

LOUIS BOLK

I N S T I T U T E

Together with nature



Annual report 2016

"Our vision and approach: Nature-inclusive agriculture and positive health"



In 2016 the concept of nature-inclusive agriculture gained real momentum. This became clear to me during inspirational sessions and meetings with State Secretary of Agriculture Martijn van Dam, provincial deputies and business representatives. All of us are searching for solutions towards more resilient, sustainable food systems based on healthy soils and environmental and landscape quality. Nature-inclusive agriculture is a sustainable approach to food production, and I am proud that the Louis Bolk Institute has nurtured this concept and its implementation. Another concept that is well-known by now is positive health. This concept focuses on people's resilience, adaptive capacity and ability to self-manage their own health and well-being. Positive health and nature-inclusive agriculture were the central themes of our 40th-anniversary symposium held in October 2016, with Cees Veerman as keynote speaker. This festive and inspiring meeting confirmed the value of our vision and approach for tackling the big, complex challenges facing society.

As illustrated by the projects highlighted in this annual report, our practice-oriented approach has proved itself over the course of the years, resulting in effective and often cost-saving solutions ranging from soil fertility improvement and nature development to reversing diabetes and promoting fruit and vegetable consumption among young children. A recently conducted market analysis shows that our work is widely appreciated. Nevertheless, we had to close the financial year of 2016 with a negative result. This is due to the fact that our work is mainly funded by government agencies who are faced with continuing budget cuts.

Hence, it is high time to change our business strategy. Our institute has initiated a transition toward a more market-oriented approach, where the challenge lies in engaging both public and private partners who not just appreciate our work, but are also willing to invest in it. As part of this new strategy we have redefined our market positioning. From now on, we are the knowledge institute for nature-inclusive agriculture and positive health. Our focus remains: promoting the sustainable health of humans, animals, plants, soils and ecosystems.

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Executive Director

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Restoring nature while growing feed

Soil phosphate levels in Europe are among the highest in the world, with the Netherlands ranking at the top: more than 60% of our agricultural sandy soils are saturated with phosphate. In nature areas established on former agricultural land, excess soil phosphate leads to impoverished plant communities dominated by one or few species. Furthermore, soil phosphate leaching to surface water and groundwater results in algal blooms and biodiversity loss. Meanwhile, global phosphate supplies are running out: phosphate is a finite

resource. To address these problems, the Louis Bolk Institute has developed a soil phosphate recycling method, which involves growing grass-clover combined with repeated mowing and removal of the hay for animal feed. We tested this method (also known as phytoextraction) in various conservation areas in the province of Noord-Brabant, together with farmers and nature managers. Our conclusion: phytoextraction is an effective and affordable alternative to topsoil removal, with the added advantage that soil

history and soil biota are conserved. Moreover, this method provides farmers with a valuable source of animal feed, based on recycled soil phosphate.

Phytoextraction of Soil Phosphorus by Potassium-Fertilized Grass-Clover Swards; Publication in Journal of Environmental Quality; 2016; Bart Timmermans, Nick van Eekeren

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MORE TREES, MORE HONEYBEES

The industrialisation of agriculture has resulted in significant habitat loss for honeybees in the countryside. To bring back bees, ten biodynamic farmers in the Netherlands reintroduced beehives on their farms a few years ago. On these farms, the Louis Bolk Institute investigated what vegetation is preferred by foraging bees. Our analyses show that no less than 80% of the pollen stored by bees in April and May comes from trees and shrubs. While trees were already known for their valuable ecosystem services such as providing shade, drainage, and habitat for beneficial insects, this study shows that trees are also a vital food source for bees.

Project Bees, Farmers & Citizens; 2014-2016; Boki Luske.
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PROTEIN-RICH CROPS: GOOD FOR FARMERS, CONSUMERS AND THE ENVIRONMENT

Lupins, field beans, peas and soy not only have a high protein content but also fix nitrogen and have abundant flowers. Hence, these crops offer great possibilities as soil improver, feed crop, food source for beneficial insects, and ingredient for vegetarian meat. The Louis Bolk Institute currently participates in an EU project to improve opportunities for cultivating these crops in moderate climates such as in the Netherlands. Thanks to our expertise in innovation across supply chains, our contribution to this project ranges from plant breeding and crop optimisation to market development and consumer research.

