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*Analysis of facilities in OFF research in participating countries of CORE Organic*  
 Aija Nykanen and Stefano Galati

## **Analysis of facilities in OFF research in participating countries of CORE Organic**

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## Summary

Report lists the following research facilities: research farms, experimental fields, on-farm studies, networks, animal research facilities, leaching fields and long-term experiments. Other facilities like facilities for laboratory analyses, food processing, greenhouses, climate chambers and growth cabinets are left out from this analysis, because they are seldom exclusively used for OFF research and because their use for OFF research does not require particular characteristics. On the other hand, when required, these facilities can easily be converted to OFF research.

**Research farms** (76 in total) can be found in almost all countries except for Italy and Norway, where lots of research is done on experimental fields and as on-farm research. Most of the farms are used for research on animal and crop husbandry as well as on farming systems. A big number of **experimental fields** are listed for Sweden, Norway, Italy, Switzerland and Denmark. All experiments carried out in these facilities are focused on crop husbandry research. In almost all countries researchers and research bodies have contracts with farmers to carry out **on-farm research** and experiments on their farms. In most countries, contracts are not on a permanent basis. The number and type of farms depends on the actual projects. Most of the on-farm research is committed to animal husbandry and crop husbandry, but in some cases, economical aspects as well as farm nutrient management and soil quality are studied, too. In six countries, more or less permanent **networks** are established among farms and also among research institutes and farms in 6 countries: Sweden, UK, Netherlands, France, Switzerland and Germany.

**Animal research facilities** are situated in 8 countries and they are mainly for dairy cattle research. Sheep and beef cattle research facilities are situated in Norway, Sweden and UK, but there are only a few facilities for Poultry and Pig production research. **Leaching fields** for nutrient leaching research are established only in Nordic countries. Nevertheless, it is likely that, according to the various soil properties and climate characteristics, other methods than leaching fields are utilised in environmental studies, too. All experiments concentrate on different crop rotations and production systems as well as different management techniques and fertilization. **Long-term experiments (LTE)** have been established in all countries, except for Netherlands, where some years ago research projects were organised in three or four year programmes. Most common topics in these trials are: farm nutrient management, crop combinations and interactions and soil quality. Nutrient leaching, composting and manuring as well as food quality are studied, too. In some cases, data for economic analysis are collected or calculated as well.

## 1. Introduction

Work package 4 'Coordination of existing research and integration of knowledge' of CORE Organic project has produced this report as a part of its deliverables. Report is based on the information given in the Country Reports (section 5. Research facilities) and other documents made by participating countries of CORE Organic project. This information concerning the research facilities in each country is reported in the documents attached at the end of this report (see below "Annexes"). Codes (FI6, AT1...) in the text of this document refer to the given facility of certain country. They have been prepared with the help of the persons responsible for WP4 in each country. Thanks of the authors of this report are due to all of them.

## 2. Definitions of facilities

Research facilities were categorised according to definitions listed below:

- **Research farms:** Farms, which have been certified as organic farms, also herds, if existing. Some data are collected regularly. A certain part of the farm can be in conventional farming, if comparison with organic farming is done. These farms may belong to an institute or they can be private farms with research contracts.
- **Experimental fields:** Certain area or part of the fields in research institute is under organic farming and OFF field experiments can be done there.
- **On-farm studies:** Research institutes do on-farm experiments with private farms and the cooperation is based on contracts between farms and institutes.
- **Networks:** A farm network is a group of farms where data are collected or similar experiments are carried out and information is disseminated among farmers, researchers and advisors.
- **Animal research facilities:** Facilities for animal feeding, behaviour, etc. experiments.
- **Leaching fields:** Experimental plots where drainage and/or surface runoff is collected and measured.
- **Long-term experiments:** Experiments or research are planned and set up with the main aim to carry out research activities which need long term monitoring and research activities to get results. Facilities where experiments last for more than 5 years were considered with particular emphasis.

During the WP4 group meeting held in Florence in March 2006, it was decided that facilities for laboratory analyses, food processing, greenhouses, climate chambers and growth cabinets are excluded from this analysis, because they are seldom exclusively used for OFF research and because their use for OFF research does not require particular characteristics. On the other hand, when required, these facilities can easily be converted to OFF research.

Food quality issues and facilities devoted to this kind of research can be found in FQH – web pages International Research Association for Organic Food Quality and Health, <http://www.organicfqhresearch.org>.

All the facilities mentioned in the national Country Reports were classified under research subject areas according to the research area in which they are used. The subject areas used here are the same as listed the Organic E-prints database ([www.orgprints.org](http://www.orgprints.org)). Many facilities fall within several subject areas.

A synthesis of the information is given in the “Facilities overview table” attached to this report (see below “Annexes”). Codes in this text (for example SE1, NL2) refer to the actual facilities of that country described in the documents in the Annexes.

### **3. Results of analysis**

#### **3.1 Research farms**

Research farms (76 in total) can be found in almost all countries except for IT and NO, where facilities fulfilling the criteria defined above could not be identified. There are 2-4 research farms in DK, FI and AT each, 8 farms in FR, GE and CH each, and more than 10 in the UK, NL and SE. Most of the farms are used for research on Animal and Crop husbandry. Almost all Animal production systems are represented with the exception of Aquaculture (no facilities identified) and Beekeeping. As far as Crop husbandry is concerned, research farms are mainly used for research on Cereals, pulses and oilseeds as well as Pasture and forage crops. Fewer farms are used for research on Root crops (GE1, GE2, SE1, SE3, SE5) and Vegetables (CH11, FR5, GE2, NL6, NL7, NL8, NL9, NL10, NL12, SE3, SE4, SE12, SE15, UK7, UK13). Only few farms deal with Fruit and Berries (CH12, UK6), Olives (CH13) and Ornamental crops (NL5, NL12).

Research farms are also utilised for research on Farming systems, mainly Nutrient management (AT3, FI1, FI2, FR4, FR6, SE2, SE3, SE8, SE9, SE12, UK24) and, to a lesser extent, on Buildings and machinery (FR7, FR8, NL4) and Farm economics (FR1, NL4, UK24). Crop combinations and interactions (FI1, FI2, FI3, FR3, SE2, SE3, SE8, SE11, SE13, SE14, SE15, SE16) as well as Breeding, genetics and propagation (CH11, CH12, CH13, FR5, FR6, GE1, SE1, SE2, SE5, SE6, SE15, SE16, variety trials) are studied, too. On some farms, data related to Environmental aspects are collected (FR1, FR3). Some farms concentrate on Product quality (SE2, UK24), Soil quality (FR6, SE7, SE8, SE9, SE10, SE15, UK24) and Systems research (FR1, NL9, SE2, SE8, SE13, SE15).

#### **3.2 Experimental fields**

A large number of experimental fields are listed for SE (16), NO (15), IT (10), CH (7) and DK (6). The large number of experimental fields in NO and IT could be explained by the lack of facilities described as research farms. All experiments carried out in these facilities focus on Crop husbandry research. Facilities for Olive research are present only in IT (IT4, IT11) and for Viticulture research in CH and AT (CH32, CH41, AT4). Experimental fields for Root crops (DK5, DK6, SE1, SE3, SE5, included in crop rotations) and Vegetables (DK4, NO1, SE3, SE4, SE12, SE15) are found in NO, DK and SE. Fruit and berries are studied on experimental fields in several countries (AT4, CH34, DK4, IT1, IT5, IT6, IT10, NO7, NO8). Soil tillage (DK4, NO4, NO9), Manuring and composting (DK4, DK5, DK6, DK7, SE12) and Weed management (DK3, NO4, NO9, SE7, SE10, SE15) are studied in DK, NO and SE; and Crop health in CH, SE and UK (CH31, CH33, CH41, SE7, UK34). Cereals, pulses and oilseeds, Forage and pasture crops as well as Fruit and berries are the most common research topics studied on experimental fields.

#### **3.3 On-farm research**

In almost all countries researchers and research bodies have contracts with farmers to carry out on-farm research and experiments on their farms (AT, CH, DK, FI, FR, IT, NL, NO, SE, UK). In most countries, contracts are not on a permanent basis. The number and type of farms depends on the actual projects. In CH, NL and UK permanent contracts can also be found. Most of the on-farm research is committed to Animal husbandry and Crop

husbandry, but in some cases Economic aspects as well as Farm nutrient management and Soil quality are studied.

### 3.4 Networks

In six countries, different kinds of networks of farms (researchers and advisors can also join) have been established: SE (15), UK (10), NL (5), FR (5), CH (4) and GE (1). Concerning Animal husbandry, there are networks for Beef production in FR10, FR13, FR14 and UK28; for Dairy production in CH46, NL13 and UK8; and for Sheep and Goat production in FR13, FR14, NL15 and UK28. There are no networks in Poultry production and only one in Pig production (UK28). Under Crop husbandry, all sub-subject areas are covered in 1-4 networks per area. Plant breeding (seed production, variety choice, SE24, UK12, UK25, UK30), Weed management (SE24, UK19), Cropping systems (SE24) and Crop health (UK25) are included in networks as well. Other subject areas covered by the networks are: Buildings and machinery (FR10, FR12), Farm economics (CH16, CH29, FR10, FR12, UK18), Social aspects (CH45), Biodiversity on farm scale (SE24) and Nutrient management (UK30). There are no networks on Soil research and only two concerning Environmental aspects (UK9, SE24). In the UK and SE, the networks are especially used for Dissemination and communication activities.

### 3.5 Animal research facilities

Facilities for animal research are situated in AT, CH, DK, FI, GE, NO, SE and UK. In these countries a relatively high number of facilities can be identified. Below, they have been grouped according to the sub-subject areas of research:

- 3 facilities for Beef production (SE6, SE23, UK3),
- 14 facilities for Dairy production in 8 countries in (AT1, CH16, CH26, DK1, FI3, GE1, NO19, SE10, SE18, SE21, SE22, UK24, UK26, UK30)
- 7 facilities for Pig production in 5 countries (AT1, AT2, CH26, DK1, GE1, SE17, SE20),
- 7 facilities for Poultry production in 5 countries (DK5, GE1, GE2, NL4, SE19, UK10, UK27)
- 5 facilities for Sheep production in 4 countries (GE2, NO20, SE22, UK26, UK30).

Facilities for Animal Breeding and genetics and Health and welfare have been described in AT (AT1, AT2) and SE (SE18, SE20, SE21, SE22, SE23), for Buildings and machinery in SE (SE18, SE22, SE23) and UK (UK10, UK26) and for Animal feeding more or less in all of these countries. Pastures for research have been identified with codes CH16, NO19, NO21, SE6, SE17, SE20 and SE21. Milk quality is studied in facilities NO19, SE18, SE21 and SE22; and Certification issues in AT2.

### 3.6 Leaching fields

Leaching fields for nutrient leaching research are established only in the Nordic countries: 5 in DK (DK3, DK4, DK5, DK6, DK9), 2 in FI (FI5, FI6) and SE (SE8, SE9) and 1 in NO (NO16). All experiments concentrate on different crop rotations and production systems (conventional, integrated and organic) as well as different management techniques and fertilization (green manure, solid/liquid manure with different levels, catch crops).

### 3.7 Long-term experiments

Long-term experiments (LTE) have been established in all countries, except for NL, where some years ago research projects were organised in three or four year programmes. No guarantees were given of funding beyond such a period. Research projects had to serve a clearly defined policy interest. The stakeholders in organic farming were given an important voice in defining priorities for research. These factors together made it irrelevant

to invest in long-term experiments. In SE, altogether 10 long-term experiments are running at the moment, in the UK and IT 8 experiments in each, in DK and CH 5 experiments in each, while in other countries there are 1-3 trials/country. Most common topics in these trials are: Farm nutrient management, Crop combinations and interactions and Soil quality. Nutrient leaching, Composting and manuring, Food quality. Nutrient turnover, Variety trials, Weed management and Crop health are included in many experiments and in several countries, too. The Crop production sub-subject areas Cereals, pulses and oilseeds, Forage and pasture crops and Vegetables are studied in several experiments in several countries. Fruits and berries are studied, too.

Table 1. LTEs in participating countries according to research subject areas. The same experiment can be placed under several subject areas.

