspects such as the governance structure, or in other words how that infrastructure can be organised. "We make exchanges possible by linking up the research methods, the data, the networks and the people," says Zimmermann. "Policy-makers need information so that they can take the right decisions about nutrition and health, which keeps hospital costs down. And that's possible with this infrastructure."

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Throwing away less food

If households and retailers in the EU could cut the amount of food they waste by 40% by 2020, that would save €123 per person per year. Over the whole EU, that makes €75.5bn. It would mean that less agricultural land is needed: an area the size of Belgium. "The savings are largely in dairy products and meat, and in fruit and vegetables, where there are relatively large amounts of waste," says LEI researcher Martine Rutten. "The land that is freed up can be used for cultivating crops for export or for biofuels." She has been investigating this for the European Commission. It also turns out that more gains can be made if European households start eating more healthily. The amount of agricultural land saved could then be as much as three times the size of Belgium. What does this mean for the consumer? Rutten replies, "It's about getting consumers to be more aware of their lifestyle and doing both: wasting less and eating more healthily."

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40%
less food wastage by European households and retailers would mean savings of €75.5 billion



New techniques are creating new connections that make agricultural products and services accessible throughout the world. In addition, business customers and consumers want information about the safety and quality aspects of products. More possibilities and exchanges of information are making the market more complex. A major European consortium led by Sjaak Wolfert of LEI has therefore developed a new and open online platform called FIspace that focuses on SMEs for the European Commission. "The people in the supply chain can all use the platform to do business and exchange information in a secure environment without having to invest in systems of their own," says Wolfert. "It lets them respond more simply to the needs of their customers. In addition, European software developers are coming up with new apps such as weather forecasts, crop protection and apps for planning – things that help business people optimise their business operations. FIspace facilitates improvements within the supply chain and to the individual links within it, aiming for a more sustainable and more efficient whole."

IT makes the supply chain more efficient and transparent

Impact

As part of the quality monitoring in 2013, a monitoring committee of independent experts has evaluated the quality of the organisation and the research at LEI. This committee looks at the social, economic and scientific impacts. Some extracts from the inspection report:



Governmental authorities: Immediate response to current events

"Immediately after Russia announced the import ban on vegetables, fruit, dairy products and meat from the EU in 2014, the Ministry of Economic Affairs wanted to know how this would affect the agricultural sector in the Netherlands," says Siemen van Berkum of LEI. There are some products such as pears where more than 20% of all exports went to Russia in recent years. Together with the companies and the ministry, the researchers went looking for alternative markets, for example in the Middle East. In addition, LEI's position as an independent research institute let it assess the claims for damages made by the companies affected. There have also been other incidents where the authorities have asked us about what something might mean for the sector, consumers and food prices. "In the bird flu epidemic at the end of 2014, we immediately gave a picture of the impact on poultry farming," says Van Berkum. "The economic damage was considerable, partly because of the export ban."



Society: Sustainable, healthy and green

"We are helping the governmental authorities and companies to get a picture of what society wants through our research into nutrition, sustainability and green cities," says researcher Hans Dagevos. LEI is investigating for example whether people are prepared to buy sustainable foods or help the environment by taking responsibility for greenery in their neighbourhood. It also gives a picture of the social acceptance of developments such as the biobased economy. "We investigate the best strategies for getting products or ideas onto the market, strategies that fit in with the way consumers see the world," explains Dagevos. "We give companies background, context and perspectives to come to more sustainable and healthier production. Good examples also encourage companies to define their own added social value. That may be on a very small scale or extremely large scale, such as the Sustainable Living Plan from Unilever."

Monitoring
2013

Social impact

LEI plays an important role in providing accurate data and reliable analyses for its customers (governmental authorities, sectors and companies) and society in general. LEI's reports and findings often play a role in policy-making and in the public and political debate. In addition, LEI publications are often cited in policy documents both in the Netherlands and in the EU. That is no mean achievement.



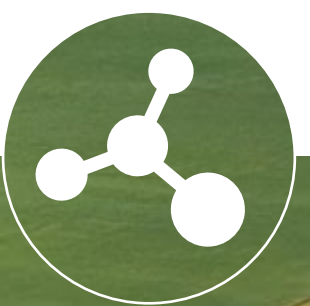
The commercial sector: Antenna in Europe

"We're doing a lot of research into proposed EU policy," says LEI researcher Petra Berkhout. She and her colleagues have for instance done work for the Dutch Ministry of Economic Affairs, looking at the proposals from the European Commission for reforming the Common Agricultural Policy. Our knowledge helps officials in The Hague and Brussels to weigh up the options correctly. "We set out the pros and cons of the policy changes for them. That lets us make sure that the negotiators are better prepared. On top of that, the commercial sector also benefits from our expertise and information about Europe. Because we know what's going on there, we can help companies respond proactively and make the most of the opportunities. This lets them make allowances in their strategies for policy changes in Europe," says Berkhout.

Monitoring
2013

Economic impact

The economic impact of LEI is substantial, given that its turnover is steady or even growing slightly and given the success rates in competitive calls. Customers from the private and public sectors value LEI for its methodologically sound, objective economic analyses.



