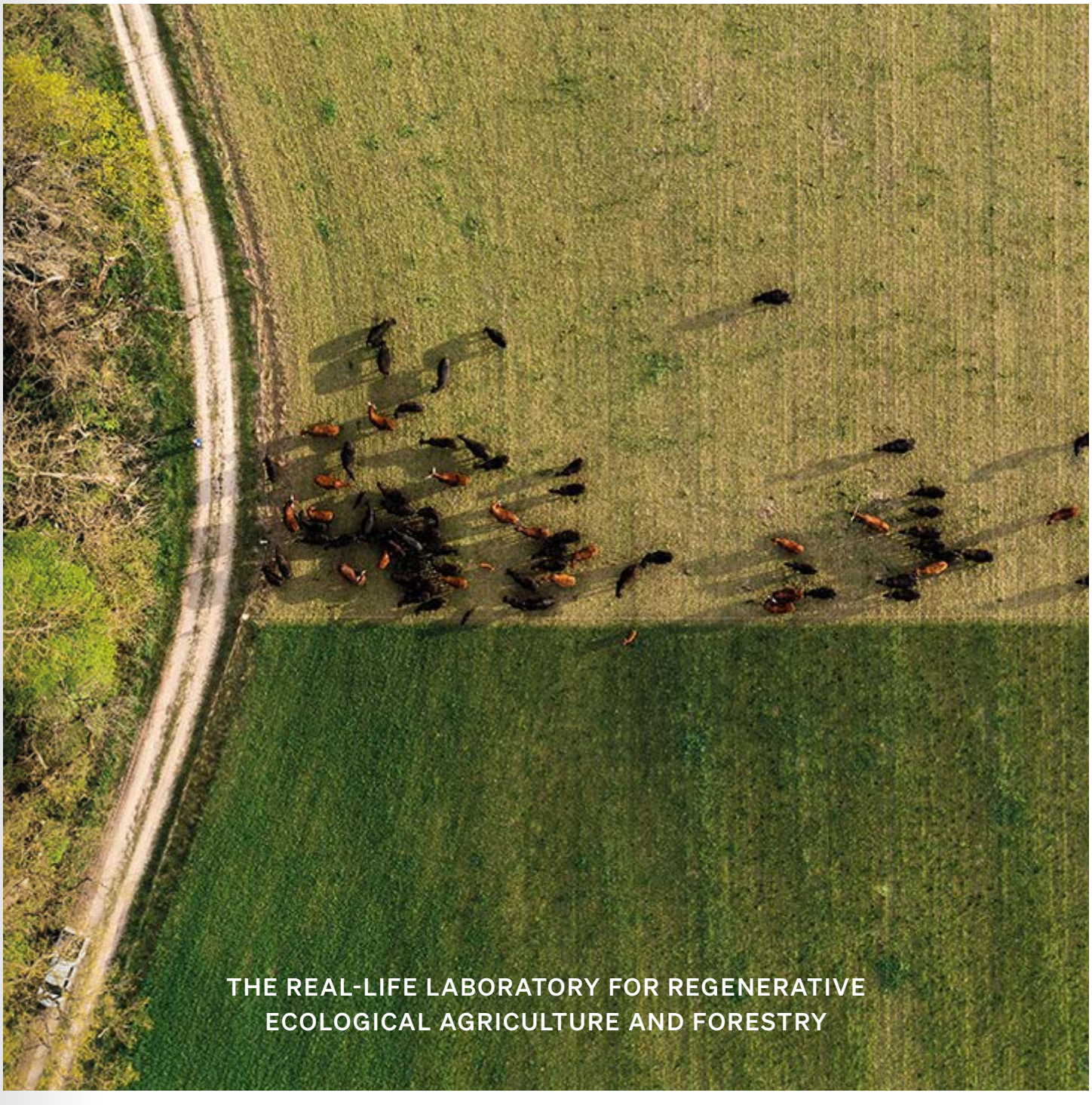
THE MAGAZINE NO.01 – 2024

FINCK FOUNDATION
ANNUAL REPORT



THE REAL-LIFE LABORATORY FOR REGENERATIVE ECOLOGICAL AGRICULTURE AND FORESTRY

TABLE OF CONTENTS

CHAPTER 1 | FOREWORD

We look back on the last years with gratitude. We have been able to achieve incredible things in the three years since the AVINA Foundation became our first donors, laying the founding stone, in March 2021. We have partnered with experts and individuals, developed areas of science and research, founded educational formats: run workshops, published our book "Rebels of the Earth", welcomed many interns and guests. As well as implemented nature conservation projects. Last but not least, we launched our DaVaSus project, funded by the Federal Ministry of Agriculture and Food.

In addition to the figures, data, facts and the work itself, it is our hope that our work reaches and radiates beyond Madlitz and can be useful to others. None of this would have been possible without the generous support of the AVINA Foundation. The next 3-year funding period begins next year, for which we have been able to secure further support in order to continue what we have started.

It was a personal milestone for us, and for me, to have the opportunity to present our work and findings on the challenges and necessary solutions in farming to the German Bundestag in 2023.

Before we look at the individual successes and challenges in this annual review, I would like to use my statement, in the Bundestag to set the scene for why and how we set our goal to take on this kind of work day after day.

"The focus of German agricultural policy in the last 50 years was to produce as much as possible at cheapest possible cost. This has put German farmers in an extremely difficult situation." Because the systems surrounding agriculture, such as politics, science, technology development, education and training, access to land and the capital market, have been organised over the last 50 years according to the same false assumptions.

Many farmers are forced to make vast investments and further specialise their operating systems in order to be able to participate in the potential gains of technology. Today, these farms are usually heavily in debt and extremely dependent – on fluctuating world market prices, continuous loan re-payments, increasingly expensive inputs, suppliers and customers. This means that even if many farmers wanted to make their farming systems more resilient by improving soil protection, biodiversity and animal welfare, they would not be able to do so, purely because the costs of loans from the bank and productions processes are too high to be maintained.

Our industrial philosophy of land utilisation is currently divided into forestry, agriculture and livestock farming. The agricultural production process is exclusively horizontal, with one crop as a monoculture and one harvest per year. Until recent years, it has long been the assumption that this way of farming would have little impact on soil and biodiversity. Just like the belief that the availability of water would remain infinite and energy costs affordable.

In actuality the soil of traditional farmland has been degraded to a kind of substrate, that is merely holding the plants in place. All the nutrients extracted from the soil, are being compensated by synthetic fertilisers, which – if used too intensively – as they often are, go on to attack the soil nutrient biodiversity, consequently lead to diseased plants. Sick plants, in turn, are more susceptible to diseases and pests and are also unable to supply the soil organisms with sufficient nutrients. So continues the system of increased application of additional synthetic chemicals, which then further intensifies the process of soil biodiversity degradation.

In addition to the lack of appreciation and profitability, adaptation to changing climatic and social requirements for farmers, we have a food system, only in Germany, which has external costs of 90 billion euros (according to estimates by the Boston Consulting Group) – adding only a gross value of 21 billion euros to German agriculture. So what must the architecture of a turnaround look like, in order to continue to produce high-quality food in the long term, despite the interlinked mega-crises of climate change, biodiversity loss and soil degradation? What are the strengths of agriculture and forestry? How can we ensure and increase our self-sufficiency? What responsibility do we want to take on? How can we make better use of precious resources and preserve them for future generations? How do we build up the independence of our farmers?

How can we increase appreciation for the work of our farmers? How can we get more young people interested in working in agriculture again, but also enable them to enter the world of farming?

The answer lies in the development of healthy soils and healthy ecosystems, that are adapted to their respective regional ecological context. We need to make forms of land use that build up soil, close nutrient cycles and restore biodiversity – below and above the soil. These methods of regenerative agriculture make a significant contribution to storing carbon in the soil, reducing farmers' dependencies and, above all, enabling farms to operate more profitably again.

Areas of activity of the foundation

RESEARCH

EDUCATION

NATURE CONSERVATION

A widespread expansion of these forms of land use, together with a change in our food purchasing habits and a reduction in food waste, could reduce the negative externalities of production, i.e. the external costs, by 70 billion euros, to 20 billion euros.

The challenges posed by climate change, the biodiversity crisis and soil degradation will become ever more serious. The only thing that will help us to secure our food supply today and in the long term is healthy soil and healthy ecosystems.

The consequences of climate change are not guaranteed to be drought or excessive flooding. The changing climate means unpredictability. And only healthy soil and a healthy ecosystem can deal with this. So its important to use our technological excellence, outstanding research, education system and the capital market to adapt our agriculture and food system to the needs of society and develop it in harmony with nature. After all, we want to take responsibility – for ourselves and our future generations.

With these words, I invite you to find out more about our work and the pleasure we take in it, as well as the potential of agricultural and forestry methods, in this end-of-year magazine. Many thanks to all our employees, without whom none of this would be possible.

– Benedikt Bösel, Managing Director
and founder of the Finck Foundation

FINCK FOUNDATION RESEARCH PROJECTS AT A GLANCE

DaVaSus, funded by the BMEL, co-operation partners JKI, KTBL, ATB

SEBAS, research cooperation with BTU Cottbus, DeFAF, DVL

Forest re-organisation, research cooperation with HNEE, TUM and JKI

Biotope networking, planning by Max Küsters of the Finck Stiftung with FÖL, Wasser- und Landschaftspflegeverband Untere Spree and funded by NaturschutzFonds Brandenburg

Cost and yield estimation analysis of agroforestry replanting with animal integration, research cooperation with KTBL

DAVASUS RESEARCH PROJECT IN FIGURES

5

Test areas and a comparison area totalling approx. 170 hectares

–

14

project participants from 4 institutes and 2 companies

–

16

climate stations

–

approx. 1.500

soil samples for biodiversity and soil carbon determination

THE FINCK FOUNDATION 2023

Currently six agroforestry systems on

51,5 ha

—

over 1000

hectares living lab

—

400.000 m²

of biodiversity strips

—

15

compost patches created using 5 different methods and 260 cubic metres of compost produced

—

approx. 30.000

perennials produced for winter planting, 300 field treatments carried out and 1.300 fruit trees grafted in the tree nursery

—

4

climate measuring stations on one forest conversion area each and an additional 24 soil moisture and temperature sensors in different soil horizons on all five analysed areas

approx. 5.000 m²

revitalisation of the first four field swales successfully completed

—

23

interns

—

over 1.600

visitors from research, education and politics

—

12.934

copies sold of “Rebels of the Earth” in the 3rd edition

Other exciting facts:

