

DEMAND OF RESEARCH AND DEVELOPMENT IN ORGANIC FARMING IN EUROPE

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ABSTRACT

This paper gives an overview of the state of research and extension in the countries of the EU and EFTA and a more detailed view of the situation in the German language region, including information on the transfer of research results into agricultural practice, the transfer of the needs of agricultural practice to research and the state of applied research. The International Federation of Organic Agriculture Movements (IFOAM) and its regional groups in Europe and their activities; needs in organic farming research from an IFOAM regional perspective, as well as European research networks are described. For this paper a number of sources were used: Input came from the IFOAM regional groups as well as from experts on organic agriculture in the countries of Europe. For the situation in the German language region a survey was conducted among organic advisers and inspectors.

ORGANIC FARMING IN EUROPE

Organic agriculture has developed at a very fast rate in Europe in the past 10 to 15 years. According to a survey conducted by Stiftung Ökologie and Landbau in 1999, 2.3 million hectares were managed organically by 92 646 farms in the member states of the European Union and the European Free Trade Association. This constituted 1.64 percent of the agricultural land and 1.18 percent of the farms (preliminary figures). There are however, substantial differences between the countries: In Austria 10.1 percent of the area is organic and in Liechtenstein it is even 17.7 percent. Portugal on the other hand only has 0.6 percent.

The reasons for success of organic farming in the individual countries of Europe are various, depending on the level of individual farm support, the existence of a state or a common logo, the existence of an action plan, the availability of organic products, consumer education, information for farmers/existence of an advisory service and the funding of research and research institutions.

Table 1. Organic Agriculture in the EU and EFTA-countries: Land under organic management 1999 (hectares) - Preliminary figures¹⁰

Source: Lampkin (in Höök 1997) and Stiftung Ökologie and Landbau 1999 (survey conducted in January 1999; various sources)

Country	Hectares 1985	Hectares 1999	% 1998
Austria	6 300	345 375	10.09
Belgium	500	6 418	0.48
Denmark	4 340	98 120	3.60
Finland	1 000	127 233	5.90
France	45 000	120 241	0.40
Germany	29 100	357 715	2.10
Greece	0	10 200	0.20
Ireland	1 000	23 591	0.53
Island	0	119	0.01
Italy	5 000	564 913	3.18
Liechtenstein	0	620	17.70
Luxembourg	350	678	0.50
Netherlands	2 450	19 300	0.90
Norway	280	15 581	1.50
Portugal	200	24 902	0.60
Spain	2 140	269 465	1.10
Sweden	4 500	127 000	3.70
Switzerland	3 000	78 369	7.30
United Kingdom	6 000	106 829	0.70
EU + EFTA	111 160	2 298 689	1.64

RESEARCH AND EXTENSION IN THE COUNTRIES OF THE EU AND EFTA

An overview of research institutions, research projects, research needs and the advisory service in the countries of the EU and EFTA is given in the table attached. The information given in this table was supplied by experts on organic agriculture in the countries of Europe. This chapter summarizes the contents of the table.

Research Institutions

Research in organic agriculture is currently conducted in almost all countries of Europe. The amount of on-going research is highest in Scandinavia and the German speaking regions of Europe. It takes place in private institutions but also at university institutes and research stations, some of which dedicate all their activities to organic agriculture. In several countries research in ecological agriculture originated at independent institutes like FiBL (CH), Elm Farm Research Centre (GB) or Ludwig-Boltzmann-Institute (A).

Especially in the German language region and in Scandinavia research and teaching in organic farming is being carried out at a large number of research stations, universities, etc. In Austria, Denmark, Germany and The Netherlands for instance, universities have founded university departments for the study of ecological agriculture. Many universities,

¹⁰ Official statistical figures may be obtained from Dr. Nicolas Lampkin, University College of Wales

institutes and research centres have facilitated research in ecological agriculture by making land and even entire farms available to researchers. The university of Kassel-Witzenhausen now has access to a 320 hectare farm, which should be the biggest trial farm in Europe.

In Southern Europe as well as in Central and Eastern Europe, research activities often depend on individuals. Money used for organic farming research was often allocated originally for other research fields (integrated farming).

An overview of research institutions dedicated to organic agriculture can be obtained via www.soel.de/infos/adressen/research.htm

Funding

In some countries research is mainly funded by the government; sometimes quite substantially. This applies to state research institutions, universities as well as private research institutes. The latter often carry out projects which are to a large extent funded by the state or by the EU. In some countries supermarkets play an increasingly important role in funding organic farming research related to quality, storage and processing. In Southern Europe little money is allocated specifically for organic agriculture. Researchers use research funds originally intended for other purposes like integrated farming.

Coordination of Research

Coordination of research occurs in some countries: there is the Nordic network, in the German language region every two years a scientific conference takes place. In Italy there is the network of GRAB-IT, in Austria the *Forschungsinitiative Biologischer Landbau (Research initiative organic agriculture)*.

In Denmark and Sweden the state supports Research Centres for Organic Agriculture, which do not only do research but which also have a coordinating function in terms of a dialogue between advisory service, practitioners and research.

Research Fields

Research on organic farming focuses on production issues; i.e. rotations, fertilization, conversion to organic production, mechanical weed control, cultivation techniques and variety material for cereals, potatoes and green-manure crops, handling of manure as well as economic aspects. An overview of research projects that were completed up to 1996 is given by Niggli and Lockeretz (in FAO, 1997); an overview of on-going research worldwide can be obtained via the IFOAM conference proceedings (see list of proceedings at the end of the text).

Research in horticulture and viticulture and other special crops has gained importance in recent years as well as research on animal husbandry. Energy, natural resource management, agricultural ecology, quality, processing, market issues, political aspects, regional conversion, legislation are other issues.

Research Needs

In several countries work is being conducted to identify specific areas where knowledge is lacking and future research is needed (e.g. Austria, Ireland, Sweden). Areas with increased research priorities are energy supply and management of natural resources, animal husbandry and health, agro-ecology, biodiversity, marketing, processing, quality assessment techniques, social and environmental impact of conversion to organic agriculture, how to keep plant breeding, organic production and processing free from genetic engineering.

Often research results from the core of Europe cannot be transferred to other climatic regions. This applies for example to the Mediterranean countries, where a lot of research on production techniques is still needed. In Ireland for instance organic farmers have problems with fluke and worms in their herds, research on this is urgently needed. Iceland needs more information on nitrogen fixation and supply of organic fertilizers under Icelandic conditions.

Advisory Service

The advisory service plays an important role in the transfer of scientific results into agricultural practice, ideally it should be the link between practice and research. The organic advisory service is quite well developed in the German language region and in the Nordic countries. Here the advisory service is partly integrated into the conventional advisory service. Most development in terms of advisory service is needed in the countries of Southern Europe: where only a few advisers are available and are mainly private consulting firms or advice through seminars of the producers organizations or exchange between farmers. A good overview of the organic advisory service in some countries in the European Union is given by Ferester and Gruber (1998).

Transfer

The transfer of research results into agricultural practice or of the needs of practitioners into research is organized in very few countries only. Exceptions are the research institute in Switzerland where researchers and advisers cooperate closely, or Norway: here a fixed procedure for the dialogue research, advisers, practice exists. In Iceland the *Organic Science Council* unites farmers, advisers, researchers and ministry officials in order to coordinate needs. In Denmark and Sweden the state funded organic research centres also have a coordinating function.

Networks and Cooperation in Research

Presently at numerous research stations, universities and institutes all over Europe, research on organic agriculture is conducted. There is, however, a need for improvement of the communication between researchers as well as between researchers and practitioners, both at national and transnational level. Networks are a very efficient tool for stimulating research and disseminating results in the scientific community as well as among extensionists, in spite of the fact that many of the requirements are quite site specific (Wynen, 1997, Zanoli, 1997, in FAO, 1997).

The International Federation of Organic Agriculture Movements was originally founded with the aim to coordinate research in organic agriculture and several IFOAM regional groups now exist in Europe. The aims of the groups are various; some of them were founded specifically to coordinate research activities (Nordic group, Mediterranean group). The IFOAM regional formations are briefly introduced with their respective research situations and perspectives.

Several research networks exist which are funded by the EU.

RESEARCH AND APPLIED RESEARCH ON ORGANIC FARMING IN THE GERMAN LANGUAGE REGION

Research Situation in the German Language Region

Research on organic farming in the German language is conducted at a number of institutions. Some of these dedicate all their activities to organic agriculture. Many other research institutions carry out research on specific questions of organic agriculture, even if

their main activities are related to general agriculture (state research stations, various university institutes).

Every two years a scientific conference ("Wissenschaftstagung"; Zerger, 1993; Dewes, 1995, Köpke, 1997) takes place where researchers from the German language region meet.

In order to find out whether research carried out at these institutions was relevant to the needs of agricultural practice, a survey was conducted among the organic advisers and inspectors in the German language region in the summer of 1998, for they should know best what the expectations and needs of the agricultural practice are. The questionnaire was returned by 25 percent of the 214 organic advisers and 50 inspectors.

Recent Research Results and their Use for Agricultural Practice

The advisers were asked which research results had been taken up successfully by agricultural practice in recent years. Among the answers were:

- variety trials;
- cultivation trials;
- nitrogen conservation after legume cultivation;
- weed control techniques;
- organic fertilizers;
- development of animal friendly husbandry and stable systems.

