

# Organic Agricultural Research in Europe -- Present State and Future Prospects<sup>1</sup>

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## Introduction

Organic agriculture has become a widely accepted sector of agricultural and food research. In Europe publicly funded research has shifted towards organic farming, while research funding for conventional farming has been cut considerably. This paper takes a closer look at how organic farming research is organised in Europe and at what challenges researchers will face in the future.

## 1 The Beginnings of Research in Organic Agriculture

Organic farming research has developed over four stages: first through pioneer farmers and scientists; then through pioneer private research institutes; through organic farming chairs at universities; and, finally, through organic farming projects at state research institutes.

In the very beginning (from the 1930s onward), several scientists such as Sir Albert Howard, Lady Eve Balfour, Rudolf Steiner, Hans Mueller and Jean Boucher as well as practitioners like Maria Mueller, Raoul Lemaire and Maria Thun developed ideas for or carried out many research activities.

Formal scientific research activities began in the 1970s. The following research institutions were founded within a very short space of time: the Research Institute of Organic Agriculture (*Forschungsinstitut für biologischen Landbau FiBL*) in Switzerland (1974); the *Louis Bolk Institute* in the Netherlands (1976); the *Rodale Institute* in the USA (founded in 1947, research activities since 1976); the *Ludwig Boltzmann Institute for Organic Agriculture and Applied Ecology* in Vienna, Austria (1980); the *Elm Farm Research Centre* in England (1982); the *Henry Doubleday Research Association (HDRA)* with its research station in Coventry, England (1984); and the Norwegian Research Institute for Organic Agriculture (*NORSOK*), now one of eight state institutes under the Norwegian Ministry of Agriculture (1987).

Biodynamic research has a longer history and has its beginnings in the 1920s. It is now carried out at: the Natural Sciences Section of the Goetheanum in Dornach, Switzerland; the Research Institute of Biodynamic Agriculture in Darmstadt, Germany (1954); and the *Stiftelsen Biodynamiska Forskningsinstitutet* (Biodynamic Research Institute), Sweden (1986).

## 2 Current Research Structures

Organic farming research is organised differently in the various European countries. Compilations of the most important research institutions are provided by Willer and Zerger (1998) and Padel (1999) (see also [http://www.soel.de/inhalte/oekolandbau/research\\_table.html](http://www.soel.de/inhalte/oekolandbau/research_table.html)). A list of links to institutions active in organic farming research is available at <http://www.organic-research.org/institution.htm>; addresses are available via the address database of the internet site <http://www.organic-europe.net>.

### 2.1 Funding

According to recent reviews (Padel, 1999; Niggli, 1999; ADAS, 2000), the emphasis placed on organic farming research in a given country only partly reflects the density of organic farms. Leading in organic farming research are the Nordic countries: Denmark, Norway, Finland and, to a lesser extent, Sweden. Denmark has reserved 4-8% of its total research funds for organic farming projects. Organic farming research is also growing rapidly in Switzerland, where 3 to 4% of the total research budget of the Federal Office of Agriculture is allotted to the private Research Institute of Organic Agriculture (*Forschungsinstitut fuer biologischen Landbau, FiBL*), and another 2 to 3% are earmarked for organic farming projects at state research institutions.

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<sup>1</sup> In: Alföldi, Thomas, William Lockeretz and Urs Niggli (Eds.): IFOAM 2000 – The World Grows Organic.

In contrast, organic farming research is seriously under-funded in Italy, considering the density of organic farms there and the severe technical problems posed by the Mediterranean climate and horticultural crops. There is also a research deficit in other Mediterranean countries as well as in central and eastern European countries. In most other European countries, research funding corresponds to the proportion of organic farms to conventional ones.

Several research projects focusing on organic agriculture were funded under the EU's 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> Framework Programmes. The 5<sup>th</sup> Framework Programme (1998-2002) explicitly calls for research on organic farming under Key Action 5 of the Quality of Life and Management of Living Resources Programme, which stresses the need for research on conversion to organic farming and for support for EU legislation. Five organic projects have been under negotiation since October 1999, which reflects a significant preference. (A list of EU-funded projects is available at: <http://www.organic-research.org/euprojects.html>.)