Project Protein2Food; 2015-2019; Udo Prins, Edwin Nuijten.
See also: <https://www.youtube.com/watch?v=Q6maW1uVHLM&t=7s>
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Dairy farmers working on soil quality

Farmers across the Netherlands are faced with decreasing soil quality due to intensive land use. The Louis Bolk Institute has conducted various projects to investigate how soil quality can be restored. Focusing on dairy farms on sandy soils, our research shows that the optimal land use pattern for improving soil organic matter (SOM) is 60 percent permanent grassland combined with 20 percent grass-clover in rotation with 20 percent silage maize. Rotation of three years grass-clover with three years maize increases SOM to 3.5-4%

(compared to 2% SOM under permanent arable cropping), while SOM under permanent grassland increases to 6-7%. This land use not only improves soil quality, but also increases farm profits: thanks to savings on chemical fertiliser and feed (soy), dairy farms in the Achterhoek-Liemers region could gain 6,000-7,400 euro per year, on average. We established these figures together with Wageningen Livestock Research, using data from the project Vruchtbare Kringloop ("The fruits of nutrient cycling") in the Achter-

hoek-Liemers region. Our conclusion: improved soil quality and sustainable land use result in pure profit for both farmers and the environment.

Optimal land use for soil quality; Publication in trade journal V-focus (in Dutch); 2016; Nick van Eekeren.

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ADVISING THE DUTCH GOVERNMENT ON AGRICULTURE, NUTRITION AND HEALTH

Members of Dutch Parliament frequently question Government Ministers about genetic modification, soil fertility, animal welfare, biodiversity, climate change and other urgent issues related to food production. To address these questions, ministry staff seek information from experts, increasingly including researchers from the Louis Bolk Institute. In 2016 our researchers contributed their knowledge and views to round-table discussions on soil fertility and organic matter, food policy, crop breeding and outdoor grazing systems. This way, we contribute to the development of new laws and regulations towards sustainable agriculture, nutrition and health.

Expert views (in Dutch) on www.louisbolk.nl/actueel

KEEPING CALVES AND COWS TOGETHER

In wild cow herds, calves stay with their mothers. A growing group of consumers would like to see the same on dairy farms in the Netherlands. In 2016 the Ministry of Economic Affairs therefore commissioned the Louis Bolk Institute to conduct a study on calf-friendly rearing systems, together with Wageningen University and Research. The aim is to gather practical information for farmers who are considering to keep their calves and cows together. To this end, we interviewed experts and farmers with hands-on experience, and conducted a literature review. A report on this project will be published in 2017.

Project Keeping Cows and Calves Together; Cynthia Verwer and Lidwien Daniels
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Learn young, learn well

The majority of Dutch children are not eating enough fruits and vegetables. Since most babies and toddlers spend at least one day a week in pre-school childcare centres, the Louis Bolk Institute focused on these locations to investigate how to stimulate fruit and vegetable consumption among young children. During three months, we kept track of fruit and vegetable purchases and children's actual fruit and vegetable consumption at seven childcare centres in Rotterdam and Amsterdam. Pre-project levels were also recorded.

Both childcare staff and parents were closely involved in the project. At some centres the staff worked with special fruit and vegetable themes to stimulate consumption; various centres also worked with a cook. Our conclusion: pre-school childcare centres are a suitable learning environment for stimulating fruit and vegetable consumption among young children. By more frequently exposing these children to fruit and vegetables and offering a greater variety, they start eating more different kinds and greater portions.

However, more research is needed to determine the most effective strategy.

Increasing vegetable and fruit consumption – An intervention to increase children's (organic) fruit and vegetable consumption at childcare centres; LBI Report (in Dutch); 2016; Lucy van de Vijver, Marieke Battjes-Fries, Marja van Vliet, Miek Jong.