Subject area	Number of experiments	Countries
Farm nutrient management	23	AT, CH, DK, FI, GE, IT, NO, SE, UK
Crop combinations and interactions	20	DK, FI, FR, IT, SE, UK
Soil quality	13	AT, CH, FI, IT, UK, SE
Nutrient leaching	9	AT, CH, DK, FI, NO, SE
Composting and manuring	9	CH, DK, FI, GE, NO, IT, SE
Food / crop quality	9	CH, FR, IT, NO, SE
Nutrient turnover	6	CH, FR, IT, NO, SE
Breeding (Variety trials)	6	FR, IT, SE, UK
Weed management	6	DK, IT, SE
Crop health	3	FR, IT, SE
Cereals, pulses and oilseeds	26	CH, DK, FI, FR, IT, NO, SE, UK
Forage and pasture crops	17	CH, DK, FI, NO, SE, UK
Vegetables	11	GE, IT, NO, SE, UK
Fruit and berries	2	IT, FR

The comparison of organic and conventional farming has been a research topic in 5 countries (CH, FI, IT, SE, NO). Experiments to study the conversion to organic farming are running in AT, SE and NO.

#### 4. Conclusions

The results obtained in the analysis might suggest, that **research farms** are preferably utilised to improve and modify Production systems at production system level, both in Animal and Crop husbandry. Probably the research farms have been identified as a valuable tool to study the improvement of breeding and cultivation techniques.

On the other hand, it seems that this type of research facility has not been considered as a powerful tool to evaluate environmental, social and economic aspects. In some countries social and economic aspects are studied within farm networks. Environmental aspects are more commonly studied in experimental fields.

Very likely there are political or structural reasons for the existence, or lack, of research farms. Where such farms exist, they have to be filled with activities – crop and animal husbandry is a logical choice. The people who manage those farms will probably not be representative of commercial farmers to study the social or economic aspects.



**Experimental fields** are mainly used in countries where there are no or only a few organic research farms available. These facilities are mainly utilised to carry out research on Crop production systems. In few cases experimental fields are dedicated to Compost and manuring, Weed management, Breeding and genetics, Crop health and protection research. More research could be done on Soil tillage, Weed management and Crop health, as well as Nutrient management especially in stockless farming.

With the exception of Animal husbandry, it seems that research farms and experimental fields are used to carry out research in the same topics, but in different countries. This can be explained by taking into account that experimental fields are valuable tools where crop husbandry research in stockless farming system (or low stocking rate farming systems) is needed. On the other hand, when crop and animal husbandry are both present and linked to each other, research farms are better tools as they allow to carry out integrated activities and research to study interactions and synergies.

On-farm research is done in all countries except in Germany and Italy. Research carried out by this approach covers a wide range of sub-subject areas of Plant and Animal husbandry. On-farm research can be used as a tool for short or long-term monitoring activities. Although this kind of research requires much work, it gives wide and 'true' on-the-spot data from farming practises. This kind of research can give data for comparisons between different countries in transnational research. A wider range of subject areas should be covered by this kind of studies.

**Networks**, more or less permanent, are established among farms as well as among research institutes and farms in 8 countries. In addition to data collection, the networks are a tool for dissemination of research results and communication. In some countries participatory research is used as an important tool to formulate problems, carry out experiments and evaluate results. Transnational research could be done with the collected data. More subject areas (i.e. Food processing, Marketing, Consumer issues, Environmental aspects) could be covered by this type of facilities.

**Animal research facilities** are situated in 8 countries and they are mainly for dairy cattle research. Sheep and Beef cattle research facilities are situated in NO, SE and UK, but there are only a few facilities for Poultry and Pig production research. These facilities could be used internationally, because animal production research, especially animal feeding and breeding studies, are quite expensive. Animal behaviour and Health research as well as simple Feeding experiments can also be partly carried out on farms.

**Leaching fields** are situated in the Nordic countries. Comparison of different Manures and Crop rotations has been the main focus. The treatments in these experiments could be harmonised to get a wider picture of the results. On the other hand, the change of the set-up and/or the experimental design of these facilities aiming to find answers to new research questions should be taken into account.

The European Commission and public authorities in many participating countries consider the environmental impact of OFF as one of the most important questions (see WP6 analysis) and almost all countries are at present carrying out research projects within this topic (see Research topic analysis). Evaluation of risks of nutrient losses from agricultural systems is one important aspect of the problem. Nevertheless, it is likely that, because of the different soil properties and climate characteristics, the facilities and methodologies utilised may vary greatly among countries, which means that other methods than leaching fields are utilised in environmental studies, too. Probably leaching studies are carried out

in not fully dedicated facilities like experimental fields, research farms and, mainly long term experiments, by other methods like soil samples, suction cups and nutrient balance calculations.

**Long-term experiments** are widespread in almost all farming systems (animal dominated, low stocking rate, stockless systems) and are aimed at carrying out research in a wide range of topics (i.e. improvement of production systems, nutrient management, plant protection, soil and yield quality, environmental impacts). In some cases, data for economic analysis are collected or calculated as well.

As long-term experiments are generally expensive and work consuming, they should be established only if research results and conclusions could not be achieved by using other types of facilities. On the other hand, where LTEs exist, they provide very valuable research material that should be utilised by merging data from various experiments. It should also be considered whether some changes in experimental design may be carried out to facilitate the merging of results.

At the moment there is probably a strong need to start a discussion on the results achieved up to now in the different European LTEs and what roles LTEs should play in the future. The LTE-group of ISOFAR has been formed to carry out this task and future collaboration between the LTE Group and CORE Organic is recommended.

All experiments are more or less field experiments, where data are collected from soil, water and plants. Perhaps LTEs could be done within animal research, like Animal health research, too. Social aspects as well as Economic monitoring could be the focus of LTEs for example via farm networks, if they fulfil the criteria of LTEs. In crop production, only little work is done on Berries and Viticulture and not at all with Olives and Ornamentals and Bulbs. Soil tillage research as well as Environmental aspects other than nutrient leaching could be strengthened.

## Annexes

### Research facilities of Austria

Agricultural research and education centre Raumberg-Gumpenstein Institute for Organic Farming and Biodiversity		
Contact person:	Dr. Andreas Steinwider Altirdning 11 A - 8952 Irdning Phone: +43-3682-22451-400 <a href="mailto:andreas.steinwider@raumberg-gumpenstein.at">andreas.steinwider@raumberg-gumpenstein.at</a> <a href="http://www.raumberg-gumpenstein.at">http://www.raumberg-gumpenstein.at</a>	
Infrastructures AT1	Research farm and animal research facilities: "Moarhof"	The Institute of Organic Farming and Biodiversity is a leading competence centre for research and consultancy on organic farming in Austria. There are resources directly used for applied research, including <u>grassland, dairy cows and other cattle</u> . There are facilities for <u>accommodating cattle and recording their individual intakes, milk yield</u> etc. The experimental and education farm covers 45.3 ha (42 ha grassland, 3.3 ha arable land) <u>30 dairy cows, 20 calves, 15 growing cattle, 40 piglets, 60 pigs, 12 sows</u> . The focus lies on research in organic dairy farming, animal nutrition ( <u>feeding experiments</u> ), <u>preventive animal health, grassland management and organic plant production</u> under harsh climatic conditions. There are possibilities for group feeding and in future also for individual feeding of 30 cows (CALAN-System). Currently in conversion.
AT2	Research farm and animal research facilities:: Research station Wels- Thalheim	The herd of the research station comprises <u>30 sows</u> with piglets. A laboratory for blood examination and microbiology and the gene bank for endangered productive livestock are situated at this research unit. There are possibilities for group and individual feeding of pigs. The focus lies on preventive <u>animal health, animal husbandry (pigs), biodiversity of productive livestock and organic legislative</u> activities. Converted since 2005.
AT3	Research farm: Research station Lambach/Stadl-Paura	18.4 ha (15 ha arable land, 3.4 ha grassland) are available for research work on organic plant production ( <u>cereals, legumes, pasture</u> ) including <u>fertilization, quality measurements</u> , investigations on

		alternative plants, developing of ecologically tolerable methods to minimize the damage caused by <u>diseases</u> and investigations on <u>circuits of nutrients</u> . Currently in conversion.
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Federal College and Office for Viticulture and Pomology		
Contact person:	Dr. Ferdinand Regner Wienerstr. 74 A - 3400 Klosterneuburg Phone: +43-2244-2286-32 <a href="mailto:ferdinand.regner@hblawo.bmlfuw.gv.at">ferdinand.regner@hblawo.bmlfuw.gv.at</a> <a href="http://bundesamt.weinobstklosterneuburg.at/">http://bundesamt.weinobstklosterneuburg.at/</a>	
Infrastructures AT4, AT5	Experimental fields at research and education farm "Agneshof" and "Haschhof"	At the research and education farm "Agneshof" near Vienna 1 ha <u>vineyards</u> are used for different experiments concerning organic viticulture and 2.5 ha <u>fruit plantages</u> (apple, pear, apricot) at the education farm "Haschhof" are used for experiments on pomology.
AT6	Laboratories	The college in Klosterneuburg houses laboratories for chemical, biological and molecular analyses.

University of Natural Resources and Applied Life Sciences Department for Sustainable Agriculture Institute for Organic Farming		
Contact person:	Prof. Dr. Bernhard Freyer Gregor Mendel Straße 33 A - 1180 Wien Phone: +43-1-47654-3750 <a href="mailto:bioland@edv1.boku.ac.at">bioland@edv1.boku.ac.at</a> <a href="http://www.nas.boku.ac.at/oekoland.html">http://www.nas.boku.ac.at/oekoland.html</a>	
Infrastructures AT7	Long-term crop experiment MUBIL"	This long-term field monitoring concerning the development of organic farming is performed at the bio-farm "Rutzendorf" of the BVW GmbH in the Marchfeld and has started 2003. The experimental area covers 142.9 ha cropland (organic since 2003) and provides the basis for the monitoring of the different aspects of conversion to organic farming. A scientific concept for the conversion from conventional farming to organic farming being developed and put into practice. The effects of conversion to organic farming on <u>soil, water, flora and fauna</u> are estimated by specific parameters. The effects of <u>three different organic fertilizer</u>

		<u>regimes</u> on soil properties and crop production are compared. The importance of existing biotope structures (hedge rows, groves, etc.) are characterized, and new biotope structures are planned and laid out.
AT8	Research farm Gross-Enzersdorf	This 26-ha cropland under pannonic climate was converted in 1998. A movable greenhouse (240 m <sup>2</sup> ) is available for crop rotation studies. Cultivation of <u>cereals, oil seeds, legumes.</u>
AT9	Laboratories	A laboratory for analyses of total C and N, mineral nitrogen, N mineralisation, soil microbial biomass, Arginine ammonification and mycorrhizal colonisation is available at the Research farm Groß-Enzersdorf.
AT10	Laboratories	At the University of Natural Resources and Applied Life Sciences Vienna a DOC/TN <sub>b</sub> analyser is available.

### On farm research

AT11. Various experiments of the different research institutions are carried out in cooperation with private organic farmers and agricultural colleges. These are mainly projects concerning crop husbandry and farming-system analyses. The contracts depend on type and duration of the experiments and are not permanent.

## Research facilities of Switzerland

Agroscope Research Stations and FiBL have all facilities required for modern up-to-date research. The relevant facilities are listed for each institution in Tables 1-6.

