

CORE Organic Country Report



Country Report on Organic Food and Farming Research in Germany

30. November 2005

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Source: CMA-Fotoservice

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1 History

1.1 Research about organic agriculture in Germany: Overview

Recently, research about organic farming has gained strong impulses in Germany. Schools of higher education, as well as state research centres steadily opened up, and with the funding under the Federal Organic Farming Scheme BÖL¹ organic farming research has been strengthened substantially.

Research about organic farming has a long tradition in Germany, going as far back as into the twenties of the last century. At that time the first – mainly biodynamic – pioneers started to carry out research on their farms. The Institute for Biodynamic Research IBDF² founded in 1950, was one of the first private research institutions in the world. Also the first university chair for organic agriculture emerged in Germany, where until today more specific professorships exist than in any other country. Since the beginning of the nineties, the status quo of research in organic farming is regularly documented through the scientific conference on organic farming³, which is coordinated by the Foundation Ecology & Agriculture (SÖL)⁴. Further, in the context of EU projects, contacts to research colleagues outside of Germany were intensified. Several public bodies with research divisions got involved in organic farming. Through funding within the Federal Organic Farming Scheme (BÖL) organic research experienced a major upswing since 2002.

Germany has also played an important role in the development of international organic farming research. In 1984, the 5th International Scientific Conference of the International Federation of Organic Agriculture Movements (IFOAM)⁵ took place in Witzenhausen. In 2003 the International Society of Organic Agriculture Research (ISO FAR)⁶ was founded in Berlin. It promotes and supports research in all areas of organic agriculture by facilitating global cooperation in research, methodological development, education and knowledge exchange; supporting individual researchers through membership services, publications and events, as well as integrating stakeholders in the research process.

1.2 Milestones of organic farming research in Germany

- 1950: Institute for Biodynamic Research founded in Darmstadt
- 1981: First Chair for Organic Farming established at the University of Applied Sciences Kassel-Witzenhausen (Professor Dr. Hartmut Vogtmann)
- 1984: 5th International Scientific Conference of the International Federation of Organic Agriculture Movements: "The Importance of Biological Agriculture in a World of Diminishing Resources" held in Witzenhausen
- 1995: Elaboration of standards for site-specified fertilisation systems in organic farming in Europe based on long-term field experiments" (FERSY) started; coordinated by IBDF, one of the first European funded organic farming research projects
- 1987: Second Chair for organic Farming at the University of Bonn; now Institute of Organic Farming (Prof. Dr. Ulrich Köpke); many others to follow
- 1991: First Scientific Conference on Organic Farming in the German-speaking Countries held in Witzenhausen; now taking place bi-annually

¹ Bundesprogramm Ökologischer Landbau (BÖL), Bonn, www.bundesprogramm-oekolandbau.de/

² Institut für Biologisch-Dynamische Forschung (IBDF), Darmstadt, www.ibdf.de

³ Wissenschaftstagung zum ökologischen Landbau, www.wissenschaftstagung.de

⁴ Stiftung Ökologie & Landbau (SÖL), Bad Dürkheim, www.soel.de

⁵ International Federation of Organic Agriculture Movements (IFOAM), Bonn, Germany, www.ifoam.org

⁶ The International Society of Organic Agriculture Research (ISO FAR), Bonn, Germany, www.isofar.org

- 1996: First Diploma course in organic farming established at the University of Kassel / Witzenhausen, gradual conversion of the whole agricultural faculty to Organic Agricultural Sciences⁷
- 2000: Institute of Organic Farming (OEL-FAL) funded as part of the Federal Agricultural Research Centre
- 2002: First phase (until 2003) of research projects launched under the Federal Organic Farming Scheme (180 projects)⁸
- 2003: Internet platform for organic farming research “forschung.oekolandbau.de” established under BÖL, including a German language version of the Organic Eprints archive
- 2003: First coordination conference of the actors in state, funded organic farming research (“Ressortforschung”), now taking place annually
- 2003: International Society of Organic farming Research (ISO FAR)⁹ founded in Berlin
- 2004: Second phase of the Federal Organic Farming Scheme launched (until 2007), with numerous organic farming projects
- 2005: 8th Scientific Conference (Wissenschaftstagung) held in Kassel and for the first time Organic Eprints is used for the submission of papers
- 2006: Federal Organic Farming Scheme, including the research part, continued under the new German government

1.3 Research and research coordination on EU level

The first EU-Project about organic agriculture coordinated by a German Institute (IBDF) was the project “Elaboration of standards for site-specified fertilisation systems in organic farming in Europe based on long-term field experiments” (FERSY)¹⁰. The project running from 1995 to 1997 was one of the first European funded projects considering organic farming. In the framework of the project, results of different long-term field experiments were gathered. Several other projects followed of which the project “Effects of the CAP-reform and possible further developments on organic farming in the EU”¹¹ finalised in 2000, needs special citation. Coordinated by the University of Hohenheim, this project for the first time gave a broad overview about the situation of organic farming in Europe. Furthermore, the first proposals for the European Action Plan for Organic Farming were developed.

Another milestone in EU-Research was the approval of the project QLIF¹² with a budget of € 18 million. This project focuses on research strategies to enhance food quality and security. From Germany, the University of Kassel, the University of Hohenheim and the Institute for Organic Farming from the University of Bonn are involved.

⁷ Fachbereich Ökologische Agrarwissenschaften, Universität Kassel, Witzenhausen, <http://www.uni-kassel.de/fb11cms/?c=63>

⁸ See also Forschungsmanagement und Wissenstransfer im Bundesprogramm Ökologischer Landbau (BÖL), <http://www.bundesprogramm-oekolandbau.de/forschung.html>

⁹ Society of Organic farming Research (ISO FAR), Bonn, www.isofar.org

¹⁰ Elaboration of standards for site-specified fertilisation systems in organic farming in Europe based on long-term field experiments (Fersy), Institute for Biodynamic Research Darmstadt, www.ibdf.de/v1/fersy.htm

¹¹ Effects of the CAP-reform and possible further developments on organic farming in the EU, c/o Fachgebiet Produktionstheorie und Ressourcenökonomik im Agrarbereich, Universität Hohenheim, www.uni-hohenheim.de/i410a/eu_org/Fair3_Index.htm

¹² Food from low-input and organic production systems: Ensuring the safety and improving quality along the whole chain, Quality Low Inout Food (QLIF), c/o University of Newcastle UK, www.qlif.org/

2 Organisation

2.1 Organisational structure

In Germany, organic farming research is carried out by private institutions, universities, state research centres and agencies (see graph below).

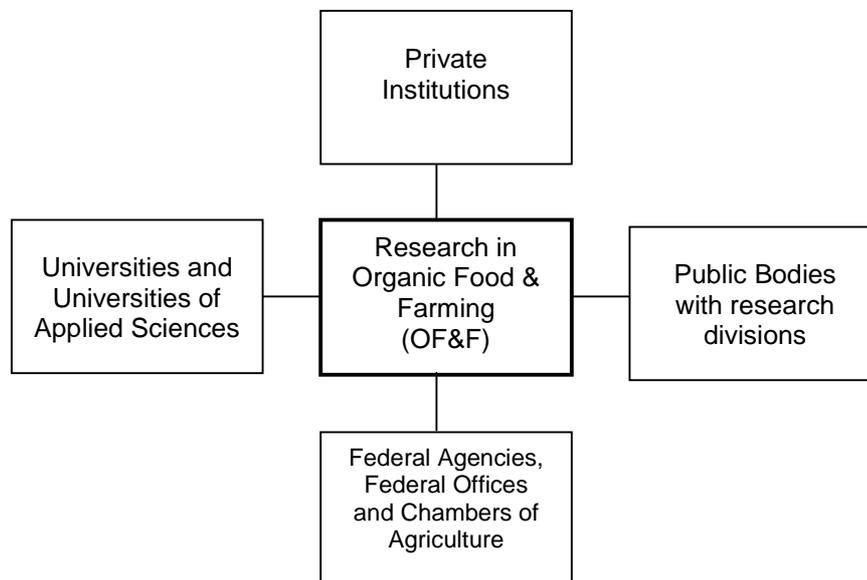


Figure 1: Organisation of organic farming research in Germany

2.2 Funding

The total funding of organic agricultural research in Germany includes funds for the financing of specific projects and institutional funding of research institutions. Research in organic farming is therefore funded as follows:

- Institutional support on governmental level (e.g. state research institutes, Leibniz-Institutes etc.)
- Institutional support on the level of federal states (“Bundesländer”), e.g. universities, state research institutes, chambers of agriculture etc.
- Project financing on governmental level by
 - the Federal Agency for Agriculture and Food (BLE)¹³, under the jurisdiction of the Federal Ministry of Food, Agriculture and Consumer Protection BMELV¹⁴
 - the German Federal Agency for Nature Conservation (BfN)¹⁵ and the Federal Environmental Agency (UBA)¹⁶, under the jurisdiction of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)¹⁷
- project financing by further public and private sponsors (e.g. private foundations, associations, German Federal Environmental Foundation (DBU)¹⁸.

¹³ Bundesanstalt für Landwirtschaft und Ernährung (BLE), Bonn, www.ble.de

¹⁴ Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (BMVEL), Bonn / Berlin, <http://www.bmelv.de>

¹⁵ Bundesamt für Naturschutz (BfN), Bonn, www.bfn.de

¹⁶ Umweltbundesamt (UBA), Dessau, www.uba.de

¹⁷ Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU), Berlin, www.bmu.de

¹⁸ Deutsche Bundesstiftung Umwelt (DBU), Osnabrück, www.dbu.de

2.3 Who coordinates the research?

In general, research planning in Germany is conducted by the Federal Ministry of Education and Research (BMBF)¹⁹. Coordinating ministries for research in Organic Food and Farming are e.g. the Ministry of Food, Agriculture and Consumer Protection (BMELV) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The main project executing organisations under the jurisdiction of these ministries are the Office of the Federal Organic Farming Scheme (GS BÖL²⁰), the German Federal Agency for Nature Conservation (BfN) and the Federal Environmental Agency (UBA).

2.4 Which are the main stakeholder organisations?

In Germany a large number of stakeholder organisations for organic farming exists, many of them are united in the Federation of Organic Food Enterprises (BÖLW)²¹. Its members are the main organic producer organisations (Bioland, Biopark, Demeter, Ecoland, Gäa, Naturland) and processing / trading associations²².

Other relevant organisations are the International Federation of Organic Agriculture Movements (IFOAM)²³, which is based in Germany, the Foundation Ecology & Agriculture (SÖL), the Research Institute of Organic Agriculture (FiBL)²⁴, the Foundation on Future Farming (ZLS)²⁵ and the Schweisfurth Foundation²⁶.

2.5 Research Institutions in Germany

2.5.1 Private institutions

With the Institute for Biodynamic Research (IBDF) in Darmstadt the eldest research institute for organic farming was founded in 1950. Apart from IBDF, other biodynamic institutes like the Cereal Breeding Institute Darzau²⁷ and the Kwalis Institute²⁸, as well as the organic Foundation Ecology & Agriculture (SÖL) carry out organic farming research. Important impulses for organic research were given by the Swiss Research Institute of Organic Agriculture (FiBL)²⁹, founded in 1973. In 2001, FiBL Germany was founded, focussing on knowledge transfer and the provision of solid scientific services regarding food production. Nationwide there is an engagement of agricultural advisory services in applied research activities. Compared to e.g. Switzerland and the USA (Rodale Institute), the importance of private research institutes involved in organic farming is, however, rather small.