When analysing these answers it becomes clear that a part of these innovations (e.g. weed control techniques, new cultivation techniques for winter wheat, development of crop protection agents) were developed by agricultural practice and not by scientific research. If this is taken into consideration, university and other state funded research on organic agriculture has not been very successful so far. Some of the respondents were of the opinion that so far no scientific research results had been transferred successfully into agricultural practice.

Research Needs

The next question was in which areas research is needed. Numerous potential research fields were named; the most important were:

- weed control especially in root weeds like thistles;
- potato blight control without copper agents;
- various pests and crop protection techniques;
- strategies for quality cereal production.

Other subjects were:

- weed control;
- plant breeding and seed variety conservation without genetic engineering techniques;
- animal breeding according to the needs of organic farms;
- improvement of existing husbandry/stable systems;
- improvement of animal feedstuffs with special consideration of protein plants;
- natural and homeopathic treatments in veterinary medicine.

Sixty per cent of the answers referred to crop production, 24 percent to animal husbandry, 6 percent to economical questions, 4 percent to cultivation techniques and machinery, 4 percent were other answers. It is notable that hardly any need was seen for research relating to the systems approach in organic agriculture.

Information on New Research Results

Another question was how advisers obtain information themselves about new research results in the field of organic agriculture. Apart from direct contacts to research institutions, mainly specialized magazines were named (both conventional and organic). Other sources of information are the exchange with colleagues and the attendance of seminars, conferences, etc. Apart from these classical sources the internet was named as a medium of information. Some of the advisers said that the information was too scattered and that too much time was needed for information retrieval.

Deficiencies in Research

Fifty-five per cent of the respondents saw deficiencies in research whereas only 7 percent saw none. Thirty-eight per cent did not answer this question. The following deficiencies were named:

- difficult access to research results;
- lack of really innovative results;
- lack of relevance to agricultural practice;
- lack of acceptance of new research results by the agricultural practitioners.

Quality of Research

When asked about the quality of applied research, 37 percent of the respondents said that many research results were not relevant to agricultural practice; another 37 percent said that at least parts were useful. Only 20 percent said that research was fully meeting the needs of agricultural practice; 6 percent did not respond to that question. The following reasons for these deficiencies were named:

- too little contact during the planning process and actual carrying-out process of research;
- research projects do not take into account the farm system (too isolated);
- lack of communication with the advisory service;
- marketing questions are not considered sufficiently.

Communication Research - Agricultural Practice

Finally it was asked how the transfer between research and practice could be improved. The advisers called for a more intensive cooperation between research and agricultural practice. The respondents said that for some research projects it could be useful to install an advisory committee of practitioners to accompany such projects. The importance of personal contact between research and agricultural practitioners was mentioned. Some advisers said that it was important for them to have their own research facilities. The existence and further development of demonstration farms and networks of demonstration farms like the *Leitbetriebe* in Germany and the *Pilotbetriebe* in Switzerland was seen as important.

Many advisers called for a central institution which collects relevant research questions, gives an overview of on-going research as well as of research results. It was said that to this end new tools of communication like the internet should be used.

RECOMMENDATIONS

In order to improve the research in Europe (Wynen, 1997 in FAO, 1997) recommends the setting-up of research networks, to install databases, avail of technical consultancies and to publish studies.

To the findings of this paper the following suggestions could be added:

- strengthen existing networks (IFOAM groups, EU networks);
- carry out organic needs studies for all countries;
- improve the dialogue between scientists;
- organize a national and transnational/international dialogue for farmers, advisers and researchers;
- make on-going research and research results available;
- install a central database with research needs, on-going research projects and research results.

REFERENCES

- AKSOY, U. (1998): "Organic Agriculture in the Mediterranean Basin: Present Status and Research Needs" Ege-University, Izmir.
- DEWES, T. UND L. SCHMITT (Hrsg.) (1995): Wege zu dauerfähiger, naturgerechter und sozial-verträglicher Landbewirtschaftung. Beiträge zur 3. Wissenschaftstagung zum Ökologischen Landbau vom 21. bis 23. Februar 1995 an der Christian-Albrechts-Universität zu Kiel. Wissenschaftlicher Fachverlag, Gießen.
- FAO: Biological Farming Research in Europe. REU Technical Series No. 54. FAO Regional Office for Europe, Rome, 1997.
- FAO: Report about the FAO/IFOAM Meeting on organic agriculture in Rome, 19-20 March, Rome 1998.
- FERESTER, S. AND A. GRUBER (1998): Beratungsstrukturen für die biologische Landwirtschaft in Österreich im Vergleich mit ausgewählten europäischen Ländern. = Forschungsauftrag L 1068/97 des Bundesministeriums für Land- und Forstwirtschaft, Wien.
- HÖÖK, K./SWEDISH COUNCIL FOR FORESTRY AND AGRICULTURAL RESEARCH (1997): Ecological Agriculture and Horticulture. Research in Seven European Countries. Stockholm, October 1997.
- IFOAM (1997): IFOAM Basic Standards of Organic Agriculture and Food Processing: (available in English, Spanish and German), US\$10, 15 DM, Tholey-Theley.
- KÖPKE, U. UND J.-A. EISELE (Hrsg.) (1997): Beiträge zur 4. Wissenschaftstagung zum Ökologischen Landbau 3. - 4. März 1997 an der Rheinischen Friedrich-Wilhelms-Universität, Bonn, Verlag Dr. Köster, Berlin ISBN 3-89574-225-2, S.224-230.
- LAMPKIN, N. AND G. WEINSCHENCK (1996): Organic farming and agricultural policy in western Europe. In: Oestergaard, T. (Ed.): Fundamentals of Organic Agriculture. IFOAM, Tholey-Theley, 223-239 pp).
- LINDENTHAL, T., VOGL C.R. AND J. HEß (1996): Forschung im Ökologischen Landbau. Integrale Schwerpunktthemen und Methodikkriterien. Bundesministerium für Land- und Forstwirtschaft Förderungsdienst 2c/1996, Wien.
- MANSVELT, JAN DIECK VAN AND D. J. STOBELAR: Landscape Values in Agriculture: Strategies for the Improvement of Sustainable Production. Based on the first and second proceedings of the EU Concerted Action "The Landscape and Nature Production Capacity of Organic/Sustainable Agriculture" = Special Issue of "Agriculture, Ecosystems and Environment", Vol. 63, Nos 2,3, June 1997. Elsevier Science, P.O. Box 211, NL-1000 AE Amsterdam, Tel.: +31-20-4853757, Fax.: +31-20-4853432
- NIGGLI, U. AND W. LOCKERETZ (1996): Development of research in organic agriculture. In: Oestergaard, T. (Ed.): Fundamentals of Organic Agriculture. IFOAM, Tholey-Theley, 9-23 pp.
- SOLTYSIAK, U. (1997): Organic Agriculture in Central and Eastern Europe. In: Ecology and Farming, No. 14, January/April 1997.

- TYBURSKI, J. (1997): The present state and proposal for future research in the field of organic agriculture in Central and Eastern Europe. In: FAO: Biological Farming Research in Europe. REU Technical Series No. 54. FAO Regional Office for Europe, Rome, 1997.
- WILLER, HELGA (Ed.) (1998): Ökologischer Landbau in Europa: Perspektiven und Berichte aus den Ländern der Europäischen Union und den EFTA-Staaten. Ökologische Konzepte Band 98, Deukalion, Holm.
- WYNEN, ELS VAN: A Framework for Analysis of Organic Farming Contribution to Food Security and Sustainability. Rome, 27 p.
- ZERGER, ULI (Hrsg.) (1993): Forschung im ökologischen Landbau. Beiträge zur Zweiten Wissenschaftstagung im ökologischen Landbau. SÖL-Sonderausgabe Nr. 42, Bad Dürkheim, Bezug: Deukalion Verlag, Postfach 1113 D-25488 Holm.

IFOAM

IFOAM Worldwide

IFOAM represents the worldwide movement of organic agriculture and provides a platform for global exchange and cooperation. IFOAM has more than 690 member organizations in more than 100 countries of the world. IFOAM membership is open to associations of producers, processors, traders and consultants as well as to institutions involved in research and training committed to organic agriculture.

Its magazine "Ecology and Farming" informs IFOAM members of international developments in organic agriculture. "Ökologie and Landbau", the German IFOAM magazine, is published by Stiftung Ökologie and Landbau. Since 1997 it has been published in cooperation with the Swiss Research Institute of Organic Agriculture, FiBL.

Aims and activities of IFOAM are to:

- exchange knowledge and expertise among the members and to inform the public about organic agriculture;
- represent internationally, the organic movement in parliamentary, administrative and policy-making forums (IFOAM has for example consultative status with UNO);
- set and regularly revise the international "IFOAM Basic Standards of Organic Agriculture and Food Processing" (the IFOAM Basic Standards are translated into 18 languages);
- make an international guarantee for organic quality. The IFOAM Accreditation Programme ensures equality of certification programmes worldwide.

Since its beginnings one of IFOAM's main aims has been the coordination of research and the dialogue of agricultural practice-research. The coordination of research was actually the reason why IFOAM was founded in 1972, in Versailles, France. Almost since its beginnings IFOAM has organized, always in cooperation with an organic organization in one country, the IFOAM International Scientific Conference. The first IFOAM International Scientific Conference took place in Sissach, Switzerland in 1977. These conferences reflect the state of organic research agriculture worldwide. The conference proceedings are published by the organizing organization or by IFOAM.