## 2.2 Private Research Institutes

Today, private research institutes continue to play a prominent role in Switzerland (*FiBL*), the Netherlands (*Louis Bolk Instituut*), England (*Elm Farm Research Centre, EFRC* and *Henry Doubleday Research Association, HDRA*) and Austria (*Ludwig Boltzmann Institut*). They act as main centres of competence in organic farming research or provide experts on organic agriculture for projects carried out at conventional research institutes, thus forming links between these and the organic sector.

## 2.3 University Chairs and Institutes

In some countries, organic agriculture research is mainly funded at the university level. Germany has several chairs for organic agriculture (in Kassel-Witzenhausen, Bonn, Gießen, Nuertingen and Osnabrueck). Research on organic farming is also mainly conducted at the university level in: Austria (University of Vienna), Denmark (University of Copenhagen), the Netherlands (University of Wageningen), Sweden (Swedish Agricultural University) and Wales (Welsh Institute of Rural Studies, Aberystwyth). This is also the case in the central eastern European countries of Hungary and Poland, where chairs for organic agriculture have been established (Universities of Budapest and Goedoelloe; University of Warsaw).

The scientific requirements for Ph.D. theses and the flux of doctoral students make it extremely difficult to transfer academic results into agricultural practice.

## 2.4 Public Research Institutions with Organic Farming Research Activities

Public research institutions specialising in organic farming exist in the following Scandinavian countries: Denmark (Danish Research Centre, *DARCOF*, Foulum); Finland (Research Station for Ecological Agriculture, Partala); Sweden (Centre for Sustainable Agriculture in Uppsala, *CUL*) and Norway (Norwegian Centre for Ecological Agriculture, *NORSOK* in Tingvoll Gard). With the exception of the Swedish *CUL*, which belongs to the Swedish Agricultural University, all centres are part of general agricultural research institutions.

In Denmark, for example, the Danish Research Centre *DARCOF* in Foulum co-ordinates the research projects of 15 research institutes with 100 researchers. The Danish call *DARCOF* the "research centre without walls". At the moment, a follow-up programme (*DARCOF II*) is under evaluation, for which 22 million euro were allocated for 2000 to 2005.

In almost all European countries, minor organic farming research is taking place at universities and other research institutes not specialised in organic farming. In Italy and other southern European countries, organic farming research mainly depends on activities at such institutions. In Austria the state research institutes at Gumpenstein and Linz are conducting several research projects on organic farming. This is also the case in Switzerland, where organic farming research takes place at all six conventional federal research stations, chiefly at the Swiss Federal Research Station for Agroecology and Agriculture (*FAL*).

The French *Institut National de Recherche Agronomique, INRA* started to co-ordinate its organic farming research in 1999. The German national agricultural research station (*Bundesanstalt fuer Landwirtschaftliche Forschung, FAL*) will also intensify its activities in the future by setting up an organic agriculture research institute in the north of Germany (Trenthorst) in autumn 2000.

Since 1990, the UK *Ministry of Agriculture and Fishery (MAFF)* has financed 54 projects at universities, colleges and state or recently privatised institutes such as *ADAS* Terrington, *ADAS* Redesdale and *IGER*

Trawsgoed. The Dutch government has also initiated research projects which are mainly carried out by conventional research institutes.

### **3 Co-ordination of Organic Farming Research**

Because research in organic agriculture is now increasing and is therefore becoming more anonymous, it is very important that the efficiency of organic research and the exchange of preliminary results and project ideas be improved.

#### **3.1 Co-ordination Activities on a Country Level**

In the Scandinavian countries, research activities are efficiently co-ordinated by the state-funded centres for organic agriculture (see chapter 2.5), fostering a dialogue between the advisory services, practitioners and researchers.