Table 1: Research facilities of Agroscope Zurich-Reckenholz (ART Reckenholz)

Type	Location/Contact	Further details
CH1. Laboratory	ART Reckenholz	State of the art facilities
CH2. <u>Greenhouses, growth cabinets</u>	ART Reckenholz	State of the art facilities
CH3. Long term field experiment DOC-trial (together with FiBL),	Therwil	Long term replicated field trial (DOK) since 1978
CH4. Organic plots for trials on neighbouring organic farms = Experimental fields	ART Reckenholz	6 ha arable land of 2 neighbouring organic farms for experimentation under organic conditions
CH5. Research farm	Alberswil , Agrovision	Monitoring of organic and integrated farming since 1997
CH6. On-farm studies	On-farm trials on about 25 organic farms	Variety testing and improvement of performance of organic grassland and arable farming

Table 2: Research facilities of Agroscope Wädenswil (ACW Wädenswil)

Type	Location/Contact	Further details
CH7. Laboratory facilities	ACW Wädenswil	state of the art laboratory facilities for pathology, entomology, nematology, microbiology, soil, plant and food related research, state of the art facilities for chemical analysis and molecular biological research
CH8, Facilities for food and beverage processing technology	ACW Wädenswil	state of the art technological facilities for food and beverage processing, microbiological and molecular biological research in beverage processing, experimental distillery
CH9. <u>Greenhouse and Climate chambers</u>	ACW Wädenswil	state of the art greenhouse and climat chamber facilities
CH10. Storage facilities	ACW Wädenswil, Güttingen	state of the art facilities for storage research (climate chambers, controlled atmosphere)
CH11, 12, 13. Research farm	ACW Wädenswil, Wintersingen, Güttingen <a href="mailto:peter.weissenbach@faw.admin.ch">peter.weissenbach@faw.admin.ch</a>	3 experimental farms for <u>fruit-, vegetable production and viticulture, variety trial</u> facilities, certified weather recordings
CH14. Research farm	ACW Wädenswil <a href="mailto:markus.buenter@faw.admin.ch">markus.buenter@faw.admin.ch</a>	Nuclear stock for <u>virus free</u> plant material, insect free

		growing facilities
CH15. On-farm studies	Various locations all over Switzerland	<u>Variety trials, crop protection</u> experiments, monitoring experiments, long-term research, full factorial trials
CH16. Networks	Various locations all over Switzerland	Farm network for economic research in fruit production

Table 3: Research facilities of Agroscope Liebfeld-Posieux (ALP)

Type	Location/Contact	Further details
CH16. Research farm	Sorens/fredy.schori@alp.admin.ch	140 ha organic farmland, 75 <u>dairy cows</u> , 100 <u>young cattle an heifers</u> ; owner is the Canton of Fribourg; main focus: comparison of different grazing intensities and complementary feeding
CH17. Research farm	Posieux hans.schaer@alp.admin.ch yvo.aeby@alp.admin.ch	67 ha IP (integrated production) farmland, 80 <u>dairy cows (12 fistulated)</u> , <u>suckler herd</u> , 80 <u>sows</u> , 240 <u>weaning, growing and finishing pigs</u> ; <u>sheep</u> ; metabolic cages for cows, sheep and pigs; feed plant; abattoir; automatic feeding systems for the livestock
CH18. Experimental Apiary	ALP Liebfeld peter.gallmann@alp.admin.ch	80-120 organically managed experimental hives, main focus on varroa control as well as European and American Foul Brood
CH19. Experimental cheese plant	ALP Liebfeld susanne.marschnig@alp.admin.ch	Production of 8 experimental cheeses of about 10 kg. Quality control of lactic acid starter. Development of new products.
CH20. Experimental cheese plant	ALP Uetligen martin.anderegg@alp.admin.ch	Production of up to 5 emmental (80-100 kg) each day. Upscaling of the results from the experimental pilot plant Liebfeld. Quality control of lactic acid starter.
CH21. Starter culture production plant	ALP Liebfeld Yves-alain.michel@alp.admin.ch	Production of 31 organic and 14 non organic cultures used in different dairy products for starter, additional, surface or ripening purposes. Production of 100'000 units/year exclusively for Swiss Dairies and cheese factories.
CH22. Experimental Dairy plant	ALP Liebfeld susanne.marschnig@alp.admin.ch	Pilot plant for process technologies (heating, filtration, separation, drying).
CH23. Experimental meat laboratory	Spiez peter.schlatter@abzspiez.ch; pius.eberhard@alp.admin.ch	Education centre for the Swiss meat industry. Pilot plant for meat processing. Co-operation contract for meat research with Agroscope Liebfeld-Posieux.



CH24. Laboratories	ALP Liebefeld bruno.albrecht@alp.admin.ch	State of the art laboratories for chemical, biochemical, microbiological, physical and sensory analyses of milk, dairy products, bee products and auxiliary substances for the dairy industry and bee keeping National reference laboratories for milk, milk products and bee products Accredited test laboratories according to ISO 17025
CH25. Laboratories	ALP Posieux bruno.albrecht@alp.admin.ch	State of the art laboratories for chemical, biochemical, microbiological and GMO analyses of feedstuff Chemical, biochemical, microbiological, physical and sensory analyses of meat Biochemical, clinical and physical analyses of blood and muscles Accredited test laboratories according to ISO 17025

Table 4: Research facilities of Agroscope Tänikon (ART Tänikon)

Type	Location/Contact	Further details
CH26. Research farm	ART Tänikon	Experimental farm for animal-, crop- and Greenland-production, 110 ha, <u>60 cows, 50 sows</u> , for different trials in barn, field and construction
CH27. Test facilities	ART Tänikon	Test bench for tractors and hay storage blower
CH28. Support services	ART Tänikon	Workshops for development of measurement systems and constructions
CH29. Networks	Various locations all over Switzerland	Farm network for <u>economic research</u> . Database of about 3000 accounts closing. On-farm research according to goals of projects (over 50/year)

Table 5: Research facilities of Agroscope Changins (ACW Changins)

Type	Location/Contact	Further details
CH30. Laboratory, field experiments, On-farm studies	ACW Changins and outer locations bernard.jeangros@rac.admin.ch	Expertise in field crops and grassland: plant and reproductive growth, agronomic value and quality of varieties, <u>dairy cattle and mountain grazing systems</u>
CH31. Laboratory, field experiments	ACW Changins and outer locations arnold.schori@rac.admin.ch	Expertise in genetic resources of cultivated plants: <u>biodiversity and genetic resources, disease elimination</u> , healthy plant material propagation, material conservation
CH32. Laboratory, field experiments, on farm research	ACW Changins and Pully, outer locations françois.murisier@rac.admin.ch	Expertise in <u>viticulture</u> : plant and reproductive growth, agronomic value and quality of varieties, vine
CH33. Laboratory, field experiments	ACW Changins and outer locations paul.gugerli@rac.admin.ch	Diagnostic of pests, of fungal, bacterial and virus diseases, <u>plant protection</u>
CH34. Laboratory, field experiments, On-farm studies	ACW Changins and Conthey, outer locations christoph.carlen@rac.admin.ch	Expertise in <u>berries, medicinal plants</u> , greenhouse crops, regional aspects of horticulture and arboriculture: plant and reproductive growth, agronomic value and quality of varieties

Table 6: Research facilities of FiBL

Type	Location/Contact	Further details
CH35. laboratory	FiBL, Frick bruno.nietlispach@fibl.org	state of the art laboratories for plant pathology, entomology and soil, plant and food related research.
CH36. Long-term field experiment	Therwil paul.maeder@fibl.org	long-term replicated field trial comparing <u>farming-systems</u> since 1978, on going (DOK-trial)
CH37. Long-term field experiment	FiBL, Frick alfred.berner@fibl.org	long-term replicated trial comparing effects of <u>soil management, fertilisation systems and biodynamic preparations</u> since 2001, on going
CH38. Long-term field experiment	Walenstadt und Malans alfred.berner@fibl.org	long-term trial comparing <u>compost fertilisation on wine grapes</u> ; since 1996, on going
CH39. Long-term soil monitoring (experiment)	Rheinau contact : paul.maeder@fibl.org	Monitoring of soil parameters during the conversion process of integrated to biodynamic farming
CH40. Research farm	FiBL, Frick Contact: pius.allemann@fibl.org	“FiBL-Hof” 30 ha <u>pasture, arable crops, milk cows, pig-breeding, chicken</u>
CH41. Experimental site (fields)	FiBL, Frick Contact: Franco.Weibel@fibl.org	<u>Viticultural</u> research focussing on <u>plant protection</u> strategies, cultivation techniques, <u>variety testing</u> including microvinification,
CH42. On-farm studies	22 organic farms Contact: <a href="mailto:hansueli.dierauer@fibl.org">hansueli.dierauer@fibl.org</a> <a href="mailto:bernhard.speiser@fibl.org">bernhard.speiser@fibl.org</a>	<u>Variety testing of winter wheat, potatoes and corn</u> demonstration trial, since 1999, on going
CH43. On-farm studies	Remigen contact: franco.weibel@fibl.org	Full factorial long-term trial on <u>apple tree nutrition</u> concepts, since 2000, on going
CH44. On-farm studies	23 on farm locations contact: franco.weibel@fibl.org	Precision trials for <u>fruit tree</u> and grape nursery <u>Variety testing</u> for apples, pears, cherries and plums, precision trials and on farm ring trials Long- term effects of biodynamic <u>wine growing</u> Root stock trial for apple growing Farm net to provide apples for quality research
CH45. Networks	3 regions with each 15-20 organic farms christine.rudmann@fibl.org	Farm network for <u>socioeconomic</u> research and extension, since 2004 on going
CH46. Networks	80 organic dairy farms contact: fritz.heil@fibl.org	<u>Improving udder health of organic dairy cows</u> (Project Pro-Q)

## Research facilities of Denmark

During the first years of DARCOF's existence several organic research facilities were set up to provide opportunities for conducting different projects simultaneously, using the same research fields, herds, etc. As researchers from different research environments cooperate in DARCOF, the use of common facilities may stimulate interdisciplinary collaboration, synergy, and complementary research. All Danish experimental facilities are described in ( <http://www.okoforsk.dk/projekt/iv1/ans.pdf> ). As it appears from table 1, there are in total 14 different experimental units which is suitable for experiments of a range of different topics and/or systems. They are all located at experimental research farms with different kind of specialisation and with access to a large range of more general facilities and laboratories, because they are closely connected to DIAS or KVL's head research centres. Therefore DK has facilities to make experiments to almost any kind of Crop including tomato and cucumbers in greenhouses.

### Research farms

DK1. The organic research station Rugballegaard

At Rugballegaard near Bygholm Research Centre, a research station has been established to investigate organic animal production and the interactions between animal husbandry and crops on a large area of land. Rugballegaard covers an area of 140 hectares, its stock comprising 60 dairy cows, with followers, and about 60 sows, for the production of slaughter pigs. The farm has been authorised for organic farming since 1996, and several new research buildings have been built for the housing of animals. Financing of these facilities is provided by the Danish Institute of Agricultural Sciences (DIAS). Animal research facilities for dairy cows and pigs.

DK2 Research farm at KVL

One of the research farms at the Danish Agricultural University (KVL), Bakkegaarden, is dedicated to organic farming. It has been converted in 1999-2000 and covers about 48 hectares.

### Experimental fields

Organic workshop sites for research, which cover a total of 55 hectares, have been set up at Flakkebjerg, Aarslev and Foulum research centres and at Jyndevad and Askov research stations. These sites have all been managed according to organic principles since 1996 and some were converted as early as 1987. They are principally dedicated to plant production investigations. At these sites it is possible to conduct analytical studies that require different soil types and climatic conditions. Furthermore, a part of the long-term fertiliser trials on Askov, which have been running since 1893, have been converted to organic farming in 1998. Financing of these facilities is provided by DARCOF II (project IV)

DK3. Flakkebjerg Cereal crop rotation, Seed crop rotation, Long-term crop rotation trial, weed trials (leaching field)

DK4. Årslev Vegetable crop rotation (green manure, catch crop), Fruit crops and berries experimental area (soil tillage, manure) (leaching field)

DK5. Foulum Dairy crop rotation, Pig crop rotation Grass/clover experiment Nutrient cycling experiment (slurry/manure), Long-term crop rotation trial, potatoes, cereals (leaching field) (animal research facilities for poultry)

DK6. Jyndevad Cattle crop rotation, Long-term crop rotation trial, (Potatoes, grain quality of oats) (leaching field)

DK7. Askov Long-term fertilisation experiment (manuring)

DK8. KVL-Taastrup Combined food and energy production, Dairy crop rotation (soil tillage, weed control, farming system)

DK9. Holeby Long-term crop rotation trial (leaching field)

### **Animal research facilities**

DK1. There is a organic experimental dairy herd of 60 dairy cow and 60 sows and their offspring at RUG for livestock research.

DK5. There is facility to poultry research at Foulum, but due to lack of research money this is not in function at the moment.

### **Leaching fields**

There are permanent facilities for nutrient leaching measurements at the units: DK3, DK4, DK5, DK6 and DK9.

### **Long-term experiments**

Crop rotation trials (DK 3, DK5, DK6, DK9)

Long-term organic crop rotation trials have been performed since 1996 on four locations: Jyndevad, Foulum, Flakkebjerg and Holeby. The crop rotations have different proportions of legumes, cereals, and catch crops. They are carried out on different soil types and with different levels of manure. The aim of these trials is to investigate how the type of rotation affects yields, nutrient balances, weed and disease problems, and soil fertility. Financing of these facilities is provided by DARCOF II (project IV)

Fertilisation trial (DK7)

A part of the long-term fertiliser trials on Askov, which have been running since 1893, have been converted to organic farming in 1998. (Slurry, solid manure)

### **On-farm studies (DK10)**

Agreements have been drawn up with private organic farmers who make their farms available for research in relation to different projects. Expenses for farm studies are covered by the individual projects undertaking such activities. There is formalized collaboration with approx 10 dairy/mixed farms, 5 pig farms, 5 poultry farms and 8 arable cropping farms without livestock. Mostly used in the livestock and whole farm analysis. This is however a flexible facility which is fit to the research topic in focus.

