Biodynamic science economics

A look at international research activities and publications

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Research has been part of biodynamics since the beginning
namical economy. While in the early years research was carried out primarily within the movement - first at the Goe-theanum and then on the farms - scientific engagement with biodynamic farming also reached this level from the 1950s onwards with the activities of the Research Ring Institute in Darmstadt general universities. From the 1960s to the 1980s, several dissertations and habilitation theses were written there, which testify to a serious scientific discussion of biodynamic farming and also to the recognition of this work by experts. The works of Ulf Abele, Hartmut Spieß, Uli-Johannes König and others should be mentioned here.

Unfortunately, many of these works are not available digitally and are therefore in danger of being forgotten by experts. It is time for a new review article in a scientific journal that recalls this work with its extensive results. Today, peer-reviewed articles in scientific journals – usually as ePapers – are the currency in the research sector. What appeared there can be considered scientifically recognized, even if the quality assurance procedures are implemented very differently by the different journals. It is therefore good and important that research on biodynamic farming is represented in specialist journals.

Development of the publication landscape

For a review article on the current state of research published in 2019, we identified 86 articles in scientific journals from 2004 to 2018 (Brock et al. 2019). An Italian working group reports 147 publications for the period 1985 to 2017 (Santoni et al. 2022), whereby only articles in journals that have an impact factor, i.e. have a high visibility in the scientific sector and on the Web of, are taken into account here Science are listed. Smaller, but sometimes still high-quality specialist journals fall through the cracks. In a current review based on our review mentioned above and the articles listed in the research ring's Biodynamic Research Newsletter, we come to 197 scientific publications on biodynamic farming since 2004. The timing of publication activity shows a strong increase in articles on biodynamic farming in recent years (Figure 1). On the one hand, this certainly reflects the growing global interest in biodynamic farming: As Figure 2 shows, working groups from Asia (particularly India) and Latin America have played a significant role in the increase in publication activity. But it also shows that a solid and consistent scientific approach to biodynamic farming is possible and is also being undertaken successfully.

Research topics

The published studies cover a wide range of topics
of topics (Figure 3). The majority is made up of work on the system effects of biodynamic farming. The effect of individual factors (e.g. the preparations) is not examined here, but rather the economic system as a whole, but complex, i.e. the result of the interaction of various factors (crop rotation, soil cultivation, fertilization, plant protection, preparation work, etc.). individual factors). This has the disadvantage that observed effects are not clearly assigned to specific factors

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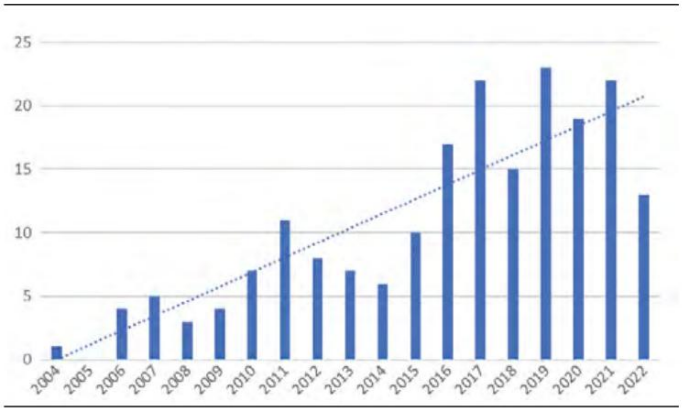
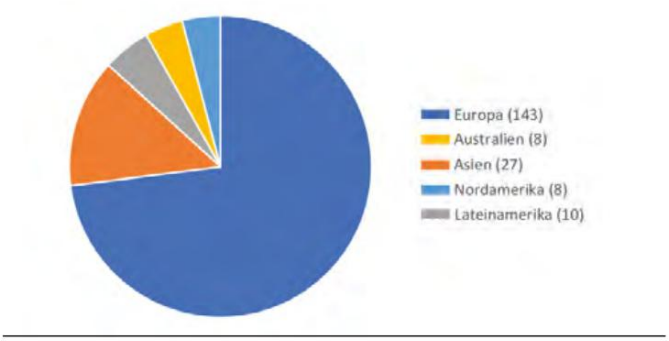
Fig. 1: SCIENTIFIC PUBLICATIONS ON BIODYNAMICS; PEER REVIEWED