Year	Location	Motto
1. Conference 1977	Sissach, Switzerland	Towards Sustainable Agriculture
2. Conference 1978	Montreal, Canada	Basic Techniques in Ecological Farming
3. Conference 1980	Brussels, Belgium	The Maintenance of Soil Fertility
4. Conference 1982	Boston, USA	Resource-concerning Environmentally Sound Agricultural Alternatives
5. Conference 1984	Kassel, Germany	The Importance of Biological Agriculture in a World of Diminishing Resources
6. Conference 1986	Santa Cruz, USA	Global Perspectives on Agro-ecology and Sustainable Agricultural Systems
7. Conference 1989	Ougadoudou, Burkina Faso	Agricultural Alternatives and nutritional Self Sufficiency
8. Conference 1990	Budapest, Hungary	Socio-economics of Organic Agriculture
9. Conference 1992	Sao Paulo, Brazil	A Key to Sound Development and a Sustainable Environment
10. Conference 1994	Christchurch, New Zealand	People, Ecology, Agriculture
11. Conference 1996	Copenhagen, Denmark	Down to Earth and Further Afield
12. Conference 1998	Mar del Plata, Argentina	Organic Agriculture: Credibility for the 21st Century
13. Conference 2000	Basel, Switzerland	The World Grows Organic

The Research Institute of Organic Agriculture (FiBL) is staging the 13th International Scientific IFOAM Conference from 27-31 August 2000. The motto "The World Grows Organic" indicates the intent of the Conference to explore ways in which organic agriculture can gain global momentum. At the threshold of the new millennium organic agriculture, although it has reached a high level of acceptance, still faces many challenges, which the Conference will address. The Conference is open to everyone interested in organic agriculture and in sustainable development: farmers, scientists, teachers, advisers, processors, manufacturers, retailers, consumers, policy makers, officials, etc. The Conference will include lectures, workshops, posters and panel debates.

IFOAM EU Working Group

The IFOAM EU Working Group was founded in 1990 as part of the IFOAM regionalization process. Each EU country is represented by one person; Norway and Switzerland are observers. The IFOAM EU Group's main activity is to comment on the EU regulation on organic production and is in close contact with EU officials. It is mainly due to the work of the EU Group that the EU regulation is very much in line with the international IFOAM standards.

The Commission of the European Union has asked the IFOAM EU Group to submit its views on the main priorities on research and development for organic food production. This was done in relation to the EU's FAIR5-Projects from 1999. The required list from the IFOAM EU Working Group is meant to serve as a tool for the EU Commission to judge applications for research projects. This list is based on the input of the members of the IFOAM EU Group, on consultation of researchers in organic agriculture as well as on several reports (FAO, 1997, FAO, 1998, Wynen, 1997, Lindenthal *et al.*, 1996).

The research priorities were formulated especially in the light of new developments of the EU Regulation 2091/92. The list covers aspects of crop production, animal husbandry, conversion, development of organic farming, marketing, quality, socio-economic aspects and research methodology; for example the reduction of copper salts, pest and disease control in horticulture and viticulture with regional adaptations, alternatives to chemical medicines, long-term monitoring on pilot farms and impact of EU-regulations on the development of organic farming. The full list is available in Internet under www.greenplanet.net/forum/AgricolturaBiologica//messages/9.html.

IFOAM-Mediterranean Group

Since 1990 the IFOAM members from the Mediterranean area have met and organized the so-called Agrobiomediterraneo conferences, because most research and other activities related to organic farming in Central and Northern Europe were not of relevance to the Mediterranean area. The Mediterranean countries are united by climatic similarities and common crop production patterns. After successive meetings the IFOAM Mediterranean Group was formally established in 1997. Its aims are:

- to find appropriate solutions to the farmers needs;
- research efforts;
- publication of organic research activities;
- exchange of experience.

Since 1997 the Secretariat has been at the Mediterranean Agronomic Institute (IAM) in Bari, Italy. It is one of the four institutes of CIHEAM, an intergovernmental organization founded in 1962. The institutes do research for example, on the use of water in agriculture and on Mediterranean crops. They also coordinate research. The IAM Bari intends to play the same role in organic agriculture.

In the European Mediterranean countries the increase in organic production has been very substantial: e.g. 20-fold in Italy (1990 to 1996) and 10-fold in Turkey (1990 to 1996). Horticultural commodities play a major role in the organic production of the Mediterranean countries. Despite the expansion of the area under organic management and that of the market, systematic research on organic agriculture is still lacking. The review of present research projects shows:

- organic agriculture is still comparatively ignored by general research;
- there is no coherent research strategy;
- there is no analysis of farmers' needs;
- climatic peculiarities sometimes limit the applicability of research results;
- there is an urgent need to carry out multidisciplinary applied research work.

Potential fields of research are among others:

- cover crop and green manure in perennials;
- cultivar selections for drought, salinity resistance, high limestone contents in soils;
- alternatives to copper in plant protection;
- mycorrhiza utilization and N-fixation in arid conditions.

IFOAM Central and Eastern European Initiative

A first meeting of pioneers from several Central and Eastern European countries took place in 1989. After the fall of the totalitarian powers the first producer associations were set up and in 1990 the IFOAM Scientific Conference took place in Budapest.

The IFOAM Central and Eastern European Group represents widely varied agriculture, both in terms of climate conditions (Estonia to Bulgaria) and in terms of the agricultural structure: small peasant farms in Poland (average seven hectares) or Croatia (three hectares) contrast with huge agricultural-industrial enterprises. Environmental pollution is a problem in some areas, due to former extensive and chaotic industrialization. On the other hand there are areas with excellent natural value with relatively low use of chemicals and biodiversity reserves. There is, however, a common element: the political and economical crisis after the fall of the communist regimes. The situation for the farms is difficult for several reasons:

- difficult privatization process of the former state farms;
- low income from agriculture;
- necessity to develop new marketing structures and survival strategies;
- consumers lack significant purchasing power, food expenses range from 30 to 70 percent of a household's income.

Topics for future research in Central and Eastern Europe are according to Tyburski (1997):

- estimation of internalization of environmental costs by organic farmers in order to find out the real cost of food production;
- the role of organic farming for biodiversity and conservation;
- on-farm research;
- research on pesticide residues in food (not only active ingredients but also their by-products);
- work on modern breeding methods without genetic engineering;
- work on choice of appropriate varieties of crops and breeds of animals;
- animal husbandry;
- animal nutrition;
- marketing strategies for organic products;
- policy options.

IFOAM Italian Members Coordination

The Italian IFOAM members coordination works out common positions on IFOAM-issues, EU-regulations, standards and the AgriBioMediterraneo region. IFOAM Italia coordinates the delegates in various committees. The coordination is based on a coordinator and a small office. A web site is available with a discussion forum (reserved to IFOAM Italian members, but it will be available in the near future also for IFOAM-EU and AgriBioMed members) and a newsletter.

Nordic Research Network – Ecological Agriculture

The Nordic countries, especially Denmark, Finland and Sweden have seen a fast increase in organic farms in recent years. They hold, together with Austria and Switzerland, the highest percentages in Europe. In the Nordic countries a “Nordic research network – ecological agriculture” exists (it is not an IFOAM group). Apart from coordinating teaching activities at university level, the Network also develops research, focusing on multidisciplinary research for the development of the organic farming system.

IFOAM German language Group

The IFOAM German Language Group (IFOAM-Regionalgruppe deutschsprachige Länder) has existed as an informal group since 1991. The countries participating: Austria, Germany, Luxembourg and Switzerland are united by the German language, hence its name. The main purpose of the meetings of the regional group is information exchange. This

includes issues of general importance to the organic movement in the region as well as issues related to IFOAM. At the meetings members of IFOAM committees report on their activities. These representatives are invited to the meetings of the regional group. Other important aspects of these meetings are country reports as well as the discussion of topics relevant to the organic movement like genetic engineering or organic seed production. It has not been active in the field of research/coordination of research yet.

Proceedings of the International IFOAM-Conferences

- Conference (Sissach 1977): Besson, Jean-Marc/Vogtmann, Hartmut (Eds.): Towards a Sustainable Agriculture/ Auf dem Wege zur nachhaltigen Landwirtschaft/Vers une agriculture viable, Wirz Verlag, Aarau (Schweiz), 1978, ISBN 3-85983-017-1; out of print /sale.
- Conference (Montreal 1978 and Brussels 1980).
Hill, Stuart/Ott, Pierre (Eds.): 1. part: Basic Techniques in Ecological Farming – Techniques de Base en Agriculture Biologique – Grundsätzliche Verfahren der ökologischen Landwirtschaft – Exposés – Papers – Referate, presented at the 2nd International Conference held by IFOAM, Montreal, 1-5 October 1978.
Le Maintien de la Fertilité des Sols – The Maintenance of Soil Fertility – Die Erhaltung der Bodenfruchtbarkeit – Exposés – Papers – Referate, présentés à la 3^{ème} Conférence internationale organisée par IFOAM, Brussels, du 3 au 5 septembre, 1980.
Birkhäuser Verlag, Basel-Boston-Stuttgart, 1982, 32,- DM, ISBN 3-7643-1374-9 (out of print).
- Conference: (Boston 1982); Lockeretz, William (Ed.): Environmentally Sound Agriculture, 426 pages, US\$37.95 (out of print), Pragger Publishers, 521 Fifth Avenue, New York 10175.
- Conference: (Witzenhausen 1984)
a) German edition.
- Vogtmann, Hartmut, Engelhard Boehncke and Inka Fricke (Eds.): Öko-Landbau - Eine weltweite Notwendigkeit. 352 pages, 19,80 DM, C. F. Müller Verlag, Karlsruhe 1996 (out of print).
- Sambras, Hans Hinrich/Engelhard Boehncke (Eds.), Ökologische Tierhaltung - Theoretische und praktische Grundlagen für die biologische Landwirtschaft 280 Seiten, 19,80 DM, C. F. Müller Verlag, Karlsruhe 1996.
b) English edition
Vogtmann, H. *et al* (Eds.): The Importance of Biological Agriculture in a World of Diminishing Resources., 448 Seiten, 157,- DM, Verlagsgruppe Witzenhausen (Kniegasse 2, 37217 Witzenhausen), Witzenhausen, 1996.
- Conference (Santa Cruz 1986).
Allen, Patricia and Deba van Dusen (Eds.): Global Perspectives on Agroecology and Sustainable Agriculture Systems): IFOAM Proceedings, Agroecology Program, Univ. of California, Santa Cruz CA 95064 USA, 1987, 40 US \$ +2,50 US \$ (postage).
- Conference (Ouagadougou 1989).
Djigma, A., D. Lairon, E. Nikiema and P. Ott: Agricultural alternatives and nutritional self-sufficiency. 430 pages, 36,- DM, Ekopan, Witzenhausen 1991.