### **Networks**

There are no permanent ones in Denmark.

## Research facilities of Finland

In Finland major part of research facilities for research in organic food and farming is dedicated for organic plant production – research fields and leaching fields with different crop rotations and farming practices. One cattle building is used for organic animal production research. One mass spectrometer is available for <sup>15</sup>N-measurements (contact [martti.esala@mtt.fi](mailto:martti.esala@mtt.fi)). Fistulated cows can be used for research on organic production as well (contact: [aila.vanhatalo@helsinki.fi](mailto:aila.vanhatalo@helsinki.fi) )

### Research farms

F11. Partala experimental farm

The fields of Partala experimental farm with an area of 28 hectares (owned by the MTT Agrifood Research Finland) have been under organic farming since 1985. Nowadays they are under crop rotation of organic dairy farming consisting of 2-year-old clover based leys, pulse crops and vetch based green fodder. The soil type is moraine soil and the nutrient status is quite diverse. The farm is situated in Eastern Finland (62° N 27° E). The annual rainfall is about 650 mm, average temperature 3.5°C, growing season 190 days and effective temperature sum 1,250°C. There is also a two hectare spatial field, where lots of chemical, physical and biological parameters as well as quality and quantity of clover based ley have been determined in 105 spots. Nutrient leaching data have also been collected from certain plots.

Contact: Arja Nykänen [arja.nykanen@mtt.fi](mailto:arja.nykanen@mtt.fi)

F12. Stockless organic farm, Kourla

The Organic Research Farm Kourla (owned by the MTT Agrifood Research Finland) is situated in southern Finland (60° N 24° E). The fields of 20 hectares have been under organic farming since 1994. The main soil type is clay soil and crop rotation consists of clover-based leys, vetches, cereals and oil seed hemp. The farm is further developed as a model for stockless organic farming. Planning and book keeping is launched using different programmes. Records of soil fertility are regularly made. The plots are offered to other units for experiments. Detailed research projects are planned yearly.

Contact Winfried Schäfer [winfried.schafer@mtt.fi](mailto:winfried.schafer@mtt.fi)

### Experimental fields

F14. Karila experimental station

The fields of Karila experimental station (owned by the MTT Agrifood Research Finland) have been partly under organic farming since 1995 (4 hectares) and partly since 2001 (5.5 hectares). Nowadays they are under crop rotation of organic dairy farming consisting of 2-year-old clover based leys, pulse crops and vetch based green fodder. Soil type is fine sand. The station is situated in Eastern Finland (61° N 27° E). The annual rainfall is about 650 mm, average temperature 3.1°C (growing season 12.6°C), growing season about 160 days and effective temperature sum 1200°C.

Contact: Harri Huhta [harri.huhta@mtt.fi](mailto:harri.huhta@mtt.fi)

### Animal research facilities

F13. Muuruvesi College and Organic Farm

Muuruvesi Organic Farm (owned by the Savo Vocational College) is situated in Eastern Finland (63° N 28° E). The fields of Muuruvesi farm have been under organic farming partly since 1988 and the whole farm since 1995. The arable area is 145 hectares and the soil type is mainly silt, containing 3-6 per cent organic matter. The crop rotation consists of silage, pasture, hay, oats, barley and peas. The farm has had organic milk production since 1998. There are 60 cows and average milk yield is 9,500 kg/year. A new cowshed

was built in 2001 and now it is possible to make feeding experiments with cows in 2-3 groups. There is also 3,000 m<sup>2</sup> of greenhouse area in the organic production of tomatoes and cucumber and some pepper, honeydew melon and aubergine.

Contact: Arja Taskinen [arja.taskinen@luukku.com](mailto:arja.taskinen@luukku.com) ,  
Jari Nousiainen [jari.nousiainen@sakky.fi](mailto:jari.nousiainen@sakky.fi)

### **Leaching fields and Long-term experiments:**

#### **FI5. Toholampi leaching field**

Toholampi leaching field (owned by the MTT Agrifood Research Finland) is situated in Western Finland (63° N 24° E). The field consists of 16 plots of 0.16 ha each. The soil type is fine sand, with 5 per cent organic C in the plough layer. There has been an experimental setup with organic and conventional crop rotations since 1997. Plots are sub-drained and water is collected separately from each plot to the observation building, where the volume of water is measured and flow-weighted water samples for analyses are taken manually. Surface water is also collected and measured.

Contact: Eila Turtola [eila.turtola@mtt.fi](mailto:eila.turtola@mtt.fi)

#### **FI6. Yöni leaching field**

Yöni leaching field (owned by the MTT Agrifood Research Finland) is situated in South-western Finland (60° N 23° E). The soil type of the field is clay, with 4 per cent of organic C in the plough layer. There are 6 plots, 0.5 hectares each. Two plots have been under organic farming since 1993, two plots are under conventional farming and two plots are under natural grassland. The volume of the water from drainage pipes of each plot is measured automatically and flow-weighted water samples are taken by hand. Surface runoff is conducted to the same measurement system so that the runoff represents the total runoff from the plots. There are 4 other plots under organic and 4 plots under conventional farming, but the drainage system does not allow the measurement of runoff from these plots.

Contact: Eila Turtola [eila.turtola@mtt.fi](mailto:eila.turtola@mtt.fi)

### **On-farm studies**

FI7. Various experiments of the different research institutes are carried out in cooperation with private organic farms. These are mainly projects on crop husbandry, animal behaviour and health, farm economy and farming-system analyses. The contracts are not permanent and the duration of the contract and number of farms depend on type and duration of the research projects.

## Research facilities of France

### Research farms

FR1. The Farm of Redon (INRA Centre of Theix; altitude 800m) is converted to Organic Farming since January 2002. There are 200 ewes (Limousine breed) for 320 lambs a year and 30 reed deer. The area used is 90 ha (2,5 for crops). There are shed and barns for sheep but deer stay outside in winter. The research is made with a systemic approach, comparing 2 reproduction systems (1 lambing per year, half spring / all autumn vs 3 lambings in 2 years). The fields studied are about zootechnical performances (reproduction, lamb growing...), fodder production, animal health, economic results, quality of products, environment aspects.

FR2. The farm of Orcival (INRA, Unité Experimentale Les Monts Dore ; altitude between 1000 and 1480m): 14 ha are devoted to Organic Farming experimentation (among 680 ha) with 100 ewes (other 110 dairy cows and 140 suckler cows on conventional farming). The organic research program is devoted to the study of the quality of the products, comparing 50 ewes managed on OF (9ha) to 50 ewes (6,4ha) managed on a conventional way. It was not possible to ask an administrative conversion of the 9 ha used by the organic flock (because of conventional flock compared). This program began in the year 2000. We'll get the main results in the years 2005 and 2006.

FR3. At Mirecourt in the east of France, the INRA organic research farm conducts research on the conception, the management and the evaluation of more sustainable mixed farming systems. The farm covers 225 hectares and its stock comprises 100 dairy cows with followers. 2 different farming systems are studied and the research station operates as 2 model farms: (i) 40 dairy cows on 75 hectares of permanent sward and (ii) 60 dairy cows with 55 hectares of permanent sward and 95 hectares for 2 crop rotations with different proportions of legumes, cereals, temporary sward and catch crops. The objectives of the 2 systems are environmental preservation and independence of the farmer's decision enhancement. (Beginning of the conversion period 2004, end 2007)

FR4. 3 farms devoted to organic sheep production in 3 agriculture schools (3 departments of the Massif Central), with an average 70 ha and 300 ewes. Year of conversion: 2002 (Rocheftort), 1998 (Brioude), 1976 (Saint-Affrique). These farms are associated to the Organic farming sheep production platform at INRA, centre de Theix.

Other project at Brioude (with ENITA ): Permanent pasture organic fertilization in organic farming (9 treatments/ 9ewes)

Farm at Saint Affrique : Demonstration in organic meat sheep and beef cattle finishing system in dry area of South Centre of France (135 ewes, 15 cows)

1 farm in the agricultural college of Tulle-Naves (Correze), (69 ha), 29 cows. Study : Demonstration in organic calf and beef cattle finishing system in Limousin. (with the coordination of the Pole Agriculture Biologique Massif Central) year ?

FR5. 1 farm in the agricultural college of the site of Suscinio Morlaix (Bretagne). 6 ha (among 17ha converted to organic framing since 1995) of this farm is devoted to experimentations conducted by the Platform of InterBioBretagne (inter-professional and regional organization). These experimentations concern screening and evaluation of varieties of vegetables (crucifers, potatoes,...)

FR6. 1 farm in an agricultural college devoted to pedological studies concerning wheat (soft and hard), barley, triticale, corn, sunflower, soy bean, field bean, field pea cultures. This farm is associated to the The Regional (Midi-pyrénées) Center of research and



experimentation in organic farming (CREAB). A part of this farm of 135 ac.(55ha) is converted to organic farming since 1999. The trials are about screening of variety, testing organic manure on soft wheat, testing cropping sequences, studying mechanics of weed controls, characterizing nitrogen remains after leguminous plants, evolution of the fertility of the farm since the beginning in organic farming.

FR7. The farm of Bordes (Indre) gathered ARVALIS-Vegetal Institute and 4 local chambers of agriculture (council organisms for development) in the departments of Indre, Cher, Creuse, Haute-Vienne. This experimental farm is devoted to bovine meat production. The aim of this farm is to work out reliable technical references to securise the technical routes. One of the two fields of the farm was converted to organic farming in 1998. There are about 60 limousines cows on 116 ha. The farm is certified “organic” with the follow-up system, technical and zootechnical performances and trials of fodder associations farming mode.

FR8. The farm of Thorigne (Maine-et-Loire) was initiated in 1998 by the chamber of agriculture of Maine-et-Loire. This experimental farm is devoted to bovine meat production. The aim of this farm is to work out reliable technical references to securise the technical routes. There are 54 ha divided in two sites and 23 limousines cows.

### **On-farm studies**

FR9. monitoring of 4 pairs of private farms (Conventional vs organic). Study: Forage system characteristics and evolutions in organic dairy cattle farms in Centre of France. (project leaders: engineer school ENITA and “Institut de l'élevage”). Beginning of the study : 2002

### **Networks**

FR10. A monitoring network of private farms have been set up in 1988. In 2004, there are 18 organic farms compared to 31 conventional farms in plain area and in mountain. The aim is to compare (on a long time study) the structures, the functioning, and the technical and economic performances. The data for organic farms are obtained by INRA and by collaboration with partnership around the Massif Central (with the coordination of the Pole Agriculture Biologique Massif Central). There is, in the same INRA team, an equivalent network of farms dealing with suckler cow production (80 conventional farms and 6 organic and other organic farms in relation with other partners).

All the following description concern projects coordinated by the “Pôle Scientifique Agriculture Biologique Massif Central” (South of the France)

FR11. A network of 12 private certified organic farms in the Massif Central region. Studies: Grassland mechanical maintenance in organic farming (with the coordination of the Pole Agriculture Biologique Massif Central and “Institut de l'élevage”)beginning of the project 2001

FR12. A network of 100 private farms (33 certified in organic farming)) in the Region of “Roquefort” (project leader : AVEM (association of veterinary surgeon stockbreeders ); contract since 10 years. Studies : Technical, economic, feeding and sanitary set of reference in organic dairy sheep production. Beginning of the project 2003

FR13. A network of 40 private organic farms. Study : In-farm research in organic meat sheep and beef cattle husbandry practices in South Centre of France. (project leader : Agri

Bio Lozère (association of organic producers of the department "la Lozère"). Beginning of the project 2003.

FR14. A network of 35 private organic farms. Study: In-farm research in organic meat sheep and beef cattle husbandry practices in Limousin. Project leader: GABLIM (association organic farming of the région « limousin » beginning of the project : 2001

### **Long-term experiments**

FR15. Long-term organic fruit tree production trials have been carried out since 1994 in the INRA (National Institute for Agricultural Research) Gotheron experimental station. The aim is: (i) to identify and analyse the key problems (mainly related to pest control and soil fertility) for two perennial crops, apple and peach; and (ii) to assess the effect of organic production on the orchard and on its arthropod community. Organic orchards now cover 3.2 ha in the experimental station. The measurements concern the tree growth, the soil nutrients, the yield and the fruit quality (sugar, acidity, average weight, mineral contents).