Invited expert in the **Bundestag**

—

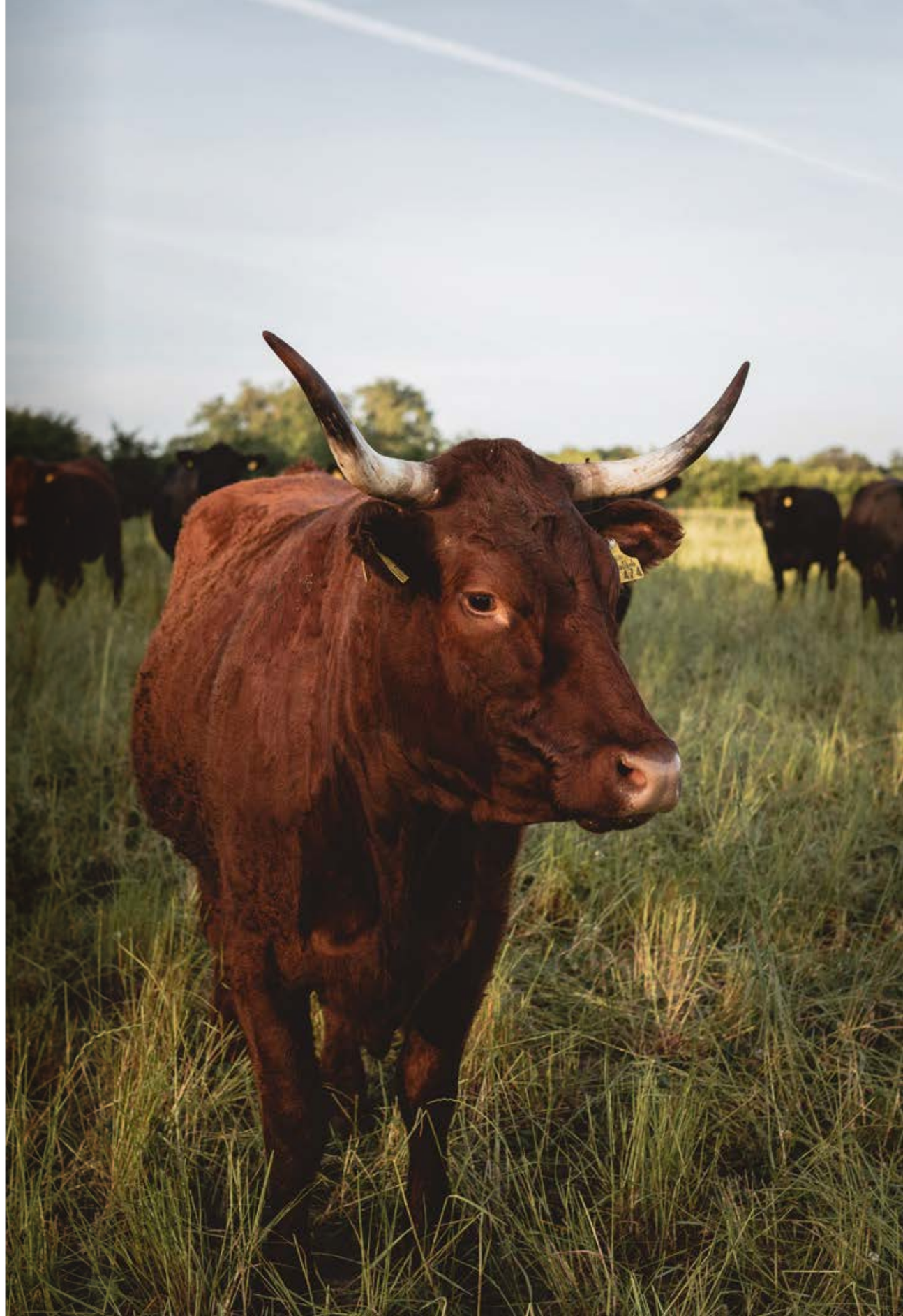
TV-appearances: e.g. on the NDR Talkshow (NDR), Studio3 (rbb)

—

Radio: ZEIT Podcast, SWR1, Deutschlandfunk

—

Press: Bundesregierung, Spiegel, Focus, TopAgrar, FAZ, Tagesspiegel, dpa, manager magazin, Schrot&Korn and many more



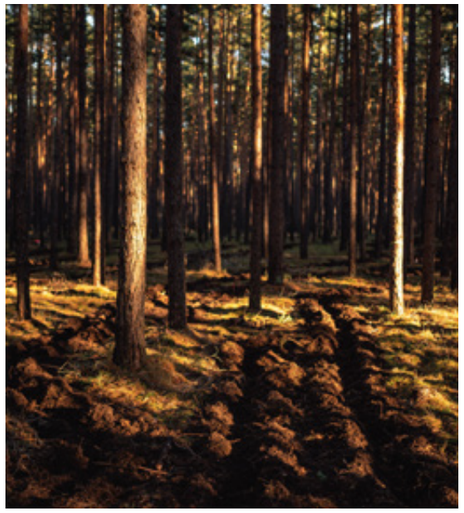
CHAPTER 2 | TRANSFORMATION OF LAND USE

2.1

WHERE DO WE STAND: DEVELOPMENTS, STATUS QUO AND CHALLENGES

Since the 1950s, land use in Germany has been undergoing a transformation, partly due to population growth, which is characterised in particular by an increase in settlement and transport areas. This is at the expense of intensified agricultural use, as we see a simultaneous decline in the numbers of farms, which has a direct impact on the climate, soils and plants.

Structural change to our land has been accelerated by new technical interventions, increasing use of fertilisers, plant adaption – to increase soil yields, pesticides to ward off pests and mechanisation in tilling and harvesting. At the same time this has increased cost pressure for farmers. The specialisation required to increase productivity means that fewer crop rotations are planned, long-lasting monocultures make up the majority of the land. This means more intensive fertilisation and plant protection with pesticides become necessary, polluting and degrading the soil.
The fragmentation of natural habitats above the ground and below-ground species are disrupted, damaging their delicate ecosystem. In particular, the living conditions of soil organisms, which are responsible for nourishing plants, stabilising the soil – enabling a high water storage capacity, and fine fungal networks are affected by mechanical processing.



„Instead of widespread continuous rain, there will be more frequent and heavy rain over a smaller area. In addition, short periods of extreme heavy rain will be much more extensive and somewhat more intense"

— LARGE ARABLE FIELDS PRONE TO EROSION, BUT ALSO MONOCULTURE FORESTS ARE PARTICULARLY AFFECTED

DWD (2021): Study by the Strategic Alliance of Public Authorities "Adaptation to climate change".

Changes in land use, ongoing climate change and increasing weather extremes are also developments that require us to adapt and transform land use concepts. The figures on land use show that land use can have the greatest possible influence on averting climate threat to our agriculture and food supply. How land use is organised in the future will have a direct impact on the water, carbon and nutrient cycles as well as above- and below-ground biodiversity and therefore also the climate and ultimately the quality of our food. So what must climate-adapted and resource-conserving land use look like in the future in order to withstand the current crises and who will shape it?

"The expected annual follow-up costs for the period from 2022 to 2050 will increase more and more over time and will ultimately total between 280 and 900 billion euros"

Dehnhardt, Al. et al. (2023): What the consequences of climate change will cost us. Costs of climate change impacts in Germany – summary and fact sheets. Ed. by the Federal Ministry for Economic Affairs and Climate Protection.

"Regenerative agriculture describes an adaptive approach to farming. That applies field-tested and science-based measures. These focus on soil and plant health to increase yield resilience while creating positive impacts on carbon and water cycles and biodiversity."

— JOINT STUDY BOSTON CONSULTING GROUP AND NABU

2.2

WHAT IS POSSIBLE: SOLUTIONS FOR ECO-LOGICAL, REGENERATIVE AND MULTIFUNCTIONAL LAND USE

An initial starting point for more soil vitality, biodiversity and pesticide-free food is offered by resource-conserving and sustainable methods of organic farming, which, among other things, pursues cultivation with nutrient cycles that are as closed as possible. These are self-sustaining and don't require the use of chemical-synthetic mineral fertilisers and pesticides. Instead this technique relies on old, more resistant varieties of plants and natural methods in cultivation such as extended crop rotations and the use of catch crops, as well as species-appropriate animal husbandry.

Organic farming has an important impact on the protection of the environment, the preservation of biodiversity and the long-term conservation of ecosystems. Methods of regenerative agriculture, in particular, complement organic farming by developing, maintaining and promoting the balance in the soil. The regenerative techniques also reduce dependencies on external factors. It looks not only at agriculture in isolation, but factors in entire land use, with its interlocking cycles being brought into focus – such as forests and nature conservation measures – to create a holistic view.

In our research work, the areas in Alt Madlitz are used as a living lab. Here, the Finck Foundation emphasises on value-adding multifunctionality of concepts applied. Our research expands this to include extensive data collection that calculates the economic, ecological and social benefits. These factors are crucial to demonstrate the economic viability of these approaches, in order to be realistically viable to a new future of farming.

Extensive data collection and a specially created database, with thousands of geo-referenced data points, form the basis for a digital twin of the analysed areas. In this tool, the existing land use systems are mapped, linking all the collected data such as soil samples, planting locations and tree varieties as well as climate data with the help of a geographic information system. In addition, there is a link to soil sensors, weather stations and drone images, which provide information on soil moisture and biomass. All investment, planting and labour costs are also recorded and evaluated in the projects.

FIVE PILLARS FOR MAINTAINING SOIL HEALTH

Gabe Brown, farmer and pioneer of the soil health movement from the USA, summarises the processes for maintaining soil health that have emerged from natural observations in five pillars

1.

Relieving the soil by minimising mechanical, chemical and physical disturbance of the soil, as this form of mechanical soil cultivation doesn't occur in nature and destroys the structure and function of the soil and its microbiome.

—

2.

Protection of the soil surface through plants, or a ground cover layer.

—

3.

Creation and promotion of biodiversity through intercropping and expansion of crop rotation.

—

4.

Living roots in the soil as long as possible throughout the year, to close the nutrient and carbon cycle for the soil microbiome and to multiply and strengthen mycorrhizal fungi. This then makes nutrients and water available to the host plants.

—

5.

Integration of animals into the agricultural landscape to increase photosynthetic performance and sequestration of carbon in the soil.

PROJECT OVERVIEW OF THE FINCK FOUNDATION 2019 – 2022

2019

April: 1st agroforestry system of pasture, poplar and alder on 29.5 hectares of arable land.
May: Start of holistic pasture management (cows: 11 Salers, 9 Angus, 1 bull).
Winter: Planting a syntropic agroforestry system with 200 different fruit, nut and berry varieties, as a test laboratory.

2020

April: 30 more cattle integrated into pasture management.
Winter: 1. 1st planting of an agroforestry "seed system" from our own seeds and a "deciduous pasture" to create a year-round greened syntropic, silvopastoral system for cows and chickens. **Two** conversion of Christmas tree plantation into regenerative plantation with berries and chestnuts.

2021

March: Establishment of Finck Stiftung gGmbH for accompanying research and data collection of the approaches trialled and to be tested.
Spring: Establishment of composting system to build up the soil life, close nutrient cycles and the establishment of a tree nursery for high-quality, site-adapted planting material.
Early Summer: Establishment of bees onto the farm. A co-operation to promote pollination performance and start of the design of the DaVaSus research project.
Summer: 1. Carrying out soil reference sampling and analysis of 400 composite samples. These were taken from over 10.000 geo-referenced punctures in 5 different laboratories to generate comprehensive baseline for effect measurement. **2**. Planting of flower strips to promote beneficial insects and biodiversity. **3**. Planning measures for biotope networking, e.g. by means of target re-naturalisation.
Winter: 1. Establishment of an agroforestry "Keyline" system for water retention by planting along the contour lines. This included comprehensive cost and effort analysis of the new agroforestry system in cooperation with the KTBL.
2. Start of monoculture conversion in the forest – including scientific data collection in cooperation with HNEE. **3.** Programming of a digital twin of the agricultural and forestry areas into a separate database - with over 50.000 data points on soil, climate and fauna plus automated linking with sensors.

2022

Spring: Installation of 200 nesting aids to strengthen biodiversity. First compost inoculations of approx. 30 tonnes of seed for 400 hectares of arable land.
Summer: First field refinements on the agroforestry areas.
Autumn: 1. Re-naturation of four field swales to enable water collection and habitat preservation for rare amphibians. **2.** Conclusion of scientific co-operation agreements with the Julius Kühn Institute, the Leibniz Institute of Freshwater Ecology, Eberswalde University of Applied Sciences and the Board of Trustees for Technology and Construction in Agriculture. **3.** Planting of an agroforestry system on 5 hectares as a biotope network. **4.** Climate measuring stations set up.

Step by step, various regenerative multifunctional land use systems were successfully established for research purposes.

CHAPTER 3 | CYCLES IN NATURE

3.1

HOW TO “PLANT” WATER WITH AGROFORESTRY SYSTEMS

Water availability is crucial for plant vitality and yield development.

Regions with low precipitation are the first to feel the effects of climate change, especially agriculture. 99% of farms water supply, in Germany, comes from precipitation.

One way of keeping water in the landscape and increasing its availability is by using agroforestry systems. Here, narrow strips of woodland are cultivated and harvested in combination with arable crops or on grassland. These systems can be adapted to the location and yield with fast-growing tree species such as poplar, willow and alder, but also with fruit and valuable woods such as sweet chestnut, hazel, field maple, plum and elder.

Crops can still be grown in between the rows or grassland can be utilised by chickens, sheep or cattle. This multi-functionality in plant cultivation

“In the SEBAS project, the effects of agroforestry structures on the diversity of insects are being investigated under the leadership of the BTU Cottbus-Senftenberg, scientists and associations – working side by side with the Finck Foundation. The Finck Foundation’s direct connection to the Gut and Bösel farms enables very practical research, which is essential for the further spread of agroforestry systems in Germany...”