French edition: Alternatives agricoles et auto-suffisance alimentaire, 36,- DM.
- Conference (Budapest 1990).
IIFOAM Programme Planning Committee (Ed.): Socio-Economics of Organic Agriculture. IFOAM, Tholey-Theley, 1991, 195 pages, out of print.

- Conference (Sao Paulo 1992)
Köpke, U. and D. G. Schulz: Organic Agriculture, a Key to Sound Development and a Sustainable Environment. IFOAM, Tholey-Theley 1992, 438 pages, 45,- DM
- Conference (Christchurch 1994).
Crabb; Donal, H: People, Ecology, Agriculture. Biological Husbandry Group, Lincoln University, PO-Box 61, Canterbury, New Zealand, 1994. 28 volumes, per volume 5,- NZ \$.
- Conference (Copenhagen 1996).
- Oestergaard, Troels: Proceedings of the 11th international IFOAM Conference: Fundamentals of Organic Agriculture (Vol.1) and New Research in Organic Agriculture (Vol.2), US\$ 26, Swiss Francs 34, DM39 (each volume) of Organic agriculture. IFOAM, Tholey-Theley, 1996, Internet: ecoweb.dk/english/ifoam/conf96/abs224.htm.

Most of the proceedings are available at the IFOAM head office (see also IFOAM's internet page).

IFOAM Addresses

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Research Networks and Research Projects on a European level

In recent years the EU has funded several research networks and research projects in organic farming. Those that are known to the authors of this paper are briefly introduced.

Effects of the CAP-reform and possible further developments on organic farming in the EU

The research project "Effects of the CAP-reform and possible further developments on organic farming in the EU" was commissioned by the EU in order to provide an assessment of the impact of the CAP reform and of possible policy developments in organic farming in the European Community. Five universities and scientific institutions are working for the first time on a complete inventory of organic farming at the European level.

In detail, the project will focus on the economic performance of organic farms and on marketing conditions in the organic sector with respect to all EU member states plus the Czech Republic, Norway and Switzerland. Environmental consequences of organic farming are also considered. The researchers also analyse the impact of the CAP-reform on organic farming in the EU. Several computer simulation programmes are used to assess the further development of organic farming in the EU. This will lead to policy recommendations for the organic sector in Europe.

It is planned to establish an international research network on organic farming in 18 European countries, where the researchers will cooperate with organic farmers, marketing experts, advisers and administration officers. The project started in March 1997 and is financed by the European Commission with an amount of ECU1.13 million for 40 months. Participating institutions are:

- University of Hohenheim, Germany;
- University of Wales, U.K.;
- University of Ancona, Italy;
- South Jutland University Centre, Denmark;
- Federal Agricultural Research Centre Braunschweig-Völkenrode, Germany.

Contact: Prof. Dr Stephan Dabbert (Coordinator), Matthias Stolze (Project manager), Universität Hohenheim, Institut für Landwirtschaftliche Betriebslehre (410A), Schloß, D-70593 Stuttgart, Germany, Tel.: +49-711-459 2543, Fax.: +49 711 459 2555, e-mail: stolze@uni-hohenheim.de, www.uni-hohenheim.de/~i410a/eu_org/fair3/fair3_html

Landscape and Nature Production Capacity of Organic Sustainable Types of Agriculture in the EC

The concerted action "The landscape and nature production capacity of organic sustainable types of agriculture in the EC" (1993-1997) gives clear indications to the EU/CAP for potential and feasible values of environment, nature and landscape and set standards for sound/acceptable styles of agriculture. Targets were to:

- give an overview of the state-of-the-art of agricultural landscape production;
- identify the different patterns of research of those participating in concerted action;
- develop proposals and parameters to comply with disciplinary and regional demands.

Project Director: Mansvelt, Dr J.D. van and D.J. Stobbelaar, Landbouwniversiteit Wageningen, Vakgroep Ecologische Landbouw, Haarweg 333, NL-6709 RZ Wageningen, Tel.: 31-317-483522; Fax.: 31-317-484995; Email: werff@rcl.wau.nl, internet www.agro.wau.nl/eco/Research/Dmt-pr02.htm

DOCEA - Documentation Ecological Agriculture

DOCEA is a concerted action funded by the European Union in which various documentation centres and user-representatives were working on better availability of literature relevant to ecological agriculture. A strategic plan for the future was developed. The DOCEA-Project Phase I ran in the period 1995-1997 and included several workshops. Outputs of DOCEA so far:

- a list of journals documented completely or partly by the participating documentation centres;
- a list of journals on ecological agriculture per European country which the DOCEA group likes to have documented;
- a comparison of the participating databases on overlap and on results obtained for some selected search-questions.

It is now hoped that further EU-funding can be made available for DOCEA II in order to unite existing databases and make them available in the Internet. DOCEA is related to another concerted action on ecological farming, ENOF, which focuses on exchange and knowledge of research projects on ecological agriculture in Europe.

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FERTILIZATION SYSTEMS IN ORGANIC FARMING

Several field experiments have been conducted investigating the long-term effects of different kinds and intensities of fertilization in organic farming systems compared with mineral fertilization. The widest investigations were or still are carried out in Darmstadt (Germany), Oberwil (Switzerland) and Uppsala (Sweden). This concerted action (1995-1997) merged experiences from the long-term field experiments. Five meetings took place, and the results of each were documented in a publication. The participants were:

- Partala Research Station, Juva, Finland;
- Swedish University of Agricultural Sciences, Uppsala, Sweden;
- Royal Veterinary and Agricultural University, Frederiksberg, Denmark;
- Institute of Organic Agriculture, Bonn, Germany;
- Research Institute of Organic Agriculture, Frick, Switzerland;
- Institute for Biodynamic Research, Darmstadt, Germany;
- University of Kassel, Division of Ecological Agriculture, Witzenhausen, Germany.

Contact/Final report available from: Dr Joachim Raupp, Institute for Biodynamic Research, Brandschneise 5, D-64296 Darmstadt, Tel.: +49-6155-842119, Fax.: +49-6155-842125; Raupp@aol.com, Internet: members.aol.com/orgfarming/v1/fersy.html

ENOF

ENOF is the acronym of the European Network for Scientific Research Coordination in Organic Farming. It is funded by the Commission of the European Communities and managed by the Direction General of Agriculture (DG VI). Its main objective is to put in contact and establish collaboration between the institutions working on education, research, experimentation, demonstration or diffusion of organic farming techniques. This includes universities and state and private research centres. It gathers information on organic agriculture and the state-of-the-art of research in this field, in order to identify the priorities and the needs of organic farming. ENOF establishes relationships with similar networks. ENOF has a steering committee with a coordinator and five sub-coordinators, one for each area of research:

- Crop Production and Weed Control;
- Soil Fertility and Environmental Aspects;
- Animal Husbandry, Grassland and Fodder Production;
- Legal and Economical Aspects;
- Crop Protection.

The Network publishes the newsletter NENOF and organizes workshops. The first one took place in Bonn (Germany) in November 1995 ("Land Use and Biodiversity: the Role of Organic Farming"). The second one took place in Barcelona (Spain) in October 1996 ("Steps in the Conversion and Development of Organic Farms"); the third one was held in Ancona (Italy) in June 1997 ("Resource Use in Organic Farming").

Coordinator: Dr Juan Isart, Laboratory of Entomology and Environmental Analysis-Agroecology, Centre of Research and Development (CID), Spanish Council for Scientific Research (CSIC), Jordi Girona 18-26, E-08034 Barcelona, Spain, Tel.: +34-3-4006100; Fax.: +34-3-2045904; e-mail leaam@cid.csic.es, internet www.cid.csic.es/enof

On-Farm Development and Evaluation of Organic Farming Systems: The Role of Livestock and Agroforestry (AIR3-CT93-0852)

An EU-project under AIR3 with five European partners from France, Germany, Greece, Spain and United Kingdom. The Department of Ecological Agriculture of the University of Kassel coordinated the group over a timespan of 42 months. The German contribution to the cooperation resulted in the assessment of plant performance through a series of on-farm trials for the evaluation of plant extracts and a long-term rotational trial for the elaboration of the nutrient management in an organic arable growing system.