¹⁹ Bundesministerium für Bildung und Forschung (BMBF), Berlin, www.bmbf.de

²⁰ Geschäftsstelle Bundesprogramm Ökologischer Landbau (GS BÖL) in der Bundesanstalt für Landwirtschaft und Ernährung (BLE), Bonn, <http://www.bundesprogramm-oekolandbau.de>

²¹ Bund Ökologische Lebensmittelwirtschaft (BÖLW), Berlin, www.boelw.de

²² Assoziation ökologischer Lebensmittel Hersteller / Association of Organic Food Producers AÖL, Oberleichtersbach, <http://www.aeel.org>; Bundesfachverband Deutscher Reformhäuser e.V. / Federation of German Reform Houses (refo), Zarrentin, www.refo.de; Bundesverband Naturkost Naturwaren Herstellung und Handel e.V. / Federation of Organic Processors and Traders, Cologne, <http://www.n-bnn.de>; Verband der Bio-Supermärkte / Association of Organic Supermarkets, Darmstadt

²³ International Federation of Organic Agriculture Movements (IFOAM), Bonn, www.ifoam.org

²⁴ Forschungsinstitut für biologischen Landbau (FiBL), Frankfurt, www.fibl.org

²⁵ Zukunftsstiftung Landwirtschaft (ZLS), Bochum, <http://www.zs-l.de>

²⁶ Schweisfurth Stiftung, Munich, www.schweisfurth.de/

²⁷ Getreidezüchtungsforschung Neu-Darchau, <http://www.darzau.de/>

²⁸ KWALIS - Untersuchung von Lebensmitteln, Dipperz, www.kwalis.de

²⁹ Forschungsinstitut für biologischen Landbau (FiBL), CH-Frick, www.fibl.org

2.5.2 Universities and Universities of Applied Sciences

In contrary to many other European countries, the major part of research on organic farming in Germany takes place at universities and universities of applied sciences. This is clearly mirrored by the number of research papers documented in the Organic Eprints database.

In 1981, the former director of FiBL Switzerland, Hartmut Vogtmann, received a call for the world-wide first professorship of “Alternative Agriculture” at the University of Applied Sciences Kassel-Witzenhausen (since 2002: University Kassel) – a milestone in the history of organic farming research. Since the nineties, the University continuously increased its activities related to teaching and research about organic agriculture. With the generation change of professorships starting in 1997, a “conversion” of the whole faculty to a “Division of Organic Agriculture” took place. Today, the Faculty of Organic Agriculture offers a Bachelor and two Master programmes in organic farming, which are accredited according to European Norms (ECTS – European Credit Transfer System).

The professorship in Witzenhausen was followed by another chair for organic farming in 1987 at the University of Bonn (now: Institute for Organic Farming IOL)³⁰. Throughout the nineties, several professorships and coordination posts at schools of higher education were established (Eberswalde, Giessen, Kiel, Munich, Nuertingen, Osnabrueck, Stuttgart-Hohenheim, Wiesbaden-Geisenheim). With more than 20 dedicated professorships and coordination posts, Germany is world-wide leading in the field of higher education for organic agriculture. As the market for organic products is growing on a world-wide scale, the University of Hohenheim offers a new Master programme “Organic Food Chain Management” (MSc), which started in 2005, in order to prepare students of all nationalities for this challenging task.

2.5.3 Public bodies with research divisions on federal level

On federal level, several public bodies with research divisions are involved in organic farming. At the Institute of Farm Economics and the Institute of Rural Studies³¹ of the Federal Agricultural Research Centre (FAL)³², several scientists have been intensely involved in organic farming since the late eighties. One milestone for the development of research on organic farming was the establishment of the Institute for Organic Agriculture of the FAL (OEL-FAL) at Trenthorst in the year 2000. Also, at the Federal Biological Research Centre for Agriculture and Forestry (BBA), questions regarding biological plant protection are worked on for a longer period of time. Specifically, the Institute for Integrated Plant Protection and the Institute for Biological Plant Protection deal with these issues. Several divisions of the Research Centre for Nutrition and Food (BFEL)³³ and the Federal Centre for Breeding Research on Cultivated Plants (BAZ)³⁴ are currently involved in research projects within the BÖL.

The activities of the organic farming research activities at the federal research centres are coordinated by the Institute for Organic Agriculture of the FAL (OEL-FAL) and annually a conference takes place where the latest research results are presented. The proceedings of these conferences are all documented in the Organic Eprints database.

³⁰ Institut für Organischen Landbau (IOL), Universität Bonn, <http://www.iol.uni-bonn.de/>

³¹ Institut für ländliche Räume & Institut für Betriebswirtschaft, Bundesforschungsanstalt für Landwirtschaft (FAL), Braunschweig, www.fal.de

³² Bundesforschungsanstalt für Landwirtschaft (FAL), Braunschweig, www.fal.de und www.oel.fal.de

³³ Bundesforschungsanstalt für Ernährung und Lebensmittel (BFEL), Karlsruhe, <http://bfa-ernaehrung.de/>

³⁴ Bundesanstalt für Züchtungsforschung an Kulturpflanzen (BAZ), Quedlinburg, <http://www.bafz.de/>

2.5.4 Research at federal level (“Bundesländer”)

In several German federal states employees of federal agencies, federal offices and chambers of agriculture work in the field of organic agriculture. Here, mainly applied research is carried out. Knowledge transfer into practice has a high priority, which can be seen in the establishment of leading and demonstration farms, as well as in the strong collaboration with the agricultural advisory service. Since 1998, scientists of the federal institutes have been coordinating their activities in the nation-wide “Experimental Task Force Organic Farming”³⁵.

2.5.5 List of main research institutions according to research themes (Selection)

Multidisciplinary institutes in Germany:

Bundesforschungsanstalt für Landwirtschaft (FAL), Federal Research Institute for Organic Agriculture, Institut für ökologischen Landbau:

PD Dr. Gerold Rahmann, Trenthorst / Wulmenau, 23847 Westerau, Germany

Plant production, plant protection, plant breeding etc.:

Universität Kassel, Fachbereich Ökologische Agrarwissenschaften, Fachgebiet Ökologischer Land- und Pflanzenbau:

Prof. Dr. Jürgen Heß, Dr. Christian Schüler et. al., Nordbahnhofstr. 1a, 37213 Witzenhausen, Germany

Christian-Albrechts-Universität Kiel, Institut für Pflanzenbau und Pflanzenzüchtung, Grünland und Futterbau/Ökologischer Landbau:

Prof. Dr. Friedhelm Taube, Hermann Rodewald Str. 9, 24118 Kiel, Germany,

Tel: +49 431 880 2133, Fax: +49 431 880 4658

<http://www.grassland-organicfarming.uni-kiel.de/>

Universität Kassel, Fachbereich Ökologische Agrarwissenschaften, Fachgebiet Ökologischer Pflanzenschutz:

Prof. Dr. Maria Finckh, Dr. Helmut Saucke, Dr. Christian Bruns

Nordbahnhofstr. 1a, 37231 Witzenhausen, Germany, <http://mars.wiz.uni-kassel.de/phytomed/>

Rheinische Friedrich-Wilhelms-Universität Bonn, Institut für Organischen Landbau:

Prof. Dr. Ulrich Köpke, Katzenburgweg 3, 53115 Bonn, Germany, <http://www.iol.uni-bonn.de/>

Justus-Liebig-Universität Gießen, Professur für Organischen Landbau:

Prof. Dr. Günter Leithold, Karl-Glöckner-Str. 21 C, 35394 Gießen, Germany,

<http://www.uni-giessen.de/orglandbau/>

Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für integrierten Pflanzenschutz:

PD Dr. habil. Stefan Kühne, Stahnsdorfer Damm 81, 14532 Kleinmachnow, Germany

<http://www.bba.de/oekoland/index.htm>

³⁵ Arbeitsgruppe Versuchsansteller im Ökologischen Landbau im Verband der Landwirtschaftskammern, Leipzig, <http://orgprints.org/2354/>

Institut für Biologisch-Dynamische Forschung (IBDF) e.V.:

Dr. Johannes König, Dr. Hartmut Spieß, Dr. Georg Eysel, Dr. Joachim Raupp
Brandschneise 5, 64295 Darmstadt, Germany, <http://www.ibdf.de>

Getreidezüchtungsforschung Darzau, Gesellschaft für goetheanistische Forschung e.V.:

Dr. Karl-Josef Müller, Darzau Hof, 29490 Neu Darchau, Germany, <http://www.darzau.de>

Fachhochschule Osnabrück, Studiengang Gartenbau:

Prof. Dr. Christian Wonneberger, Oldenburger Landstr. 24, 49090 Osnabrück, Germany,
<http://www.al.fh-osnabrueck.de/gartenbau.html>

Fachhochschule Eberswalde, Fachbereich Landschaftsnutzung und Naturschutz:

Prof. Dr. Hans-Peter Piorr, Friedrich-Ebert-Straße 28, 16225 Eberswalde, Germany,
<http://www.fh-eberswalde.de/lanu/>

Fachhochschule Osnabrück, Studiengang Landwirtschaft: Fachgebiet Umweltschonende
Landbewirtschaftung:

Prof. Dr. Dieter Trautz, Am Krümpel 31, 49009 Osnabrück, Germany,
<http://www.al.fh-osnabrueck.de/index.html>

Hochschule für Technik und Wirtschaft Dresden (FH); Fachbereich Landbau/Landespflege,
Stiftungsprofessur Ökologischer Landbau:

Prof. Dr. agr. Knut Schmidtke, Pillnitzer Platz 2, 01326 Dresden, Germany,
<http://www.htw-dresden.de/pillnitz/>

Animal husbandry, animal feeding, livestock breeding, animal health etc.:

Universität Kassel, Fachbereich Ökologische Agrarwissenschaften, Fachgebiet
Tierernährung und Tiergesundheit:

Prof. Dr. Albert Sundrum, Dr. Christian Krutzinna, Nordbahnhofstr. 1a, 37213 Witzenhausen,
Germany

Universität Kassel, Fachbereich Ökologische Agrarwissenschaften, Fachgebiet
Nutztierethologie und Tierhaltung:

Prof. Dr. Ute Knieriem, Nordbahnhofstr. 1a, 37213 Witzenhausen, Germany

Bundesforschungsanstalt für Landwirtschaft (FAL), Institut für Tierschutz und Tierhaltung:

Dr. Lars Schrader, Dörnbergstraße 25-27, 29223 Celle, Germany, <http://www.tt.fal.de>

Fachhochschule Osnabrück, Studiengang Landwirtschaft, Fachgebiet Umweltschonende
Tierproduktion:

Prof. Dr. Robby Andersson, Am Krümpel 31, 49090 Osnabrück, Germany

Fachhochschule Weihenstephan, Fachbereich Land- und Ernährungswirtschaft, Fachgebiet Tierernährung:

Prof. Dr. Gerhard Bellof, Am Hofgarten 1, 85350 Freising, Germany
<http://www.fh-weihenstephan.de/le/projekte/lw/tierernaehrung01.html>

Gesellschaft für Ökologische Tierhaltung (GÖT), e.V.:

c/o Bernhard Hörning, FH Eberswalde, FB Fachbereich Landschaftsnutzung und Naturschutz, Studiengang Ökolandbau und Vermarktung, <http://www.goet.de/>