— DR. CHRISTIAN BÖHM (CHAIR OF SOIL PROTECTION AND RECULTIVATION, BTU COTTBUS-SENFTENBERG)

enables more than just one harvest per year per area, ensures long-term perennial yields in addition to the field crops, whilst making important contributions to soil and erosion protection. This in turn improves the microclimate, reduces wind speed and raises crops from groundwater level, building up humus and closing the nutrient cycles.

Syntropic agroforestry is a special type of regenerative agriculture, characterised by the Swiss researcher and farmer Ernst Götsch. By systematically distributing the various woody plants (strata) and synchronising their growth over time (succession), natural growth cycles are imitated in order to maximise photosynthesis and create a fast-growing, resilient system. As the various 'woody' plants thrive better in a plant community, they are planted very densely. A mulch over the plants provide a ground cover, which protects the soil from wind and rain erosion, as well as solar radiation. This also facilitates water absorption and, in the long term, the water storage capacity of the soil. The mulch layers simultaneously nourish soil micro- and macro-organisms and also promote soil structure.

Since 2019, six agroforestry systems, with different research questions have been planned, established and maintained by the foundation team on the areas investigated by the Finck Foundation (see info box on p. 31). The latest silvopastoral agroforestry system, which began in 2023, combines the knowledge and experience gained from all systems to date. The focus is on the economic scalability of different tree row spacings and their effect on the yield and soil parameters of the arable areas in between.

Time and financial resources required for the establishment of the keyline system, were collected by the Finck Foundation in cooperation with the Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. (KTBL). This information enables an understanding of the economic efficiency of the establishment and maintenance of a syntropic agroforestry system to be measured on a real farm. Julia Toups and Max Küsters from the Finck Foundation have also developed a yield and turnover plan for further agroforestry systems, which allows the economic potential of the systems to be estimated. This serves to provide an actual comparison and can give information, based on findings to ensure security and success for others wanting to transform arable land. Together with the Leibniz Institute of Freshwater Ecology (IGB), the Finck Foundation has been investigating how different land use methods affect water availability and groundwater recharge on the land in Alt Madlitz since 2021. Using drone overview and soil moisture sensors in four agroforestry systems, on the summer pasture and in three differently managed forest areas, the IGB is collecting data on the water balance and linking it to the foundation's data.

Current results show that uneven, heavily aged and mixed forests with conifers and broad-leaved trees has the greatest potential to increase water absorption and be more resistant to droughts. At the same time these forests can increase groundwater recharge – a motivation for the Finck Foundation – which is being done in the foundation's forestry projects, by introducing a diverse mixture of woody plants in different stages of succession to the fields in order to get closer to this optimum.

"In close co-operation with the Finck Foundation, the JKI is investigating above- and below-ground biodiversity in arable cropping systems with windbreak hedges. The results so far show that windbreak hedges have an added value for biodiversity as well as a benefit for pest suppression..."

— DR. LUKAS BEULE,
JULIUS KÜHN-INSTITUTE (BERLIN)

Principles of syntropic agriculture

1. Maximising photosynthesis

2. Stratification to increase overall yield

3. Work with succession and understand disturbance and dynamics

4. Pruning and trimming stimulates, nutrient cycling and growth to maximise photosynthetic performance

5. Concentration on diversity of plants and nutrients

6. Considering eco-physiological function

"The documentation and calculation of costs and benefits of farm production is the foundation of an economic farm's goal. The output, which is derived from the yield and price of market goods, compensates for the production costs incurred. However, for sustainable business development, it will be essential to also calculate the performance and costs of previously non-marketable goods, to take into account in the long-term orientation of the business"

— MICHAEL HISS, (KTBL E.V.)

NUMERICAL AND PRACTICAL DEFINITION OF THE SIX AGROFORESTRY SYSTEMS OF THE FINCK FOUNDATION

Poplar-pasture system

29.5 hectares with 20 rows over a length of 11.6 km in both east-west and north-south orientation. This is designed for arable farming and animal integration in combination with flower strips.

—

Syntropic

a diverse system on 3.5 hectares, providing a DNA database looking at 200 different fruit, nut and berry varieties.

—

Seed system

2.1 hectares with 20 rows for animal integration, focusing on sea buckthorn and valuable fruit trees. The seed establishment is unbeatable with regard to climate adaptability. Grafting takes place directly in the field.

—

Deciduous pasture

silvopastoral, year-round grassed system on 6 hectares with 74 rows over a total length of 8.2 km for independent fodder supply.

—

Keyline

2.65 hectares with 30 rows over a total length of 2.7 km for berry and fruit production. Planting along the contour lines ensures slower infiltration and more even distribution of water in the system's plant rows in the event of precipitation.

—

Biotope networking

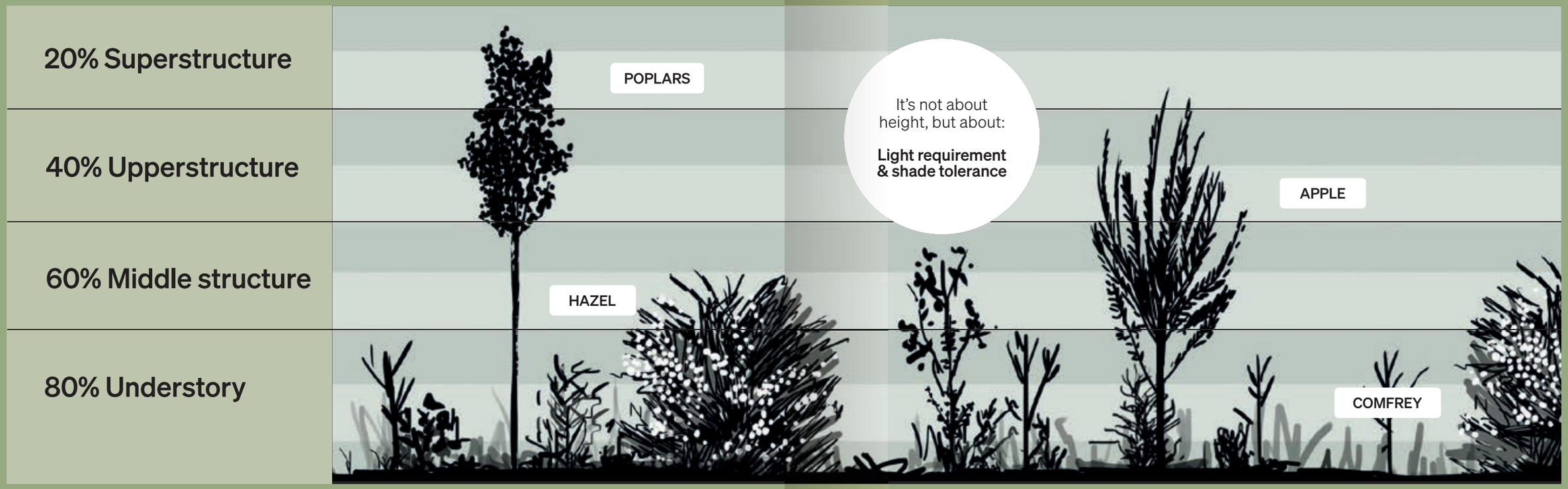
3.8 hectares area with 4.5 km of tree strips as a nature conservation measure to connect two forests in order to network habitats and build up biodiversity.

PRINCIPLE: STRATIFICATION AND SUCCESSION

Succession describes the natural course of nature. After being cut back, grasses and herbs grow first, followed by thorny shrubs and pioneer tree species, then come the trees with a longer life cycle.

Stratification describes the vertical layers of vegetation based on different growth heights. This results in the varying light requirements of the individual plants, from which the percentage coverage of the respective strata (understory, middle, upper and superstructure) is derived.

The principles of stratification and succession support the natural processes of nature. This allows the weak soil to build up more quickly and store the little water for longer. The goal is a resilient and self-sufficient land use concept.



created the tree nursery in Alt Madlitz as a logical continuation of the agroforestry approach. It uses the same principles, with a combination of temporary and permanent rows of trees. This system creates a microclimate in which trees can grow and be grafted in the best possible way. The plants already receive the necessary information about the prevailing ecosystem with low precipitation and nutrient-poor soils via their roots, to which they adapt right from the start and are thus prepared for transplanting into the new systems. In 2023, around 30,000 perennials were produced for winter planting, 300 field treatments were carried out and 1,300 additional fruit trees were grafted in the tree nursery, 800 of which had already been planted in the new systems by the end of the year.

In order to have high-quality perennials for the agroforestry systems, it was essential to start a tree nursery that enables to focus on strong root formation, climate adaptability as well as species diversification.

The focus is on integrating as many varieties as possible above- and below-ground, as well as biomass production, drought and disease resistance and late frost tolerance. The aim is to achieve maximum resilience with plants through site adaptation. This will enable the development and preservation of an independent gene pool of climate-resilient plants and shrubs.

The availability and variety of conventional suppliers are not sufficient in this respect. They focus primarily on the above-ground growth of the plants, but the roots are equally essential for healthy plant growth. It is the roots that ensure water and nutrient uptake in addition to stability in the ground. Depending on the site and soil conditions, roots are also able to adapt to the prevailing ecological conditions. The oversupply of water and fertiliser, as well as limited space due to narrow plant pots in traditional tree nurseries, prevent the plants from developing fine roots networks. A large total root volume is needed in order to use the available precipitation more efficiently and also balance the disproportionate above-ground growth. This imbalance can lead to many failures, due to the minimal lower root mass, when transplanting the plants at a later date. Johannes Harms, from the Finck Foundation,

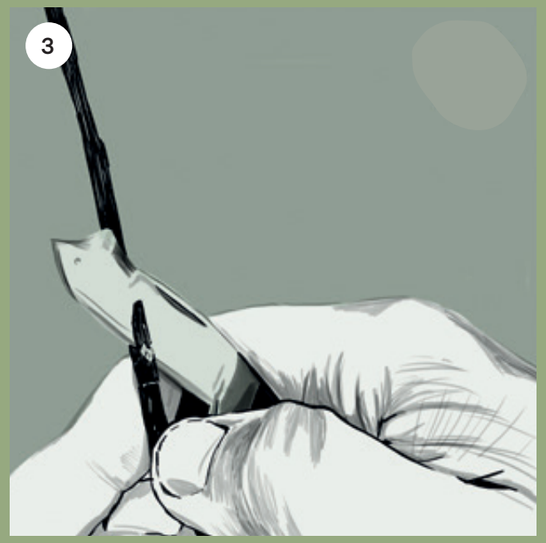
System combinations
Each row contains a different combination of woody plants, shrubs and perennials over a length of 42 metres, providing a miniature test version for future system planning, serving as a pomological garden (variety collection).

FOCUS ON ROOT HEALTH

Root pouches can be used as temporary containers for plant cultivation. These allow optimal root growth. The cylindrical pockets are permeable and allow the exchange of water and nutrients. As a result, the roots do not grow in circles, unlike in rigid plastic pots, and enable a gentle transition to the permanent system rows in the fields.

Airpruning systems were used for the first time in autumn 2023, for large-scale cultivation, using the smallest of spaces to improve a higher root surface area. The construction of the raised beds without ground contact, relies on an air-permeable wire mesh (8×8mm) on the underside, which ensures a downward-growing taproot. The roots dry out on contact with the air and stop growing deeper. At the same time, a hormonal signal stimulates the root to form fine-fibre lateral roots, which spread out in all directions, to form a strongly branched root system. This form of cultivation is also rodent-proof. In addition to nut trees (chestnut and hazel), the focus is on apple and pear rootstocks, taken from the pomace of wild and resistant fruit trees.

Tree grafting is not only a craft that requires great skill and care – it also has great aesthetics. Here is an illustration from the book “Rebels of the Earth”.



1 **Careful preparation:** For chip grafting in summer, the rootstock should be healthy, have a good root system and be in sap with its foliage. The scion should be fresh, the leaves removed and only the dormant bud from the following year leftover.

2 **Pruning:** The tree is pruned on the main trunk, or shoot, in a straight line from top to bottom and slightly deeper. There should be no more shoots below the cut that would take away the sap pressure for grafting. The flat wedge is removed.