Scientific impact

LEI is developing strongly in terms of scientific papers, in both quantity and quality. LEI publications are often cited, more frequently than other publications in the same journals. Fifteen per cent of the published papers can be found in the top ten cited items in comparable journals, and a third of the papers are published in journals that are in the top quartile in terms of their impact factor. In addition, LEI is strongly represented in European research projects (FP7 and Horizon 2020), with a success rate (40%) that is far above the average.

Monitoring
2013

"The people at LEI combine genuine research expertise with excellent organizational capabilities. They get things done. They're extremely efficient - for example in coordinating the Foodsecure project, which is very complex because it's got so many teams - LEI is also really good at providing information, encouraging cooperation, interacting with stakeholders and communicating. That's all very important in scientific projects nowadays."

Jean-Christophe Bureau, Professor of economics at AgroParisTech, Paris Institute of Technology and Research unit director public economics at INRA.

Products and services

LEI Wageningen UR carries out applied scientific economic research for (international) government bodies, companies and other types of organisations. Using our expertise, unique data, models and analyses, and assisted by the (international) partners we cooperate with, we develop new insights and useful tools for our clients and stakeholders. This lets us ensure that the latest scientific knowledge in our field can be applied. We explore and explain, so that you can enhance your policy or strategy. That lays the foundations for ‘earning’ more, not only in a financial sense, but also for your organisation, your clients, the environment and society. In short, it is science for impact and for quality of life.

Models

Models help analyse complex economic problems consistently and study them at the level of a company (micro) or sector (meso) or the whole world (macro). A model makes it possible to approach an issue from different perspectives. Structured analysis using unique applications developed in-house makes sure that important angles of approach are not overlooked. Substantiated, well-considered strategic decisions can therefore be made. LEI uses various models embedding detailed knowledge of the food chain, nutrition, environment and the biobased economy. These models focus on the regional, national, European and global economies.

Examples:

MAGNET is a general equilibrium model of the global economy. The model describes the development of prices, production and trading at the level of individual countries. The model is used to calculate the consequences of changes in the global economy and policy changes, such as international trade agreements. It is very important for quantitative analyses for the bio-economy and for food security.

AGMEMOD is an econometric and dynamic model of agriculture in the European Union and individual member states. LEI manages this model in a consortium with other European

member states. The model uses prognoses and simulations to evaluate measures, programmes and policies on agriculture at the European level and at the level of the member states.

MAMBO is an econometric model based on Big Data (of all Dutch agricultural holding companies) about the use, production and transport of minerals in the Netherlands. The model is used to calculate the consequences of policies on agriculture and minerals for the environment at a national or regional level.

SERA is a spatial, explicit actor-oriented model for studying the consequences of external developments in prices and policy on the economic and ecological resilience of regions.

Data

As well as the models, LEI also has a large amount of data it has gathered itself or acquired through international networks, such as Eurostat, FAOSTAT and the OECD. LEI is better than anyone else at interpreting these figures in the right context. This provides valuable information that our clients can base strategic decisions on. It creates a unique combination that allows us to monitor the effects of (international) policy and map out specific markets and market developments in the agro-food sector. We are able to explain what works in practice and what does not.



Explore

LEI Wageningen UR works for businesses and government bodies, studying new trends in regions, countries and markets and analysing possible developmental paths. The horizon of a study ranges from short-term to several decades, depending on the client’s question. We combine our many years of expertise in the sector and scientific knowledge with data from a wide range of data sources. This results in unique and innovative insights and business opportunities.

Examples

- Scenario analyses
- Monitoring
- Expert interviews
- Delphi analyses
- Market Intelligence
- Gaming & Experiments

www.wageningenur.nl/lei/products

Explain

LEI Wageningen UR explains what may happen, what is happening or what has happened by measuring and monitoring the effects of government and company policies, of international markets and chains, and of the competitive position and competitiveness. The emphasis is on providing insights for our clients, showing why and how these events take place or took place. We investigate this using clear indicators and intervention logic and we are able to look at issues at the company, sector and macro levels, considering all possible effects and influences as we go.

Examples

- Impact evaluations (ex ante, ex durante and ex post)
- Value chain analysis
- Social cost-benefit analysis
- Lifecycle analysis of products (TSC)
- Financial and economic analyses
- Consumer surveys
- Market and chain research
- Bio-economic modelling
- Research into competitiveness

Enhance

Based on the insights obtained from explorations, we present concrete points for improvement. This may improve the impact of policy and strategy on earning capacity and competitive position. We can suggest points for improvement beforehand, during the project and afterwards. This lets our clients work more effectively and more efficiently.

Examples

- Impact evaluations (ex ante, ex durante and ex post)
- Business Process Management
- Service-oriented approach
- Information architecture
- Social innovation approach

Earn

The insights and opportunities for improvements have provided a basis for ‘earning’. We consider earning not only as financial gain, but also as the creation of added value for organisations, the environment, consumers and the society. For instance, we are working with commercial companies on developing and implementing innovative and sustainable business models. As we do so, we challenge entrepreneurs to look at their companies, chains and markets in a different way. In complex transition processes, we also look at social acceptance and embedding, and we help build effective government policy.

Examples

- Business Innovation Approach
- Social Innovation Approach
- Chain arrangements

75 years

Applied scientific economic research

266

staff in 2014

in 2014 turnover of

€31 million

LEI Wageningen UR is an independent and internationally leading socio-economic research institute. Its unique data, models and knowledge offer clients insights and integral advice for policy and decision-making processes in an innovative way, contributing to the creation of a more sustainable world.

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