Fachhochschule Eberswalde, Fachbereich Landschaftsnutzung und Naturschutz, Studiengang Ökolandbau und Vermarktung, Ökologische Tierhaltung:

Prof. Dr. Bernhard Hörning, Friedrich-Ebert-Straße 28, 16225 Eberswalde, Germany,
<http://www.fh-eberswalde.de/oelbv/>

Farm economics, rural development, marketing, policy areas etc.:

Bundesforschungsanstalt für Landwirtschaft (FAL), Institut für Betriebswirtschaft:

Dr. Hiltrud Nieberg, Bundesallee 50, 38116 Braunschweig, Germany

Universität Kassel, Fachbereich Ökologische Agrarwissenschaften, Fachgebiet Agrar- und Lebensmittelmarketing:

Prof. Dr. Ulrich Hamm, Prof. Dr. Bernd Wirthgen i. R., Steinstraße 19, 37213 Witzenhausen, Germany

Universität Hohenheim, Fachgebiet Produktionstheorie und Ressourcenökonomik im Agrarbereich:

Prof. Dr. Stephan Dabbert, Schloß-Osthof-Süd/Schwerzstrasse, 70593 Stuttgart, Germany

Universität Hamburg, Institut für Allgemeine Botanik, Forschungsschwerpunkt Biotechnik, Gesellschaft und Umwelt (FSP BIOGUM):

Dr. Heike Kuhnert, Ohnhorststr. 18, 22609 Hamburg, Germany

Christian-Albrechts-Universität Kiel, Institut für Agrarökonomie:

Dr. Maike Bruhn, Wilhelm-Seelig-Platz 6/7, 24098 Kiel, Germany
http://www.uni-kiel.de/juniorprofessur_agrar/index.shtml

Fachhochschule Eberswalde, Fachbereich Landschaftsnutzung und Naturschutz, Studiengang Ökolandbau & Vermarktung:

Prof. Dr. Anna Maria Häring, Friedrich-Ebert-Straße 28, 16225 Eberswalde, Germany
<http://www.fh-eberswalde.de/oelbv/>

Consumer protection, human nutrition, organic food quality, food analysis etc.:

Universität Kassel, Fachbereich Ökologische Agrarwissenschaften, Fachgebiet Ökologische Lebensmittelqualität und Ernährungskultur:

Prof. Dr. Angelika Ploeger, Dr. Johannes Kahl, Nordbahnhofstr. 1a, 37213 Witzenhausen, Germany, <http://www.wiz.uni-kassel.de/nue/>

Bundesforschungsanstalt für Ernährung, Institut für Verfahrenstechnik:

Dr. Esther Mayer-Miebach, Haid-und-Neu-Str. 9, 76131 Karlsruhe, Germany
<http://www.bfa-ernaehrung.de/Bfe-Deutsch/Institute/Ivt/Ivt-ma/ivt-mayer-miebach.htm>

Büro Lebensmittelkunde und Qualität:

Dr. Alexander Beck, zum Pilsterhof 7, 97789 Oberleichtersbach, Germany
<http://www.bl-q.de/>

Viniculture etc.:

Forschungsanstalt Geisenheim, Fachbereich Weinbau / Getränketechnologie, Institut für Biologie, Fachgebiet Phytomedizin:

Prof. Dr. Beate Berkelmann-Loehnertz, Von-Lade-Str. 1, 65366 Geisenheim, Germany

Fachhochschule Wiesbaden, Fachbereich Weinbau und Getränketechnologie, Professur für ökologischen Weinbau:

65366 Geisenheim, Germany,
<http://fh-web1.informatik.fh-wiesbaden.de/go.cfm/fb/13/sprachid/1.html>

Practical research, scientific services, transfer of knowledge etc.:

FiBL Deutschland e. V., Forschungsinstitut für biologischen Landbau:

Dr. Robert Hermanowski, Galvanistrasse 28, 60486 Frankfurt/Main, Germany, www.fibl.org

Stiftung Ökologie & Landbau (SÖL):

Dr. Uli Zerger, Weinstraße Süd 51, 67089 Bad Dürkheim, Germany, www.soel.de

Arbeitsgruppe der Versuchsansteller im ökologischen Landbau, c/o Sächsische Landesanstalt für Landwirtschaft:

Dr. sc. agr. Hartmut Kolbe, Gustav-Kühn-Str. 8, 04159 Leipzig, Germany

Öko-Institut Freiburg e.V.- Biodiversität, Ernährung und Landwirtschaft (BE&L):

Ruth Brauner, Binzengrün 34a, 79114 Freiburg, Germany

ECOZEPT GbR, Marktforschung im Biomarkt:

Dr. Burkhard Schaer, Oberer Graben 22, 85354 Freising, Germany
<http://www.ecozept.com>

Kompetenzzentrum Ökolandbau Niedersachsen:

Ulrich Prolingheuer, <http://www.oeko-komp.de>

Kompetenzzentrum Ökologischer Landbau (KÖL) Rheinland Pfalz:

<http://www.soel.de/projekte/wissenschaftstagung.html>

3 Research & research financing for Organic Food and Farming

In the following, the research programmes for Organic Food and Farming and their financing by the Ministry of Food, Agriculture and Consumer Protection (BMELV) from 1997 – 2007/2008 will be explained in detail.

In general, there are three main funding pools of the BMELV to support organic farming research projects:

- The **Funding pool "UM"** ("Research and development projects for environmental protection in agriculture") – is a permanent funding source.
- The **Funding pool "EH"** ("Research assignments for advisory and decision-making support at the (BMELV)") – is also a permanent funding source.
- The **Federal Organic Farming Scheme (BÖL)** – is a temporary funding source (2002 – 2007/2008).

3.1 Funding pool "UM" ("Research and development projects for environmental protection in agriculture")

This pool is a permanent funding source for both conventional and organic farming projects (Table 3.1). The goal is to implement new, environmental-friendly solutions (incl. animal welfare) and to transfer current research findings into the agricultural practice. Practitioners and scientists are involved in these projects.

Table 1: Financing of the "UM" funding pool

Year	Total funding of all projects	Funding of organic research projects	Percentage of organic research project funding
1997	1 259 600 €	32 000 €	2.54%
1998	904 400 €	30 500 €	3.37%
1999	1 214 100 €	491 300 €	40.47%
2000	1 210 300 €	537 300 €	44.39%
2001	1 306 600 €	562 700 €	43.07%
2002	1 254 700 €	609 600 €	48.59%
2003	833 700 €	396 900 €	47.61%
2004	1 092 300 €	311 800 €	28.55%
2005	1 292 900 €	159 200 €	12.31%

3.2 Funding pool “EH“ ("Research assignments for advisory and decision-making support at the Ministry of Food, Agriculture and Consumer Protection (BMELV)")

This pool is also a permanent funding source for both conventional and organic farming projects. Based on this pool, research projects are realised only for specific topics, which would help meet special needs for advisory and decision-making support at the Ministry of Food, Agriculture and Consumer Protection (BMELV). Table 2 shows the funding of this pool for the years 1997-2005.

Table 2: Financing of the “EH” funding pool

Year	Total funding of all projects	Funding of organic research projects	Percentage of organic research project funding
1997	4 400 800 €	0 €	0.00 %
1998	4 457 500 €	32 000 €	0.72 %
1999	3 345 000 €	32 000 €	0.96 %
2000	3 080 100 €	16 500 €	0.54 %
2001	3 597 400 €	166 000 €	4.61 %
2002	4 370 000 €	141 300 €	3.23 %
2003	4 639 800 €	182 900 €	3.94 %
2004	4 396 200 €	44 300 €	1.01 %
2005	4 781 300 €	6 400 €	0.13 %

3.3 The Federal Organic Farming Scheme (BÖL)

3.3.1 About the Scheme

The Federal Organic Farming Scheme (BÖL) is a temporary funding source (2002 – 2007/2008) especially to support the whole organic farming sector (incl. research) in Germany. The organic production system is recognised to give high priorities to environmental protection measures, covering goals of sustainability set by the government.

In the summer of 2001, the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) commissioned a project team comprised of representatives from associations and science and headed by the Federal Agricultural Research Centre (FAL) to develop a proposal for a package of measures to foster organic farming in Germany. A hearing of representatives from trade and industry, associations, consultancy, science and administration built the foundation for the team's work.

Based on this work, the former Federal Minister of Consumer Protection, Food and Agriculture Renate Künast decided to incorporate the proposed measures into the Federal Organic Farming Scheme (BÖL) to translate them into practice. This scheme supplements existing support measures with the aim of improving the basic conditions necessary for expanding organic farming. At the same time, it strives to increase supply and demand on a balanced, sustainable basis.

3.3.2 Funding of the Scheme

Table 3 gives an overview of the BÖL in total, including the research programmes, while table 4 shows the funding according to the research areas.

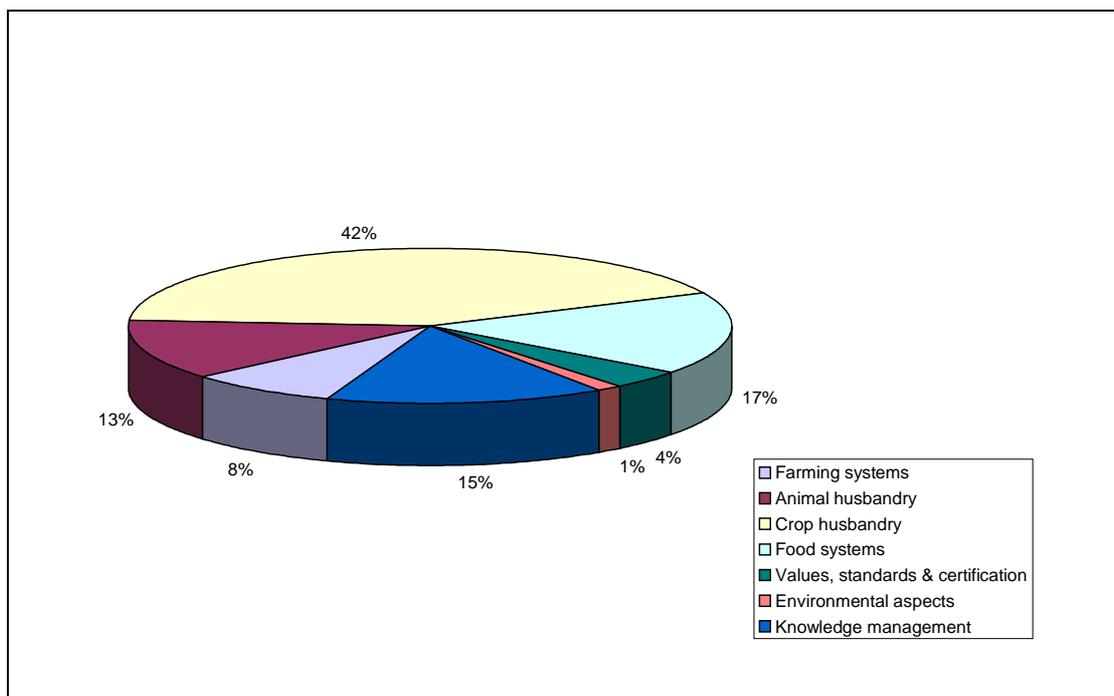
Table 3: Financing of the Federal Organic Farming Scheme

Year	BÖL – all measures	BÖL – Research & Development / technology and knowledge transfer
2002	35 Mio. €	approx. 10 Mio. €
2003	35 Mio. €	approx. 10 Mio. €
2004	20 Mio. €	7 Mio. €
2005	20 Mio. €	7 Mio. €
2006	20 Mio. €	7 Mio. €
2007	16 Mio. €	7 Mio. €
2008	12 Mio. €	7 Mio. €
2009	10 Mio. €	7 Mio. €
2010	10 Mio. €	7 Mio. €

These measures tackle all levels of organic farming, from the production to the consumption of organic products. The scheme includes training and information measures. Emphasis is also being placed on research promotion, the development of new technologies and steps to translate research findings into practice. Currently, the BÖL is the main pool of the BMELV for organic research funding.