4 3 **Clean connection:** The eye is cut out of the scion in a suitable size for the incision on the rootstock and placed in the cut-out with the knife. To avoid contamination, the cut points shall not be touched

5 **Growing together:** The better the cut-out chip fits onto the cut surface of the rootstock, the better the growth.

6 **Gentle protection:** The area must be tightly wrapped with grafting tape – several times above and below the resting eye, but only once or twice on the eye.

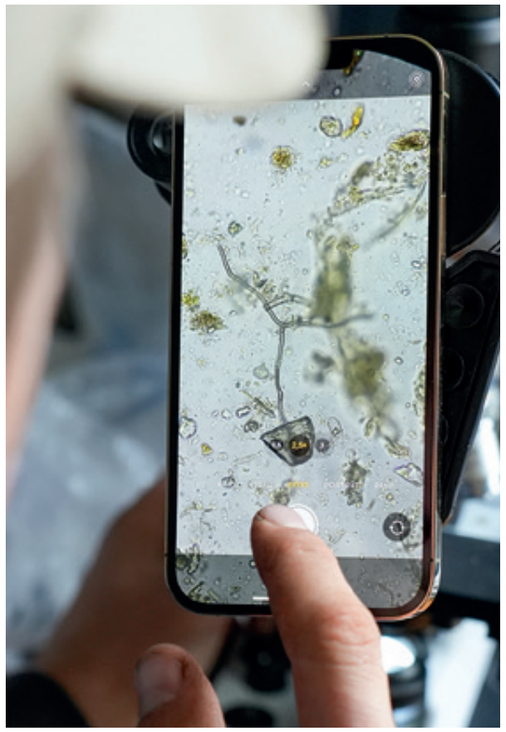
3.2

UNDERSTANDING AND PROMOTING ABOVE- AND- BELOW GROUND FOOD WEBS

In addition to water absorption, storage and erosion control, a healthy, revitalised soil is essential for stable and high-quality food production.

The soil – food – web or microbiome, which describes the complex and reciprocal interaction of soil organisms with each other and with the plant roots, is crucial for soil fertility and plant growth. This includes a large number of microorganisms such as bacteria, fungi, algae, nematodes and protozoa, which interact with each other and the plant roots, by breaking down organic substances and making nutrients available. Worms, insects, rodents and birds are also part of this network.

In addition to soil structure, pH value and moisture content, the ratio of fungi to bacteria is also an indicator of balanced nutrient dynamics and soil health. While bacteria break down organic substances into nitrogen and carbon, fungi metabolise nitrogen and phosphorus, much more slowly and efficiently, which in turn leads to better nutrient availability for the plants. At the same time, fungi store carbon in the soil for longer and ensure less respiration. Mycorrhizal fungi, in particular, play a key role in the nutrient cycle. They colonise fine roots, feed on the carbohydrates from photosynthesis and in return absorb nutrients for the plant and increase the water supply. With their delicate network of hyphae, fungi are able to open up pores far deeper than roots, make micronutrients available, or compensate for excess through metabolisation and can prevent overspill into groundwater. In addition, mycorrhizal fungi produce the substance glomalin, which, similar to an ecological adhesive, is able to bind together the smallest aggregates and strengthen the soil structure.

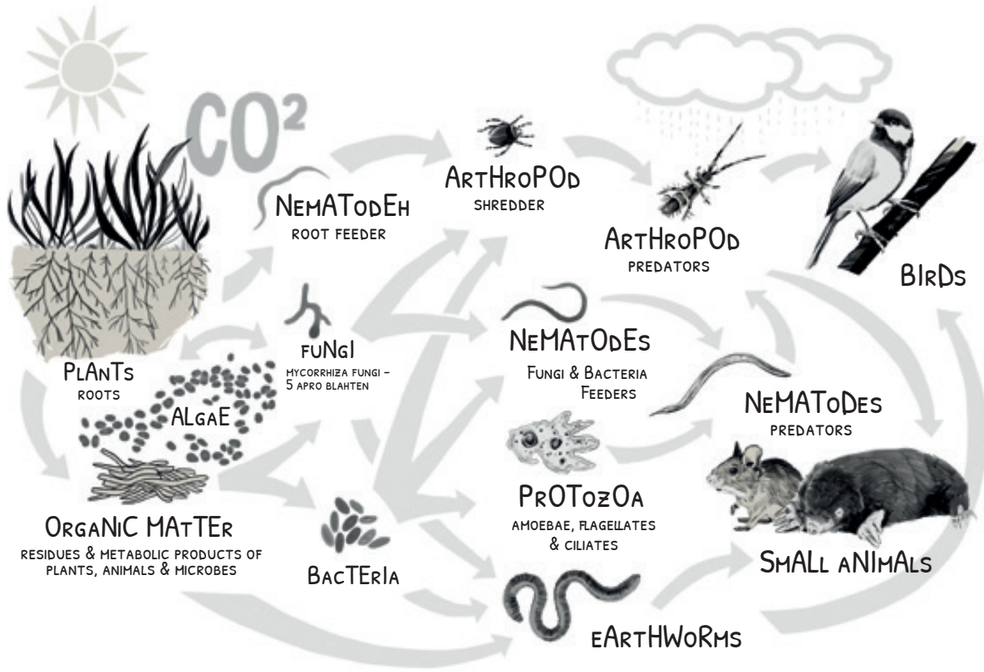


The investigation of various compost approaches, to build up soil life by means of organic fertilisation, protect against pest infestation and to close nutrient cycles across systems is part of the Finck Foundation's research work. In 2023,

"We demonstrate that soils are a cornerstone of one health and serve as a source and reservoir of pathogens, beneficial microorganisms, and the overall microbial diversity in a wide range of organisms and ecosystems..."

—BANERJEE, S. (NORTH DAKOTA STATE UNIVERSITY), VAN DER HEIJDEN, M.G.A. (UNIVERSITY OF ZURICH)

Soil Food Web: the complexity that forms the basis of all life and which must be preserved.



PICTURE LEFT BOTTOM
Clockwise: Sandy soil, compost and humus-rich soil. The dark colouring and crumbly structure are signs of good soil.

Laurenz von Glahn set up a total of 15 approaches in 5 different processes and produced 260 cubic metres of compost from materials such as manure, leaves, straw, clay, organic waste, hay, silage, wood chips, coal and rock flour. These composts are tested both in the new agroforestry systems and for the young trees in the tree nursery, as well as in the inoculation of seeds and extract dressing of seeds in arable farming during spring and autumn.

Doing this means the seeds are optimally supplied with the microbiome of fungi and bacteria required for healthy growth right from the start. Approaches to composting were investigated in 2023 with the Rillig Lab of the FU Berlin, among others, as part of a master's thesis and form the basis for evaluating further compost compositions and soil parameters with a focus on humus formation, fungal-bacterial ratio and microbiology. In addition, the aim of the composting trials is to show how farmers can become less dependent on industrially produced, synthetic fertilisers in the long term.

After three years of dressing and organic fertilisation, the first basidiomycetes were detected in the field as part of regular monitoring. These belong to the mycorrhiza, which form a symbiotic relationship with the roots of the plants and make it easier for them to absorb water and nutrients.

PICTURE RIGHT
Indication of a healthy soil food web: nematodes eat bacteria and make nutrients available to the plant.

3.3

THE IMPORTANT FUNCTION THAT ANIMALS PLAY IN THE CYCLE

Plant cultivation has the potential to remove carbon from the atmosphere, bind it in the form of plant residues and exudates and then store it in the soil. This potential can be increased through ecological and regenerative measures such as intercropping, undersowing and agro-forestry planting, which favour permanent soil cover, more photosynthesis products and more root formation. The integration of animals into this cycle increases the potential all the more.

The Thünen Institute's soil report shows that grassland, with its longer vegetation periods, higher photosynthetic capacity (resulting more above- and below-ground growth), can sequester even more carbon from the atmosphere than arable land. However, if this permanent grassland is not regularly utilised by grazing, the landscape will become overgrown with bushes, as grass needs the animal grazing that gives plants necessary growth stimulus.

One solution to this is holistic grazing management. This is a grazing method that is based on the natural behavioural patterns of ruminants, which have been grazing year-round, in their landscape, for thousands of years. The herd on the farm in Alt Madlitz, which has grown to around 200 cattle in 2023, is an crucial part of the ecosystem and integrated into the arable crop rotation. In order to build up humus and return nutrients after the harvest, grazing takes place on perennial arable forage areas in summer and on undersown crops and catch crops in winter.

The integration of cattle into arable farming represents an under researched variant of land use models, with enormous potential for closing the nutrient cycle, building soil and biodiversity and absorbing and storing water on the land. One of the aims of the DaVaSus research project is to visualise these ecological and social benefits.

"There is only one answer to desertification. We must utilise our livestock today and move them across the pastures as a substitute for the herd-predator system of the past. There is no other option! If we don't realise this, we won't be able to stop climate change, even when we have said goodbye to fossil fuels..."

— ALLAN SAVORY (BIOLOGIST AND ZIMBABWEAN CATTLE FARMER)

3.4

DAVASUS RESEARCH PROJECT

DaVaSus is a joint project of the Finck Foundation, the Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), the Julius Kühn Institute (JKI) and the Board of Trustees for Technology and Construction in Agriculture (KTBL). and runs from 10.02.2023 to 31.12.2025.
The carbon cycle shows how essential multifunctional approaches in land use and equally multi-perspective research are. This is why the Finck Foundation has developed the research project “Data and value-based decision-making for a sustainable land use”, which is one of the experimental fields funded by the Federal Ministry of Food and Agriculture (BMEL). Here we are researching digitalisation in agriculture as future farms and future regions. The aim is to make farms more productive and competitive, while promoting and improving sustainability, animal welfare, environmental, nature and climate protection. Together with its research partners, the Finck Foundation is collecting ecological, economic and social data on various forms of land use and management in Alt Madlitz. In addition to holistic pasture management and two agroforestry systems, are two arable areas with undersown crops, flower strips and sections of land that are cultivated plough free, in order to achieve the project objectives. The complex interrelationships between soil, water, biodiversity, (micro)climate, animal welfare and forms of management are measured using digital instruments, made available via mobile communications and analysed as automatically as possible.

“Our current economic system is geared towards maximising profits. However, only a fraction of the actual costs and revenues are included in profit calculation. Agriculture has high externalised cost (e.g. deforestation for fodder production,) which are not included in the profit equation. At the same time, additionally to producing high-quality food, agriculture has the greatest potential for society – with carbon storage, biodiversity creation and education. The aim of DaVaSus is to visualise the true costs and benefits of regenerative agriculture and give decision-makers in agriculture, politics and society an opportunity to act with high ecological and social morals to create change and expand the existing economic system.”

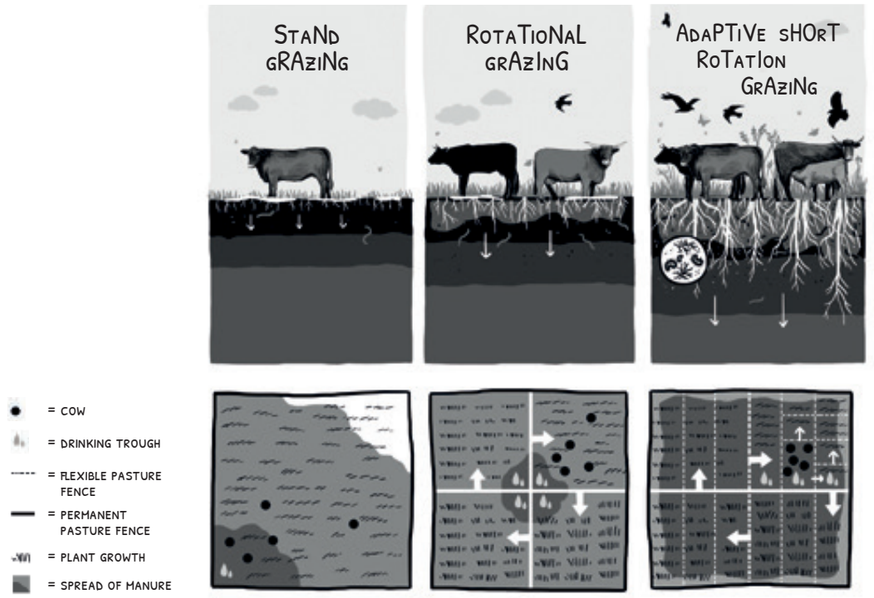
– MAX KÜSTERS, FINCK FOUNDATION

Practical measurement methods and indicators are identified by analysing collected data. The aim of the various trials is to determine effects of the different forms of cultivation in the ecological focus areas: soil health, water protection, climate impact and biodiversity. Parameters such as humus content, water erosion potential, soil greenhouse gas flows and earthworm numbers are also analysed – in each case on areas with regenerative measures (such as under-sown crops or tree strips).

