

A close-up, shallow depth-of-field photograph of two bees on yellow flowers. One bee is in sharp focus on the left, facing right, with its yellow and black striped body and dark wings clearly visible. The other bee is partially visible on the right, also facing right. The flowers are bright yellow with many small petals.

ANNUAL REPORT 2013

LOUIS BOLK
INSTITUTE

Partnerships

Highlights 2013

National Arable Nature Day

June 13 - The Louis Bolk Institute organised the first National Arable Nature Day for farmers, nature conservation organisations, NGOs and policymakers. More than 150 participants attended this event, in which the institute presented the results of the Flourishing Farm project.

Advice to Parliament Committee

May 15 - Senior researchers of the Louis Bolk Institute provided advice to the Parliament Committee on Economic Affairs, in a brainstorming session on soil fertility and animal manure management.

Inspiration Award

March 7 - The winner of the 2013 Inspiration Award for organic food shops donated the award money to the Louis Bolk Institute, in recognition of the institute's contribution to food quality research.

Article in Nature

February 20 - Jan-Willem Erisman, managing director of the Louis Bolk Institute, co-authored a paper published by the prestigious journal Nature, showing that China is one of the world's greatest nitrogen polluters.

Potato Breeding Manual presented to State Secretary Dijksma

September 11 - Edith Lammerts van Bueren of the Louis Bolk Institute presented the first copy of the *Potato Breeding Manual* (a co-production with publisher Aardappelwereld) to Sharon Dijksma, State Secretary for Economic Affairs.

Biodiversity Conference

September 19 - The Louis Bolk Institute organised a Biodiversity Conference in the province of Drenthe, including presentations and workshops on soil biodiversity and soil quality. The conference was attended by arable farmers, nature conservation organisations, NGOs and policymakers.

Book on Climate Crisis presented to State Secretary Mansveld

October 8 - Louis Bolk Institute researcher Sjef Staps presented the first copy of his book *Nothing but good about the crisis* to Wilma Mansveld, State Secretary for Infrastructure and Environment.

Report on Sustainable Poultry

December 18 - The Scientific Council for Integral Sustainable Agriculture and Nutrition (RIDLV) presented its report *Chicken Fillet: the most complex piece of meat*, co-authored by Jan-Paul Wagenaar of the Louis Bolk Institute.

Minister of Health has adopted new Health Concept

December 13 - Minister of Health Edith Schippers adopted the new health concept developed by Machteld Huber, physician and researcher at the Louis Bolk Institute.

"Partnerships are needed more than ever to address the complex challenges faced by society"

In 2013 the Louis Bolk Institute worked on as many as 250 projects. Given the limited size of our organisation, this is an enormous number. Moreover, the projects were highly diverse in terms of subject area, research questions and scope, ranging from lupin breeding and trees for free-range chickens, to assessing the efficacy of complementary health care.

The theme of our 2013 annual report is Partnerships. For it is only through partnerships that we manage to contribute to so many projects. In addition, we observe that partnerships are needed more than ever to address the huge challenges faced by society. One such challenge is antibiotic resistance, a problem extending from pig houses to hospital rooms. The key to solving complex, multi-sectoral problems such as these is to join forces and integrate relevant disciplines. This is exactly where the Louis Bolk Institute brings in added value. Thanks to our multidisciplinary systems approach, we examine problems in their broad context and take all interrelated factors into account. Our research is both participatory and solution-driven: we work together with problem owners to develop solutions that really work in practice.

Looking back on 2013, I observe that our relationship with commercial partners has grown. In the past, businesses were only



rarely involved in our projects, but lately they have increased their investments in research that is of interest to them. The fact that the government gives priority to funding public-private partnerships contributes to this trend. For example, we have set up projects together with organic companies and farmers, in collaboration with Wageningen UR and the Bionext network. In addition, we are planning various projects together with health-care organisations, businesses and NGOs.

'The natural source of knowledge': that's our motto. Nature shows, with many examples, that partnerships are important and the logical thing to do. Hence, our aim for 2014 is to further increase and intensify our collaboration with citizens' associations, NGOs, knowledge institutions, businesses and governments.

This annual report highlights a selection of our projects, to illustrate how we work together with our project partners: focused on practice, with integrated expertise, and with a heart for truly sustainable agriculture, nutrition and health.