Table 4: Financial overview of funding through the Federal Organic Farming Scheme (BÖL) and UM pool for organic research in Germany between 2002–2005, distributed according to the www.orgprints.org categories

Subject area	Projects	Amount in Euro per year			
		2002	2003	2004	2005
Farming systems	21	609 185	1 538 777	276 786	263 388
Animal husbandry	52	746 798	1 754 302	608 331	1 105 348
Crop husbandry	176	2 475 262	5 644 808	2 613 772	3 397 224
Food systems	46	1 241 945	2 069 385	965 821	1 474 610
Values, standards & certification	21	398 999	410 529	215 956	314 188
Environmental aspects	8	48 040	225 838	38 200	137 787
Knowledge management	41	791 514	2 459 749	801 359	962 930
Total	365	6 311 743	14 103 388	5 520 225	7 655 475



Graph 1: Total amount of funding by BÖL & UM in €

Supporting research and development projects is a superordinate measure of the BÖL. This, along with measures to foster the transfer of technology and know-how, is to fill existing gaps in people's knowledge about and experience with organic farming:

3.3.3 Support for R&D projects and for measures encouraging the transfer of technology and knowledge into the organic farming sector

Gaps in people's knowledge and experience are considered to be major obstacles to the growth and expansion of organic farming. These gaps are to be filled by research being conducted and their result dissemination. Government assistance for research and development is particularly necessary because industrial research findings benefit conventional farming much more than the organic farming sector. Given that organic farming largely foregoes the use of purchased inputs and in light of the comparatively small size of this sub sector, industry seldom finds it to be worthwhile to invest in research and development in this field. The lack of knowledge in turn hampers the continued development of organic farming and production growth.

In light of this situation, the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) has developed a “Programme to Support Research and Development Projects and Measures for the Transfer of Technology and Knowledge in the Organic Farming Sector” within the BÖL on the basis of the proposals submitted by the project team. This programme pursues the goal of filling important knowledge and experience gaps in the organic farming sector and, in the process, boosting its competitive strength, from production to sales, on a lasting basis. It targets university institutes, research facilities, private enterprises, organisations and research centres that conduct departmental research under the Ministry's purview. This programme was originally set up to run until the end of 2003 (1st phase).

In general, the Federal Organic Farming Scheme (BÖL) aims to remedy weak points within a short timeframe that particularly hinder the expansion of organic farming. However, some of these weak points, especially in the field of research and development (R&D), cannot be constructively eliminated in the course of a two-year programme. For this reason, the “Programme to Support Research & Development Projects and Measures for the Transfer of Technology and Knowledge in the Organic Farming Sector” within the BÖL was laid out right from the start for a period of more than two years and – together with other parts of BÖL - was continued up to 2007 / 2008 (2nd phase).

Based on this programme, especially in the 1st phase (2002 – 2003) research contracts were awarded for specific topics, which would help meet special needs for extension and decision-making support for the Ministry of Food, Agriculture and Consumer Protection.

The Ministry can, on the basis of a special funding guideline, award grants or allocations for other projects arising from this programme, which do not directly contribute to meet the Ministry's needs in this area. This guideline differentiates between projects within and outside of the production, processing and marketing of products listed in Annex I of the EC Treaty (projects within the agricultural sector vs. projects outside the agricultural sector).

In keeping with the objectives pursued by the Federal Organic Farming Scheme, funding is provided for projects in the following areas in particular:

- Projects to boost the efficiency of agricultural production methods with the aim of increasing the organic produce market's prospects for growth
- Projects that seek new strategies for making species-specific animal husbandry compatible with profitability and improved quality
- Projects that balance as optimally as possible organic farming with the objectives of nature conservation
- Projects that seek solutions to urgent problems arising in connection with storage, first marketing stage, processing and marketing of organic produce
- Projects that support and foster the transfer of technology to practice
- Projects that fill existing gaps in people's knowledge about the problems that organic farming faces at political, legal and societal levels

3.3.4 Main subject areas of Research & Development within BÖL

The list of research themes of the Federal Organic Farming Scheme below shows the themes and challenges that are currently dealt with in the Federal Organic Farming Scheme:

- Crop Husbandry
 - Plant protection and plant breeding
 - Plant strengthening preparations
 - Plant nutrition
- Animal husbandry
 - Animal health and rearing of livestock
 - Animal feeding and breeding
- Food Systems: quality and processing
- Values, standards and certification
- Knowledge management: Extension
- Marketing / Consumer behaviour
- Food Service Sector
 - Youths and organic products
 - Other activities in context of Organic Food Management

Information on each research project carried out as well as the final reports are available at the Organic Eprints Archive (summaries are available in English)³⁶.

³⁶ <http://orgprints.org/view/projects/BOEL.html>

3.3.4.1 Crop Husbandry

Projects on crop husbandry are generally over-represented within the German Federal Organic Farming Scheme. The structure of the German research system in organic agriculture is responsible for this: research capacities for crop production are much larger than in other areas, such as animal husbandry and food research. The main cause for this imbalance can be seen in the fact that organic farming developed as an alternative, especially to conventional plant production.

Plant protection and plant breeding³⁷

Under the given economic conditions, there is a need for the plant production in Germany to rationalise the measures for soil cultivation up to crop harvest. The growing demand for products of consistent and high quality with a constant availability can only be fulfilled by organic farmers, if their stock is healthy and if they can achieve high yields.

Hence, questions concerning plant health and safety are of main importance. This was reflected by the fact that from a total of about 180 projects, 50 were dedicated to organic plant protection³⁸.

The use of chemical pesticides as applied in conventional farming is forbidden in organic agriculture. Conventional pesticides treat plants symptom-oriented, while organic agriculture works system-oriented. This systemic view includes soil cultivation, crop rotation, the use of disease-resistant varieties and the specific application of biological pesticides, up to the appropriate living conditions for beneficial insects.

The projects of the Federal Scheme try to meet these challenges. Therefore, several projects were initiated in the field of plant breeding. These dealt with breeding of resistant crops, such as wheat and fruits. Furthermore, one project addresses the issue, to what extent organic wheat varieties need a special and modified licensing procedure, which is to be established deviant from conventional testing parameters.

Plant protection in organic agriculture is far more complex than in conventional agriculture. Thus, its needs to be system-oriented (see above). Nevertheless, it is important that single measures need to be effective. This means that also biological plant protection preparations have to be reliable in their effect. If this is not the case, then they are unable to fulfil their duty in context of soil cultivation, crop rotation and selection of crop variety.

Many projects of the Federal Organic Farming Scheme are devoted to the research of active ingredients, their formulations in different concentrations, their compositions, etc. Highly qualified scientists work in such projects. Based on their research topic, the scientists have to analyse and solve relatively isolated research questions. The research results that were presented in October 2003 and November 2004, showed that this can constitute a danger: The clarification of chemical interrelations should not lead to the systematic approach of organic plant protection to get lost. Plant protection in organic farming should not be a simple substitution of conventional methods. The results of single research questions should be re-included into the overall context of the biological cultivation system and also include existing practical experiences.

The example of plant protection makes it quite clear, how important and equally difficult it is to fill the requirement of interdisciplinary and transdisciplinary research with life.

A special problem within organic plant protection is the intensive use of the heavy metal copper. At present, there is no alternative available. Nevertheless, there are several projects in viticulture and potato cultivation that deal with the following aspects: which kind of formulation will reduce the copper concentration in the applied medium, what kind of cropping measures will help avoid the use of copper and which active substance can replace copper in the long-term.

³⁷ <http://orgprints.org/view/projects/de-boel-pflanze-pflanzenschutz.html> and
<http://orgprints.org/view/projects/de-boel-pflanze-pflanzenzuechtung.html>

³⁸ <http://orgprints.org/view/projects/de-boel-pflanze-pflanzenzuechtung.html>

Plant strengthening preparations

The organic pesticides available on the German market are subject to great dynamism. A large amount of preparations, as well as small manufacturers that are sometimes unable to keep up on the market, are responsible for this. Furthermore, there is a category in Germany called “plant strengthening preparations”³⁹HYPERLINK, which are subject to a simplified licensing procedure. This category does not exist in all European countries. Therefore, it is difficult for the farmers to choose the appropriate preparation for their crops and their cultivation. In order to improve this situation a project³⁹ was started, which provides a list containing all relevant information about plant strengthening preparations and other inputs available on the market, their components, their effect as defined by the manufacturer, as well as independent research results. This input list is continuously updated. Thus the farmer and the advisor have a transparent overview of all currently available preparations and their usability.

Furthermore, the development of improved mechanised repelling methods against thistle (*Cirsium arvense* (L.) Scop)⁴⁰ and dock varieties (*Rumex* spp.)⁴¹, as well as the use of developed prototypes, was subject of projects within the Federal Scheme.

Plant nutrition⁴²

Organic crop production refrains from using supplemental mineral fertiliser, as its availability for the plant is quite predictable. The management within a closed cycle and the use of organic fertilisers is the basis for plant nutrition in organic agriculture.

Due to increasing specialisation, organic farming has to deal with a growing number of farms operating with low or without any animals. Therefore, fertiliser from animal husbandry is hardly available to these farms. They have to focus on organic fertilisers of plant origin, and on the design of a sustainable crop rotation. These issues are taken up by the Federal Scheme: e.g. reasons for a depression in harvest and other cultivation problems on farms operating without animal husbandry are being investigated. Furthermore, the effect of fertilisation from leguminous plants in field vegetables or faba bean meal for different crops are studied⁴³.

For the prediction of available minerals of the organic material, as well as the soil nutrients available in the long-term, importance is placed on the balance of soil humus. The methods used in conventional agriculture cannot simply be applied here. Systematic research on humus balance has not been done. In order to remove this deficit and to supply the organic farmers, as well as the advisors with a balancing method, which is quite accurate and still practical, a broad project was recently started.

3.3.4.2 Animal husbandry⁴⁴

The role of research about animal husbandry can be deduced from the history of organic farming. It has never played a major role and even lost part of the genetic resources like locally adapted breeds and health features. Compared to the subject of crop husbandry, less project proposals were handed in. One reason for the lower number of research projects on organic animal husbandry under the BOEL is that projects concerning animal husbandry are in general far more expensive than e.g. crop husbandry projects. During the first period of the BÖL (2002-2003) several status quo

³⁹ <http://orgprints.org/6944/>; <http://www.betriebsmittel.org/>

⁴⁰ <http://orgprints.org/5015/>

⁴¹ <http://orgprints.org/6167/>

⁴² <http://orgprints.org/view/projects/de-boel-pflanze-pflanzenernaehrung.html>

⁴³ <http://orgprints.org/3490/>

⁴⁴ <http://orgprints.org/view/projects/de-boel-tier.html>

projects about animal husbandry of cattle, pigs and poultry, as well as aquaculture were realised. The results served as a basis for follow-up projects considering more specific, current and relevant issues.