Overall Goal

To increase the uptake of organic production in the EC to meet market, environmental, social and production aims.

Objectives

- a) Through on-farm research and farmer participation, increase the potential for organic production in regions where there are limited viable livestock enterprises and/or where it is necessary to protect sensitive Mediterranean environments.
- b) Through detailed study, improve nutrient supply and weed control systems for organic arable crops

Objective A4: Assessment of the role of plant extracts on various crops: Procedure: On-farm trials on plant extracts applied to winter wheat, spring barley, potatoes and red beets

Objective B2: Management of nutrient supply: Procedure: Rotational plots {clover grass, potatoes, winter wheat, spring barley} for the evaluation of the effect of legumes and various off-farm nutrient sources: a) no amendment, b) biogenic waste compost, c) sugar beet vinasse, d) combination of b) and c), applied to grain crops

Summary

Objective A4 (Assessment of the role of plant extracts on various crops) was carried out over three years as on-farm research on fields of organic farms in Northern Hessa (three farms, East of Kassel) and Lower Saxony (two farms, North of Hannover). The extracts were used as foliar applications, twice applied in the early growth development of crops. Test crops were winter and spring wheat, spring barley, potatoes and beet roots. The

plant extracts were provided by the company PLANTGRO, Bensheim and consisted of various species of the botanical family of the Caryophyllaceae; according to specific target plants or groups of plants, the formulation differed (CEREALIN for wheat, HORDENIN for barley, POTANIN for potatoes, VEGETALIN for beetroots).

The summary of all trials resulted in a fairly low efficacy of the different extracts towards improving efficiency for crop yield and quality. The effects on yield were mainly positive. 64 percent of all trials resulted in promoted yields, but the extent was not higher than 6.2 percent for the group of positive differences to the controls and 3.8 percent for the total means of the specific crops. The higher frequency of positive reactions was only reflected in the total mean of spring barley (+3.8 percent over the control) whereas all other means ranged from -0.1 percent to +2.3 percent. Of the quality parameters the influence on the nitrate content of tubers and roots was distinctly higher than on the seed protein content. Ten of 13 trials revealed increased reductions of nitrate in the potato tubers; the total mean of all treatments was 14 percent below the controls. This fact is noticeable, but only true for the potatoes. The nitrophilic beetroots, however, accumulated higher nitrate concentrations in treated plants, especially with increasing N fertilization rates. The total mean exceeded the control by approximately 7 percent.

Objective B2 (Manipulation of N management through crop rotation and additional nitrogenous material) was part of a long-term field trial on stockless organic crop rotation, established at the research farm Neu-Eichenberg of the University of Kassel in 1991. Main topics of the project were effect of rotational structure and N input on the N dynamic and N nutrition, plant development and N losses through nitrate leaching in the soil profile.

The crop rotation was built up by an annual clover grass-crop as set-aside followed by three saleable crops, potatoes, winter wheat (WW) and spring barley (SB). The rotational structure consisted (1) of 50 percent non cereals and 50 percent cereals, (2) of 25 percent leguminous and 75 percent non leguminous crops. Oil mustard and phacelia were grown as catch crops twice, (1) after clover grass and (2) after winter wheat. Four treatments were included: (A) unamended control {in comparison to additional, external N inputs} (B) source separated compost from organic compostable household residues, (C) sugar beet vinasse, a by-product of fermentation processes from the bakery yeast or citric acid production, (D) a combination of (B) and (C). Only the cereals were fertilized by different dosages: (B) 100 kg N/ha to winter wheat and 60 kg N/ha to spring barley, (C) 60 kg N/ha to winter wheat and 40 kg N/ha to the catch crop preceding spring barley, (D) combination of (B) and (C). Each crop of the rotation was annually grown and could be investigated under similar growing conditions. Experimental design (randomized block) and plot size (9 x 15 m) were suited for the use of usual mechanical tools of practical farming.

The main results can be summarized as follows:

The average N fixation capacity for clover grass was assessed at 120 kg N/ha. Due to stress situations through pests and diseases and extreme climatic conditions from 1994 to 1996 there was a range from 20 to 260 kg N/ha.

N nutrition and the length of growing period were the main yield factors of the potatoes. The latter were determined by the planting date and time of potato blight induced decay. The N nutrition was mainly effected by the N accumulation of the preceding set-aside green fallow and by an early soil management till beginning of April, at least three weeks before planting. In unfavourable conditions the retarded N mineralization enabled a yield level of 170 dt/ha (saleable tubers). The mean yield level was found at 270 dt/ha.

Climatic conditions and the N nutrition were the main yield factors of winter wheat. The latter was essentially influenced by the Nmin accumulation after potatoes and nitrate leaching during winter. The average yield level (seeds) was 48 dt/ha (34-64 dt/ha). The protein content did not exceed 10.9 percent.

The yield of spring barley was mainly influenced by the sowing date and the length of growing period. Being sown at the beginning of April the N provision enabled yields to 43 dt/ha, but in two seasons the yield was less 20 dt/ha and the quality for malting purposes insufficient due to unfavourable sowing conditions. Early soil management in February led to better conditions for N mineralization in spring, adequate in time and quantity.

The applied source separated compost to winter wheat and spring barley was found as a very minute N source. Only 6 percent of the total nitrogen was taken up by the seeds. The increase of yield was approximately 5.7 dt/ha. The protein content was unaffected by the fertilization. Of the soil parameters the humus content and the pH value were significantly increased by the low quantity of applied compost. Within the first stage of the rotational project long lasting effects to succeeding crops could not be found.

Sugar beet vinasse was applied within the third year of the rotation: (A) to winter wheat in spring (60 kg N/ha), (B) to the catch crop after winter wheat (40 kg/ha). Of the applied vinasse-N 21 percent was used by the seeds of winter wheat and spring barley. The cereals responded by significant increases of the seed yield [3.7 dt/ha (WW) and 4.3 dt/ha (SB)] and the protein content [+0.4 percent (WW)]. The uptake of other nutrients was also increased due to the higher yields, not due to higher nutrient contents. Influences on soil parameters and succeeding crops (to some degrees) could not be stated.

The combination of both fertilizers led to additive effects, mainly determined by the vinasse efficacy.

The nutrient balance of a stockless rotation is highly dependent on the N fixing capacity of the leguminous set-aside. The average N fixation was estimated as 125 kg N/ha (18 to 263 kg N/ha). The N balance of the four year crop rotation achieved negative differences for all treatments apart from the combined fertilization of compost and vinasse. It ranged from -70 to +88 kg N/ha which corresponds to -18 to +22 kg N/ha/a. These annual figures can be assessed as balanced. Analogous trends were found for the nutrients P, K and Mg ranging between ± 20 kg/ha/a apart from -42 kg/ha/a for potassium in the untreated control.

Towards the development of the soil parameters clear trends could be shown after a period of four years: Vinasse significantly compensated the exhaustive effect of four unfertilized crops on the available soil potassium and caused positive differences between soil data of 1996 and 1992. pH and C were similarly affected by the use of compost. The pH decline was significantly lower and the increase of the C content was significantly higher when compost was applied.

Susceptibility of nitrate leaching below 90 cm could be restricted to the period from end October to end May based on measurements of soil moisture. The average rate of nitrate leaching in the investigated crop rotation was found at 11 kg N/ha. Variations were mainly determined by the precipitation-dependent volumes of seeping water and the different rotational segments. Highest levels of downward movement were measured by 32 kg N/ha in the segment potato-winter wheat whereas all other segments showed negligible extents. Fertilization, regardless type and quantity of fertilizer, had no effect on the nitrate leaching.

The findings of the project have preliminary character with regard to long lasting effects of the organic stockless growing system. But the experimental design enable the assessment that the N provision of stockless, organic crop rotations can mainly rely on a 25 percent clover grass set-aside and in the case of need, on the restricted use of minor quantities of organic fertilizers. In the long-term, balanced nutrient balances should be achievable by such a rotational design.