“We are developing methods for sensor-based assessment of soil health, using the soil properties of humus content and soil moisture as examples. This allows a comparison to be made between different forms of cultivation (ploughing, intercropping, flower strips, agroforestry...) and conventional cultivation. Healthy soil is essential to ensure sustainable yields for generations to come. In addition, we use digital relief analyses to assess the soil erosion potential and thus the potential risk to neighbouring water bodies.”

– FRIEDERIKE SUHL, DR MICHAEL HORF, DR SEBASTIAN VOGEL, LEIBNIZ INSTITUTE FOR AGRICULTURAL ENGINEERING AND BIOECONOMY E.V. (ATB)

The influence of the type of cattle grazing on the development of roots and biodiversity



DAVASUS RESEARCH PROJECT IN FIGURES

5

test areas and one comparison area totalling approx. 170 hectares.

—

8,64 MM

data points, on herd behaviour, are sent monthly by 185 GPS collars for virtual fencing.

—

3

measuring devices automatically send data on the cattle herd to a digital product passport – this promotes transparency in the value chain.

—

92

heifers and suckler cows in the analysed herd fitted with rumen boluses.

—

14

project participants from 4 institutes and 2 companies.

—

16

climate stations.

24.790

insects – the highest number of insects per day recorded with digital flying insect sensors on one of the test areas.

—

12

transects are analysed every 14 days using soil moisture probes and optical spectrometers.

—

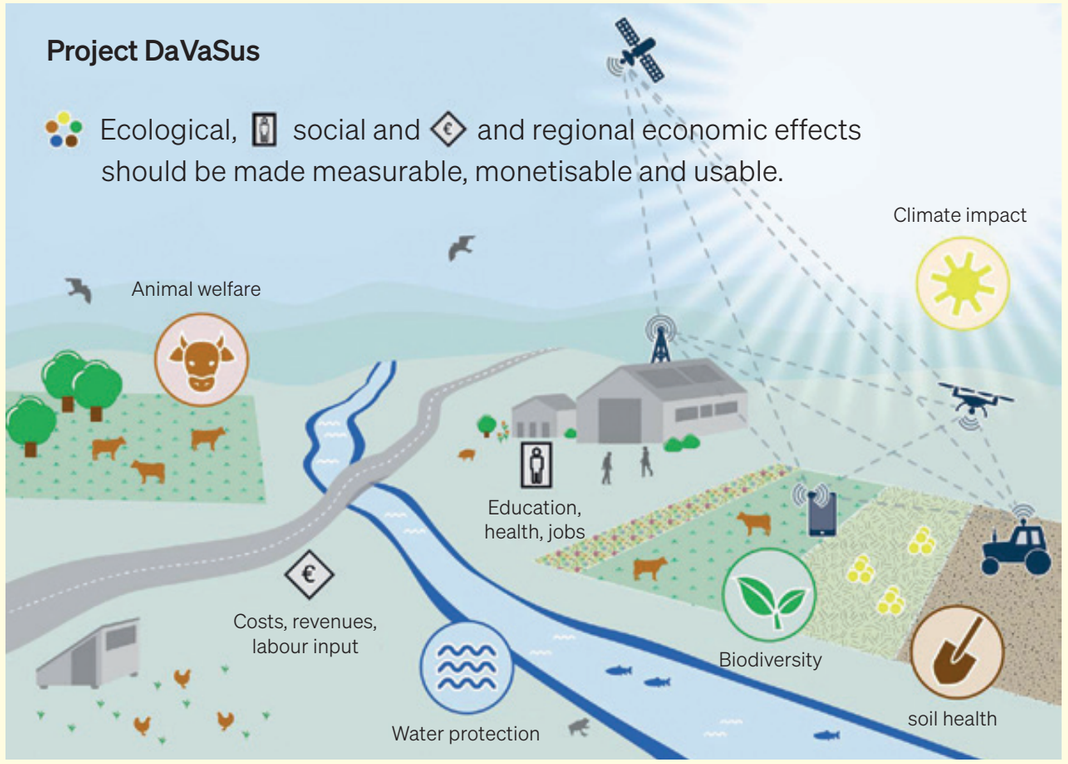
approx. 300

soil samples for biodiversity analyses.

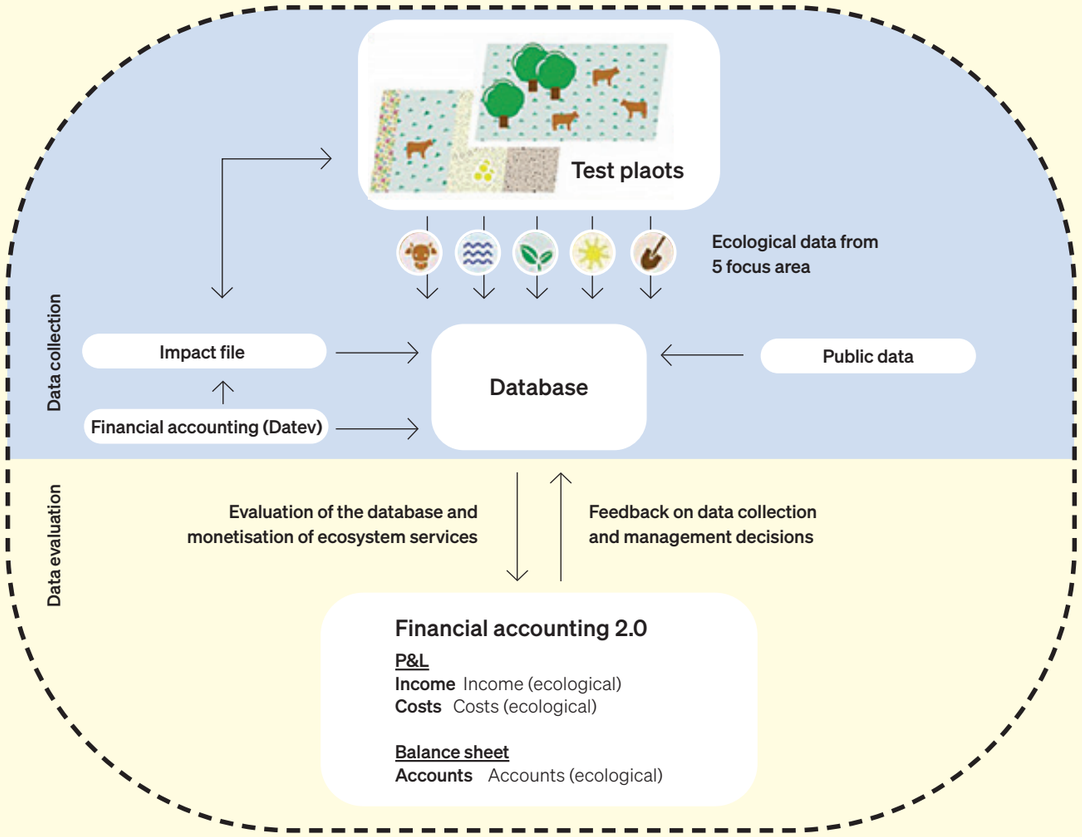
—

approx. 1.500

soil samples for biodiversity and soil carbon analyses.



PROTOTYPE / DEMONSTRATOR



RESEARCH PROJECT

"The third-party funded project DaVaSus, which is coordinated by the Finck Foundation, manages to scientifically address issues of practical relevance. The Finck Foundation forms the bridge between practice and science in the project"

— DR. LUKAS BEULE, JULIUS KÜHN INSTITUTE

"In the DaVaSus project, we collect data on animal welfare and the health of cattle in year-round grazing in combination with agroforestry. The integration of modern and automated sensors and monitoring systems allows us to analyse physiological and ethological parameters in individual animals, in relation to management practices and environmental conditions, without harming the animals. This is important as improved management through multifunctional land use systems can support animal welfare monitoring."

– DR SEVERINO PINTO, LEIBNIZ INSTITUTE FOR AGRICULTURAL ENGINEERING AND BIOECONOMY (ATB)

Today, key figures from the financial accounting of agricultural and forestry businesses do not reflect the true values and costs of these businesses. The vision of DaVaSus is to make these services and costs visible.

3.5

REGENERATIVE FOREST CONVERSION FOR GREATER CLIMATE RESILIENCE

Regenerative land use also includes the utilisation of forestry. Around 1/3 of Germany is forested, which means that forestry has a major impact on the entire ecology, natural cycles and the climate.

Pure pine monoculture forests, aged 70 – 80 years old, are widespread in Brandenburg. These are considered to be comparatively vulnerable to climatic changes. This is due to irregular rain and the risk of forest fires. The recent forest conversion that is now practised on large areas in Brandenburg forests has focused on the introduction of a second layer of deciduous trees. This ranges from trees aged around 60 for varieties of beech and from the aged 80 for varieties of oak.

These substructures are generally planted over large areas, with the deciduous tree species growing under the canopy as the next forest

"The numerous activities surrounding the Alt Madlitz forest reorganisation project were extremely successful and motivating, last year. Numerous data recordings and initial finalisation of the constructive cooperation between HNEE and Finck Stiftung gGmbH. With the expansion of the field equipment, including several climate measuring stations, an important foundation stone was laid for the further scientific observation of interrelationships within the ecosystem. The further development of climate-resilient forest structures is the focus of science and practice - the project in Alt Madlitz and the cooperation with the Finck Stiftung gGmbH are forward-looking in many respects."

— PROF DR M. GUERICKE, EBERSWALDE UNIVERSITY FOR SUSTAINABLE DEVELOPMENT (HNEE).

generation. Here we expect predominantly even-aged and comparatively species-poor deciduous forest structures.

As part of the forest conversion project launched in 2021, the “Madlitz variants” have extended the forest conversion concept commonly used in Brandenburg. The Finck Foundation has focused on comparing three innovative, practical forest conversion variants, with a reference area that has been left to develop naturally and an addition of a regularly managed area in of pure pine. Around 17.000 trees were planted and 2.5 million seeds sown, on five 1.5-hectare plots in a 50-year-old pine monoculture plot. The three trial variants are characterised by the use of a wider range of tree species and the testing of additional, partly new silvicultural and silvicultural engineering aspects as well as alternative revegetation methods with a holistic view of the site, humus layer, herb, shrub and tree layer. After just two growing seasons, the clear-cut area that was planted according to syntropic principles showed more vigorous growth compared to the mixed species regeneration area, despite years of monoculture. As part of the scientific monitoring together with the Eberswalde University for Sustainable Development (HNEE), the Finck Foundation has carried out extensive soil sampling and georeferenced all the plants and determined their vitality. As part of the ongoing research cooperation, 4 climate measuring stations with data loggers were installed, on one area each, for long-term effect measurement of air humidity, air temperature, PAR/global radiation, soil moisture, soil temperature and plant-available water. In addition, 24 soil moisture and temperature sensors in different soil positions provide further data on all five investigated areas. As part of the research collaboration with the Technical University of Munich (TUM), launched in 2023, plant health is being investigated by sampling photosynthetic parameters and the function of tree communities.

The experimental design addresses the question of whether the lower layers (herbaceous species and shrubs) and pioneer species can facilitate the establishment of transition to successfully adapt species on calamity areas. The main objective is to document how the alternative methods influence the establishment and vigour of the selected plant combinations, in order to determine the success of tree species diversity, soil quality and carbon sequestration of the young plants, as well as the associated risks of planting.

Forest conversion trial areas

1.

In the fenced nature conservation area, the development observed after storm damage is simulated by three perforations without further management and without the influence of increased wildlife populations.

2.

In the second area, the perforated area, three holes of approx. 500 – 700 m2 were cut into the middle of the pine area and these were reforested using a diverse seed mixture and planted to instigate a light-ecologically orientated forest development.