Animal health⁴⁵ and rearing of livestock⁴⁶

In general, it can be observed for all productive livestock that differences in the health status of animals under organic or conventional livestock husbandry differ less than between farms of the same production type. This allows the conclusion that it is mainly a matter of husbandry management determining if an animal is healthy or not.

In the case of cattle husbandry, which plays an important role in organic farming, one research focus is animal health. Mainly udder diseases like mastitis prevent a higher productivity and better quality of the given milk. Therefore, management support systems are developed in running projects and implemented into practice. These tools should enable farmers to establish the basic conditions (building of stables, hygienic aspects, milking techniques) for improved animal health. Only when these preconditions are fulfilled, more advanced treatments (e.g. homeopathy) can be successful in mastitis prophylaxis.

A similar situation can be found in pig husbandry, where project results show that the status of animal health is not yet satisfactory. Considering observations on living animals as well as diagnostic findings of the carcass (liver, lung) it was evident that the presently practised hygienic management and husbandry systems are often not compatible with the requirement for better health conditions under organic farming. In comparison to other countries the basis for organic pig production is comparably narrow in Germany. Only a few hundred farms are involved in breeding of piglets and fattening of pigs. Next to the research itself, knowledge transfer is of main interest. Therefore, different projects of the Federal Organic Farming Scheme include extension service in their research. Furthermore, pig farms from neighbouring countries like Austria and Switzerland are partly included in surveys and evaluations.

The organic rules and regulations for species appropriated husbandry and better animal welfare do not necessarily guarantee advanced animal health. To adjust this imbalance is a challenge the Federal Organic Farming Scheme is facing with the current projects.

Animal feeding⁴⁷ and breeding⁴⁸

Following recent regulations for organic animal husbandry it will be compulsory to feed animals with 100% organic fodder. So far, it was possible to use conventional additives. This upcoming restriction means a challenge for all organic farms involved in animal husbandry still reaching high outputs in spite of the low energy density and partly different composition of organic fodder under the circumstances of a permanent tightening market competition.

There are two ways to go in order to solve the existing problems. On the one hand, there are several breeds used in organic farming today, which are not adapted to an optimum in their demands and requirements to the conditions of organic animal husbandry. In lack of adequate breeds, adapted hybrids are used, which have been reared for the demands of conventional circumstances. Features like longevity, robustness, persistent performance and adaptation to extensive husbandry conditions were lost along the way. Therefore, it is of main importance for the establishment of suitable breeds for organic farming to establish breeding programmes and develop breeding criteria under the recognition of still available genetic resources.

⁴⁵ <http://orgprints.org/view/projects/de-boel-tier-tiergesundheit.html>

⁴⁶ <http://orgprints.org/view/projects/de-boel-tier-tierhaltung.html>

⁴⁷ <http://orgprints.org/view/projects/de-boel-tier-tierernaehrung.html>

⁴⁸ <http://orgprints.org/view/projects/de-boel-tier-tierzucht.html>

On the other hand, it is necessary to improve the used fodder in a way that neither deficiency symptoms nor depression of performance will appear. This problem can be clearly demonstrated by the example of feeding layers: When the layers are fed according to organic criteria, a deficit especially in essential amino acids in the fodder is detectable. A supplement, e.g. of synthetically produced methionine, is not allowed. Therefore, two joint projects from the Federal Organic Farming Scheme are searching for ways to extract methionine from natural sources: In one project, different algae species are screened in view of a higher methionine synthesis. Another project is focusing on the search for bacteria showing higher methionine production caused through natural mutation. If these projects are successful, a natural source of methionine might be available in the future. Used as a fodder additive, it could avoid the above-named deficiency symptoms.

3.3.4.3 Food systems: Quality and processing⁴⁹

Within the Federal Organic Farming Scheme far more projects have been submitted and realised regarding food quality than processing. Research about food quality is mainly carried out by universities and public bodies with research divisions concentrating on laboratory investigations. Research about food processing is interesting for companies inventing e.g. new production systems, but only a few project proposals were handed in. Often the support for small innovative food companies goes in conflict with the funding guidelines evaluating the funding as a distortion of competition distinguishing between small-scale business promotion and market intervention.

A comparison of the amount of realised projects in the category food quality and processing with other organic research categories clearly shows a deficit in this area. On the one hand, only a few project proposals have been handed in after the call for this category. This is due to several reasons:

It is and stays difficult to measure the gained health status of organic products objectively beyond the given facts (e.g. less residue and pesticide contamination). It lacks suitable parameters as well as experience concerning relevant methods for measuring quality. Here, it is a great challenge to validate holistic methods for quality analysis, in comparison to already established conventional analysis and make them available for practitioners. Current projects of the Federal Organic Farming Scheme are dealing with these subjects.

On the other hand, organic food processing is partly affected by small structures. Several small companies with many innovative ideas exist. In comparison to experienced third-party fund raisers of universities, these companies have less experience and capacities for the successful application of project proposals. Their project ideas often include features of company promotion hampering the support as a research project. Anyway, at present, the organic food sector is little structured to communicate their problems combined to research institutes and project executing organisations.

An important research focus of the BÖL is the quality of organic food produced. Several investigations already have shown that because of the ban of synthetic pesticides, residue contamination of organic products is considerably less. It is far more difficult to determine, whether organic products have a different composition than conventionally grown products, if the contents of specific components (e.g. secondary plant ingredients) are significantly higher and the consumption of organic food implements have an objectively detectable excess for the health of the consumer. These questions have been and still are being investigated in several projects dealing e.g. with fruit, vegetables, cereals and fish.

In this context, it is important to consider, which analytical methods are being chosen. By using only the methods confirmed for the conventional sector, the acceptance of the results from the organic point of view will be little. Similar scepticism appears from the conventional point of view when only results from holistic methods are being generalised. Therefore, one key project of the BÖL investigates about the differentiation and classification of organic products using validated

⁴⁹ <http://orgprints.org/view/projects/de-boel-lebensmittel.html>

analytical and holistic methods. For comparative measurements, samples of conventional and organic products (wheat, apples, carrots) receive a code and are being analysed by analytical and holistic methods (e.g. copper chloride crystallisation, fluorescence-spectroscopy, physiological amino acid status). The contents of secondary plant ingredients are determined and sensory investigations carried out, in order to do a comparative analysis of plant resources from conventional and organic systems. Furthermore, investigations consider whether the location of production and type of cultivar have a higher or lower impact on the quality of ingredients than the farming technique itself.

3.3.4.4 Values, standards and certification⁵⁰

Twenty-one projects are assigned to this category, consisting of projects concerned with decision support for certification agencies to comply with the GMO prohibition or decision guidance for processors and traders to minimise the risk of GMO blending into the production process. The introduction of a quality management system, as well as databank technical requirements for the development of a trace back system, are current projects considering actual needs. Information supply about organic products without GMO is realised through a handbook for practitioners. Further internet pages have been established presenting overviews about certified companies or judicial laws relevant for import and export countries. Several projects are concerned with the development of methods to verify organic products like eggs and salmon. Others are dealing with the establishment of evaluation systems for approval of technical ingredients, food additives and auxiliary substances, as well as risk management for plant protection residues.

3.3.4.5 Knowledge management: Extension⁵¹

One main focus of the BÖL is to professionalise knowledge transfer and extension service for organic farming. Several measures and projects already start during the vocational training. An internet based knowledge portal containing teaching material about organic farming for agricultural vocational training was created in order to integrate organic farming subjects into the courses. Furthermore, a trainee programme for young extension workers was realised to optimise their preparation for the extension service. Also, for experienced advisors, further education considering different themes and methodological competence is being offered.

In a project a “management handbook for organic agriculture” was compiled. It lists current practices, cost calculations, construction solutions and economical instruments for consultants and farmers. The handbook is available in the form of a book or an IT-programme. This handbook will be updated regularly.

Research about extension on organic farms amongst others is focussing on the development of new extension tools. Organic farms often have a much more diverse production system than their conventional colleagues. For a competent assessment of one's own strengths and weaknesses, it is of importance to separate the different production areas in order to do an economical calculation and to decide about correct inside farming prices for a product changing from one production area of the farm into another one. These questions are attended to by a large joint project including dairy farming, pig production, poultry, as well as field and vegetable crops.

⁵⁰ <http://orgprints.org/view/projects/boel-12-certification.html>

⁵¹ <http://orgprints.org/view/projects/de-boel-oekonomie-beratung.html>

3.3.4.6 Marketing / Consumer behaviour⁵²

The difficult economic situation in Germany has strained the food industry, because consumers have become much more conscious of prices. Mainly discount stores have profited from this development and even registered rising turnovers. The result of this is that production prices came more and more under pressure. For many foods production costs could barely be covered or lost out to cheaper products from abroad.

An opposite trend can be seen in the organic sector: While retail stores in the food sector are having losses, the organic field is recording positive two-digit turnovers. Though there were different food scandals, these only had a short-term effect. More and more consumers are becoming aware of a healthy diet and nourishment. Surely, the Federal Scheme has contributed positively to this development.

The consumer backgrounds are rather losing transparency, as the organic niche has lost its organic “alternative” image. Though there are still convinced organic activists, there are equally those, who are occasional buyers with different familial and educational backgrounds. Even the motives and reasons to buy organic have become diverse. Research projects dealing with the analysis of the qualitative structure of organic consumer behaviour (especially occasional and rare buyers of organic goods) have been realised on survey basis in the Federal Organic Farming Scheme. Furthermore, projects concerning the demand of organic food products have been conducted using panel data and long-term observations.

Another branch of market research deals with the successful marketing initiatives of organic products, as well as the effect in sales promotion and special price offers in retail.

An improvement is also necessary at the interface between producers of organic goods and commercial enterprises. Many consumers are prepared to buy organic products, but do not want to spend the time and effort to comb through the different stores in order to find what they want or need. Therefore, the need exists to bundle the portfolio of goods of the manufacturers and establish communication to retailers. Latter are only interested in clients that are affine to organic goods and want to keep such clients with respective marketing, so that these will buy from the retailer, who offers a large product palette. This sensitive topic was taken up by a broad project of the Federal Organic Farming Scheme, which is currently running.

At the beginning of the Federal Scheme, research projects focused on the primary sector, i.e. the production side. But sustainable agriculture can only develop, if the demand side equally rises. Thus, in 2003/2004, many projects turned towards the marketing issue. In the meantime, the organic niche has started to develop into a branch of its own. The increasing entry of retailers and also of discount stores into the sale of organic goods reflects this as well. Unfortunately, risks evolve next to the many positive opportunities, as conventional agriculture has already experienced since several years: The producing side gets more and more under pressure from the buyer side, because the demand for high quality, consistent and largely produced goods, can only be satisfied, if a constant delivery is warranted. This increases the pressure on rationalisation. Additionally, foreign producers of organic raw materials and goods are also pressing forward onto the German market, which does not facilitate the situation for the German organic farms and businesses.

Many stakeholders fear that German organic farmers will be forced to use conventional methods such as securing short-term harvest maximisation and placing the optimisation of the farm processes in the back. Advances in organic agriculture cannot be achieved if only single production techniques or branches are intensified or changed, without considering the interaction within the entire farming system.