Prof. Jan Willem Erisman
Managing Director

Red clover instead of chemical fertiliser and soy

In the KlaverKlimaat (Clover climate) project, the Louis Bolk Institute has teamed up with Agrifirm Feed and Barenbrug to conduct on-farm research on growing red clover in forage pastures. Clover is rich in proteins and provides a cheap alternative to soy. It also brings nitrogen into the soil, reducing the need for chemical fertiliser.

Jan de Wit, researcher at the Louis Bolk Institute:

"The production of chemical fertiliser is energy intensive. Moreover, it leads to greenhouse gas emissions, particularly of CO₂ and nitrous oxide. If the agricultural sector wants to become 'climate neutral', an obvious step is to reduce fertiliser use. In this project, we are showing farmers that growing red clover is not only good for the climate, but also for the purse. Clover brings in an additional 100 to 350 euros per hectare, thanks to savings on chemical fertiliser and higher yields of protein-rich grass silage. By paying regular visits to dairy farmers, the forage specialists of Agrifirm Feed know what the problems and opportunities are. These visits also enable them to directly share research findings with the farmers, which greatly accelerates the practical application of research results."

Toine Heijmans, product manager forage management at Agrifirm Feed:

"I really like the fact that we conduct practical research together, in real practice: not on an experimental farm with optimal conditions, but on two commercial dairy farms. No matter how convincing the data on paper, farmers will always want to see with their own eyes how it works, over several years. The strength of the Louis Bolk Institute is that they know exactly what farmers want and need. These days, dairy farmers are facing a range of problems: roughage and protein are in short supply, chemical fertiliser and soy are getting more expensive, manure regulations are strict, and soil organic matter is decreasing. Growing red clover provides a solution to all of these issues. I enjoy noticing that we not only learn from Jan, but Jan also from us. We are exchanging knowledge and complement each other well: together we can reach a higher level. Thanks to the fact that we do this research really together, our forage specialists and dairy farmers are becoming more enthusiastic every day."





Upland sandy soils are often susceptible to droughts. Climate change will increase the vulnerability of these areas. In the Bufferboeren (Buffer Farmers) project, the Louis Bolk Institute has been working together with stakeholders - local farmers and the Brabant Water Company - on sustainable management of scarce water resources in the Dutch province of Noord-Brabant.

The search for drought-tolerant agriculture

Nick van Eekeren, researcher at the Louis Bolk Institute:

"We share the view of the Brabant Water Company that sustainable water management is only possible if all stakeholders are involved. The Buffer Farmers project therefore aims to build a partnership between the water company and the farmers working near the water extraction area. The fact that the agricultural sector and water sector are joining forces makes this project unique. For both farmers and water companies, risk management is very important. Due to climate change, the risk of water scarcity is increasing. Our job is to work together with the farmers to find solutions that work in practice. For example, by using compost and reducing soil tillage, farmers can improve the water holding capacity of their soils. In addition, they can choose to grow crops that need less water, such as sorghum. Together with the farmers we are assessing which measures work best on individual farms."

Ruud van Nieuwenhuijze, policymaker at Brabant Water Company:

"Society is becoming ever more complex, particularly in terms of keeping the growing cities supplied with food, energy and water. Until now, everyone would approach these issues mostly from their own narrow discipline. However, by working together we can develop much better solutions. The Louis Bolk Institute is able to apply an integrated approach, and looks at interrelationships. This broad view enabled Nick van Eekeren to initiate several promising innovations, which he has field-tested together with the farmers. In this project, we are primarily interested in the process. We have learned that if you work well together, the technical solution will follow as a matter of course. Each of us has a piece of the puzzle. Therefore, we need each other to get the whole picture."



Promoting resilience, in health and in illness



The concept of Positive Health, which was introduced by Louis Bolk Institute researcher Machteld Huber in 2012, has been presented across the Netherlands during the past year. Health and social care professionals have shown great interest in this innovative view on health. Together with GGD Nederland (Association of Community Health Services), the Louis Bolk Institute is going to elaborate this new health concept for practical use.

Machteld Huber, physician and researcher at the Louis Bolk Institute:

"After we launched the concept of Positive Health, various GGDs (Community Health Services) contacted us because they wanted to start using it. The new concept is appealing to them because it fits in so well with decentralised health care, which places more emphasis on patient empowerment. Ultimately, decentralisation should help to reduce healthcare consumption. Together with these various GGDs we are now elaborating the concept for use in their practice. The GGD of South-Limburg is going to coordinate this project. Thanks to the collective expertise and size of the GGDs, our research has gained considerable momentum. GGD professionals are seeing many Dutch citizens, every day. They work with modern measurement and monitoring systems. In addition, they are highly motivated to promote the quality of life and well-being of their patients. This is an ambition we share."