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REFERENCES

- ANON. (1997): Luonnonmukaisen tuotannon tutkimusohjelma. Maatalouden tutkimuskeskuksen julkaisuja 11. Sarja B. Research programme for organic agriculture. Agricultural Research Centre of Finland.
- BOXEM, HERMAN, VAN (1998): Ökologischer Landbau in Belgien. In: Willer (Ed.), Holm.
- CENTRO DOCUMENTAZIONE AGRICOLTURA SOSTENIBILE NAD CIHEAM: Annuario 1998: Ricerca e Sperimentazione sulla Agricoltura Sostenibile in Italia. I-Cesena.
- FAO (1997): Biological Farming Research in Europe. REU Technical Series No. 54. FAO Regional Office for Europe, Rome, www.fao.org
- HEINONEN, SAMPSA (1998): Ökologischer Landbau in Finnland. In: Willer (Ed.), Holm.
- HÖÖK, KARIN/SWEDISH COUNCIL FOR FORESTRY AND AGRICULTURAL RESEARCH (1997): Ecological Agriculture and Horticulture. Research in Seven European Countries. Stockholm, October 1997.
- LINDENTHAL, T., VOGL C.R., HEß J. (1996): Forschung im Ökologischen Landbau. Integrale Schwerpunktthemen und Methodikkriterien. Bundesministerium für Land- und Forstwirtschaft Förderungsdienst 2c/1996, Wien.
- Niggli, Urs: Ökologischer Landbau in der Schweiz. In: Willer (Ed.), Holm 1998.
- NIGGLI, URS: Organic Agriculture Research, State-of-the-Arts and Future Priorities and comments on the Report of Els Wynen. In: FAO: Biological Farming Research in Europe. REU Technical Series No. 54. FAO Regional Office for Europe, Rome, 1997, www.fao.org
- PICAZOS, JOAN UND ANGELES PARA (1998): Biologische Landwirtschaft in Spanien. In: Willer (Ed.), Holm.
- REYNAUD, MICHEL (1998): Die Situation und das Entwicklungspotential des ökologischen Landbaus in Frankreich. In: Willer (Ed.), Holm.
- STOLTON, SUE (1998): Ökologische Landwirtschaft in Großbritannien. In: Willer (Ed.), Holm.
- TAURIAINEN, J.: Luonnonmukaisen tutkimuksen rahoitus. Alustus Luonnonmukaisen tuotannon tutkimusseminaarissa Jokioisilla 18.3.1998. [Financing of organic production research projects. Paper presented at Research Seminar of Organic Production in Jokioinen, March 18, 1998].
- VOGL, CHRISTIAN, JÜRGEN HEß UND TANJA LOZICZKY (1998): Biologische Landwirtschaft in Österreich. In: Willer (Ed.), Holm.
- WILLER, HELGA (Ed.) (1998): Ökologischer Landbau in Europa. Ökologische Konzepte Band 98, Deukalion, Holm.
- ZANOLI, R. (1998): Ökologischer Landbau in Italien. In: Willer (Ed.), Holm.
- ZIMMERMANN, KARIN L. (1997): Organic Farming Research in The Netherlands and Comments on the report of Els Wynen. In: FAO: Biological farming Research in Europe. REU Technical Series No. 54. FAO Regional Office for Europe, Rome, 1997, www.fao.org

**Research and Extension in Organic Agriculture
in the Countries of the European Union and the European Free Trade Association**

Compiled by Helga Willer, Stiftung Ökologie and Landbau; Germany

Addresses of Research Institutions available at
www.soel.de/infos/adressen/research.htm

77

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
Austria ¹¹	<ul style="list-style-type: none"> • <i>Ludwig-Boltzmann-Institut</i> = independent institute, financed by the city of Vienna • <i>University of Agricultural Sciences in Vienna</i> (BOKU): professorship in organic agriculture at the Institute of Organic Farming • Various research activities at a number of other institutes of the university (see address list) • <i>Institute of Animal Husbandry and Protection of Animal Welfare</i>, University for Veterinary Medicine • Various research activities by NGOs • <i>Institute of</i> 	<ul style="list-style-type: none"> • Seed quality and multiplication of seeds, legal aspects of seed trade • Genetic Engineering and its possible influence and risks to organic farming • Development of material flows and of yields after a regional or national conversion to organic farming; • Renewable resources in Organic Farming (hemp, flax, dyeplants) • Development and evaluation of animal housing systems respecting animal welfare and behaviour • Techniques and engineering in organic farming 	<ul style="list-style-type: none"> • Nutrient recycling for farms and entire regions • Energy efficiency in plant production and livestock husbandry • Renewable resources for energy and industry • Maintenance and enhancement of fertility • Disease prevention in livestock husbandry • Integration of livestock husbandry and plant production • Economic, social and policy prerequisites to promote the development of organic farming • Horticulture • Wine production • Quality assessment 	<ul style="list-style-type: none"> • Organic Producer organizations offer an advisory service to their members • Regional agricultural authorities in various districts offer advice to (organic) farmers in their district. • Agricultural schools which converted to organic farming offer curricula, courses and in some cases advisory service • Federal Ministry for Agriculture offers a curricula in organic farming for agricultural teachers and agricultural advisers. 	<p>Some farmers and organic producers organizations turn to the agricultural university with their questions, but many of the farmers questions (>80 percent) are, however, related to advisory service or literature review and not to scientific research.</p> <p>Scientists from Austria, Switzerland and Germany are frequently invited to courses for organic farmers organized by organic producer organizations in wintertime or to curricula in organic farming for advisers organized by the Ministry for Agriculture.</p>

¹¹Source: Lindenthal, Thomas *et al.* 1996, Vogl, Christian *et al.* 1998, Vogl, Christian, personal comment of 20.8.1998, 26.8.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
	<p><i>Interdisciplinary Research and Continuing Education</i> of the Universities of Innsbruck, Klagenfurt, Vienna</p> <ul style="list-style-type: none"> •Some research by Federal Agencies (<i>Bundesamt für Agrarbiologie; Bundesanstalt für alpenländische Landwirtschaft</i>) <p>Coordination of Research by the <i>Forschungsinitiative Biologischer Landbau</i> Research funded by various ministries at a federal level</p>	<ul style="list-style-type: none"> •Alternative energy (solar- and wind energy, biogas, ...) •Treatment of manure to reduce losses of nutrients •Economical aspects of organic farming at farm and community level •Development of the animal needs index (TGI) •Product quality of organic products 			Several research projects were developed in close collaboration between scientists and organic producer organizations.
Belgium ¹²	Some regional agricultural authorities carry out some research	<ul style="list-style-type: none"> •Wheat varieties •Plant protection and varieties in organic horticulture 		<ul style="list-style-type: none"> •No advisory service •Two demonstration projects under EC-Regulation 2078/92 	
Denmark ¹³	Research in organic agriculture is mainly coordinated by the <i>Danish Research Centre for Organic Farming</i> . The following universities and research institutes are	<p>Danish Organic Research Programme; coordinated by the Research Centre for Organic Farming</p> <ul style="list-style-type: none"> 1. Fundamental and Strategic issues •Farm manure and 	In 1996 the Danish Ministry of Agriculture initiated 33 research projects in organic agriculture. Most of the projects expire in 1999/2000. In discussions on the	In Denmark a two level advisory service exists: <ul style="list-style-type: none"> •Local advisers who are in direct contact with the farmers, and •The Danish agricultural advisory centre that provides information for 	The two level advisory system allows for a fast introduction of research results into agricultural practice and the other way around from farmers to researchers. In 1998 a programme

¹² Source: Boxem, Herman van, 1998

¹³Source: Höök, Karin, 1996, Thomas Vang Jorgensen, personal comment of 15.9.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
	<p>associated: <i>Danish Institute of Agricultural Sciences – Royal Veterinary and Agricultural University - Riso National Laboratory - National Environmental Research Institute - South Jutland University - Roskilde University - The Technical University of Denmark - Alborg University - Institute of Agricultural Economics - Technical College, Slagelse - Danish Pest Infestation Laboratory - Biotechnological Institute, Kolding - The Danish School of Pharmacy - Aarhus University - University of Copenhagen</i></p> <p>Development projects are carried out by the Danish advisory services and by several farmer and trade organizations</p> <p>Research and development primarily state funded, for 1996-</p>	<p>compost; nitrogen fixation, recycling, leaching; soil fertility and treatment</p> <ul style="list-style-type: none"> •Organic Crop rotations for grain production •Plant health, effects of cultivation techniques •Market and consumer surveys •Impact of various strategies in the development and expansion of organic agriculture on society and the environment. <p>2. Applied research/development</p> <ul style="list-style-type: none"> •Black currants and strawberries •Vegetables •Potato quality •Use of legumes for feeding •Weed control •Egg and pork production •Effect of organic farming on domestic animals 	<p>continuation of research in organic agriculture, the following themes have been suggested:</p> <ul style="list-style-type: none"> • Development of plant production systems with focus on regulation •Weeds and pests, accumulation of humus and utilization of nutrients, as well as product quality •Production of green house vegetables •Milk and meat production •Health and welfare in animal husbandry •Environmental issues •Nutrition, quality and health issues •Issues concerning society in general 	<p>the local advisers on all aspects of agricultural advice, on a nation-wide basis.</p> <p>The area that causes most uncertainty among farmers are the rules for organic production. There is a need to clarify the often very complicated rules and to make it clear that it is a dynamic set of rules that changes as our knowledge on the factors involved in organic production changes.</p> <p>Production related issues are organic swine and poultry production. Another challenge is to develop models for cooperation that will overcome the problems of specialization with regards to organic production.</p>	<p>called grass-root research was introduced, under which farmers can get financial support to do semi-research on their own. The programme was introduced because the established organic farmers felt that on-going organic research did not fill their need for information to a satisfactory level.</p>

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
	2000 100 million Danish Crowns (= 13,6 million ECU) allocated to organic farming research				
Finland ¹⁴	<ul style="list-style-type: none"> •Research Station for Ecological Agriculture Partala has a key role in research of organic farming. It is part of Agricultural Research Centre of Finland (ARCF). Research on organic farming also on other research stations of ARCF. In 1997 ARCF had 27 research projects (2,7 mio. ECU= ca. 8 percent of its total budget (ANON 1997). •Ministry of Agriculture and Forestry finances research projects in organic agriculture with 1,5 mio. ECU. In 1998; mainly economic studies (mostly done at Agricultural Economics Research Institute, MTTL) and technology development projects 	<p>Research of organic agriculture in Finland covers practically all aspects of organic production, although emphasis is clearly on plant production. Latest research programme for organic agriculture is from November 1997. The programme includes 39 direct and 38 indirect research projects (ANON, 1997).</p> <ul style="list-style-type: none"> •Natural resources, economy and society •Plant nutrient management •Plant protection, environment and landscape •Food quality •Working methods and agricultural engineering •Organic production of horticultural crops •Animal husbandry in 	Research is split into many small projects. In the future there should be more coordination	<p>Advisory service for organic farming is coordinated and developed by the Union of Rural Advisory Centres.</p> <p>Practical advisory work is run by 20 regional advisory centres, which have about 50 advisers specialized in organic farming, usually in plant production. About 18 of the advisers are employed full time on organic farming.</p>	