A solution for this conflict of aims is difficult, because economic, political, social and scientific interests have to be aligned. This implies the following for organic research: Scientists, as well as

⁵² <http://orgprints.org/view/projects/de-boel-oekonomie-marktentwicklung.html> and <http://orgprints.org/view/projects/de-boel-oekonomie-vermarktung.html>

those who decide about financing of research projects in Germany, have to do justice to the area of conflict between the pressure of conventionalising (i.e. organic farming, which is on the legal periphery) and the desired holistic approach for a sustainable and environmental-friendly agriculture.

The stakeholders of the organic food industry are equally challenged: They have not only to convince the consumer of the quality of produced goods, but also of the quality and raised environmental-friendliness of the production process.

This proves to be a difficult task. The occasional buyer's motives to go for organic products are mostly of an egoistic nature. He/she decides on the basis of health, taste etc. Higher or altruistic motives are of secondary nature, such as honouring the ecological and social benefits of organic agriculture. These include protection of natural resources, conservation of biodiversity as well as securing and creating new jobs.

The Federal Scheme supports the difficult task to communicate the process quality as an added value. A model project supports a dairy farm by purposely raising the price of the produced milk by 5 cent/litre. Then, this surcharge is mentioned on the packaging as a direct income transfer for the milk producing farmers. This surcharge is given directly to the regional milk producers so that they are also able to produce cost effectively in the future. The practice was a success, as early fears of a loss in sales by 10-20 % was unfounded. The project idea that a higher price helps to conserve the landscape and secure regional jobs even led to an introduction of new clients for the dairy. Furthermore, new stores took up this milk into their product range, which were then able to sell more milk than before. The sale of the organic milk with a surcharge did not go to the expense of organic milk sales of other dairies.

Basically, this example is transferable to other products as well and shows that even regional sales structures make it possible to use the processing quality of organic farming as a sales criterion.

In times of an increasing globalisation, process quality is not just a matter of environmental-friendly agriculture, but it receives an ethical dimension as well. Many consumers consider the moral reputation of a company. What kind of values does the company represent? Are job and family compatible for his employees? How does he deal with his suppliers? Does the company also take social responsibility with the respective obligation?

Markets do not necessarily orient themselves towards the lowest prices. The person as an entrepreneur, as an employee of a company, as well as a consumer, equally designs the market (un)consciously with his or her specific ethical orientation.

While the conventional sector has been trying to polish its image since several years with specific measures, the organic sector never had this problem. There never was a reputation deficit, as organic agriculture already started off with a highly ethical claim.

Nevertheless, the belief that the product speaks for itself is losing its validity in the increasing globalisation and anonymity. Still, especially the organic branch is very dependant on its social and ethical image. Hence, the implementation of a value management system would be a valuable asset. Within the Federal Organic Farming Scheme a feasibility study was elicited to check, whether there would be a possibility to introduce a certified ethical or value management system for the natural food sector. The aim is to get an active involvement of companies in this sector into the implementation of such an ethical management system. Such a management system can have an internal, as well as an external benefit for the companies: internally it will help the employee to identify him/herself with the employer and the orientation towards its values. Externally, this systematic management of values will help to communicate corporate citizenship, credibility and a moral reputation to the consumer. In the medium-term, the consumer is supposed to identify him/herself with the ethical values of the product connected to the producer, which the consumer will then take into consideration of his purchase decision.

3.3.4.7 Food Service Sector (FSS)

Organic agriculture can only then grow in a sustainable manner and be economically sound, if its products and services are accepted and demanded broadly by society. For this, not only private consumption plays a role, but equally bulk consumers. They play a key role for the stabilisation and increase of this demand.

In order to better use the shown potential of organic products for the FSS in future, several projects (2002 – present) were realised within the Federal Organic Farming Scheme: restraints, success factors and development opportunities for the use of organic goods, questions concerning certification and control of organic products in the food service sector.

Large amounts of food are purchased and processed by catering firms and hotels, canteens, schools, hospitals and other public institutions. They also represent a stable market outlet. Furthermore, they have high requirements of the delivered goods concerning health issues, because of their partly sensitive clientel, which include children, patients, convalescence patients and restaurant guests. Hence, the sales opportunities for organically produced goods are very clear.

Nevertheless, even the partial conversion of public catering to organic products is connected to great challenges: suppliers have to guarantee a homogenous and sufficiently large amount. Furthermore, freshness and quality of the raw materials have to be assured from the producer up to the processing in the canteen kitchen. Even the kitchen staff needs to adapt to a few changes, such as purchase, storage, seasonal availability, menu composition and price calculations, as these deviate from conventional processes. Additionally, a precise communication strategy is necessary for the introduction phase of organic products.

All of the above-mentioned problems can be solved. Still, many kitchen managers and those responsible for the food service sector are reluctant to introduce and use organic products due to the sum of hurdles that need to be overcome.

Another challenge for companies in the FSS that want to process and offer organic goods, are the labelling and certification requirements for such products. According to the legal requirements, all companies in the food service sector need to go through the control system of the EU Regulation on organic agriculture, if they want to use organic products and label them as such. Many companies in this sector that were using organic products, were not certified, as they were unaware of the inspection requirements. The inspection bodies also have large gaps: many do not have specially trained personnel and suitable forms for the FSS. The inspection bodies, which have experience with the food service sector, possess standardised forms for processing companies. According to them, there are four core differences between companies in the FSS compared to other processing companies in the organic food sector:

- Companies in the food service sector generally do not work with fixed recipes
- Labelling cannot be done directly on the product
- There is a large problem with the delivery of the goods
- There is often a lack of documentation, which hampers the control of the flow of goods

In the past, the bureaucratic effort of certification scared off many responsible persons in this sector, who were generally willing to partially or fully convert to organic products. It is interesting to note the result of a survey from 2003, conducted by the Federal Organic Farming Scheme: Two thirds of the managers of establishments rejected the additional effort related to labelling and inspection. Simultaneously though, 60 % of the interviewees signalled a willingness to buy, process and offer organic goods without organic labelling, as they can market them well with the term “organic” in their menus. Apparently, the quality of organic products are convincing enough for the food service sector personnel (while purchasing), as well as for the guests to pay a higher price for a qualitatively higher raw material and accordingly healthy and delicious food.

Youths and Organic Products

Children and youths receive special attention within the FSS projects of the Federal Organic Farming Scheme. On the one hand, healthy nourishment for adolescents is essential, on the other hand, children have quite an influence on the purchasing habit within their families – much more than anticipated at first. And finally, these youths are the clients of tomorrow.

One focal point in the Federal Organic Farming Scheme is an exemplary scheme to introduce organic products for meals in schools and day-care centres. Currently, there is a network of several projects located in rural areas, as well as in large cities like Berlin or Hamburg. The office of the Federal Organic Farming Scheme is organising an exchange of experiences between the different stakeholders of the projects concerning successes and restraints. In order to make opportunities and requirements regarding the implementation of organic goods in schools and day-care centres available to a large public, a booklet is currently being issued.

Other activities in the context of Organic Food Management

The dedication of the Federal Scheme concerning the food service sector, organic catering and gastronomy go far beyond research and exemplary projects. Meanwhile, extensive information is offered in printed format as well as on the internet for bulk consumers from catering, gastronomy, event and food service sectors. These publications cover information for the introduction of organic foods (economics, convenience in canteen kitchens, basics in hygiene and storage, personnel training), as well as precise help in daily planning and work with organic products in communal feeding (e.g. shopping schedule, assortment list, recipe finder, costing calculator, seasonal calendar).

4 Research Facilities

Due to the high number of institutions involved in organic farming research – universities, universities of applied sciences, research centres at federal and at county level, private institutes – it is impossible to list all facilities available to organic farming research. Below is a selection of major facilities.

4.1 Experimental farms

Most German Universities involved in research concerning organic farming have experimental stations or farms connected to the relevant institutes. Furthermore, there are experimental farms run by federal institutions like the FAL (Trenthorst) or private ones run by associations like Demeter (Dottenfelder Hof). The table 5 gives an overview about their location and available online context.

Table 5: Organic experimental farms in Germany

Experimental Farms	Location	Online
Gladbacher Hof, Uni Giessen	Villmar	http://www.uni-giessen.de/tbe/home_gh.htm
Hessische Staatsdomäne Frankenhäusen, Uni Kassel Witzenhausen	Frankenhäusen	http://www.wiz.uni-kassel.de/dfh/index.html
Kleinhohenheim, Uni Hohenheim	Hohenheim	http://www.uni-hohenheim.de/i3v/00065700/08765041.PDF
Institut für ökologischen Landbau, FAL	Trenthorst	http://www.oel.fal.de/
Wiesengut, Uni Bonn	Hennef, Bonn	http://www.iol.uni-bonn.de/indexneu.htm
Dottenfelder Hof	Bad Vilbel	http://www.dottenfelderhof.de/
Klostergut Wiebrechtshäusen	Northeim	http://www.kws.de/ca/bv/begh/
Waldhof, FH Osnabrück	Wallenhorst-Lechtingen	http://www.al.fh-osnabrueck.de/1608.html
Lindhof, Uni Kiel	Noer	http://www.agrar.uni-kiel.de/forschung/versuchsgueter/versuchsbetriebe.html

4.2 Demonstration farms

A network of demonstration farms is funded under the Federal Organic Farming Scheme⁵³.

A network of organic pilot farms is existing in Northrhine-Westphalia for more than ten years now and it is run jointly by the Institute of Organic Farming of the University of Bonn (IOL) and the chambers of agriculture in that federal state.⁵⁴

4.3 Long-term trials

At the Institute of Biodynamic Research in Darmstadt a long-term fertilisation trial has been running since 1980.⁵⁵

5 Initiation of research and stakeholder engagement

Currently the BÖL is the main funding source for research in Organic Food and Farming in Germany. Therefore, the initiation of research and stakeholder engagement within the several phases of the BÖL research programme is described hereafter.

5.1 1st Phase of BÖL (2002 – 2003)

After the decision to establish the Federal Organic Farming Scheme (BÖL), the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) has developed a “Programme to Support Research and Development Projects and Measures for the Transfer of Technology and Knowledge

⁵³ Netzwerk Demonstrationsbetriebe; demonstrationsbetriebe.oekolandbau.de/

⁵⁴ Leitbetriebe Ökologischer Landbau in NRW, <http://www.oekolandbau.nrw.de/leitbetriebe/projekt/index.html>

⁵⁵ Langzeit-Düngungsversuch; www.ibdf.de/v1

in the Organic Farming Sector“ on the basis of the proposals submitted by the project team, which was responsible to carry out the BÖL-concept.

On the basis of topic recommendations by the BÖL-project team mentioned above and in collaboration with the simultaneously established Office of the BÖL within the Federal Agency for Agriculture and Food (BLE), the BMELV prepared an extensive request for proposals covering nearly all fields of Organic Food and Farming. This request was published in 2002 and over 700 short proposals were handed in thereafter. The cardinal procedure of selecting and deciding is shown in chapter 6.

5.2 2nd Phase of BÖL (2004 – 2007/2008)

However, a lot of research challenges and questions could not constructively be solved in the course of a two-year programme. For this reason, it was decided to continue the “Programme to Support Research & Development Projects and Measures for the Transfer of Technology and Knowledge in the Organic Farming Sector“ within the BÖL for a period of more than two years and – together with other parts of the BÖL - up to 2007/2008.