In France the *Institute Technique de l'Agriculture Biologique (ITAB)* with its two regional organisations (the *Groupe de Recherche en Agriculture Biologique (GRAB)* in Avignon and the *Groupement d'Agriculture Biologique du Nord, GABNORD* in Lille) co-ordinates applied and on-farm activities. The Italian "Group of Researchers in Organic Farming" (*Gruppo di ricerca in agricoltura biologica, GRAB-IT*) was founded in 1996. It aims to co-ordinate research efforts and organise workshops. In Austria the *Forschungsinitiative Biologischer Landbau* provides a forum for all institutions active in organic agriculture research. In Switzerland a working group comprised of members of *FiBL* and of the six federal research stations co-ordinates common projects. In England the *Colloquium of Organic Researchers (COR)* has met twice since autumn 1999. It aims to improve the dialogue between organic researchers.

#### **3.2 Regional Networks**

A scientific conference has taken place every two years since 1993 in the German-speaking countries (<http://www.soel.de/inhalte/projekte/wissenschaftstagung.html>). It is organised by an organic farming research institution in co-operation with the *Stiftung Oekologie & Landbau (SOEL)*.

In the Scandinavian countries, the Nordic Research Network for Ecological Agriculture co-ordinates teaching activities at the university level. The network discusses multidisciplinary research for the development of the organic farming system and publishes a newsletter.

The Mediterranean countries are beginning to co-ordinate their research activities within the IFOAM Mediterranean group *Agrobiomediterraneo*, which was founded in 1990 to meet the very special requirements of the Mediterranean climate.

#### **3.3 Pan-European Co-ordination Activities**

The EU has funded several concerted actions, such as *the European Network for Scientific Research Co-ordination in Organic Farming (ENOF)* and *Documentation of Ecological Agriculture (DOCEA)*. *The Network for Animal Health and Welfare in Organic Agriculture (NAHWOA)* is a recent addition.

The *FAO Regional Office for Europe (REU)* has established a working group on "Research Methodologies in Organic Farming", a part of the *SREN-SCORENA* network, which has met twice since 1998.

*ENOF* has started to establish collaboration between all institutions working on the research, experimentation, demonstration or diffusion of organic farming techniques (see *ENOF-White Book, 1999*).

#### **3.4 World-wide Co-ordination Activities (IFOAM)**

The *International Federation of Organic Agriculture Movements (IFOAM)* promotes the dialogue between organic agricultural practice and research internationally. It has held thirteen scientific conferences since 1977 ([http://www.organic-research.org/resources\\_ifoam\\_conferences.htm](http://www.organic-research.org/resources_ifoam_conferences.htm)).

#### **3.5 The Internet as a Tool for Information Exchange on Organic Agriculture Research**

The internet has recently gained importance as a medium for the exchange of information on organic farming research. Most institutes have their own homepages where they present their activities. A list of links to research

institutions as well as a project and event database and other information related to organic farming research in Europe is available at: <http://www.organic-research.org>, an internet site maintained by *FiBL* and *SOEL*.

Another recent development is a review of current European research on organic farming compiled by the British *ADAS* (see: <http://www.adas.co.uk/organic/>).

#### 4 Future Challenges

In the process of allocating more money to organic farming research, many national agricultural ministries and some international organisations have evaluated the needs and priorities of organic farming research. With far less than one per thousand of public and private research funding allocated to organic farming during the last 50 years, the results of such evaluations inevitably are long lists. Although organic farming benefits from basic and conventional research (e.g. resistance breeding, soil ecology, agri-environmental research, bio control etc.) most practical solutions suitable for integrated pest management or conventional farming can not be applied to the organic system.