Frank Klaassen, Director Public Health at the GGD of South-Limburg:

"Positive Health is definitely not a hype; it is a future-proof and sustainable concept. It is also groundbreaking, in the sense that it helps to open previously closed doors. At present, 96% of the healthcare budget is spent on curative care, and only 4% on prevention. Based on the innovative concept of Positive Health, it is a logical step to invest much more in prevention. The GGDs have taken up this challenge. We want to promote health, using an integral approach: living, working and learning environments should all contribute to health and well-being. I am particularly impressed with Machteld Huber's thorough and conscientious, step-by-step approach of the problem. She has placed the problem in the middle of society by discussing it with a range of relevant parties: GGDs, the curative healthcare sector and health insurance companies. From science, Machteld is initiating a process of societal change. You don't see that often: usually a problem is approached either from a scientific focus, or from a societal focus. The Louis Bolk Institute bridges the gap between these two domains."

Check first, and spray only when really necessary

The Bloeiend Bedrijf (Flourishing Farm) project is a co-creation between the Louis Bolk Institute and the Veelzijdig Boerenland Farmers' Association. This project enables participating farmers to exchange and gain experience in integrated pest management. The aim is to reduce reliance on chemical insecticides through increasing functional agrobiodiversity: beneficial insect populations in particular.

Merijn Bos, researcher at the Louis Bolk Institute:

"Our institute is responsible for sharing knowledge with farmers. Thanks to our partnership with *Veelzijdig Boerenland* Farmers' Association and many organisations for agricultural landscape and nature management, we are reaching over 600 farmers with this project. The success of our collaboration is based on a clear division of tasks: we focus on the technical content and fieldwork with the farmers, while *Veelzijdig Boerenland* is in charge of the practical organisation and financial administration. The farmers, who are very enthusiastic about this project, are the third pillar of our partnership. I think that our participatory approach has been key to raising their awareness and getting their commitment. Instead of having measures imposed on them, the farmers are directly involved in testing innovative techniques that they can apply on their farms right away. Thanks to this project, 70% of the farmers have already made the switch: from now on, they will thoroughly check their crops first; only if natural enemies are really lacking, they will spray."

Hans Hoek, Director of the *Veelzijdig Boerenland* Farmers' Association:

"The project as a whole has been an eye-opener. Thanks to the collective approach, we got the project up and running in no time. Our strategy proofed to be quite effective. As it turned out, the flowering field margins not only contribute to integrated pest management, but also to other functions and goals, such as water management, recreation and meeting biodiversity targets. The EU has been showcasing our collective approach as 'best practice' example to other member states: we have demonstrated that collective regional or national projects accomplish more than projects focusing on individual agricultural entrepreneurs. Our collaboration with the Louis Bolk Institute has been very constructive and transparent. I think of the project as a co-creation: together we are working towards a common goal, creating added value because we complement and inspire each other."





Comparing farming systems to improve agricultural policy

In the ProEcoOrganicAfrica project, the Swiss FiBL institute is working together with Agro Eco-Louis Bolk Institute and other partners to compare productivity, profitability and sustainability between organic and conventional farming systems in Kenya and Ghana. The objective of this study is to identify possibilities for yield improvement and to contribute to agricultural policy improvement.

**Boudewijn van Elzakker,
adviser at Agro Eco-Louis Bolk Institute:**

"Reliable, long-term research data on farming systems in Africa is scarce. As a result, present agricultural policies lack a solid basis. The ProEcoOrganicAfrica project will provide policymakers with an objective comparison of the various systems. In Africa, the potential for improving farming systems is still enormous: think of yield improvement, sustainable soil management and choosing the right seeds. While FiBL manages the project, Agro Eco-Louis Bolk Institute is coordinating the work in Ghana. We are going to compare four farming systems: certified organic, non-certified organic, low input conventional, and high input conventional farming. Agro Eco-Louis Bolk Institute and FiBL complement each other well: while we have longstanding experience with small-scale agriculture and poorly educated farmers, FiBL has more of a research background besides practical expertise. We challenge and inspire each other."