¹⁴Source: Heinonen, Sampsa 1998, and Sampsa Heinonen, M.Sc. (Agr.), Plant Production Inspection Centre, personal comment of 31.8.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
	<p>(mostly done at Institute of Agricultural Engineering (VAKOLA) of ARCF (TAURIAINEN 1998).</p> <ul style="list-style-type: none"> •Universities of Helsinki and Joensuu •National Food Expertise Centres, especially EKONEUM in Mikkeli; research and product development projects. • Many research and development target 5b-projects financed by regional Employment and Economic Development Centres 	<p>organic agriculture</p> <ul style="list-style-type: none"> •Plant breeding, seed production and selection of varieties •Food processing, storage and distribution of food for quality and sustainability 			
France ¹⁵	<ul style="list-style-type: none"> •ITAB - <i>Institute Technique de l'Agriculture Biologique</i>: coordination of research in cooperation with research institutes and advisers •ISARA - Institute Supérieur d'Agriculture Rhone-Alpes <p>Organic Farming</p>	<ul style="list-style-type: none"> •Cultivation Systems •Crop Rotations •Fruit, vegetable and wine cultivation (nutrients, weed control, rotation, environmental quality) •Conversion •Grassland •Grain and buckwheat cultivation •Sheep production •Nitrogen mineralization, 	<ul style="list-style-type: none"> •No planning or prioritizing of research in ecological agriculture. 	<ul style="list-style-type: none"> •Conventional Advisory Service •Advisory Service of the organic producer organizations, and the umbrella organization of the producers FNAB 	

¹⁵Source: Höök, Karin 1996 and Reynaud, Michel 1998

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	research takes place at a number of Institutions, like <i>Institute National de Recherche Agronomique</i> , Universities, "écoles nationales", research centres	farm yard manure, composting •Nitrate leaching, water quality •Economic aspects •Quality			
Germany	Professorial Chairs at Universities/colleges •Institute of Organic Agriculture, University of Bonn •Fachgebiet Ökologischer Landbau, Kassel-Witzenhausen •University Gießen •FH Nürtingen •FH Osnabrück Activities at all other agricultural universities and agricultural colleges, also at many research stations and regional agricultural authorities Private Research	•Cultivation systems •Crop production •Vegetable production •Fibre production •Soil cultivation •Nutrient supply •Farm manure •Green manuring •Seed issues •Weed control •Plant protection •Soil biology •Animal husbandry •Animal health index •Market issues •Homeopathic treatment of animals •Energy flows	•Weed control especially in root weeds like thistles •Potato blight control without copper agents •Various pests and crop protection techniques •Strategies for quality cereal production •Plant breeding and seed variety conservation without genetic engineering techniques •Animal breeding according to the needs of organic farms •Improvement of existing husbandry	•State advisers, full time or part time for organic farming •Advisers employed by the producer organizations •Private advisory institutions (Ökoringe) are partly state funded •Private consulting firms Once a year the AGÖL-Beratertagung takes place = meeting of the organic advisers. ¹⁷	•Leitbetriebe = network of demonstration farms in the federal state of Nordrhein-Westfalen •Federal programme for the introduction of innovation into agricultural practice (started in 1998) •SÖL publishes the "Berater-Rundbrief", a quarterly bulletin for organic advisers

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	<p>Institute</p> <ul style="list-style-type: none"> •Institute of Bio-dynamic Research •Research at numerous other private institutions (e.g. SÖL, several institutes involved in organic seed breeding etc.). Research is mainly state funded. <p>Every two years the <i>Scientific Conference on organic agriculture</i> takes place; next conference: Berlin 1999¹⁶</p>		<p>/stable systems</p> <ul style="list-style-type: none"> •Improvement of animal feedstuffs with special consideration of protein plants •Natural and homeopathic treatments in veterinary medicine 		
Greece¹⁸	<ul style="list-style-type: none"> •Research initiatives depending on interested individuals at Research institutions/universities •Some producers do investigations 	<ul style="list-style-type: none"> •Organic fertilizing •Insect management with traps instead of pesticides 	<ul style="list-style-type: none"> •Mediterranean agriculture (olive, vine, almond, fruit trees) •Fertilizing under Mediterranean conditions (green manures, organic substances) •Weed management in annual crops 	<ul style="list-style-type: none"> •2-3 independent advisers •Advice through companies selling inputs •Seminars •Exchange between farmers 	<ul style="list-style-type: none"> •No organized cooperation between researchers and farmers •Exception: Dacus fly management with traps (= research of University) is widely known. Exact Recommendations for use •Some books in preparation describing research results in organic fertilizing. Pest control etc.

¹⁸ Source: Nicolette van der Smissen, Dio, personal comment 11.8.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
Iceland ¹⁹	<ul style="list-style-type: none"> •Agricultural Research Institute Keldnaholt •Hvanneyri Agricultural College •Reygkir Horticultural College 	<ul style="list-style-type: none"> •Legumes under Icelandic conditions •Organic Fertilizers; fishmeal 	<ul style="list-style-type: none"> •Supply and utilization of organic Fertilizers for crop production, including glasshouse growing •Breeding and growing suitable legumes for Icelandic conditions •Control of pests and diseases in crops and animals •Development of suitable machinery and buildings for organic farms 	Farmers Association of Iceland (Baendahöllin) provides basic information about conversion to organic farming, also more specialized information on land cultivation, grazing, livestock breeding etc. on a national basis. Good contacts with organic farmers.	The <i>Organic Science Council</i> , founded in November 1997, links together organic farmers, advisers, researchers, teachers, officials from the Ministry of Agriculture. Discussions on priorities in research and advisory work. Results published in farming journals and included in meetings and conferences on agricultural issues. Mutual exchange of ideas and solutions to problems specific to organic farming.
Ireland ²⁰	<ul style="list-style-type: none"> •Johnstown Castle Research Farm (a national research agency) •Drumcolloogher Community College, Co. Limerick •The Organic Centre (applied research) Limited government funding 	<ul style="list-style-type: none"> •Organic Sheep and cattle production •Economics of organic sheep and cattle husbandry •Organic herb production •Seed compost quality 	An <i>Organic Needs Study</i> was published by the (general) advisory service <i>Teagasc</i> in conjunction with the organic producer associations in 1998. This may result in changes in research. <ul style="list-style-type: none"> •Organic dairy production in an Irish context 	•Currently advice is administered by approved organic Association advisers (1 full, 2 part-time)	It is expected that as a result of the Organic Needs Study monitoring whereby data can be readily transferred by qualified researchers/advisers to organic farmers. Currently little is done in this area.

¹⁹ Source, Dýrmundsson, Olafúr 1998, and personal comment of 19.8.1998

²⁰ Source: Gibney, Noreen 1998 and personal comment of 19.8.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
			<ul style="list-style-type: none"> •How best to address viral and other animal diseases in an organic system •Optimum dosing regime for sheep and cattle and acceptable parasite level at which justification for dosing against should be permitted (fluke and worms). Acceptable parasite levels have to be found for each type of parasite •Protein Sources suitable under Irish production systems •Trials on horticulture to encourage development of horticultural sector 		
Italy ²¹	<ul style="list-style-type: none"> •Research activities at various universities, e.g. the universities of Ancona and Perugia •CIHEAM Bari hosts the Secretariat of the IFOAM Mediterranean Group •Gruppo di Ricerca in Agricoltura Biologica- 	<ul style="list-style-type: none"> •Structural evolution of organic farming in Italy •Competitiveness of organic farming as a whole and of individual products •Organic farming and agro-tourism •Advisory needs of organic farmers 		Advisory Service exists in some regions and is paid for by the regional governments (e.g. Toscana, Emilia Romagna); in other regions some advisers also cover organic farming. Especially in the Southern regions no	<ul style="list-style-type: none"> •Centro die informazione e divulgazione summarizes research results in its magazine <p>Weakest points are lack of research and lack of advisory service, demonstration is quite</p>

²¹ Source: Ecology and Farming, No. 13, September 1996; Zanoli, 1998, Sergio Borgono, AIAB Liguria, personal comment of 19.9.1998

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	Italia (GRAB-IT, Network of Researchers) Only few activities; these are funded by sources originally meant for integrated farming	<ul style="list-style-type: none"> •Marketing strategies •Evaluation of local, national and European legislation An overview of on-going research is given by Centro Documentazione Agricoltura Sostenibile, 1998		advisory service available, here it is to some degree covered by the producer organizations.	well developed.
Liechtenstein ²²	-		<ul style="list-style-type: none"> •Alternative veterinary medicine •Farm yard manure, use on the farm •Horticulture (weed control, fertilization, crop protection) •Low-input-production 	<ul style="list-style-type: none"> •Publications in magazines •Conferences, seminars •Organic advisory magazines •Advice from research stations 	<ul style="list-style-type: none"> •On-farm-trials •Recommendations on the basis of research results •Farms are informed on research results
Luxembourg ²³	-	-	<ul style="list-style-type: none"> •Seed and transplant production •Plant protection •Animal production and husbandry 	Up until recently no organic advisory service; the State now subsidizes an organic advisory service for the two producer organizations	
Netherlands ²⁴	<ul style="list-style-type: none"> •Agricultural University of Wageningen, Faculty of Organic Agriculture •Louis-Bolk Institute (= private research institute) 		<ul style="list-style-type: none"> •Keeping organic agriculture free of genetic engineering •Less developed areas in organic agriculture •See list of IFOAM-EU-Group 	Since 1997 the eight organic advisers have been integrated in the regular system of advisory teams to also transmit their knowledge to the advisers for	In The Netherlands an intensive network exists of advisers, who translate the results of fundamental and applied research to different strategies of farm