After this decision was taken, the team in charge of the research management within the Office of the BÖL started a broadly spread process to identify the most relevant future research topics. This was organised as a participative process to involve the main stakeholders (scientists, extensionists, practitioners, representatives from associations etc.), as much as possible. The stakeholder involvement took place at workshops, consultations during scientific congresses or meetings following invitations to hand in written suggestions. It was very important to identify the main research deficits and gaps on behalf of the improvement of the whole organic food chain from agricultural production to the consumer demands. Furthermore, this procedure was very important to integrate practical partners with their specific farming experience.

This participative procedure was a challenging task for the responsible research management team. Although Germany is a big European country, the organic farming community is more or less small, compared to other stakeholder communities. Many players of the organic scene were already involved in the BÖL in very different functions. Some of them already worked in running projects, others had received rejections of proposals handed in in the past and some were also involved as external experts to evaluate applications. It was a challenge for the staff of the BÖL to successfully overcome this potential conflict of interests. This topic identifying procedure resulted in requests for proposals concerning the following categories:

- Animal breeding
- Animal feeding
- Animal welfare
- Horticulture
- Food processing
- Food quality
- Concepts for the Food Service Sector
- Socio-economics and marketing
- Plant production
- Plant breeding

After publishing these requests for proposals, more than 800 short proposals were handed in and had to be evaluated as well as rated in a short time (see chapter 6 about the selection procedure).

On behalf of setting the right research priorities and supporting the best project ideas, it is important for the research management team in the BÖL to avoid working and deciding in an “ivory tower“. Hence, the attendance at scientific conferences and workshops, the contact to

several stakeholders (practitioners, extensionists, researchers etc.) outside of the “daily” collaboration on specific projects and personal discussions are “soft”, but fruitful sources of input, in order to continue working along the objective requirements.

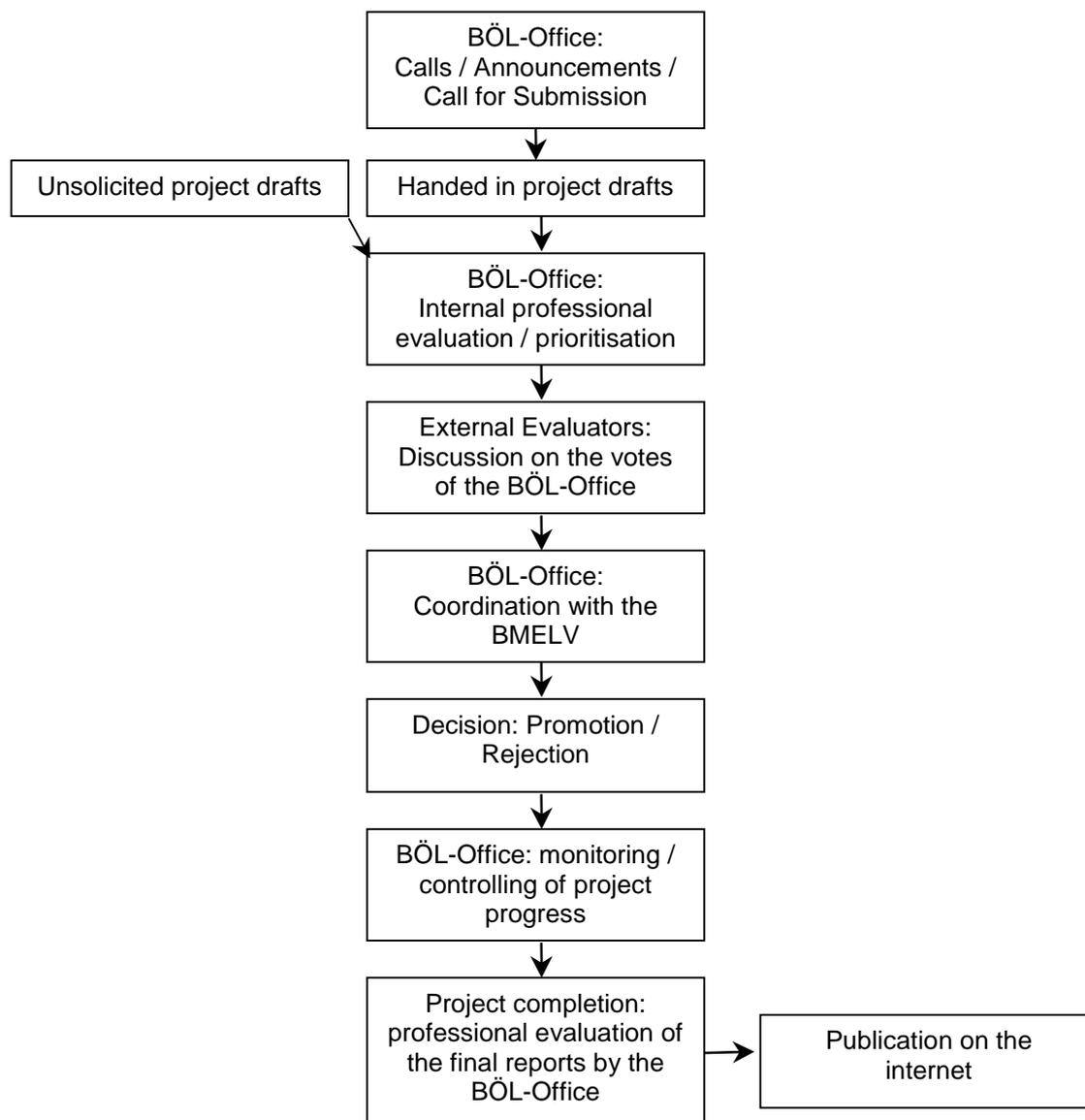
6 Selection criteria and evaluation procedures

Currently, the BÖL is the main funding source for research in Organic Food and Farming in Germany. That’s why in the following the selection and evaluation procedure within this research programme is described.

After the announcement of project calls, the staff of the Office of the BÖL (belonging to the Federal Agency for Agriculture and Food - BLE) receives the short proposals. The team, responsible for the research management, evaluates and rates these short applications. Due to the high number of proposals handed in (e.g. approx. 700 short proposals in 2002, approx. 680 short proposals in 2003) the staff, in a first step, uses a “Rating sheet” to apply a common and fair standard to all project proposals. In a second step, the staff of the Office of the BÖL consults their own votes with external experts. This can be done as a confidential workshop at the BÖL-office or by soliciting the experts statements in writing.

For the evaluation of the short proposals the external experts normally use the same “Rating sheet” as the staff of the BÖL-Office. After consultation with the external experts, the Office of the BÖL formulates recommendations clarifying, which applicants of the short proposals should hand in a detailed project proposal and, which short proposals should be rejected. These suggestions are discussed with the Federal Ministry for Consumer Protection, Food and Agriculture (BMELV). After this decision procedure with the BMELV, the Office of the BÖL solicits detailed proposals, evaluates them and makes a final decision about granting the project in collaboration with the BMELV.

Running projects are permanently monitored by the BÖL-Office staff. This monitoring consists of a professional check of the project progress (e.g. compliance with agreed milestones) and in controlling the correct use of granted funding subsidies. The main tools for the monitoring are interim reports, the final report and annual financial reports. After evaluating the project results, the Office of the BÖL publishes final reports in the German „research platform“ (research site of the internet portal www.oekolandbau.de) and in the database Organic Eprints. The following chart shows the selection and evaluation procedure of the research programme within BÖL:



Graph 2: Evaluation procedure

7 Utilisation and communication of research

7.1 Activities under the Federal Organic Farming Scheme

7.1.1 Networks

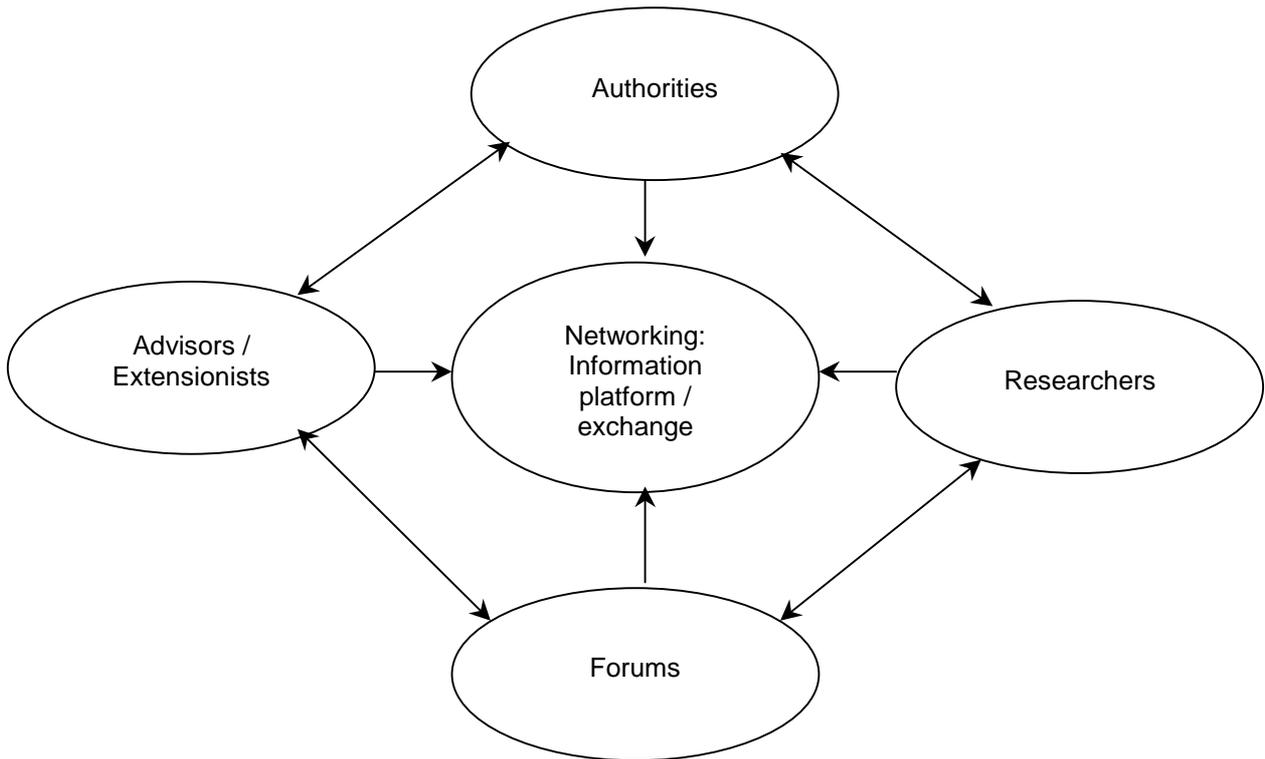
Under the Federal Organic Farming Scheme several networks have been established that meet regularly. These networks unite researchers, research managers, advisors and practitioners to discuss current themes, identify research needs and help implement research results from the Federal Organic Farming Scheme into agricultural practice.