Several factors have recently accelerated the need for research. The **growth of organic farms** has led to a diversification of production and of farm enterprises. Whereas in the past the main products were easy to produce under the restrictions of organic agriculture (milk, beef, wheat, selected vegetables), today products which pose challenges to the organic producers such as fruit, wine, difficult vegetables, oil-seeds, root crops and non-ruminants like poultry and pigs have become progressively more important. The **increasing marketing possibilities**, now mainly via conventional supermarkets, are leading to a further acceleration of the demand for foods which are difficult to produce in close cycles and which depend on various inputs. Conventional retailers look for perfect appearance, high extrinsic quality, a constant daily supply and deliveries all year round. A third factor worth mentioning are **the increasingly strict EU standards**, especially in animal husbandry.

It can therefore be anticipated that future research will strongly concentrate on the direct regulation of phyto-sanitarian and veterinary problems and on affordable inputs into organic plant and animal production which comply with the organic standards (fertilisers, substrata, pesticides, fodder, feed additives etc.). A positive effect of this will be the replacement of problematic agents like copper. Scientists will also develop alternative therapies to antibiotics and anthelmintics for major animal diseases, both of which are very problematical from a human toxicological or ecotoxicological point of view.

On the other hand, systems-oriented research, which aims towards the prevention of acute problems, must be intensified; otherwise, the basic principles organic farming would be distorted. Therefore, it will become crucial to develop self-sufficient and self-regulating production systems for horticultural crops such as fruit, wine, vegetables, herbs and berries as well as for glasshouse production; and to better integrate non-ruminants into arable farms.

Consumer preferences have been shifting from fresh or dry products towards convenience foods. To differentiate between suitable and unsuitable processing and storage techniques with regard to organic standards, more research must focus on the quality issue.

Finally, organic farming researchers must protect the genetic resources necessary for plant and animal production and for food processing.

#### 5 References

- ADAS: A Review of Current Research on Organic Farming. ADAS Newcastle, 2000  
<http://www.adas.co.uk/organic>
- Bellon, S., Y. Gautronneau, G. Riba, I. Savini et B. Sylvander: L'agriculture biologique et l'INRA. Vers un programme de recherche. INRA, 1999 <http://www.inra.fr/Internet/Directions/DIC/ACTUALITES/-Agribio/Agribio.htm>
- European Network for Scientific Research Co-ordination in Organic Farming, 1999: ENOF White Book. Barcelona, 1999, <http://www.cid.csic.es/enof/whitebook.htm>
- Hoeoek, Karin / Swedish Council for Forestry and Agricultural Research: Ecological Agriculture and Horticulture, 1997: Research in Seven European Countries. Stockholm, October 1997
- Krell, Rainer / FAO (ed.): Biological Farming Research in Europe. REU Technical Series No. 54. FAO Regional Office for Europe, Rome, 1997

- Lampkin, Nic, Carolyn Foster, Susanne Padel and Peter Midmore: The Policy and Regulatory Environment for Organic Farming in Europe. Organic Farming in Europe: Economics and Policy, Volumes 1 & 2. University of Hohenheim, Stuttgart-Hohenheim, 1999
- Niggli, U. and Lockeretz, W.: Development of Research in Organic Agriculture. In: Oestergaard, (Ed.): Fundamentals of Organic Agriculture. IFOAM, Tholey-Theley, 1996, pp. 9-23.
- Niggli, Urs: Research in Organic Farming in Europe - Priorities and Needs. Paper held at the EU Conference in Baden nr. Vienna, 27./28.5.1999
- Padel, Susanne: Research in Organic Agriculture in Europe. In: Lampkin, Nicolas, Carolyn Foster, Susanne Padel and Peter Midmore: The Policy and Regulatory Environment for Organic Farming in Europe. Organic farming in Europe: Economics and Policy, Vol. 1, University of Hohenheim, Stuttgart-Hohenheim, 1999
- Willer, Helga and Uli Zenger: Demand for Research and Development in Organic Farming in Europe. Paper held at the FAO workshop on Research Methodologies in Organic Agriculture at the Research Institute of Organic Agriculture (FiBL) in Frick, Switzerland, 30.9.1998-3.10.1998. Updated version, January 1999