3.

The third area enables the investigation of plant growth from seeds and pre-grown trees after the Mikado-like felling of 30% of the existing pine trees. This lying deadwood should protect the planting material from game and also act as a water reservoir and climate buffer.

4.

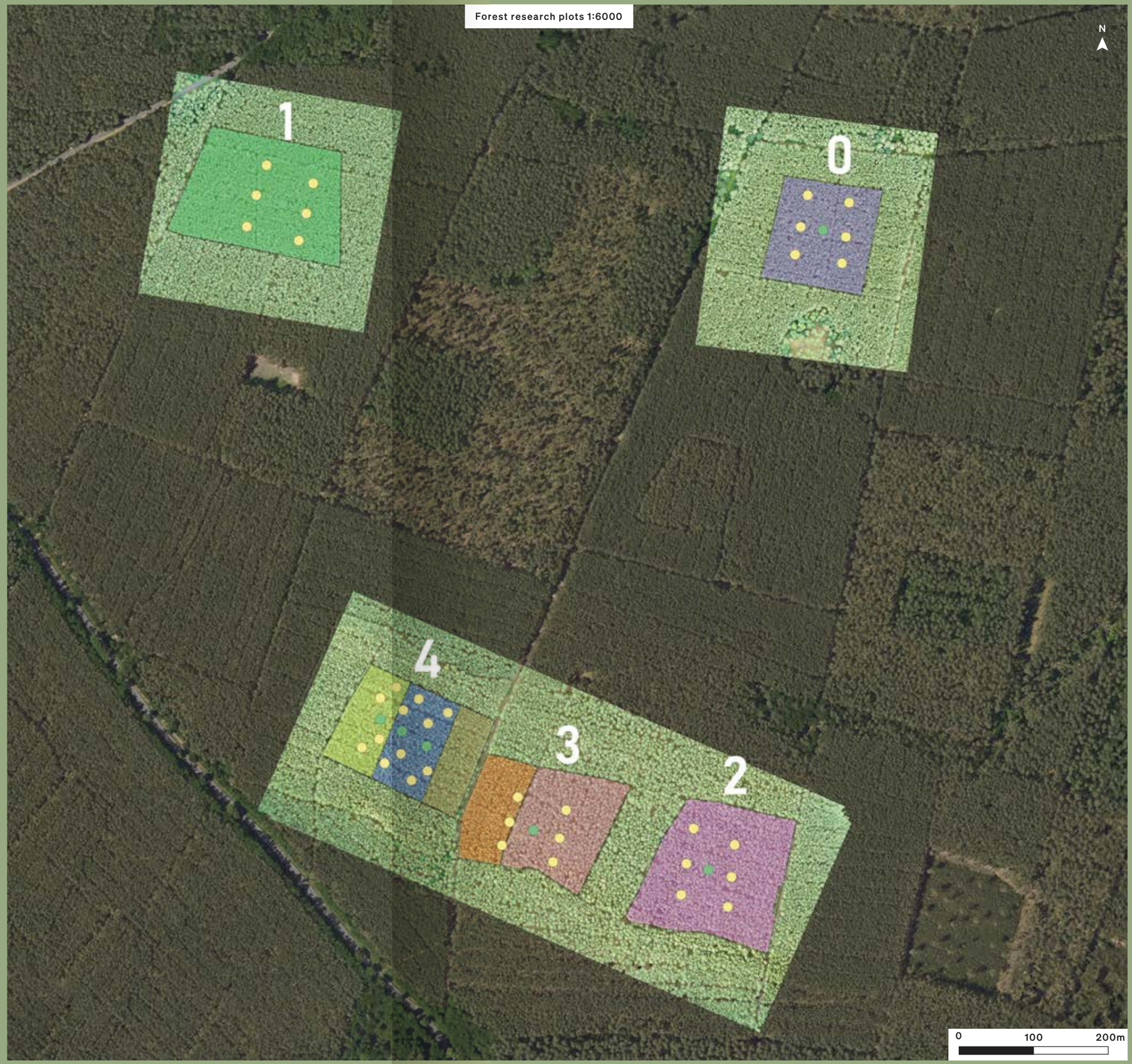
A fourth trial area was reforested according to syntropic agroforestry principles: one half after complete deforestation of the old stand, and the other half with 40 – 60% old stand.

0.

A fifth plot serves as a reference. Here, the currently common form of forest management continues to be applied.

Overview of the respective locations of the forest conversion project

- 0 Plot 0
- 1 Plot 1
- 2 Plot 2
- 3 Plot 3 and sub plots
- 4 Plot 4 and sub plots
- Center pojnt (data logger.)
- Permanent observation point



"While in commercial forests the rotation period until the wood is utilised sits between 80 to 200 years, in Central Europe the trees in the primeval forest rotate between about 400 (e.g. beech) and 1000 (oaks) years old. Utilisation therefore has a very long range (between 300 and 800 years) in the development of the ecosystem and, if there are specific plants and animals relying on certain food (and the associated deadwood), these species will be particularly threatened. The fact that a commercial forest of the same floristic (including tree specie) composition has a completely different bird life than the associated primeval forest demonstrates that nature conservation has so far paid too little attention to these ageing processes in habitats and highlights the great challenges here."

— REMMERT, HERMANN (1991): THE MOSAIC CYCLE CONCEPT AND ITS SIGNIFICANCE FOR NATURE CONSERVATION

3.6

INTERVIEW MAX KÜSTERS

Max Küsters – Head of Strategic Projects

Benedikt Bösel: Max, you have been building up the foundation with me since 2021. You developed the DaVaSus project and successfully applied to the Federal Ministry, to start the renaturation and biotope networking projects. Also you've managed our data collection and the development of the digital twin, implemented large-scale soil sampling, carried out financial analyses and much more.
How do you look back on the last few years?
Max Küsters: First of all, I find it incredible what has happened here in the last three years. We were able to find great research partners straight away, implemented the projects on the sites extremely quickly, wrote a book, welcomed countless visitors and established ourselves as an independent research institution, with the consortium management of the DaVaSus project. Sometimes I look at the calendar to see what happened a year ago and have the feeling that, with everything, there could well be three years in between. It's a pretty wild ride, with an incredible amount happening at the same time – there are always waves of absolutely calm moments, such as finalising a conservation project or observing the cattle, and intense, long working days at the PC with lots of phone calls, emails and bureaucracy.

The Finck Foundation is still a very young organisation. Where do you see our strengths? Where do we need to develop further?
I think our huge strength is the purpose of our work and the enthusiasm with which we all pursue this work. To me, the vision of the Finck Foundation is meaningful and useful. It is meaningful because there is nothing better than working for the health of the soil, plants, animals and people and contributing for future generations. The way we produce food has a huge impact on the environment and a direct lever to aid with the current ecological crisis. Our work makes sense to me because there are more efficient, better ways of producing healthy food that are economically and ecologically beneficial. One example for me is using drones to sow tiny seeds instead of driving over the fields several times with 20-tonne machines. Another example is the integration of trees and animals on arable land for multifunctional use and to create a circular economy – its effects are significant. This has not been done for centuries for nothing.

The third strength I see is our real-world laboratory construct. The Finck Foundation has direct access to two commercial farms and can observe what really makes a difference when it comes to working in an ecologically, economically and socially

beneficial way. Many of our research partners often tell me themselves that they are sometimes extremely advanced in individual areas, but that a holistic view is not possible, and that the problem is how to apply knowledge about different microorganisms in the soil in practice. We can organise research work freely, with a view of the interrelationships in order to see what can be realistically implemented. This is a new model of cooperation between science and practice, which can be replicated.

Of course, there is always a need for further development given the dynamic nature of our work and our own drive and aspirations. I believe that we must be careful to focus on the major problems of our time, such as climate change or the loss of biodiversity. Where we have the greatest strength and issues that we can we actively promote. In order to achieve our goals, we also need ever better structures so that our work in the growing team remains effective and efficient.

You have mentioned that things can be done better in agriculture and forestry. What do you think is not going well in our current economic system?
I studied economics and am fully aware of how our market economy works and what the realities are. To be honest, I'm not fundamentally against this system, especially because I don't think we have a better alternative right now but we have to be quick to act when it comes to the major problems of our time, such as climate change. In my view we simply don't have time to change the economic system first, this is politically and socially impossible. However, I firmly believe that there have been problematic decisions made in recent decades, particularly with regard to food production and health. After the Second World War, we focused on mass production and artificially low prices and treated farms like companies producing car parts. In other words, these farms specialised in a few products or parts in the chain with standardisation, exploitation of economies of scale and often dependence on a few customers for sales. A classic example is the move from many small mixed farms to one large farm that only fattens pigs. The piglets are purchased at 2 months of age, fattened for 4 months in a standardised process with commercial feed and then sold to a bulk buyer for slaughter.

The ecosystem is the basis of value creation in agriculture. And the ecosystem is not standardised, but resilient precisely because of its complexity. Standardisation causes it to wither away. In theory, the above steps make economic sense, but there are two crucial problems: 1. we forget that we do not have a “normal” production process as in car parts production, but produce food from and with nature and 2. we focus on profit maximisation without taking into account the actual costs and benefits of our actions.

It’s the same in arable farming: if I have an 80-hectare field that is rectangular and has a single crop without weeds, I can work it well with machines, but it lacks any diversity, any protection of soil and microorganisms, any basis for complex life. In the long term, this means literally pulling the rug out of the value chain and not factoring in external costs and services. That’s why we in Madlitz are practically dismantling and reconsolidating the way land is used.

You mention the ecosystem as well as the issue of the costs and benefits of ecosystem services. How can this help us from your point of view?
Exactly. I think we are firmly convinced that we can change things for the better by assessing the “true” costs and services of land use. If you manage to attribute the costs that are often incurred by society as a whole when greenhouse gases are emitted, you can already ensure that pollution is reduced, quite simply because it becomes expensive. If there were now payments for ecologically and socially favourable management methods, then there would be an incentive to work in a

way that creates value. And the interesting thing is that no sector outside of agriculture and forestry can do this. 80% of the land in Germany is used for agriculture, or forestry and this land can be used directly and actively to create value for the environment. This we urgently need due to our ecological crises.

What do you think of last year’s farmers’ protests? Can our work with the foundation help to change our food systems and possibly give farmers greater recognition?
I think the protests are a logical development from the last decades. Treating farms like companies that produce car parts, as I put it above, has brought us to this point. This is the work of politicians and some farmers themselves. The situation of farms in Germany is disjointed – there is no such thing as a single farm. They range from large farms (some of which are integrated into corporate companies), to small-scale part-time farmers.
However the trend is clear: the more you specialise, the more you produce and the cheaper the better. Farmers are encouraged to leave trade and distribution to a few large retailers. Dependence is increasing enormous, prices are being set and so attempts are being made to become more efficient and reduce costs just to to stay alive. This is only possible through size – economies of scale and in turn this increases supply and the vicious circle continues. Some farms are big enough and have been able to build up considerable capital over the last few decades.
But the situation is extremely tough for everyone, because the price is set and the quality of the products has little influence. Farmers are effectively just producers, sometimes only for part of the value chain, who need to maximise volumes, but otherwise have no influence. At the same time, farmers bear extreme risks, are often directly involved in the business with their families, have to comply with ever stricter regulations, endure a lot of bureaucracy and are increasingly criticised by society. This builds up enormous pressure, which eventually bursts. Many feel trapped. Pushed back into a situation where it often feels like there is no way out, its impossible not to.

I hope that with the foundation‘s work we can help people to understand each other’s position in our society. In some cases, there is a complete lack of understanding of what it means to produce food. Especially food of animal origin. Consumers have to deal with the killing of animals if they are vegetarian, because male calves are always born during the production of milk and cheese, which are fattened and ultimately slaughtered. And vegan consumers also need to consider where we get our nutrients from and how animals have an important place in the ecosystem without being actively utilised by humans.

In addition, I would of course like us to find concrete alternatives for making agriculture economically, ecologically and socially beneficial. Basically, we are seeing on the farm in Madlitz how forms of farming, such as agroforestry and grazing can be used to move from standard organic arable farming to a truly regenerative, ecological and economically independent. With appropriate marketing this is possible, even in an extreme location, such as dry Brandenburg. And not on a small area, but on 1.000 hectares. We want to find out what it takes so others can follow this path and share this knowledge.