FR16. In the platform of the regional cereal cooperative: Organic high quality wheat and mixed cereals: crop management sequence, varieties, quality and yield evaluations (35 varieties, 4 plots). Project leader: Engineer school ENITA (Clermont Ferrand). Beginning of the project 2000

## Research Facilities of Germany

### Research Farms

Most German Universities involved in research concerning organic farming have experimental stations or farms connected to the relevant institutes. Further there are experimental farms run by federal institutions like the FAL (Trenthorst) or private ones run by associations like demeter (Dottenfelder Hof). Table 5.1 gives an overview about their location and available online context.

**Table 1:** Research farms in Germany

Research Farms	Location Production	Online
GE1. Gladbacher Hof, Uni Giessen	Villmar	<a href="http://www.uni-giessen.de/tbe/home_gh.htm">http://www.uni-giessen.de/tbe/home_gh.htm</a>
GE2. Hessische Staatsdomäne Frankenhausen, Uni Kassel Witzenhausen	Frankenhausen	<a href="http://www.wiz.uni-kassel.de/dfh/index.html">http://www.wiz.uni-kassel.de/dfh/index.html</a>
GE3. Kleinhohenheim, Uni Hohenheim	Hohenheim Dairy, poultry, fodder	<a href="http://www.uni-hohenheim.de/i3v/00065700/0876504_1.PDF">http://www.uni-hohenheim.de/i3v/00065700/0876504_1.PDF</a>
GE4. Institut für ökologischen Landbau, FAL	Trenthorst Dairy, poultry, fodder, vegetables	<a href="http://www.oel.fal.de/">http://www.oel.fal.de/</a>
GE5. Wiesengut, Uni Bonn	Hennef, Bonn Sheep, fodder, vegetables	<a href="http://www.iol.uni-bonn.de/indexneu.htm">http://www.iol.uni-bonn.de/indexneu.htm</a>
GE6. Dottenfelder Hof	Bad Vilbel Dairy, fodder	<a href="http://www.dottenfelderhof.de/">http://www.dottenfelderhof.de/</a>
GE7. Kloostergut Wiebrechtshausen	Northeim Animals, fodder	<a href="http://www.kws.de/ca/bv/begh/">http://www.kws.de/ca/bv/begh/</a>
GE8. Waldhof, FH Osnabrück	Wallenhorst- Lechtingen Pigs, cereals	<a href="http://www.al.fh-osnabrueck.de/1608.html">http://www.al.fh-osnabrueck.de/1608.html</a>
GE9. Lindhof, Uni Kiel	Noer	<a href="http://www.agrar.uni-kiel.de/forschung/versuchsgueter/versuchsbetriebe.html">http://www.agrar.uni-kiel.de/forschung/versuchsgueter/versuchsbetriebe.html</a>

GE1. The Gladbacher Hof at Villmar is the organic research and education farm of the University of Giessen ([http://www.uni-giessen.de/tbe/home\\_gh.htm](http://www.uni-giessen.de/tbe/home_gh.htm)). It covers an area of 155 ha including 101 ha of arable land and 54 ha of pasture. The following branches of farming can be found: seed breeding of cereals and legumes, potato growing, fodder production, rearing of cows, chicken and pigs and biogas production.

GE2. In 1998, the Hessische Staatsdomäne Frankenhausen converted to organic farming. It covers an area of 341 ha with 236 ha of arable land and 44 ha of pasture. Main crops grown are cereals, legumes, potatoes, corn, carrots and clover grass. Its stock

compromises of 80 dairy cows, 350 geese and 500 layers. The integration of environmental protection measures into organic agriculture is one research topic covered by scientists working in Frankenhausen.

### **Networks**

GE10. Network Demonstration Farms (Netzwerk Demonstrationsbetriebe)

<http://www.oekolandbau.de/index.cfm/0002C03494881DF0B90D6520C0A8E066>

### **Long term experiments**

GE11. Langzeitversuch Darmstadt (Long term fertilisation trial since 1980, Darmstadt)

[www.ibdf.de/v1](http://www.ibdf.de/v1) (PhD Joachim Raupp)

## Research facilities of Italy

### Research farms

Information about organic research farms (entire farm) are not available at the moment. Consequently, all experimental facilities have to be classified in different categories (mainly experimental fields and/or long term experiments).

### Experimental fields

Experimental fields are located in different research farms (not specifically and univocally devoted to organic farming).

#### *Location of experimental farms involved in some ongoing MIPAF projects*

<b>CRA Centres</b>	<b>Location</b>	<b>Size</b>	<b>% area OF</b>	<b>Production</b>	<b>Year</b>
IT1. CRA- Experimental Institute for Fruits	Ciampino (Roma)	32 ha	6 %	Fruits	-
IT2. IT3. CRA- Experimental Institute for Soil	Fagna (Firenze)	40 ha	50%*	Forage Crops and cereals	1994
	Vicarello (Pisa)	20 ha	50%*	Forage Crops and cereals	1996
IT4. CRA- Experimental Institute for Olive- tree	Rende (Cosenza)	3 ha	100%	Olive tree	1997
IT5. CRA- Experimental Institute for Forestry	Villazzano (Trento)	0,3 ha	100%	Officinal plants	2004
IT6. CRA – Experimental Institute for Cytrus	Lentini (Siracusa)	25 ha	8%	Citrus (Orange)	1996
IT7. CRA – Experimental Institute for Industrial Crops	Budrio (Bologna)	22 ha	10%	Industrial crops	2000
IT8. CRA – Institute for beekeeping	Reggio Emilia	70 beehives	20%	Honey	2000
<b>Other centres</b>					
IT9. Cascina Vimagano, Graffignana (private)	S. Angelo Lodigiano (Lodi)	10 ha	100%	Cereals	-
IT10. Experimental Centre and Agro- environmental Centre (regional)	Calcinaro (Cesena)	18 ha	7%	Fruits	1996
IT11. Regional experimental Centre of Mirto Crosia	Mirto Crosia (Cosenza)	12 ha	30%	Olive tree	1997

\* sustainable farming included

### On-farm studies

See table above: Cascina Vimagano Graffignana. (IT9)

### Networks

No information available at the moment

### Animal research facilities

No information available at the moment

### Leaching fields

There are no leaching fields available devoted to organic farming research in Italy.

Research aimed to this topic is sometimes carried out in the long-term experimental fields.

### Long-term experiments

Table. Long term field experiments in Italy

Research Institution/body and contact person(s)	Year of start	Description/Aims/Size
IT12. CRA (Consiglio per la Ricerca e sperimentazione in Agricoltura) - ISA (Citrus Institute) & ISNP (Plant Nutrition Institute) Giancarlo Roccuzzo ( <a href="mailto:giancarlo.roccuzzo@entecra.it">giancarlo.roccuzzo@entecra.it</a> ) Stefano Canali ( <a href="mailto:stefano.canali@entecra.it">stefano.canali@entecra.it</a> )	1994	Studies on yield, <u>quality of citrus</u> , <u>nutrient turnover in the soil plant system</u> , <u>soil quality</u> . Randomised block experimental design with 4 treatments (1 conv + 3 bio different soil management strategies). 1.8 ha.
IT13. Univ.della Tuscia, Viterbo (Tuscia University) Fabio Caporali ( <a href="mailto:caporali@unitus.it">caporali@unitus.it</a> )	2001	Studies on <u>cereals and pulses</u> . <u>Crop combination and interactions</u> . 0,5 ha
IT14. Università di Pisa (Pisa University) Centro Interdipartimentale di Ricerche Agro-ambientali ( <i>E. Avanzi</i> ) located in S. Piero a Grado. Paolo Barberi ( <a href="mailto:barberi@sssup.it">barberi@sssup.it</a> ) Marco Mazzoncini ( <a href="mailto:mazzo@agr.unipi.it">mazzo@agr.unipi.it</a> )	2001	<u>Field crops</u> (cereals and pulses) in stockless farming system. Topics: <u>yield and product quality</u> , <u>soil management</u> , <u>weed management</u> , <u>nutrient turnover</u> , <u>soil quality</u> , <u>crop interactions</u> . Comparison of conventional VS organic. 24 ha
IT15. Università degli Studi di Firenze (Firenze University). Azienda Agraria Montepaldi. Concetta Vazzana ( <a href="mailto:concetta.vazzana@unifi.it">concetta.vazzana@unifi.it</a> )	AGE ????	<u>Field crops</u> (cereals and pulses) in stockless farming system. Topics: <u>yield and product quality</u> , <u>functional biodiversity in relation to crop protection</u> , <u>green manuring</u> , <u>crop interaction</u> , evaluation of allowed F+SC. Comparison of conventional VS integrated VS organic. SIZE?????
IT16. Università degli Studi di Perugia (Perugia University). Experimental station of the University, located in Papiano Guiducci Marcello ( <a href="mailto:mguid@unipg.it">mguid@unipg.it</a> ) Arianna Boldrini ( <a href="mailto:ariannaboldrini@yahoo.it">ariannaboldrini@yahoo.it</a> )	1998	<u>Field crops and open field vegetables (tomato)</u> in stockless farming system. Topics: <u>yield and product quality</u> , <u>crop protection</u> , <u>green manuring</u> , <u>mechanical weed management</u> ,

		<u>variety testing</u> . Comparison of conventional (low input) VS organic. 1,4 ha
IT17. Centro Ricerche Produzioni Vegetali – CRPV (Cesena). Cristina Piazza	1996	<u>Field crops and open field vegetables (tomato) in stockless farming system</u> . Topics: <u>yield and product quality, green manuring</u> . Comparison of conventional VS organic + new technologies for OF. 8 ha.
IT18. Centro Ricerche Produzioni Vegetali – CRPV (Cesena). Vanni Tisselli ( <a href="mailto:tisselli@crpv.it">tisselli@crpv.it</a> )	1995	<u>Open field vegetables (horticultural specialised production system)</u> . Topics: <u>effect of rotation, green manuring, variety testing, allowed inputs (F+SC and PPP) testing and evaluation</u> . Aimed to develop <u>new technologies</u> for OF. 1,4 ha.
IT19. Centro Ricerche Produzioni Vegetali – CRPV (Cesena). Vanni Tisselli ( <a href="mailto:tisselli@crpv.it">tisselli@crpv.it</a> )	1999	<u>Open field vegetables for industrial transformation (i.e, green beans, spinach, pea, tomato) and cereals (not specialised horticultural production system)</u> . Topics: <u>effect of rotation, green manuring, variety testing, allowed inputs (F+SC and PPP) testing and evaluation</u> . Aimed to develop <u>new technologies</u> for OF. 1,2 ha.

#### Others:

Type	Contacts	Dated/ %OFF	Further details
Laboratory	CRA (Consiglio per la Ricerca e sperimentazione in Agricoltura- Agriculture Research & Experimentation Council) <a href="mailto:stefano.bisoffi@entecra.it">stefano.bisoffi@entecra.it</a>	from 1994; 20 - 100% dedicated to OFF depending on subject area. Approximately 300 m <sup>2</sup> labs used for OFF in research centres located in different regions.	state of the art laboratories and analytical instrumentation: spectroscopy, spectrometry, chromatography, molecular biology, NMR, rheology. These equipments are used for studies in plant pathology, entomology, soil chemistry & biology, plants and food related research for different areas: cereals, fruits, vegetables, flowers, olive-oil, wine, aromatic plants (herbs), animal husbandry, beekeeping.

	INRAN (Istituto Nazionale di Ricerca per gli Alimenti e la Nutrizione-Food & Nutrition Research Institute) <a href="mailto:paoletti@inran.it">paoletti@inran.it</a> ; <a href="mailto:mengheri@inran.it">mengheri@inran.it</a>	from 1995; 500 m <sup>2</sup> labs (20% used for OFF research)	state of the art laboratories and analytical instrumentation for food technology, food chemistry, experimental nutrition; cells-micro-organism culture labs; experimental animal stables.
	Dipt. Produzioni Vegetali -Univ.della Tuscia, Viterbo (Dept.Plant Production –Tuscia University) <a href="mailto:muleo@unitus.it">muleo@unitus.it</a> ;	from 2004; 20% OFF 50 m <sup>2</sup> (20% used for OFF research)	
	Dipt. Biologia animale e Genetica-Univ.di Firenze (Dept.animal biology & genetics-Florence University) <a href="mailto:mbuiatti@dbag.unifi.it">mbuiatti@dbag.unifi.it</a> ;	from 2004, 20% OFF	
	Istituto di Genetica Vegetale, CNR (Institute of plant genetics, National Research Council,) Perugia	50 m <sup>2</sup> ; 12 % OFF)	state of the art laboratories and analytical instrumentation of molecular biology: DNA sequence analysis, DHPLC, nucleic acid electrophoresis, PCR
Greenhouses	CRA (Consiglio per la Ricerca e sperimentazione in Agricoltura-Agriculture Research & Experimentation Council) <a href="mailto:stefano.bisoffi@entecra.it">stefano.bisoffi@entecra.it</a>	2000; 30-50% OFF	greenhouses for cereals, vegetables, flowers, olive oil in the research centres located in different regions.
	Dipt. Produzioni Vegetali -Univ.della Tuscia, Viterbo (Dept.Plant Production -Tuscia University) <a href="mailto:muleo@unitus.it">muleo@unitus.it</a> ;	2004; 20% OFF	160 m <sup>2</sup>



## Research facilities of Netherlands

### Research Farms

NL1. *Proef- en Leerbedrijf Droevendaal* in Wageningen is the organic research and education farm of the Plantkundig Proefcentrum Wageningen of Wageningen UR (PPW). It covers 50 ha of which 32 ha is actually available for research and education purposes. The remaining 18 ha consist of permanent pastures and nature. Droevendaal is a mixed farm aiming at a closed cycle. The permanent herd comprises of 65 bull calves from Aver Heino, Centre for Organic Farming, for the production of 'organic young beef'.