Irene Kadzere, ProEcoOrganicAfrica project manager at FiBL:

"The ProEcoOrganicAfrica project aims to compare the performance of organic and conventional farming systems in Ghana and Kenya. In Ghana, we are focusing on cocoa and vegetable production. We have partnered with Agro Eco-Louis Bolk Institute for this project, because of their knowledge and experience in setting up sustainable cocoa supply chains in Ghana. Particularly their experience in working with resource-restricted farmers practicing organic production methods will benefit the ProEcoOrganicAfrica project. We hope that the information generated by this project will contribute to greater recognition of the benefits of ecological and organic farming methods in the two countries."

Fresh harvest from own community garden

In the Bruistuin project the Louis Bolk Institute and the Arnhem Housing Cooperation, together with other partners, have set up a community garden in a multi-ethnic neighbourhood of Arnhem. The objective of the Bruistuin ("lively garden") is to promote social cohesion and a healthy lifestyle in the neighbourhood.

Lucy van de Vijver, researcher at the Louis Bolk Institute:

"The *Bruistuin* has developed into a beautiful meeting place. Neighbourhood residents are growing their own vegetables and fruits here. In the adjoining Bruishuis community centre they can attend activities and courses, for example on nutrition and health. Children, in particular, benefit from the garden. There is a playground for them, and on Tuesdays and Thursdays they can work in their own gardening plots, supervised by a gardener. In our collaboration with Arnhem Housing Cooperation, we had a clear division of tasks: they coordinated the work on site, and we measured the effect of the garden. Our study was conducted among 30 women of Turkish or Moroccan origin. We selected these groups because of their increased risk of diabetes and other lifestyle-related diseases. One of the positive effects we observed was that the garden has increased social cohesion. The women have also gained more confidence in their neighbourhood. Beforehand they thought that the garden would be vandalised in no time. The fact that it worked out so well has really boosted their morale."



Christel Hoogland, Social Development Manager at Arnhem Housing Cooperation:

"For each of our social projects, the question is: what do we gain, what are the tangible effects? Our collaboration with the Louis Bolk Institute allowed us to objectively assess the effects of the Bruistuin project. In addition to conducting the study, the researchers contributed valuable ideas and vision. The ideas of the project team on greening the neighbourhood and involving the residents in the garden design process were innovative and creative. Thanks to this participatory approach, the residents have developed a sense of ownership of the garden, and are taking pride in the result. Our collaboration was energetic and organic. Although we had set a clear goal on the horizon, the road towards it had not been fixed beforehand. This allowed us to move along with what came across our paths, which made the project incredibly fun."





Healthy soil, without chemical fumigation

In the Weerbare Bodem (Resilient Soil) project, the Louis Bolk Institute and Applied Plant Research (PPO) of Wageningen UR are investigating how to increase the natural disease-suppressiveness of soils, specifically in relation to common soil-borne pests and diseases in strawberry production. Research is taking place on the Vredepeel experimental farm and on commercial strawberry farms.

Leen Janmaat, soil research coordinator at the Louis Bolk Institute:

"Intensive crops, such as strawberry, are prone to soil-borne pests and diseases. Strawberry growers are still allowed to fumigate their soils, but these chemicals will be banned in the future. Hence, the growers participating in our study are very motivated to find alternatives for chemical fumigation. The project focuses on the effect of compost and green manures - such as marigolds and bristle oat - on soil disease suppressiveness. The strength of our project partners at WUR is their specialised research. They have been monitoring the soils of their experimental farms for years. This way they have gained a fundamental knowledge of soil processes. In addition, they have the technology to map DNA of soil organisms. At the Louis Bolk Institute, we make use of this fundamental research to develop practical solutions for the strawberry farmers. We need each other to get this done."

Jan Lamers, researcher at PPO Lelystad (part of Wageningen UR):

"This partnership enables us to study soil disease suppressiveness from different angles: our experience is focused on conventional production, whereas the Louis Bolk Institute brings in expertise on organic agriculture. Furthermore, they have more experience in conducting on-farm research together with growers. In this study, we took soil samples at our experimental farm and at participating strawberry farms, in places where crop growth was either very good or very poor. PPO measured the strawberry yields, while the Louis Bolk Institute assessed the level of disease suppression. Next, we analysed all the data together. It was an eye-opener for me how everyone brought in their own knowledge and experience in interpreting the data. This enabled us to get the whole picture, and to draw more comprehensive conclusions than had we worked alone. This is the added value of working in a partnership."