Currently the following networks are funded:

- Forum Plant Protection in Organic Agriculture
- Network Animal Breeding in Organic Agriculture
- Network for the Trial of Organic Medicinal and Herbal Plant Cultivation
- Network for the Advancement of Cultivation Concepts in Organic Agriculture

- Network Food Processing and Food Quality
- Communication Network Organic Meat and Organic Wheat
- Network in Organic Vegetable Cultivation
- Feed Cultivation and Animal Nutrition in Organic Agriculture
- Transnational Network for Organic Animal Breeding – Cooperation between Germany and Poland

Graph 3: Network system and utilisation of research under the Federal Organic Farming Scheme



7.1.2 Communicating the results of BÖL among the research and expert community

The research results are communicated via the research platform of the central internet portal “forschung.oekolandbau.de”. This platform, funded under the Federal Organic Farming Scheme, informs with brief texts about new results and it provides access to the full reports. They are all archived at Organic Eprints, where they are publicly accessible. Furthermore, this site informs about relevant events, has an address database and links to internet sites of relevance to the project. The platform maintains a monthly e-mail newsletter to which almost a thousand users have subscribed.

During the first project phase of the research platform project (2002-2003)⁵⁶, it was decided to use Organic Eprints for documenting the final reports of the Federal Organic Farming Scheme. During this phase, the German language version of the archive was implemented.

Additionally, a dedicated journalist employed by the Federal Agency for Food and Agriculture (BLE) is in charge of communicating the research results to the organic sector and general public by actively communicating with the media.

7.1.3 Making BÖL results available for agricultural practice

Apart from the networks mentioned above, which play a major role for the dissemination of BÖL research results into agricultural practice, a number of further activities take place, such as:

- As part of several BÖL projects, attractive leaflets for farmers have been published containing the relevant information for agricultural practice⁵⁷
- Results from projects that are relevant for agricultural practice are processed and adapted to the needs of farmers and presented at the central internet portal for organic farming of the Federal Ministry www.oekolandbau.de⁵⁸

For the next period of the research programme under the Federal Organic Farming Scheme even greater attention will be given to knowledge transfer.

7.2 Research conferences on organic agriculture in the German-speaking region⁵⁹

Since the early nineties, the Foundation Ecology & Agriculture (SÖL) has been coordinating a series of scientific research conferences on organic agriculture. Each conference is organised in cooperation with a university or research institute active in organic research. These conferences provide an opportunity for researchers from Germany, Austria, Switzerland and other European countries to present their activities and results. Scientists, students, farmers, as well as members of scientific and agricultural institutions are invited to attend the conferences. The next conference will be held in March 2007 in Stuttgart-Hohenheim.

The 8th research conference was held at the University of Kassel. It was organised from the Faculty of Organic Agricultural Sciences (Fachbereich Ökologische Agrarwissenschaften) of the University of Kassel, the Institute for Organic Farming (Institut für Ökologischen Landbau), the Federal Agricultural Research Centre (Bundesforschungsanstalt für Landwirtschaft - FAL) and the Foundation Ecology & Agriculture (SÖL).

⁵⁶ <http://orgprints.org/580/>

⁵⁷ For instance there is a leaflet on thistle control, available at <http://orgprints.org/5015/02/5015-02OE055-2-bba-verschwele-2003-distel-faltblatt.pdf>. A leaflet on propagation material is available at <https://www.fibl.org/shop/pdf/mb-1367-pflanzsubstrate.pdf>.

⁵⁸ For example <http://www.oekolandbau.de/erzeuger/tierische-erzeugung/milchviehhaltung/aus-der-forschung/entwicklung-eines-konzepts-zur-schwachstellenanalyse-in-milchviehhaltenden-betrieben/>

⁵⁹ Wissenschaftstagung zum ökologischen Landbau http://www.soel.de/english/wissenschaftstagung_e.html

For the first time ever, the Organic Eprints Archive was used for submitting the conference papers. After the conference, these papers (more than 200) were made available publicly⁶⁰. Together with the final reports of the Federal Organic Farming Scheme, Organic Eprints now gives an almost complete overview of current organic farming research in Germany.

7.3 Implementation of practical research results at laender level

At many research stations of the federal states a lot of research targeting the needs of agricultural practice is carried out, much of this is funded under the Federal Organic Farming Scheme. In most cases, there is a close link with the organic advisory service, which guarantees that the research is oriented at the needs of practice and that the results are transferred to the farmers. The results of these trials are also documented in the Organic Eprints Archive⁶¹.

8 Scientific education & research schools

All German universities and universities of applied sciences with a chair / coordinator for organic farming offer organic farming courses (see list above). Also most other faculties of agriculture or environmental studies are involved in research and teaching and offer courses about organic farming or agroecology.

There are also some Bachelor and Master Courses specialising in Organic Farming (see list below).

- BSc Studiengang Ökolandbau und Vermarktung / BSc Organic Farming and Marketing, Fachhochschule Eberswalde, Fachbereich Landschaftsnutzung und Naturschutz, 16225, Germany, <http://www.fh-eberswalde.de/oelbv/index.htm>
- BSc Ökologische Landwirtschaft / Organic Farming, University of Kassel; Fachbereich Ökologische Agrarwissenschaften, 37213 Witzenhausen, Germany, <http://www.uni-kassel.de/fb11cms/?c=217>
- Common European Specialisation in Ecological Agriculture, c/o Fachgebiet Ökologische Land- und Pflanzenbausysteme, 37213 Witzenhausen, Germany, <http://www.wiz.uni-kassel.de/foel/sokrates.html> "
- MSc Ökologische Landwirtschaft / Organic Farming, University of Kassel; Fachbereich Ökologische Agrarwissenschaften, 37213 Witzenhausen, Germany, <http://www.uni-kassel.de/fb11cms/?c=217>
- Master Programme (MSc) Organic Food Chain Management, University of Hohenheim / Universität Hohenheim (340D), 70593 Stuttgart, Germany, <http://www.uni-hohenheim.de/organicfood/>
- MSc International Ecological Agriculture, University of Kassel; Fachbereich Ökologische Agrarwissenschaften, 37213 Witzenhausen, Germany, <http://www.uni-kassel.de/fb11cms/?c=35>

Under the Federal Organic Farming Scheme, a trainee programme for graduate students is offered and the participants are trained to work in the organic sector, be it in advice, trading companies or with publishers⁶².

Furthermore most organic producer and other sector organisations as well as some agricultural schools provide training on organic farming. At the central internet portal on organic farming (<http://www.oekolandbau.de/service/termine/>) all events including short training are listed.

⁶⁰ <http://orgprints.org/view/projects/wissenschaftstagung-2005.html>

⁶¹ <http://orgprints.org/view/projects/de-agrarverwaltung.html>

⁶² Projekt "Traineeprogramm Öko-Landbau", Ausbildung in der Öko-Beratung, Kontrolle, Verarbeitung und Vermarktung, <http://www.soel.de/projekte/trainees.html>

Table 6: Research schools with faculties for organic agriculture or trainee programmes

Institution	Course	Online
University of Bonn Prof. Köpke	Complete programme of study	http://www.iol.uni-bonn.de/
University of Giessen Prof. Dr. G. Leithold	Complete programme of study	http://www.uni-giessen.de/orglandbau/
University of Hohenheim Dr. Sabine Zikeli	Organic Food Chain Management	http://www.uni-hohenheim.de/organicfood/
University of Kassel-Witzenhausen Prof. Dr. J. Heß	Complete programme of study	http://www.wiz.uni-kassel.de/foel/
University of Kiel Hans-Rudolf Bork	Kiel Ecology-Centre	http://www.ecology.uni-kiel.de/ecology/english/index.html
University of Goettingen Prof. Dr. Teja Tschardt	Agroecology	http://wwwuser.gwdg.de/~uaoe/Agroecology.html
Hochschule für Technik und Wirtschaft Dresden Prof. Dr. Knut Schmidtke	Course of study	http://www.htw-dresden.de/pillnitz/zzz_endkntn/fb/prof_mit.html#KSchmidtke
SOEL Britta Weitbrecht	Trainee programme for extension service	http://www.soel.de/soel/pm/2003/06_18.html
Bauernschule Hohenlohe	Seminars, training, courses	
Fachschule für ökologischen Landbau	Training in organic agriculture	http://www.riswick.de/oeka/oe_fachschule.shtm
University of Applied Sciences Eberswalde Prof. Dr. Hans-Peter Piorr	Complete programme of study	http://www.fh-eberswalde.de/oelbv/
Sächsische Interessengemeinschaft Ökologischer Landbau e. V. (SIGÖL) Roland Einsiedel	Training and courses in organic agriculture in the federal state of Saxonia	sigoel@web.de
Verband für handwerkliche Milchverarbeitung im ökologischen Landbau	Seminars, information for organic cheese producers and milk processing	http://www.milchhandwerk.info
University of Applied Science Nuertingen Prof. Dr. Barbara Elers	Research and teaching	http://www.fh-nuertingen.de/profhp/elers/

References

- Gerlach, Florian; Meier, Julia und Willer, Helga (2005): Kommunikation von Forschungsergebnissen deutschlandweit und international: forschung.oekolandbau.de und orgprints.org [Communication of research results via orgprints.org and forschung.oekolandbau.de]. Poster presented at the 8. Wissenschaftstagung Ökologischer Landbau – Ende der Nische, Kassel, 01.03.2005 - 04.03.2005; Veröffentlicht in Heß, J und Rahmann, G, (Hrsg.) *Ende der Nische, Beiträge zur 8. Wissenschaftstagung Ökologischer Landbau*. <http://orgprints.org/3668/>
- Heß, Jürgen und Rahmann, Gerold, (Hrsg.) (2005): Ende der Nische - Beiträge zur 8. Wissenschaftstagung Ökologischer Landbau. Tagungsband 8. Wissenschaftstagung Ökologischer Landbau - Ende der Nische, Kassel, 01.03.2005 - 04.03.2005. kassel university press GmbH, Kassel. <http://orgprints.org/4541/>
- Heß, Jürgen und Schüler, Christian (2003): Ökoforschung am Standort Witzenhausen. *Ökologie & Landbau, Jahrbuch Öko-Landbau 2003* 125(1/2003):pp. 72-74. <http://orgprints.org/955/>
- Rahmann, Gerold und Flachowsky, Gerhard (2003): Forschung für den Ökolandbau in der FAL [Research in Organic Agriculture in the German Federal Agricultural Research Centre (FAL)], in Rahmann, Gerold und Nieberg, Hiltrud, (Hrsg.) *Ressortforschung für den ökologischen Landbau 2002*. Landbauforschung Völkenrode Sonderheft Nr. 259, Seite(n) pp. 88-92. Institut für ökologischen Landbau (OEL) und Institut für Betriebswirtschaft, Agrarstruktur und ländliche Räume (BAL), Bundesforschungsanstalt für Landwirtschaft (FAL). <http://orgprints.org/2128/>
- Rahmann, Gerold, (Hrsg.) (2006): Tagungsreader: Statusseminar "Das Neuste aus der Ressortforschung für den Ökologischen Landbau 2006" [Proceedings of the Seminar: "Recent results of state funded research on organic farming 2006"]. Tagungsband Statusseminar der Ressortforschungseinrichtungen des BMVEL, Braunschweig, 02.03.2006. Senatsarbeitsgruppe Ökologischer Landbau. <http://orgprints.org/7683/>
- Willer, Helga; Meier, Julia und Gerlach, Florian (2005): Öko-Landbau-Forschung in Deutschland [Organic Farming Research in Germany]. *Ökologie & Landbau* 1/2005(133):pp.52-55. <http://orgprints.org/4233/>