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BETTER HEALTH WHEN MORE IN CHARGE

The Amsterdam-Zuidoost district is lagging behind when it comes to local health. Initiatives to improve this situation have not been effective so far. Using the concept of positive health as a starting point, the Louis Bolk Institute is investigating whether local health and welfare can be improved by strengthening people's resilience and ability to take charge of their own well-being. The project approach and methods have been determined in close collaboration with all stakeholders, including local residents, healthcare organisations, policymakers and municipal authorities.

Project Positive Health in Amsterdam-Zuidoost; 2016-2019;
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LIVING LONG AND HEALTHY LIVES IN OSS

In some areas of the world – known as Blue Zones or longevity hotspots – people live very long lives in good health. The lifestyle in these zones is characterised by a positive outlook on life, healthy diets, daily physical activity and strong social engagement. Various organisations and citizens in the Dutch city of Oss have launched an initiative to establish the first Blue Zone in the Netherlands. The Louis Bolk Institute was asked to assess the conditions for a successful follow-up. Our advice: work together on awareness and inspiration and ensure active collaboration between organisations, citizens and governments.

Project Blue Zone Oss; 2016; Sjef Staps
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Altered diet and lifestyle as medicine

In the Netherlands, close to a million people suffer from type 2 diabetes, and 55,000 new patients are diagnosed each year. In current practice, patients receive medication and standard diet advice, but these offer no cure. In collaboration with Stichting Voeding Leef (a network of professionals working in health care and nutrition) the Louis Bolk Institute investigated whether type 2 diabetes can be 'reversed' by an altered diet and lifestyle. A group of 72 patients received information and guidance on increasing their intake of fresh, unprocessed foods and slow carbohydrates

(nuts, seeds, fruit and vegetables). In addition, they were stimulated to make lifestyle changes such as exercising and sleeping more. The control group consisted of patients receiving regular care. Compared to this control group, patients who had changed their diet and lifestyle experienced better health and showed improved clinical parameters such as morning blood glucose and HbA1c. This enabled them to reduce their diabetes medication by 75% within 30 days. Our conclusion: type 2 diabetes patients can take charge of their own well-being and save on medical

costs by altering their diet and adopting a more active lifestyle. A good example of positive health in practice.

The project Reversing type 2 diabetes received the 'Sensible Health Care' award from VGZ Health Insurance in 2016; a report on this project will be published in 2017; Peter Voshol, Marieke Battjes-Fries.

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LESS STRESS WITH MINDFULNESS

Due to healthcare budget cuts, general practitioners (GPs) have to see a lot of patients in a very short time. The increased work pressure results in stress, which in turn has an impact on care quality. In a project initiated by a GP, the Louis Bolk Institute has investigated whether family doctors can reduce their stress by mindfulness. During eight weeks, 54 GPs followed mindfulness training. By becoming more aware of their own stress patterns, participants were able to significantly reduce their

stress levels and increase their self-compassion and self-reflection - even six months after finishing the training.

Project Mindfulness for General Practitioners; 2016; Miek Jong
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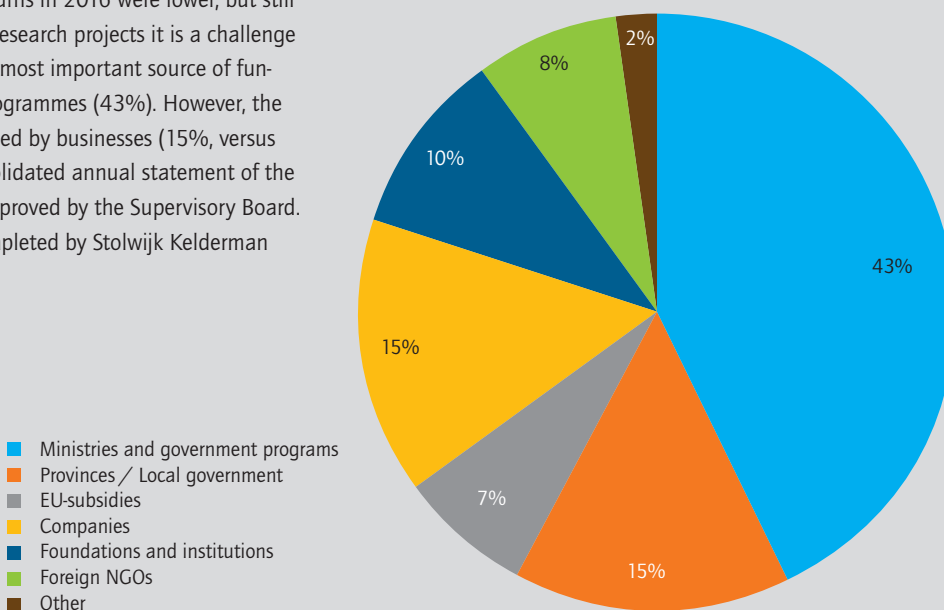
Statement of accounts