NL2. *Aver Heino*, Centre for Organic Dairy Farming, is a research unit of the Animal Sciences Group of Wageningen UR (ASG). The research focuses on all aspects of organic dairy farming.

NL3. *Raalte*, Centre for Sustainable and Organic Pig Farming, is a research unit of the Animal Sciences Group of Wageningen UR (ASG). The organic unit can accommodate 100 breeding sows and 600 growing finishing pigs.

NL4. *Het Spelderholt* is a research unit of the Animal Sciences Group of Wageningen UR (ASG). It has facilities for all kinds of poultry (layers, broilers, turkeys and ducks), and for rabbits. There is also a hatchery. Attention is paid to animal welfare, organic farming, environment, health, feeding, economics, labour and working conditions. One stable has a capacity of 2000 organic laying hens divided over 8 experimental subunits. Animal research facility

NL5. *Proefboerderij De Noord* is a research unit of Applied Plant Research (PPO), Sector Bulb-growing of Wageningen UR. Beside two integrated farm systems the unit has an organic farm system (3 ha) with several kinds of flowering bulbs, representing the organic bulb-growing farms in the north-west of The Netherlands.

NL6. *PPO Nagele* is a research unit of Applied Plant Research (PPO), Sector Arable Farming, Rural Area and Open Field Vegetables of Wageningen UR. The unit consists of four farming systems:

- Bio-dynamic system with arable crops and open field vegetables representing the organic farms in the northern and central clay areas of The Netherlands (22 ha)
- Bio-intensive system with field vegetables, representing the smaller organic farms (12 ha)
- Bio-diverse system, optimal use of biodiversity to control diseases and plagues. (12 ha)
- Integrated system with arable crops representing the conventional farms in the northern and central clay areas of The Netherlands (24 ha).

NL7. *PPO Vredepeel* is a research unit of Applied Plant Research (PPO), Sector Arable Farming, Rural Area and Open Field Vegetables of Wageningen UR. Beside an integrated farm system the unit has an organic farm system (4 ha) representing the organic arable farms in the south-east of The Netherlands with vegetables for industrial processing.

NL8. *PPO Westmaas* is a research unit of Applied Plant Research (PPO), Sector Arable Farming, Rural Area and Open Field Vegetables of Wageningen UR. Beside an integrated farm system the unit has an organic farm system (1.2 ha) with open field vegetables, representing the more extensive organic arable farms in the south-west of The Netherlands.

NL9. *PPO Prof. Broekemahoeve* is a research unit of Applied Plant Research (PPO), Sector Arable Farming, Rural Area and Open Field Vegetables of Wageningen UR. The farm is used for farm systems research focussing on two factors: low use and no use (organic) of pesticides and production aiming at communities experiencing agriculture and bulk production.

NL10. *Regionaal Onderzoek en Informatie Centrum Kollummerwaard* regional research and information centre of Stichting Proefboerderijen Noordelijke Akkerbouw (SPNA - Experimental Farms Northern Agriculture Foundation). The farm consists of a conventional and an organic unit for the production of arable crops and open field vegetables.

NL11. *Proefboerderij Rusthoeve* is a privatised arable research farm with a conventional and an organic part. The Rusthoeve is also pilot farm for nature management.

NL12. *Proeftuin Zwaagdijk* is a privatised research farm of the Proeftuin Zwaagdijk Foundation dealing with open field vegetables and bulb cultivation in an organic and in a conventional setting.

### **Networks**

In the past knowledge on technical solutions for farmer use was mainly produced at the research centres. Advisers and farmers were instructed on technical improvements within their farm systems and methodologies. It turned out, however, that this knowledge dissemination system was insufficiently tuning to the demand for knowledge of individual farmers. Since a few years many research activities have been moved towards private farms and experiments are conducted in a participatory way together with the entrepreneurs. Farmers and researchers are organized in socio-technical knowledge networks for knowledge dissemination and mutual support. In this way, research aims are better tuned to farmers' individual and collective demands and generate solutions for local problems. In this respect one can also refer to them as problem oriented knowledge networks. Knowledge will be transferred from researcher to farmer and vice versa, resulting in an intense knowledge circulation and construction. Up scaling and developing generic solutions are the new scientific challenges.

The effectiveness of the participation in these knowledge networks differs between farmers. Real innovations in farming systems only occur when farmers are front liners. Examples of remunerative organic farming systems inspire conventional colleagues, thus making farming as a whole more sustainable. It is the result of a good balance between the future oriented innovative power of the pioneers and the effective interaction with and spin-off to study groups of the more conventional farmers and other parties involved in the production-consumption chain.

At present the following knowledge networks are active:

NL13. *Bioveem: dairy husbandry, 17 farmers*

NL14. *Biom: 40 farmers (arable crops and open field vegetables, - tree nursery, bulbs)*

NL15. *Ekopluij: poultry, 18 farmers*

NL16. *Biofruitteelt: apple and pear production, 3 farmers*

NL17. *Biokas: protected (covered) crop production, 6 farmers.*

### **On-farm studies**

NL18. Beside the above mentioned farms participating in knowledge networks much research is performed at private commercial farms. This especially applies to the research conducted by the Louis Bolk Institute since it has no research facilities (e.g. experimental

farms) of its own. It is also the LBI view that research should be conducted on-farm in order to increase the usefulness of the results.

## Research facilities of Norway

### Background

In general, “organic” and “conventional” researchers in Norway cooperate well, which reduces the need for separate organic research facilities. There is also close cooperation between scientists and private farmers. An especially interesting case in this respect is that Norway has one of the world’s oldest bio-dynamic farms (converted in 1932), which has been used as an object for several scientific studies. Some other long-term organic farmers, especially within the bio-dynamic sector are also open to researchers and offer the farm as a study area. Still, organically managed research fields and herds are required, and especially within Bioforsk a range of such areas are available as almost all divisions and departments have some organically managed area (Table 1). The future existence of research fields and other facilities is dependent on funding, and the duration of the availability of the research facilities described here is somewhat uncertain.

### **Experimental fields**

#### Organically managed research fields

*Table 1. Area and year of conversion (YOC) available for OFF research in Norway. YOC is defined as the year of conversion of the first fields on each location.*

<b>Institution, location</b>	<b>Area (ha)</b>	<b>YOC</b>	<b>Main crops Contact</b>
NO1. Bioforsk, Landvik*	3	1993	Vegetab., seed <a href="mailto:randi.seljaasen@bioforsk.no">randi.seljaasen@bioforsk.no</a>
NO2. Bioforsk, Særheim	4	1998	Ley <a href="mailto:olav.harbo@bioforsk.no">olav.harbo@bioforsk.no</a>
NO3. Bioforsk, Kise	1.8	1998	Ley <a href="mailto:jens.winju@bioforsk.no">jens.winju@bioforsk.no</a>
NO4. Bioforsk, Apelsvoll**	12.4	1989	Cereals <a href="mailto:ragnar.eltun@bioforsk.no">ragnar.eltun@bioforsk.no</a>
NO5. Bioforsk, Løken	1	1991	Ley <a href="mailto:tor.lunnan@bioforsk.no">tor.lunnan@bioforsk.no</a>
NO6. Bioforsk, Sæter	1	1997	Ley <a href="mailto:jorgen.todnem@bioforsk.no">jorgen.todnem@bioforsk.no</a>
NO7. Bioforsk, Ullensvang	0.2	2000	Fruit: Plums <a href="mailto:jorunn.borve@bioforsk.no">jorunn.borve@bioforsk.no</a>
NO8. Bioforsk, Njøs	0.7	2000	Fruit, berries <a href="mailto:dag.roen@bioforsk.no">dag.roen@bioforsk.no</a>
NO9. Bioforsk, Kvithamar	4.3	1993	Cereals <a href="mailto:anne.kjersti.bakken@bioforsk.no">anne.kjersti.bakken@bioforsk.no</a>
NO10. Bioforsk, Tjøtta	10.2	1992	Ley <a href="mailto:vibeke.lind@bioforsk.no">vibeke.lind@bioforsk.no</a>
NO11. Bioforsk, Vågønes	106	2003	Ley <a href="mailto:steffen.adler@bioforsk.no">steffen.adler@bioforsk.no</a>
NO12. Bioforsk, Holt	4	1998	Ley <a href="mailto:gunlaug.rothe@bioforsk.no">gunlaug.rothe@bioforsk.no</a>
NO13. Bioforsk, Tingvoll	22	1986	Ley <a href="mailto:martha.ebbesvik@bioforsk.no">martha.ebbesvik@bioforsk.no</a>
NO14. Norwegian University of Life Sciences, Ås	15	1992	Ley, cereals <a href="mailto:ann-kristin.alstad@umb.no">ann-kristin.alstad@umb.no</a>
NO15. Hedmark University College, Hamar	16	1998	Cereals <a href="mailto:fredrik.fogelberg@hihm.no">fredrik.fogelberg@hihm.no</a>

\*) The fields on Bioforsk, Landvik comprise 1 ha silty loam, YOC 1993 used for a crop rotation experiment in vegetables 2000-2006 (see further description below); 1 ha silty loam, YOC 1999 used for experiments with cereals and grass seed; 0.5 ha sandy soil, YOC 1999 used for grass seed and vegetables experiments and 0.9 ha sandy soil, YOC 2005 used for grass and clover seed experiments.

\*\*\*) The fields on Bioforsk, Apelsvoll comprise 1.44 ha in the farming systems comparison experiment, YOC 1989 (see below); 1.5 ha managed as a diversified livestock system, YOC 1995; 2 ha for organic cereals, YOC 1997 and 7.5 ha for potatoes and cereals, rented land at Hoff, YOC 2000. All is morainic soil.

## Long-term experiments

NO16. Farming systems comparison study, Bioforsk Arable Crops Division, Apelsvoll

A long-term farming systems comparison study was initiated at Bioforsk Arable Crops Division, Apelsvoll, in 1989. The aim was to compare on a model farm level differences in yields, nutrient runoff, nutrient balances and economical results for conventional, integrated and organic dairy and cash crop farming systems. The vision of the project was to develop farming systems that minimized the runoff of nutrients and pesticide residues, produced healthy crops with optimal nutritional value, and gave satisfying yields and economic results. In 2000, the system was changed so that the term “integrated” was replaced by “optimal”, defined as the treatment that achieves the maximum yield per kilo leached nitrogen. The study comprises a field lysimeter with 12 plots, each 0.18 ha. Each plot is treated as a model farm, and six different farming systems (2 replicates per system) are compared as follows:

A reference cash crop farm with cereals and potatoes, managed as in the reference year of 1985

Optimal cash crop

Organic cash crop with 25% land as green manure

Optimal cash crop with animal manure and 50% ley

Organic mixed crop with 50% ley

Organic mixed crop with 75% ley

All model farms are managed with a 4-year crop rotation, where all crops are grown in each year (all plots are divided in four sub-plots). Please contact [audun.korsaeth@bioforsk.no](mailto:audun.korsaeth@bioforsk.no) for further information and publications from the study.

NO17. Long-term study of cropping system for organic dairy farming, Bioforsk Grassland and Landscape Division, Kvithamar

Since 1993, 1 ha farmland has been managed as an organic dairy production unit, with purchased farmyard manure (FYM; dairy cow slurry). The crop rotation is designed for a herd size of 1 animal unit ha<sup>-1</sup>, and the corresponding amount of manure is used in the experiment. The land is divided in four plots which are tilled by normal size farm equipment in a four-year crop rotation comprised of 1) barley with undersown grass-clover ley, 2) and 3) ley and 4) mixed oats and peas. Yield levels and the nutrient content of soil and FYM are recorded regularly, and the earthworm population was studied in 1993, 1996 and 2000. As the soil here is a heavy clay, and conversion to organic farming practice caused a significant yield depression for several years, the experiment represents a nice example of development in yield levels after conversion. Please contact [anne.kjersti.bakken@bioforsk.no](mailto:anne.kjersti.bakken@bioforsk.no) for further information and publications from the study.