Reuse of organic waste in arable farming

Chris Koopmans, Head of R&D at the Louis Bolk Institute:

"The project has been set up as a knowledge exchange network for the entire supply chain, from farmers to processing industry. By exchanging knowledge and experience, we can learn from each another and develop practical, win-win solutions together: the industry gets to recycle its waste, while the farmers gain new sources of organic residues for improving their soils. We are supporting this network by conducting field experiments and showing farmers how to assess compost quality, using a scoring system. Through our collaboration with the Skylark Foundation, we are not only solving the technical question of reducing waste flows, but also ensure that the solution contributes to the larger goal of making the entire food chain more sustainable. With this



project we are reaching more than four hundred arable farmers and over fifty processing companies and suppliers associated with the Skylark Foundation. The project shows that it can be done: innovation through collaboration between businesses, which is one of Europe's ambitions."

In the Resttest XL project (Residue Recycling Network), the Louis Bolk Institute is working closely together with the Skylark Foundation. The central question of this project is how organic waste from food industry, livestock farms and households can be reused sustainably in arable farming.

Henk Heinrichs, Director of the Skylark Foundation:

"The added value of the Louis Bolk Institute is their specialist knowledge of soils and organic agriculture: in both these areas the institute is leading in the Netherlands. The researchers are sharing solutions from organic agriculture with our conventional farmers, who adopt some of these measures in their own farming practices. Thus, we do not need to reinvent the wheel. Our collaboration is both pleasant and effective because we are like-minded: everyone involved is very knowledgeable of the subject matter and speaks the same language. Furthermore, we are sharing the ambition to increase environmental as well as economic sustainability. This is what I like about the Louis Bolk Institute: they really want to achieve results at both these levels. I expect that we will intensify our collaboration in the future. Conventional arable farming is facing many issues that call for sustainable solutions based on scientific evidence, and that's where we need each other."

Potato breeding

A practical manual for the potato chain;
M. Tiemens-Hulscher,
E.T. Lammerts van Bueren
and others.



*Nothing but good about the crisis - Climate and biodiversity:
Inspiring conversations about urgency and hope (in Dutch);*
J.J.M. Staps.

De waarde van agrobiodiversiteit

*The value of agrobiodiversity:
Five measures to improve its use (in Dutch);* J. de Wit and
J. Wagenaar.

Lupineveredeling voor kalkrijke bodems

Lupin breeding for calcareous soils (in Dutch); E. Nuijten
and U. Prins.

Gezonde grondruit tussen melkveehouders en bollentelers

Healthy land exchange between dairy farmers and bulb growers (in Dutch); N.J.M. van Eekeren and others.

Building on Resilience

Principles for sustainable agriculture; W.J.M. Cuijpers,
C.J. Koopmans and J.W. Erisman.



Selected publications and reports 2013

In 2013, the projects of the Louis Bolk Institute resulted in more than 90 publications in scientific journals, trade media, newsletters, conference proceedings, and regional and national newspapers and magazines. Furthermore, 30 reports and books were published. A selection and only authors from the Louis Bolk Institute are highlighted here. Please visit www.louisboltk.org/publications for a complete overview of publications and reports, including full bibliographic data.

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NJF Seminar 461. Bredsten,
Denmark. 21-23 August
Introducing trees in Dutch dairy
and poultry farms; M.W.P.
Bestman and N.J.M. van Eekeren.

Adaptive Medicine

The challenge of measuring
health as the ability to adapt;

M.A.S. Huber et al.

Zoonoses and Public Health

Methicillin-resistant
Staphylococcus aureus (MRSA)
in organic pig herds;
L.P.L. van de Vijver et al.

Experimental Agriculture

Towards a regime change in
the organization of the seed
supply system in China; E.T.
Lammerts van Bueren et al.

EUROPEAN JOURNAL OF PULMONOLOGY

Influence of alternative
lifestyles; M.A.S. Huber,
L.P.L. van de Vijver et al.

Plant and Soil

Shoot growth, root growth and
resource capture under
limiting growing conditions for
two cultivars of lettuce; E.T.
Lammerts van Bueren et al.

nature.com

Enhanced nitrogen
deposition over China;
J.W. Erisman et al.