What do you see as the greatest added value that we can provide as a foundation? Is it data, education or encouragement?
A few years ago, I would have said data straight away! As an entrepreneur, you need a basis for planning. And for family-run businesses in particular, I can well understand that planning plays a major role and it is also demanded by politicians. Because there are still almost no figures on ecologically proven, beneficial forms of

farming (such as agroforestry,) this data must be collected and made available so that people can see the true benefit of it.

But it has become important for me to talk about the fundamental motivations, concerns, fears and hopes of people who work, or want to work, in agriculture and forestry see the whole tapestry. For me, working with and in nature is simply the most beautiful thing, and I think almost everyone who is active in this field feels the same way. People wouldn't otherwise work seven days a week, 365 days a year. They wouldn't take great risks and demand so much from their own families. For me it's also about education, an understanding of the work, the realities in our economic system, a connection between people, our food and the way it is produced, a recognition of entrepreneurial responsibilities, successes and commitment. Also its about showing what farming means, how fulfilling it can be, how complex it is and how cool it is to be a farmer.

What do you wish for the future?
To buy a few hectares of land and live there with my family and some animals.

Do you look to the future with courage and hope?
Definitely! I am certain that the basic direction is so clear and obvious: we are in an ecological crisis, we know which factors are fuelling this crisis and we know solutions that can have a directly positive influence. We just have to tackle it, so to speak. Even if that is a bit naive: I'm just fundamentally positive that we can manage to implement and scale these methods. Because it simply makes sense and is logical to do so.

3.7

NETWORKING BIOTOPES WITH TARGET RE-NATURALISATION

Biodiversity describes the diversity of all life and encompasses the ecosystems of forests, meadows, moors and floodplains, as well as the multitude of individual species and organisms – plants, animals, fungi and microorganisms as well as their genetic diversity within the species. The promotion of biodiversity and economic land use are by no means mutually exclusive. The small-scale agricultural landscape in Europe led to a biodiversity peak around 1850.

A decline in biodiversity is reflected in natural disasters, crop failures, reduced resilience in plant cultivation and lack of climate resilience of all these systems. Ecological regenerative agriculture increases above- and below-ground biodiversity and contributes to the health of the entire ecosystem and the associated services, such as pollination, closed nutrient cycles and natural pest control. Structurally rich, near-natural and networked habitats are essential for strengthening biodiversity. The Finck Foundation shows how regeneration, nature conservation, the preservation of natural areas and the maintenance of historically evolved cultural landscapes are possible through near-natural forms of cultivation. Also how the planting and care of trees and shrubs and can create additional ecosystem services.

Swamps created during the last ice age play an important role in connecting individual biotopes. Over time melting of dead ice has been overlaid with sediment, leaving above-ground hollow forms without the small bodies of water, used as “stepping stones” by migrating animal species such as frogs, toads, salamanders and insects. Due to the increasing drought caused by the climate, these ponds are becoming increasingly silted up, meaning that revitalisation through de-silting can ensure preservation and improved water retention capacity and ensure the survival of certain animal populations.

In the winter of 2022/23, the Finck Foundation successfully completed the revitalisation of the first four field swales with a total area of approx. 5.000 m^2. This represents the first part of the holistic biotope network in combination with a newly planted agroforestry system and the creation of beetle banks (insect walls). This is an example of nature conservation through utilisation. The winter precipitation means the wetlands are already rewetted in the first year can serve as a habitat for amphibians and birds. This is essential for particularly endangered species such as the fire-bellied toad and the great crested newt. The removed material was incorporated into the surrounding fields and has a positive effect on the soil quality, which can already be seen in the colour of the arable crops. The layer of clay that has been preserved at the bottom of the Soll ensures even water retention and storage.

The Finck Foundation is working with the Julius Kühn Institute on the project “Rewetting of agricultural waters as an immediate climate protection measure – scientific evaluation and impact assessment for the agricultural landscape”. The aim is to demonstrate, in particular, a possible reduction in CO2 emissions through the rewetting of field gullies in comparison to the drying out of field gullies due to climate change. The project is being funded by the Brandenburg Nature Conservation Fund Foundation.

„The Julius Kühn Institute is scientifically monitoring the target areas and investigating the extent to which CO_2 emissions from drying water bodies can be reduced by removing the organic water sediment.”

— DR. KARIN MEINIKMANN, JKI

„In Alt Madlitz, we want to imitate natural ecosystems as closely as possible and create resilient land use models that ensure the sustainable health of soil, plants, animals, people and humans. Connecting existing biotopes through use instead of cutting them to size is an important factor here. Water-retaining field swales, in particular, have a major effect on the ability of rare species to survive."

— MAX KÜSTERS, FINCK FOUNDATION

Overview of the Finck Foundation's nature conservation measures

1.

Creation of over 400,000 m² of flower strips on and along the fields promotes beneficial insects, also opens up habitats and can serve as erosion protection.

—

2.

Construction and installation of 200 nesting aids for demanding and rare species to strengthen biodiversity and for the targeted use of beneficial insects such as hornets, both in the forest and on the estate's buildings.

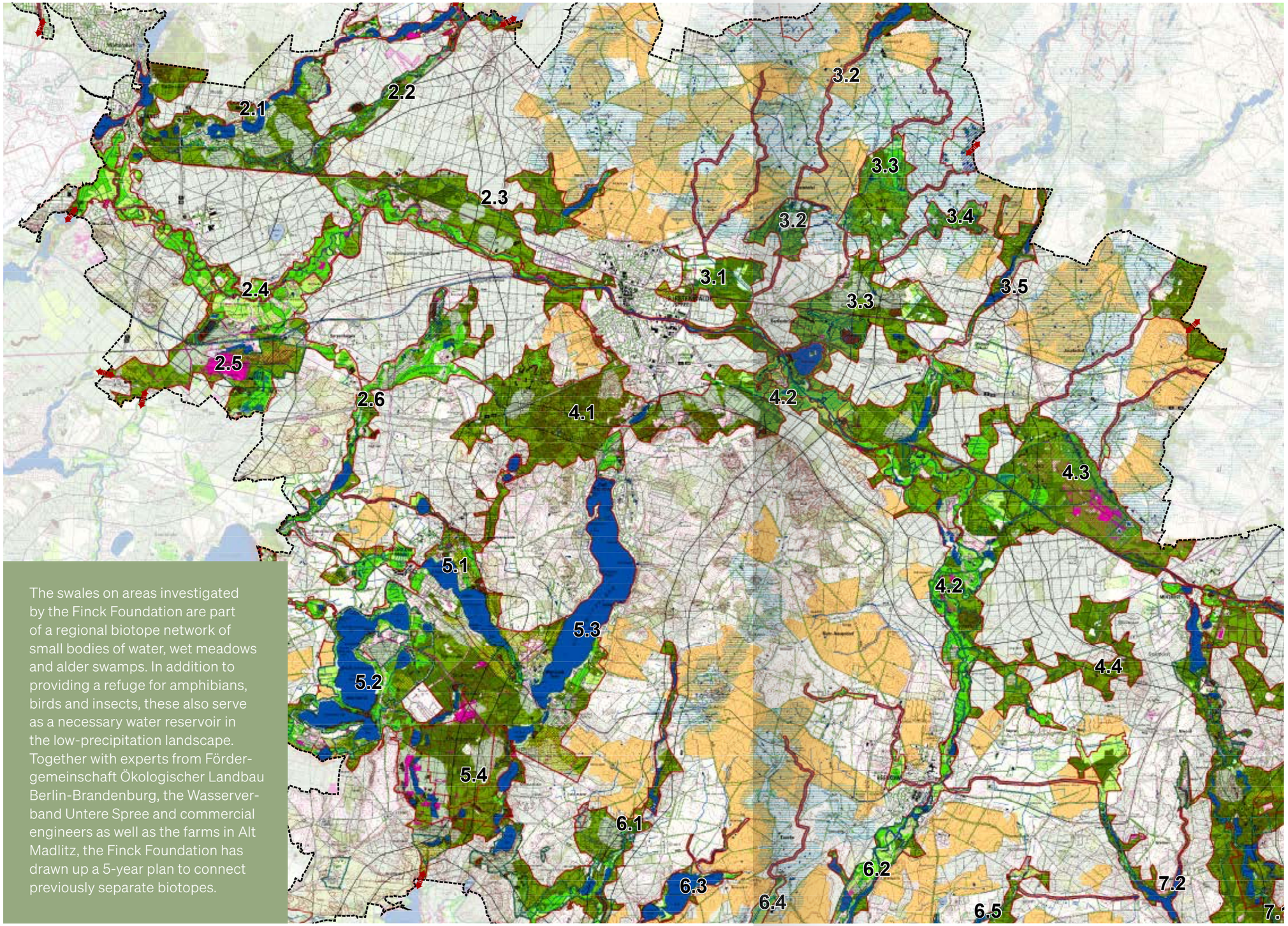
—

3.

Renaturalisation & biotope networking.

"As part of the DaVaSus project, the JKI, together with the Finck Foundation, is investigating earthworms in perennial flower strips that not only border the field, but also run through it. Our initial results already show a strong promotion of the earthworm community."

— DR ANNA VAUPEL,
JULIUS KÜHN INSTITUTE (BERLIN)



The swales on areas investigated by the Finck Foundation are part of a regional biotope network of small bodies of water, wet meadows and alder swamps. In addition to providing a refuge for amphibians, birds and insects, these also serve as a necessary water reservoir in the low-precipitation landscape. Together with experts from Fördergemeinschaft Ökologischer Landbau Berlin-Brandenburg, the Wasserverband Untere Spree and commercial engineers as well as the farms in Alt Madlitz, the Finck Foundation has drawn up a 5-year plan to connect previously separate biotopes.

Biotope network near-natural forest and low-disturbance areas

- Core area near-natural forest
- Core area Habitat target species (middle spotted woodpecker, longhorned beetle, stag beetle)
- Connecting area near-natural forest
- Development area of semi-natural forest
- Migration corridor for large mammals

Biotope networking in accordance with Section 21 (6) BNatSchG

- Priority areas for the creation of connectivity elements and stepping stone biotopes in the agricultural landscape

Networking elements

- Connecting area of near-natural forest
- Development area of semi-natural forest
- Migration corridor for large mammals

Protected areas

- Nature reserve (NSG)
- FFH area
- European bird sanctuary (SPA)

Biotope types

- Watercourses
- Standing water
- Anthropogenic raw soil sites and ruderal meadows
- Bogs and swamps
- Herbaceous meadows and fringes
- Wet meadows, wet pastures
- Fresh meadows and fresh pastures
- Grassland
- Dry grasslands
- Dwarf shrub heaths and coniferous scrub
- Forests
- Deciduous shrubs, copses, groups of trees
- semi-natural forests
- Hardwood forests
- mixed wood forests
- Coniferous forests
- Fields
- Fruit tree stands, horticulture
- Green space
- Settlement area
- Industrial / commercial area
- Special biotopes

Biotope network according to § 21 BNatSchG

- Cross-habitat biotope network in the district
- **2.6** Number of the biotope network unit
- Important networking relationship to the cross-district biotope network

Biotope network for dry habitats

- Core area dry habitats
- Core area Habitat target species (sand lizard)
- Development area for dry habitats
- Connecting area for dry habitats
- Inland dunes (development areas for dry habitats)

Biotope network of small bogs and fens, wet grassland

- Core area small moors
- Core area fens/wet grassland
- Connecting area fens/wet grassland
- Development area fens/wet grassland

"He [Benedikt Bösel] actually shows in a wonderful way that species protection, climate protection, animal welfare and secure, sufficient yields do not have to be contradictory."

— CEM ÖZDEMIR, FEDERAL MINISTER OF AGRICULTURE AND FOOD

3.8

EDUCATION AND PUBLIC RELATIONS

The Finck Foundation is committed to training, education and knowledge exchange. This means we train interns every year in the field of regenerative agricultural practices, who carry the knowledge generated on to their training, studies or the next farm. The team also provide technical support for bachelor and masters theses and organises experimental projects for these purposes.