NO18. Long-term study of organic stockless cash cropping system for organic vegetable production, Bioforsk Arable Crops Division, Landvik

Since 1993, 1 ha farmland has been used for a study of yield levels and agronomy in a stockless organic system with grass and clover seed production and vegetable growing. The nutrient supply has been from composted household waste and compost made from the plant residues produced in the experiment. The crop rotation has been wheat undersown with grass-clover ley, two years grass-clover ley for seed production, and three years of catch-crops (potatoes, cabbage, lettuce, carrots). Yield levels and the nutrient content of soil are recorded regularly, and the earthworm population was studied in 1993, 1996 and 2000. The experiment represents an interesting long-term series of yield records

in a stockless cash crop system under Norwegian conditions. Please contact [randi.seljaasen@bioforsk.no](mailto:randi.seljaasen@bioforsk.no) for further information and publications from the study.

## Animal research facilities

### Organically managed herds on research farms

*Organically managed herds on research farms. YOC is defined as the first year the herd was managed according to organic standards.*

<u>Institution, location</u>	<u>Type of herd</u>	<u>Feeding</u>	<u>YOC</u>	<u>Contact person</u>
NO19. Norwegian University of Life Sciences, Ås (UMB)	18 dairy cows	Individual	1995	<a href="mailto:trygve.skjevdal@umb.no">trygve.skjevdal@umb.no</a>
NO20. Bioforsk, Tjøtta	70 adult sheep	Group	1997	<a href="mailto:vibeke.lind@bioforsk.no">vibeke.lind@bioforsk.no</a>

### UMB, organic herds

Most organic dairy farmers in Norway have spring calving dairy cows and pasture based milk production, often due to the general poor quality of silage used for winter feeding. Hence, there is a need to increase the organic milk production in late autumn and winter. Recently revised organic standards require that all feedstuffs to dairy cows should be organically produced, which also enhance the focus on improving the quality of on-farm produced roughages. The UMB has conducted the project “Milk production and quality and N use efficiency by dairy cows offered white or red clover silages” to compare white and red clover silages with and without concentrate supplementation, and the effects on milk production and quality, and N use efficiency. The experiment was carried out during the winter 2004/2005 and will be repeated in 2005/2006. In addition to DM intake and milk yield, the treatments effects on milk quality, including the content and composition of fatty acids and phyto-oestrogens, will be evaluated. The herd is otherwise managed according to organic standards. The herd is kept in loose housing, and fodder consumption is recorded continuously for each animal. The milk yield is recorder individually 14 times per week, and body weight is recorded at each milk yield.

A farm unit at UMB has been organically managed since 1991. The farm consists of 15 ha in rotation and 6 ha used for pasture and a dairy herd with 18 dairy cows. Due to a feeding experiment with dairy cows, the area and herd was temporarily expanded in 2002.

### Research farms

There is not any farm that satisfies these criteria

### On-farm studies

NO21. On-farm study: Organic dairy farm, Bioforsk Organic Food and Farming Division, Tingvoll

The farmland belonging to the Norwegian Centre for Ecological Agriculture (NORSØK), where Bioforsk Organic Food and Farming Division (BOFF) is located, is managed as a dairy farm with a herd of 13 dairy cows, 15 adult sheep and ca 30 laying hens. 18 ha cultivated land and 8 ha pastures have been organically managed since 1995, by tenants who own the livestock. Plots for research studies are rented from the tenants. For the commercial dairy farm, BOFF researchers conduct annual registrations of yields, in addition to regular soil sampling and estimation of nutrient budgets. A climatic logger station measures the local temperature and precipitation during the growing season. In

total, this represents an interesting data material where trends in productivity etc. are studied on a practical farm level.

**Networks:** None

### Leaching fields

In the farming system experiment at Apelsvoll described above, drainage and runoff is collected separately from each plot, and analysed for N and P once every month. Runoff occurs only in months with heavy precipitation.(NO16)

### List of contact addresses

For convenience, in Table 9 we have listed all institutions active in OFF research or education that are described in this report.

*Table 3. Institutions active in research or education within organic food and farming.*

<b><u>Name of institution, acronym</u></b>	<b><u>Address</u></b>	<b><u>Web-page</u></b>
Bioforsk Norwegian Institute of Agricultural and Environmental Research	Fr.A. Dahlsvei 20 N-1432 Ås	<a href="http://www.bioforsk.no">www.bioforsk.no</a>
Bioforsk Organic Food and Farming Division	Tingvoll gard N-6630 Tingvoll	<a href="http://www.bioforsk.no">www.bioforsk.no</a>
Norwegian University of Life Sciences, UMB	P.O. box 5033 N-1432 Ås	<a href="http://www.umb.no">www.umb.no</a>
Hedmark University College, HIHM	Lærerskolealleen 1 N-2418 Elverum	<a href="http://www.hihm.no">www.hihm.no</a>
National Veterinary Institute, NVI	PO box 8156 Dep. N-0033 Oslo	<a href="http://www.vetinst.no">www.vetinst.no</a>
Norwegian School of Veterinary Science, NVH	PO box 8146 Dep. N-0033 Oslo	<a href="http://www.veths.no">www.veths.no</a>
Norwegian Agricultural Economics Research Institute, NILF	PO box 8024 Dep. N-0033 Oslo	<a href="http://www.nilf.no">www.nilf.no</a>
National Institute for Consumer Research, SIFO	PO box 4682 Nydalen 0405 Oslo	<a href="http://www.sifo.no">www.sifo.no</a>
Western Norway Research Institute, WNRI	PO box 163, N-6851 Sogndal	<a href="http://www.vestlandsforskning.no">www.vestlandsforskning.no</a>
Centre for Rural Research	Universitetssenteret Dragvoll N-7491 Trondheim	<a href="http://www.bygdeforskning.no">www.bygdeforskning.no</a>
Norwegian Agricultural Extension Service, LFR	Fr. A. Dahls vei 20 N-1432 Ås	<a href="http://www.lfr.no">www.lfr.no</a>
Norwegian National School for Organic Farming and Gardening, SJH	Sogn Jord-og Hagebruksskule N-5745 Aurland	<a href="http://www.sogn-j-h.vgs.no">www.sogn-j-h.vgs.no</a>

## Research facilities of Sweden

### Research farms

There are 16 experimental farms or agricultural colleges that host research, development projects, or long-term experiments related to organic farming in Sweden. The following research farms have been defined as organic as they host complete organic production systems i.e. cropping or animal production systems and are presented below – from the southern to the northern parts of Sweden.

*SE1. Hillshög* is located at Österlen in Scania in the lowlands. The farm has crop production (barley, white clover seed breeding, oats, wheat, peas, lupines, sugar beats) without any animals and consists of 28.5 ha all organic farming. It was converted to organic farming in 1996–1998 and the Rural Economy and Agricultural Societies (HS) in Kristianstad runs it. The farm has a fruitful cooperation with the conventional farm, Sandby farm, which is located near by.

*SE2. Bollerup, Önnestad and Östra Ljungby* are three agricultural colleges located in Scania. The schools have systems with and without ruminants. The organic part of the farming systems consists of approximately 1.7 ha. The long-term experiment “Environmentally sustainable crop rotations” has been running at the schools since 1986. The goal is to find connections between plant breeding, nutrient supply and food quality. HS in Kristianstad coordinates the long-term experiment.

*SE3. Alnarps experimental farm* is located in the lowlands south of Lomma in the southwestern part of Scania. The farm has crop production (ley, sugar beats, vegetables, cereals) without animals. 20 ha of the totally 350 ha are driven organically since 1992. A long-term experiment on biogas production in crop rotation in Scania is running on the farm. The Department of Crop Production Ecology at the Swedish University of Agricultural Sciences runs the farm.

*SE4. Lilla Böslid* is located near Halmstad in Halland, it has crop production (on the clay soil: winter and spring grain, field bean, alfalfa, red clover and on the sandy soil: cereals, green manure, red beets, winter rape) and consists of 98 ha of which 76 ha is organic. The arable land was converted in 1989–1994. HS in Kristianstad runs the farm.

*SE5. Stenstugu* is located on the Swedish island Gotland about 14 km from Visby. It has crop production (plant breeding, cereals, sugar beats, winter rape and peas). The acreage consists of 175 ha of which 10 ha is approved by KRAV. The 10 ha were converted in 1997. HS Gotland runs the farm experiments. The Swedish University of Agricultural Sciences owns the farm. A long-term experiment was going on between 1986 and 2004.

*SE6. Rådde farm* is situated in Västergötland about 25 km from Borås. The farm has meat production with about 50 suckle cows + replacement and crop production with ley and fodder grains. There are also 50 ha seminatural grasslands, including 1/3 with extraordinary flora and there are great possibilities for grouping animals in grazing experiments. The first parts of the 55 ha of arable organic land were converted in 1989, whereas some parts have been converted as late as 2001. The whole farm is of 78 ha arable land. A major part of the experiments in forage production in Sweden are carried out at Rådde experimental farm, e.g. variety experiments Experiments combining cropping and feeding cattle have also been conducted. HS in Sjuhärad runs the farm.



*SE7. Klostergården* is situated about 10 km north of Linköping in Östergötland. The farm has crop production (winter and spring wheat, rye and peas). The farm consists of 97 ha of which 45 ha is organic. The farm has no regular long-term experiments, but since the conversion in 1996–1999, yearly recordings of the amount of weeds and pest, as well as soil analysis has been performed in specific checkpoints in the fields. HS in Östergötland runs the farm.

*SE8. Logården* is situated about 2 km from Grästorps in Västergötland. The farm has crop production (field bean, spring wheat, oats, green manure, winter rape, winter wheat, rye). The acreage is 60 ha of which 22 ha is organic production, 28 ha integrated production and 10 ha conventional production. The farm was converted in 1991 and since then a long-term experiment to develop environmentally sound and productive farming systems have been going on – the experiment focuses on three different productive systems: organic, integrated and conventional farming. HS in Skaraborg runs the farm.

*SE9. Lanna experimental farm* is situated 20 km from Skara in Västergötland. The farm has crop production (winter wheat, barley, oats, rape seed). The main part of the farm is driven conventionally, 10 ha of the total of 155 ha is organically produced. The organic parts were converted in 1996 and 2003. The farm is situated in lowland. Two long-term experiments are going on at Lanna. These are focusing on nutrient losses and nitrogen turn over on farms with and without animals on loamy soils in Västergötland. The Swedish University of Agricultural Sciences runs the farm.

*SE10. Tingvall* is situated 20 km east of Tanumshede in Bohuslän. The farm has dairy production with facilities for 65 cows and fodder production. The farm consists of 130 ha – everything is organically produced according to standards set by the Swedish certification organ KRAV. The farm was converted in 1989–1992. Since 1990 changes in the weed flora, soil nutrition levels and the botanical composition of the ley harvests have been surveyed and mapped. Research on organic dairy production has been performed from the start on the farm. HS in western Sweden runs the farm.

*SE11. The agricultural college Dingle* is located 30 km north of Uddevalla in Bohuslän. The farm has milk production with about 70 cows + replacement, piglet production with about 20 sows, 10 suckle cows and crop production (mainly fodder). The acreage is 225 ha arable land of which 150 ha is organic and approved by KRAV. Since 1999 a crop rotation experiment has been going on at the farm. Parts of the farm have been converted since 1981 until 2002. Sweden's County Administration in western Götaland runs the farm.

*SE12. Skilleby farm* is located 12 km south of Södertälje in Sörmland. The farm has dairy production (0.6 animal units/ha) and crop production (ley, cereals and some vegetable production (2 ha)). The total acreage is 40 ha. The farm has been driven bio-dynamically since the middle of the 1960's. Since 1991 a green manure experiment has been going on at the farm. The neighbouring farm Yttereneby runs the experimental farm.

*SE13. Kvinnersta* is located 10 km north of Örebro in Närke. The school has conventional milk production with about 80 cows + replacement and crop production (fodder, cereals and leguminous plants). The school consists of 280 ha of which 140 ha is organically produced. The farm was mainly converted in 1989 and between 1996 and 2002. A long-term experiment comparing organic and conventional farming systems (mainly ley and wheat production) has been going on since 1992. In 2004 a long-term experiment dealing with sustainable leguminous plants in ley was started. Örebro district and the agricultural college Kvinnersta runs the farm.