World's Poultry Science Journal

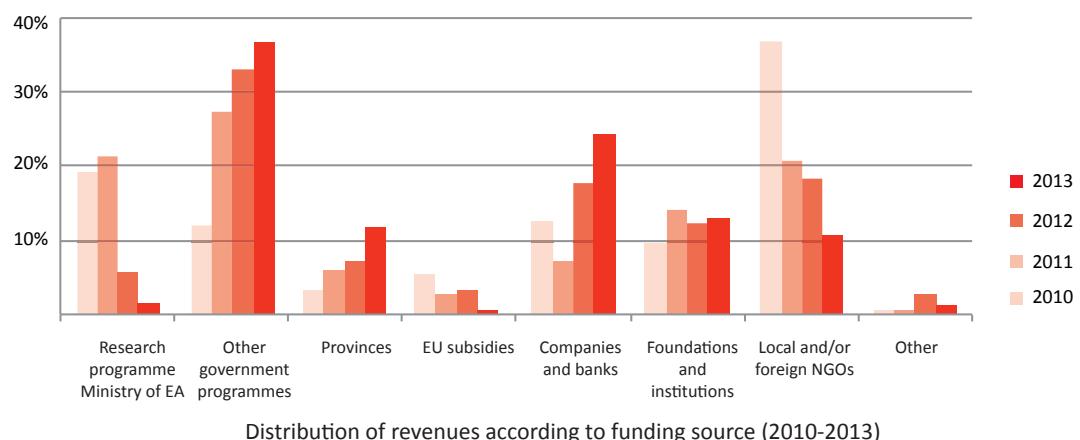
The prevention and control
of feather pecking in laying
hens; J. Wagenaar,
M.W.P. Bestman et al.

Statement of accounts

2013 Statement of revenue and expenditure (x €1,000)

	2013	2012
Revenue from projects and subsidies	4,470	4,566
Subcontracting costs	-1,638	-1,636
Net revenue from projects and subsidies	2,832	2,930
Revenue from fundraising	25	14
Donations and other revenue	21	128
Total revenue	2,878	3,072
Wages and salaries	2,293	2,275
Social security contributions	358	344
Depreciation of intangible and tangible fixed assets	24	28
Other operating costs	353	471
Total expenditure	3,028	3,118
	-150	-46
Financial revenue and expenditure	-15	-2
Net result	-165	-48

The Louis Bolk Institute closed the financial year of 2013 with a loss of €165,000. This is mainly due to a further decline in revenue from international projects and a provision for unforeseen VAT costs. The graph below shows the relative shift in funding from government to business. The previous year, 2012, was also closed with a loss, of €48,000. Negative results in two successive years have reduced the solvency ratio to 48%. The annual figures refer to the consolidated annual statement of the Louis Bolk Institute Foundation, and have been approved by the Supervisory Board on 12 April 2014. The auditor's report on these figures has been completed by Stolwijk Kelderman Accountants.



On behalf of the Supervisory Board

Due to the precarious financial situation in 2013, the Louis Bolk Institute has had to make substantial budget cuts. Furthermore, due to increasing competition it was decided to split off the Ghana Office, as from 1 January 2014. The Agro Eco-Louis Bolk Institute will continue its activities as an independent partner organisation. In the Netherlands, the institute has invested in project acquisition and efficient internal collaboration. Together, these measures have limited the net loss in 2013 to € 165,000.

The Dutch government continues to withdraw from funding research and consultancy projects: solving the economic crisis is given priority over investing in sustainable development. Fortunately, regional and European authorities, private foundations and businesses are increasingly interested in sustainability. Despite the more complicated funding process, these new partnerships offer enough potential to ensure the institute's financial continuity. Furthermore, the growing number of citizens' initiatives - a social trend in the Netherlands triggered by the reduced role of government - offer additional project opportunities for the institute.

Based on these developments, two sections of the institute's strategic plan have been modified: international development ambitions have been scaled down, and the multiyear budget has been adjusted downwards based on expected lower revenues.

Our collaboration with the Staff Council in 2013 was productive. Their critical views have positively contributed to the functioning and performance of the institute.



Although we are closing the financial year of 2013 with a net loss, the financial risk for the organisation has been eliminated. The Louis Bolk Institute has re-established a healthy financial basis. Furthermore, the institute is increasingly well-known and has built connections with media, business, healthcare organisations and funding agencies.

The Supervisory Board closely follows the financial situation. We are pleased with the Institute's growing reputation. Above all, we are proud of the research staff for conducting pioneering research and building inspiring partnerships.

Pieter van Geel M.Sc.
Chair of the Supervisory Board

Partners of the

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