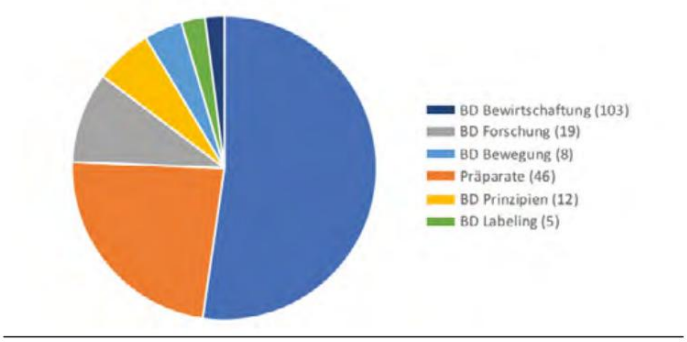
Development of the annual number of articles on biodynamic farming in international scientific journals.

Fig. 2: BIODYNAMICS – WHERE IS THE RESEARCH DONE?



Geographical origin of scientific publications on biodynamic farming.

Fig. 3: BIODYNAMICS – WHAT IS INVESTIGATED?



Thematic orientation of scientific publications on biodynamic farming.

can be made – e.g. biodynamic preparations. On the other hand, the representation of agricultural reality in such work is better than in factorial approaches. System comparisons are therefore particularly suitable for examining the effects of biodynamic farming in comparison with other forms of farming. The majority of the studies available are devoted to effects on food quality, soil and aspects of sustainability (Figure 4). As a rule, positive performance from biodynamic farming was found, which in many studies is even significantly better than in the non-biodynamic comparison systems. Without wanting to anticipate a quantitative meta-analysis, the conclusion that biodynamic farming fundamentally offers the prerequisites for high food quality, soil health and overall sustainable agricultural production seems justified based on the study situation.

preparations

In terms of scope, the second most important topic in the international research landscape is biodynamic preparations. Most studies deal with proof of effectiveness and examine the effects of the preparations on food quality, soil or plant health in factorial experiments that allow the preparation factor to be considered in isolation (i.e. comparisons in which only the application or . Non-use of the preparations makes the difference and otherwise all conditions are largely identical). Effects have been repeatedly identified, but the picture is not (yet) clear. In fact, research into biodynamic preparations is a methodological challenge, because their assumed effects are difficult to understand scientifically. Here it is important to build bridges and make the effectiveness of the preparations scientifically understandable using compatible methods - and that is not easy.

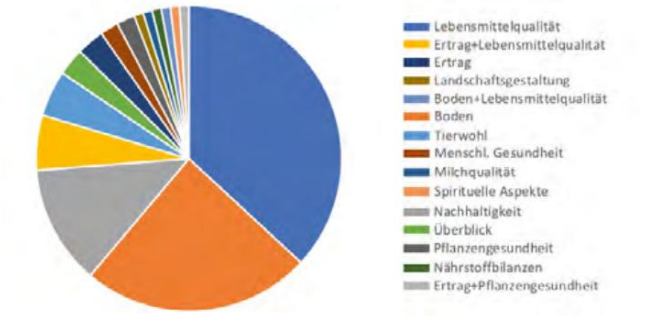
When examining the effects, the question arises as to where exactly effects are expected and what methods can they be used to demonstrate them? The analysis of the mode of action is even more demanding, as it was developed from the anthroposophical understanding of nature and must first be conceptually “translated” into a scientific approach. Nevertheless, various working groups around the world are now attempting not only to demonstrate the effects of the preparations on the material, but also to understand the nature and mode of action of the preparations from the perspective of biology (e.g. Giannatasio et al. 2013). However, there is still a lot of pioneering work to be done and so today there is some evidence of the effects of the preparations, but there is still no evidence of the mode of action behind these effects.

state of research

Currently, the publication landscape on biodynamic farming is still fairly manageable. We continually present new scientific studies in the Biodynamic Research Newsletter, which can be subscribed to free of charge via the Forschungsring (contact: newsletter@forschungsring.de). In addition, the Section for Agriculture at the Goetheanum presents and comments on selected contributions on its website in the “Research Results” section (https://www.abteilung-land-wirtschaft.org/arbeitsfelder/forschung). Selected research contributions can also be found on the Lebendige Erde website - however, these can only be used as scientific evidence to a limited extent, as they have usually not gone through a regular review process (https://www.lebendigeerde.de/index.php?id=biodyn_forschung).