²² Source: Büchel, Klaus, personal comment of 1.9.1998

²³ Source: Aendekerck, Raymond, Biolabel, personal comment 11.8.1998

²⁴ Source: Platform Biologische landbouw and Foeding, Haitsma, Jet van, personal comment 10.8.1998; Zimmermann, 1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
	<ul style="list-style-type: none"> •Applied research programmes at almost all research stations 			conventional agriculture.	management, technically as well as economically.
Norway ²⁵	<ul style="list-style-type: none"> •Norwegian Centre for Ecological Agriculture. One consultant employed at the Centre is responsible for the contact with the organic advisory service. <p>More institutions with organic farming as only a part of their research work:</p> <ul style="list-style-type: none"> •The Norwegian Crop Research Institute •Agricultural University of Norway •The Norwegian Agricultural Economics Research Institute <p>Research mainly funded through Ministry of Agriculture and Research Council of Norway, ca. 12 million Norwegian crowns per year (ca 1,5 million ECU)</p>	<ul style="list-style-type: none"> •Feed production •Vegetable production •Plant production •Soil cultivation •Grain and potato cultivation techniques •Management of natural resources •Energy efficiency 	<ul style="list-style-type: none"> •Increase the sustainability in organic farming in the long term regarding sufficient supply of nutrients, animal welfare, bio-diversity, energy use, economy and human welfare. To do this, the present farming systems in Norwegian agriculture has to be improved. This includes: <ul style="list-style-type: none"> •Recycling of nutrients in the society, improvement of fertility of Norwegian soils •Sustainable utilization of outlying field inhabited by wild animals •Find strategies for how different farms can survive economically •Decrease the costs for transport and sales •Create production systems that prevent 	Every farmer is free to become a member in the nearest <i>advisory and extension circle</i> . The board, which is elected by the members, is responsible for employment of one or more advisers, according to the amount of work and economic situation. To find a good basis for advice to the farmers, it is necessary to make plot experiments. The questions for these are declared in a coop between farmers, advisers and researchers. The experiment work is run by the adviser/s. In this way they get first-hand knowledge of the material.	Information is transferred through the organic advisory circles and gatherings with the farmers (16 throughout the country). Procedure: <ol style="list-style-type: none"> 1. Farmer needs answers to questions 2. Adviser helps the farmer to formulate the questions 3. Adviser hands over the questions to the research system. Sometimes the system has its own questions. 4. Questions are put together in local experiments; the local circles perform these experiments. 5. Results are recorded and returned to the research system. They make calculations etc. 6. Researchers make reports, produce papers for local meetings, courses etc.

²⁵ Source: Johnsen, Kaare K., Debio, 1998, and personal comment of 20.8.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
			<p>diseases and parasites on domestic animals and crops and controls weeds.</p> <p>It is of a crucial importance to develop/improve systems to combine the principles for organic agriculture and practical, timesaving ways of working. It is also important to find parameters for suitable/not suitable conditions for organic agriculture. In other words, to find nature's own limits for this way of food production.</p>		<p>7. New answers produce new questions. Some response is also given back to the researchers through direct response from the farmers to the advisers and researchers, through farm studies, and in that farmers and advisers are members of the same boards of various research projects. However, the communication is somewhat arbitrary and could be better developed.</p>
Portugal ²⁶	<p>No institutions working specifically for organic agriculture</p> <ul style="list-style-type: none"> •UTAD (Universidade de Tras-os-Montes e Alto Douro) in North Portugal, two researchers, receives technical support from Wageningen (it was built with grants from the Dutch and 	<ul style="list-style-type: none"> •Comparison of conventionally and organically produced strawberries (Cooperation of a of an organic input firm and the Ministry of Agriculture in Algarve - Patacao in South Portugal) 	<ul style="list-style-type: none"> •Change of mentality and attitude towards organic farming from the sides of the researchers, acceptance of the academics not there yet 	<ul style="list-style-type: none"> •Organic Advisory Service is almost non-existent. Agrobio (producer association) has no advisers. One independent consultant + one input producer give advice •No state activities 	<ul style="list-style-type: none"> •Not much cooperation. •The existing demonstration fields could achieve this goal, but they are essentially visited by schools of the secondary level.

²⁶ Source: Firmino, Ana, personal comment of 23.8.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
	<p>American governments</p> <ul style="list-style-type: none"> •University of Algarve, one researcher •Organic farming benefits mainly from the research in the domain of integrated protection, which is much better accepted at the technical and academic level. 				
Spain ²⁷	<ul style="list-style-type: none"> •No research institutions working specifically for organic agriculture •Private initiatives of scientists, universities, organic associations •Scientific congresses on organic agriculture are organized by <i>Vida Sana</i>, the <i>Spanish Society of Organic Agriculture</i> and the University of Cordoba 			<ul style="list-style-type: none"> •Several private advisory firms •Some producer associations employ advisers •ATAB (<i>Asociación de Técnicos para la Agricultura Biologica</i>) coordinates the organic advisers 	
Sweden ²⁸	<ul style="list-style-type: none"> •Centrum för uthalligt lantbruk/Centre for Sustainable agriculture at the Swedish agricultural University •Biodynamic Research 	<ul style="list-style-type: none"> • Plant Nutrient Flows •Effects of ley as preceding crop •Farm yard manure and soil fertility •Biodynamic Agriculture 	<ul style="list-style-type: none"> •At present a research programme with priorities for research is written 		

²⁷ Source: Picazos, Joan and Angeles Parra, 1998

²⁸ Source, Karin Höök, Personal Comment of 7.8.1998

Country	Research Institutions	Research Fields	Research Needs	Advisory Service	Transfer
	Institute	<ul style="list-style-type: none"> •Agriculture, environment and landscape •Agriculture and rural society 			
Switzerland ²⁹	<ul style="list-style-type: none"> •FiBL (Research Institute of Organic Agriculture) is partly funded by the state, 40 researchers •Various activities at the Eidgenoessische Technische Hochschule (ETH) in Zurich (Swiss Federal Institute of Technology) •Activities at the federal research stations <p>Most research is state funded, some funding through private sources, farmers' associations, supermarkets</p>	<p>FiBL Research on</p> <ul style="list-style-type: none"> •Soil cultivation •Soil fertility, •Plant health, predators •Animal husbandry •Landscape ecology <p>FiBL research is to a high degree applied research</p>	<ul style="list-style-type: none"> •Holistic approach to animal health (integrating breeding/selection, housing/ethology, feeding and alternative veterinary medicine) •technical progress in horticultural crops •development of low input and minimum tillage systems in arable crops •plant breeding without genetic engineering •ecological and socio-economic implications of regional conversion •filling the gap of knowledge on product quality •processing methods of organic food •ecoaudit systems in organic agriculture 	<p>Ca. 40 organic advisers, employed either by FiBL, by the producer organizations or the state, plus part time private advisers.</p> <p>3-4 meetings per year.</p> <p>FiBL now specializes in training for advisers</p> <ul style="list-style-type: none"> •Organic advisers are organized in the "Bio-Berater-Vereinigung". •Magazine: "Bio-Berater-Bulletin" 	<p>Close cooperation of advisers and researchers, as they are all employed or coordinated by FiBL/Bio-Berater-Vereinigung</p>

²⁹ Source: Niggli, Urs 1997, 1998

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United Kingdom ³⁰	<p>Private Research Institutes (Government and EU support for research projects)</p> <ul style="list-style-type: none"> • <i>Elm Farm Research Centre (EFRC)</i> • Henry Doubleday Research Association (HDRA) <p>Research Activities at the Universities</p> <ul style="list-style-type: none"> • SAC Organic Farming Centre with three research farms • Aberystwyth, Aberdeen: Organic Agriculture Research Centre, Reading <p>Most research funded by the British Ministry of agriculture; 1997: 1,17 million pounds (1,7 million ECU), but also by producers and supermarkets</p>	<ul style="list-style-type: none"> • Agricultural weed control • Horticultural weed control • Plant propagation • Perennial weed control • Parasites in livestock • Nutrient transfer: manure-plants • Seedborne and seedling diseases • Nutrients from permanent fertilizers: supply and availability • At SAC: Nutrient dynamics across the rotation, maintenance of crop health • Conversion process: set-aside and organic rotation, economics of stockless systems, economics of organic poultry production <p>Many research projects in cooperation with environmental organizations</p>		<ul style="list-style-type: none"> • No state advisory service • <i>Organic Advisory Service</i>, run by EFRC since 1985 • <i>Organic Conversion Information Service</i>, funded by MAFF since 1996: Soil Association offers a telephone helpline; EFRC offers free advise • SAC offers advisory/consultancy and education 	<p>Clients of ERFC's advisory service receive <i>Elm Farm Research Bulletin</i> and have access to Elm Farms' research results</p>

³⁰ Source: Stolton, Sue 1998, Elm Farm Research Centre, 1996 in FAO 1997