The complex, ecosystem-specific, relationships between different plant cultures and the interaction between plants, soil, animals and humans are presented as a supplement to teaching content that is characterised by an exploitative understanding of ecosystems. The collected data and findings from the individual projects and research programmes are made publicly available and regular reference is made to current specialist articles on the latest state of research in the field of regenerative land use. While politicians have long focused on production for the global market, competition based on price rather than quality, the path to progress in technology, the Finck Foundation attempts to reflect the long-term ecological and economic benefits of land use in its research work, in accordance with the natural cycles of nature.

With its educational programmes, the Finck Foundation creates opportunities for encounters with nature and demonstrates local production networks for a holistic food system. Workshops lasting several days, e.g. with the founder of syntropic agroforestry, Ernst Götsch, and practical educational tours provide an insight into the work and research projects and thus encourage the exchange and transfer of knowledge with interested parties, such as – students, scientists and farmers, top authorities such as the Federal Ministry of Food and Agriculture, Renate Künast (MP), Herrmann Färber (MP), Sylvia Lehmann and Helmut Kleembank (SPD), the Brandenburg Ministry of Social Affairs, Health, Integration and

PICTURE LEFT
Ernst Götsch during his workshop – here in the forest conversion area

Consumer Protection, as well as institutes such as the Potsdam Institute for Agricultural Research (PIK), the German Association for Agroforestry (DeFaF) and the Serbian Association of Organic Agriculture.

Benedikt Bösel and his team regularly present the Finck Foundation's research work in various lectures and interviews and outline possible solutions as to what the architecture of a turnaround must look like, so that German agriculture can continue to produce high-quality food in the long term, despite the interlinked crises of climate change, biodiversity loss and soil degradation. The answer lies in healthy soil and healthy ecosystems, adapted to the respective regional ecological context, we need forms of land use that build up the soil through utilisation, close nutrient cycles and increase biodiversity – below and above the soil - again. The book 'Rebels of the Earth – how we protect the soil and thus ourselves' was published in 2023.

As an essential part of the educational mission is that it shares initial findings from experience with regenerative cultivation systems and provides the general public with concrete practical tips and interrelationships in agriculture and forestry. It is aimed not only at those interested in agriculture and forestry, but also at all people who are looking for ways to solve the ecological problems of our time. First and foremost, it should give hope that we can positively shape our environment through regenerative land use. The transformation of agriculture and our food systems will not work without a change in society. The book endeavours to give people courage and hope and to awaken their interest in and enjoyment of nature, pleasure and agriculture.

Focus on educational and public relations work

23

interns in 2023

—

TV Auftritte:

e.g. on the NDR talk show (NDR), Studio3 (rbb)

—

Radio:

ZEIT Podcast, SWR1, Deutschlandfunk

—

Presse:

German Federal Government, Spiegel, Focus, TopAgrar, FAZ, Tagesspiegel, dpa, manager magazin, Schrot&Korn and many more. Invitation from Benedikt Bösel as an expert in the Bundestag

—

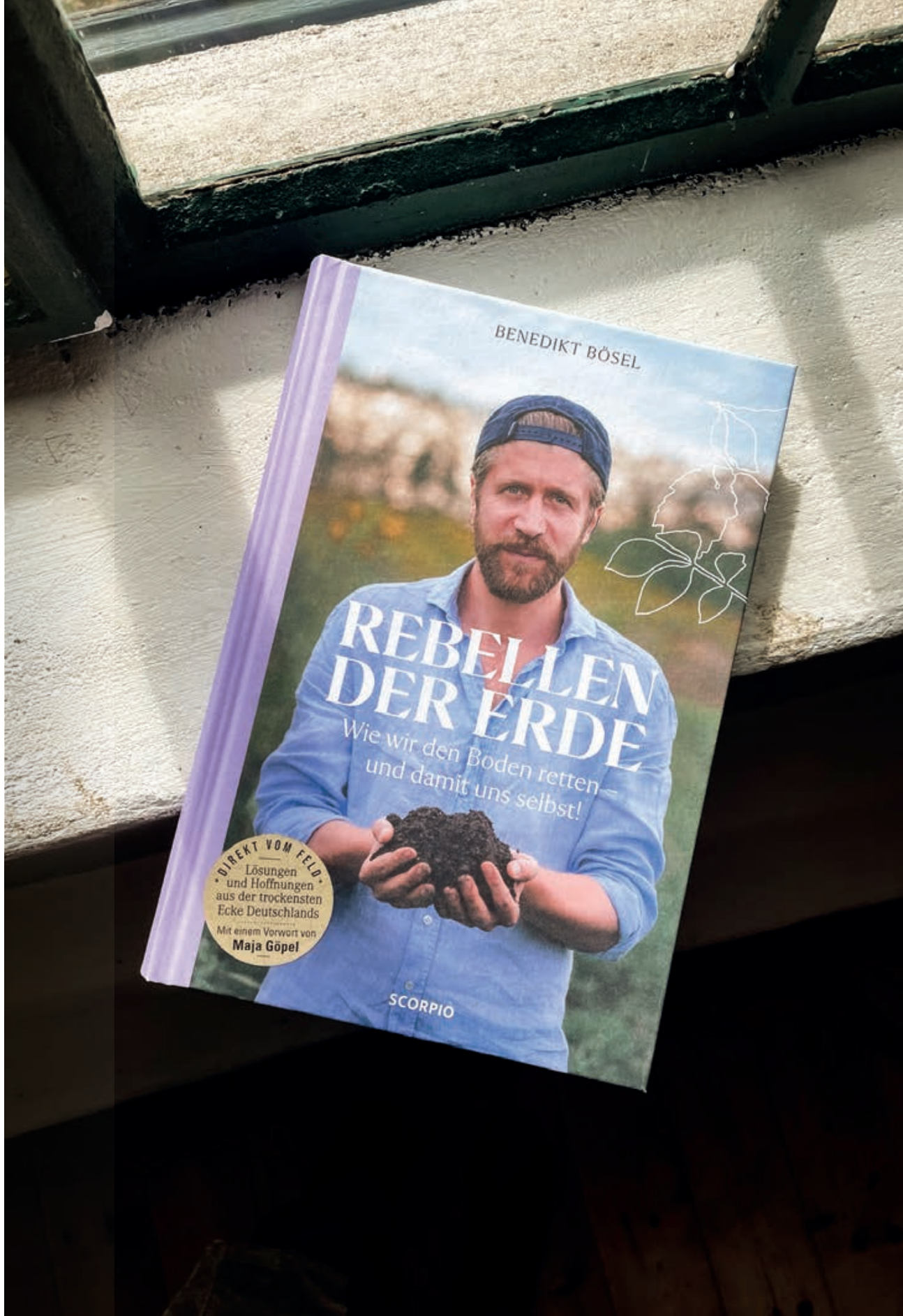
Over 1.600 visitors

from research, education and politics

—

12.934

copies of 'Rebels of the Earth' in the 3rd edition



Overview:

Supervised theses and projects

B. Sc. C. Schultze (2023):
‘The Benefits and Obstacles of Regenerative Agriculture in Germany’,
ESCP Business School

—

M. Sc. I. M. Engelhardt (2023):
‘Establishment and Conservation of Connecting Landscape Elements for a Functional Biotope Network. Implementing Methods of Regenerative Agriculture: Cultivation of Agroforestry and Ecosystem Revitalisation’,
Eberswalde University for Sustainable Development.

—

M. Sc. Z. Schierholz (2022):
‘Pathways to value creation with modern agroforestry systems. A qualitative analysis of trade practices in Germany’,
Eberswalde University for Sustainable Development

—

B. Ed. K. Ackermann (2022):
‘Carbon storage potential of woody biomass in agroforestry systems’,
University of Potsdam

—

BA L. Schridde (2022):
‘Analysing the possibilities and challenges of mobile housing for laying hens in modern agroforestry systems’,
Anhalt University of Applied Sciences

—

B. Sc. J. Herbst (2022):
‘Agroforestry: a possible adaptation strategy to climate change? Comparing the water stress of two land use systems in eastern Brandenburg, Germany’,
Wageningen University

Research projects:

DaVaSus funded by the BMEL, co-operation partners JKI, ATB, KTBL

—

SEBAS, research co-operation with BTU Cottbus, DeFAF, DVL

—

Forest reorganisation, research cooperation with HNEE, TUM, funded by ecover

—

Biotope networking, planning and implementation by the Finck Foundation and funded by NaturschutzFonds Brandenburg

—

Cost and yield estimation analysis of new agrofortification systems with animal integration, research cooperation with KTBL

—

Digital twin, cooperation with ACERNIS

—

Rewetting of agricultural waters as an immediate climate protection measure – Scientific evaluation and impact assessment for the agricultural landscape (WAKS) with JKI

CHAPTER 4 | THE FINCK FOUNDATION TEAM


NEW YORK

Rosanna Gahler – Agroforestry employee
(until 15.06.23)

Renke de Vries – Head of Agroforestry
(until 03.11.23)

Philipp Hansen – Agroforestry employee

Julius Ritter – Agroforestry employee

Mara Ursprung – Agroforestry employee
(until 14.11.23)

Benedikt Bösel – Managing Director

Johannes Harms – Nursery Manager

Nico Albrecht – Nature conservation employee

Mareike Borchert – Nature conservation employee

Laurenz von Glahn – Microorganisms and Nutrient Cycle Manage

Petra Mühlichen – Team Assistance

Anne Kathrin Seemann – Office Manager

Joke Czapla – Science Coordination and Strategy

Julia Toups – Scientific lead in the DaVaSus project

Anne Kinscher – Managing Director

Maren Schultze – Research and Communication Associate

Max Küsters – Head of Strategic Projects

Mats Ricke – Data, Innovation, Technology employee in the DaVaSus project

CHAPTER 5 | OUR PARTNER AVINA FOUNDATION

AVINA
foundation for the food of tomorrow

Since the Finck Foundation was established in 2021, the generous support of the AVINA Foundation has enabled the Finck Foundation's research projects to be realised. Founded in 1994 by Dr Stephan Schmidheiny as an independent family-financed foundation, AVINA stands for 'Acción Vida y Naturaleza' – Action for Life and Nature. Stephan Schmidheiny developed the concept of entrepreneurial philanthropy and initially focussed the foundation's work on social, cultural and educational projects. Since 2017, his wife Dr Viktoria Schmidheiny and her team have continued this work as President of the Foundation Board, focusing on projects to develop new forms of nutrition.

With this focus on a sustainable change in the food system, AVINA also supports the Finck Foundation's research, testing and development of ecological and regenerative land use models and the associated necessary change in the food system.

Among other initiatives, AVINA supports:

The Foodward Foundation in its transformation to a sustainable value network with a focus on the entire food ecosystem, through knowledge transfer and networking between industry, research and start-ups, such as by determining the environmental performance of net-positive pasture farming in the Alpine region.

Swiss Food Research, in establishing an independent, neutral and confidential platform to support innovation along the entire value chain, from field to fork, and to promote innovative solutions.

The Soil to Soul association, which provides a year-round platform and organises an annual symposium to present connections, research work, ideas and visions relating to sustainable agriculture to a wide audience.

Hannah van Zanten, Assistant Professor at the Institute for Circular Agrofood Systems at Wageningen University. The aim of her research project is to develop a globally applicable model for the optimal utilisation of biomass. Based on a given diet, this model calculates the optimal circular agricultural utilisation of an area.

Shaul Pollak, group leader at the Centre for Microbiology and Environmental Systems Science at the University of Vienna, in the development of AI-supported genomic analysis tools as well as theoretical and experimental tools. On the one hand, with the aim of understanding the ecological organisation within microbiomes and, in addition, the influence of climate change and other environmental factors on the function of microbiomes by modulating ecological interactions.

"Rethinking the food system requires innovative, creative and bold ideas. In a constantly and rapidly changing market, we need to remain flexible and agile in order to respond to needs. Financial resources, especially in research until shortly before commercialisation, are still rare in the field of sustainable and healthy nutrition and this is precisely where we see our niche."

— (SCHMIDHEINY V. ET AL (2021): AVINA ANNUAL REPORT 2020)

WAGENINGEN UNIVERSITY & RESEARCH
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foodward
shaping the future of food
SOIL TO SOUL
swiss FOOD RESEARCH

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SOURCES DIRECTORY

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