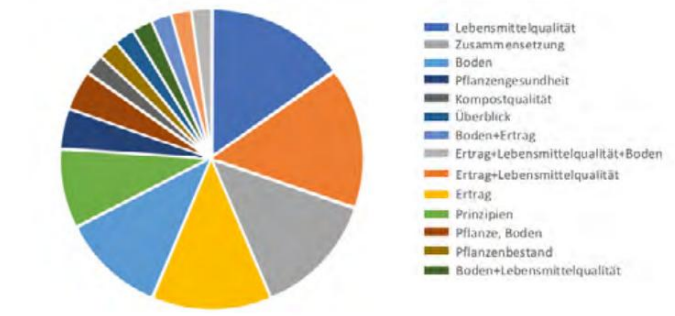
Together with the French association Biodynamie Research and the Biodynamic Federation – Demeter International, the Research ring has recently started a project with which the knowledge

Fig. 4: BIODYNAMICS AS A SYSTEM – WHICH EFFECTS ARE BEING RESEARCHED?



Thematic focus of scientific publications on the system effects of biodynamic farming.

Fig. 5: BIODYNAMIC PREPARATIONS: WHICH EFFECTS ARE BEING RESEARCHED?



Thematic orientation of the scientific publications on the preparations.

transfer from research to practice should be promoted worldwide. A service center is being planned that, in collaboration with a global network, will compile topic-related scientific studies, prepare them for specific target groups and make them available in various languages (information on www.forschungsring.de).

An extensive database, which also contains older literature not published in scientific journals, can be found at http://www.biodynamic-research.net/. However, the database is currently no longer maintained and is to be integrated into a planned online knowledge archive by Demeter eV and Forschungsring eV. The new archive is intended to make knowledge from the biodynamic movement in German-speaking countries available in various categories (scientific articles, research reports without peer review, journal articles, specialist information). However, such continuous work still requires funds.

International research collaboration

In order to make progress in research, you first and foremost need people to do it - and the exchange between these people. Against this background, the first and second international research conferences on biodynamic farming took place at the Goe-theanum in 2018 and in cyberspace in 2021. It became clear how large and diverse the research scene already is, but also that there is an urgent need for networking and collaboration. At the Agricultural Conference at the Goetheanum 2023, an international research platform on biodynamic farming will be founded under the leadership of the Agriculture Section. The target group is people with expertise in scientific work in order to jointly advance a scientifically compatible approach to biodynamic farming.

outlook

The scientific study of biodynamic farming is an exciting but also challenging task. Here bridges must be built between the anthroposophical understanding of nature (which includes the material world) and the scientific world view (which cannot grasp a spiritual world such as that which anthroposophy presupposes). The growing number of scientific publications and the expanding group of researchers show that we are on the right track - but there is still a lot to do. •

BIODYNAMIC RESEARCH

- Biodynamic Research database (online again from February 2023)
  http:// www.biodynamic-research.net/
- all research reports from Living Earth (from 1999)
  https:// www.lebendigeerde.de/ index.php?id=biodyn_forschung
- Summaries of selected research results
  https:// www.section-landwirtschaft.org/ arbeitsfelder/ forschung
- Newsletter – News from international biodynamic research (German/English)
  newsletter@forschungsring.de

Sources/literature

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- Matteo Giannattasio Elena Vendramin, Flavio Fornasier, Sara Alberghini, Marina Zanardo, Fabio Stellin, Giuseppe Concheri, Piergiorgio Stevanato, Andrea Ertani, Serenella Nardi, Valeria Rizzi, Pietro Piffanelli, Riccardo Spaccini, Pierluigi Mazzei, Alessandro Piccolo, Andrea Squartini (2013): Microbiological Features and Bioactivity of a Fermented Manure Product (Preparation 500) Used in Biodynamic Agriculture . Journal of Microbiology and Biotechnology 23: 644–651.
- Margherita Santoni, Lorenzo Ferretti, Paola Migliorini, Concetta Vazzana, Gaio Cesare Pacini (2022): A review of scientific research on biodynamic agriculture. Organic Agriculture 12:373–396