Statement of Revenue and Expenditure (x 1000 in euros, completed)

	Actual 2016	Actual 2015
Revenue from projects and subsidies	3,849	3,941
Subcontracting costs	-1,210	-1,252
Net revenue from projects and subsidies	2,640	2,689
Revenue from fundraising	8	19
Donations and other revenue	14	47
Total revenue	2,661	2,755
Wages and salaries	2,117	2,039
Social security contributions	305	296
Depreciation of intangible and tangible fixed assets	11	14
Other operating costs	340	328
Total expenditure	2,772	2,677
	-111	78
Financial revenue and expenditure	-2	-2
Net result	-113	76
Taxes	-15	9
Net result after taxes	-98	67

The Louis Bolk Institute unfortunately had to close the financial year of 2016 with a net loss of € 113,421. Compared to 2015 the returns in 2016 were lower, but still close to 4 million euros. In a shrinking market for research projects it is a challenge for the Louis Bolk Institute to hold its ground. The most important source of funding is and remains government ministries and programmes (43%). However, the Institute did succeed in getting more projects funded by businesses (15%, versus 7% in 2015). The annual figures refer to the consolidated annual statement of the Louis Bolk Institute Foundation, and have been approved by the Supervisory Board. The auditor's report on these figures has been completed by Stolwijk Kelderman Accountants.

Project funding sources 2016



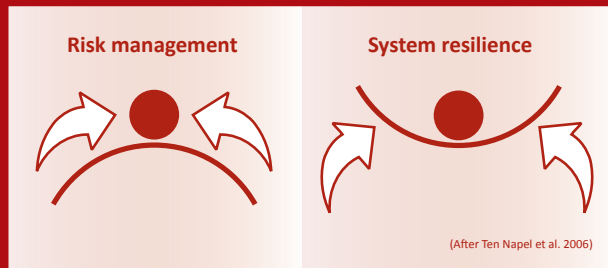
About the Louis Bolk Institute

For more than 40 years we have been developing knowledge for sustainable agriculture, nutrition and health – three areas that, in our view, are interconnected. The overarching themes of our work are nature-inclusive agriculture and positive health.

Our projects are aimed at strengthening natural systems and processes, whether these relate to agricultural areas, soils, farms, patients, or urban neighbourhoods. We conduct our projects in close collaboration with stakeholders, resulting in participatory solutions that work in practice. This way, we contribute to health and vitality, resilient food systems, and a climate-proof, sustainable human environment.

What is the essence of nature-inclusive agriculture?

In our view, nature-inclusive agriculture is a form of sustainable agriculture that makes use of functional biodiversity and natural processes. This approach results in resilient food systems and sound revenue models, while conserving ecosystems and landscapes.



How do we view Positive Health?

Positive Health stands for a broad vision on health and well-being. The emphasis lies on people's ability to adapt to the challenges of life and to manage their own health and well-being.

Rather than focusing on risk management, we develop concepts (such as Positive Health), practical knowledge and solutions to increase system resilience. Together with nature.

Louis Bolk Institute 2017 Text: Annelijn Steenbruggen Final editing: Lidwien Daniels Translation: Shades of Green Photography: Louis Bolk Institute Design: btz vorm en regie Order number 2017-020 C

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