*SE14. Riis Lillerud* is located 15 km west of Karlstad in Värmland. The school has crop production (cereals and ley) and also conventional milk production with about 60 cows and pig production with about 100 sows. The school has 250 ha of which 70 ha are organic. The unit called Riis consists of 25 ha and is the part of the school that has research and development projects. The unit was mainly (some parts earlier) converted in 1986. The school is situated in lowland. Since 1998 a crop rotation experiment has been going on at Riis. Lilleruds gymnasium runs the farm.

*SE15. Ekhaga experimental farm* is situated about 7 km east of Uppsala in Uppland. The experimental farm has two different farming systems operating – one with animals and one without (plant breeding, oats, ley, winter wheat, peas and potatoes). The total area farmland is 24 ha. The farm was converted in 1988. What animals and what type of production that exists on the farm depend on what experiments are going on. The Swedish University of Agricultural Sciences runs the farm.

*SE16. Öjebyn* is situated 5 km north of Piteå in Norrbotten. The farm has fodder production (cereals and ley). The acreage is 160 ha of which 140 ha are organic. Crop rotation experiments have been going on for more than 30 years. Variety testing programmes of cereals and herbage plants are done. In 1990 55 ha were converted and in 2003 another 85 ha. The estate office and the north experimental district at the Swedish University of Agricultural Sciences run the farm.

### **Experimental fields**

For information of the crops and farm animals see under the description of each farm in the text above

*Hillshög*, (SE1 ) 28.5 ha organic, converted in 1996-1998

*Bollerup, Önnestad and Östra Ljungby*, (SE2 ) 1.7 ha organic, conversion year 1986

*Alnarps experimental farm*, (SE3 ) 20 ha organic, main conversion in 1992

*Lilla Böslid*, (SE4 ) 76 ha organic, conversion years 1989-1994

*Stenstugu*, (SE5 ) 10 ha organic, converted in 1997

*Rådde farm*, (SE6 ) 55 ha organic, converted by stages in 1989-2001

*Klostergården*, (SE7 ) 45 ha organic, converted in 1996-1999

*Logården*, (SE8 ) 22 ha organic, converted in 1991

*Lanna experimental farm*, (SE9 ) 10 ha organic, converted in 1996 and 2003

*Tingvall*, (SE10) 130 ha organic, conversion years 1989-1992

*The agricultural college Dingle*, (SE11) 150 ha organic, conversion 1981-2002

*Skilleby farm*, (SE12) 40 ha organic, converted biodynamic in the mid 1960's

*Kvinnersta*, (SE13) 140 ha organic, converted in 1989 and 1996-2002

*Riis Lillerud*, (SE14) 70 ha organic, main conversion in 1986

*Ekhaga experimental farm*, (SE15) 24 ha organic, converted in 1998.

*Öjebyn*, (SE16) 140 ha organic, conversion years 1990 (55 ha) and 2003( 85 ha)

### **Animal research facilities**

Facilities with integrated animal and crop production

*Tingvall Organic Dairy Farm*. (SE10) A loose-housing system with two experimental groups of dairy cows. Useful for whole-lactation dairy cow experiments. A total of 70 dairy cows and integrated organic fodder production, all organically certified. Research on organic dairy production has been performed from the start on the farm.

*Rådde Organic Beef Research Farm*. (SE6) The farm has organic meat production with about 50 suckle cows + replacement and integrated crop production with ley and fodder

grains, all organically certified. The experimental farm also has 50 ha seminatural grasslands, including 1/3 with extraordinary flora and there are great possibilities for grouping animals in grazing experiments. A loose-housing system with 8 pens and 8 animals per pen in an uninsulated barn with deep litter system makes group feeding possible. There are possibilities for individual animal weighing and dry matter measurement of fodder.

#### Facilities for animal research

*Odarslöv Organic Pig Research Farm, (SE17)* SLU Alnarp (Department of Agricultural Biosystems and Technology). An insulated pig house for experiments with growing-finishing pigs in association with grazing paddocks contains eight pens with 16 pigs per pen; four pens with deep litter system and four pens with straw flow system.

*Alnarp Experimental Cattle Farm Mellangård, (SE18)* SLU Alnarp (Department of Agricultural Biosystems and Technology). The aim is to investigate the influence of different floor systems, lying surfaces fittings and fixtures on the health, behaviour, milk quality and milk yield of the dairy cow. Especially, the hoof health is of interest. The whole attached building complex has a cubicle barn, a milking parlour compartment, tie stalls, calving compartment and feed storage. The cubicle barn has in total 180 cubicles. At present, the reconstructed part accommodates 80 heads and is divided in four compartments. These have the same layout with the exception of with and without feed-stalls and different floor system. The compartments are constructed with a “double floor” in order to have the option to change the layout and the top floor easily. The rest of the cubicle barn can be use as a control group.

*Funbo-Lövsta Poultry Research Centre, (SE19)* SLU Uppsala (Department of Animal Nutrition and Management). One poultry house with 12 replicates with individual fodder/egg/production data in big cages, outdoor keeping is available in the same individual groups (approx. 100 animals per group). Pneumatic automatic computerised feeding system. Organic chicken production in two poultry houses with automatic feeding system and outdoor keeping. The group size can be varied, a total of 5 000 animals. An own small slaughter house is used for the chickens. Indoor floor feeding in small groups of different organic feed can be studied, a total of 60 groups.

*Lövsta Pig Research Station, (SE20)* SLU Uppsala (Department of Animal Nutrition and Management). Twelve insulated huts for outdoor farrowing. Four pig houses for groups of four grazing sows and piglets per house. Six sun shelters, experimental material for outdoor feeders and paddocks. Cameras and tape recorders for behaviour studies. In addition, one uninsulated building for experiments, especially during the winter.

*Kungsängen Research Centre, (SE21)* SLU Uppsala (Department of Animal Nutrition and Management). The research facility consists of an insulated barn with 46 individual stalls for dairy cows and 54 dairy cows in a loose-housing system with an automatic milking system (AMS). The amount of milk and milk composition could be recorded at each milking. Approx. 8–10 cows are fistulated. There are 60 cubicles for grouped growing cattle in a loose-housing system and 4 pens with 14 calves per pen and artificial milk feeders. In addition, there are 20 individual stalls for growing cattle. All cubicles and pens are available for behaviour studies. The cows are individually fed with both forage and concentrate. The calves are individually fed and the growing cattle are group fed. A total of eight different concentrates and four different forages could be fed at the same time without extra work. The quality of milk and meat produced, and the feed used are possible

to investigate further on in nearby located laboratories. There are good possibilities for grazing experiments thanks to grazing paddocks close to the barn.

*Röbäcksdalen Dairy and Sheep Research Centre, (SE22)* SLU Umeå (Department of Agricultural Research for Northern Sweden). The dairy research facility consists of a dairy barn with 120 cows and 100 replacement heifers in a loose-housing system with cubicles. Half the barn is insulated and half is uninsulated. Sixty of the cows could be individually fed by automatic weighing troughs. The other 60 cows and all replacement heifers could be group fed. The amount of forage consumed will be automatically registered and at the same time the eating pattern of the cows will be registered. All cows will be weighed at each milking. The amount of milk and milk composition could be recorded at each milking. There are 22 bunker silos of different size available. Rumen fistulated animals are available if needed. Good possibilities also exist to conduct studies in animal welfare and behaviour. The quality of milk and meat produced, and the feed used are possible to investigate further on in nearby located laboratories. At Röbäcksdalen, there also exists a sheep flock of 60 ewes. They are kept in an uninsulated building on bedded straw. They are normally group fed, but the size of the group could vary a lot.

*Götala Beef Research Station, (SE23)* SLU Skara (Department of Animal Environment and Health). Insulated barn, 16 pens with slatted floors and up to five animals per pen, a total of 80 animals. Uninsulated barn, 12 pens with scraped floor and straw bedding, six animals per pen, a total of 72 animals. Insulated barn with eight individual stalls with rubber mat flooring for intensive studies. IGER chewing equipment for cattle.

### **Leaching fields**

Leaching fields where drainage and surface runoff is collected and measured can be found at *Logården* (SE8) and *Lanna* (SE9). Systems of tiled drains have been installed allowing for separate samplings from each experimental plot/field. At *Logården* different production systems (conventional, integrated and organic) are compared and at *Lanna* the experiments concentrate on different management techniques and fertilisation (catch crops, increasing N and Ca levels).

### **Long-term experiments**

*Bollerup, Önnestad and Östra Ljungby.* SE2 The long-term experiment “Experiments with environmentally sustainable crop rotations” of 2.9 ha has been running at the schools since 1986. The goal is to find connections between plant breeding, nutrient supply and food quality.

*Alnarps experimental farm.* SE3. A long-term experiment on biogas production and the use of the digested residue in the crop rotation is running on the farm.

*Klostergården.* SE7. The farm has no regular long-term experiments, but since the conversion in 1996–1999, yearly recordings of the amount of weeds and pest, as well as soil analysis has been performed in specific checkpoints in the fields.

*Logården.* SE8. Since 1991 a long-term experiment to develop environmentally and productive farming systems have been going on – the experiment focuses on three different productive systems: organic, integrated and conventional farming.

*Lanna experimental farm.* SE9. Two long-term experiments are going on at Lanna. These are focusing on nutrient losses and nitrogen turn over on farms with and without animals on loamy soils in Västergötland.

*The agricultural college Dingle.* SE11. Since 1999 a crop rotation experiment has been going on at the farm.

*Skilleby farm.* SE12. Since 1991 a green manure experiment has been going on at the farm.

*Kvinnersta*. SE13. A long-term experiment comparing organic and conventional farming systems (mainly ley and wheat production) has been going on since 1992. In 2004 a long-term experiment dealing with sustainable leguminous plants in ley was started.

*Riis Lillerud*. SE14. Since 1998 a crop rotation experiment has been going on at Riis.

*Öjebyn*. SE16. Crop rotation experiments have been going on for more than 30 years.

### **Networks (SE24)**

Several private farms, besides the research farms presented above, are also communicating with each other and/or conduct research on their own farms. There are around 15 active participatory research groups in Sweden today. These groups normally consist of a number of farmers, an advisor and a researcher. One person also functions as a facilitator. The farmers learn to improve their own problem solving but also to do research together with scientists. Network building as well as documentation and communication of the working process and the research results are also part of the learning process. Some groups started their work as early as 1998 whereas some groups just have been formed. Each group consists of somewhere between 7 to 16 farms and work with a specific topic for example: biodiversity on farm scale, organic dairy production, organic crop production, organic ley crop seed production, organic greenhouse tomato production, vegetables production outdoors, weeds, potatoes and cropping systems.

### **On farm studies**

Some organic farmers make their farms available for research in relation to different projects. Such projects are for example performed in collaboration with advisors at the Rural Economy and Agricultural Societies, the Swedish Ecological Farmers Association, the Federation of Swedish Farmers, Sweden's County Administration and with researchers at the Swedish University of Agricultural Sciences. The activities are commonly funded by national research programs or by a specific training program in organic farming (KULM) administrated by The Swedish Board of Agriculture, SJV and partly financed by EU.

## Research facilities of UK

	Organisation	Type	Location & Contact.	Further Details (size, capacities, organic since when, etc.)
UK1	ADAS	Research farm	E England ADAS Terrington Bill.cormack@adas.co.uk	Total of 25 ha in a <u>stockless arable rotation</u> . Conversion started 1990. 10ha in a five-course rotation, organic conversion completed in 1995. Field-scale study of sustainability of stockless organic arable production
UK2	ADAS	Research farm	NE England ADAS High Mowthorpe	<u>Mixed arable and grass</u> covering 100 ha with a <u>suckler cow</u> herd. Start date ? Sustainability of upland organic beef and sheep production and compares performance with non-organic.
UK3	ADAS	Research farm	N England ADAS Redesdale	Upland <u>sheep</u> (500) and <u>beef</u> (40 cows) unit covering 440 ha. Start conversion 1991
UK4	ADAS	Research farm	Wales ADAS Pwllpeiran	Upland <u>sheep</u> (160) and <u>beef</u> (12 cows) unit covering 110 ha. Established 1993
UK5	Department of Agriculture and Rural Development Northern Ireland	Research farm	Northern Ireland Greenmount Campus, College of Agriculture, Food and Rural Enterprise <a href="mailto:charlotte.moore@dardni.gov.uk">charlotte.moore@dardni.gov.uk</a>	Organic unit comprises 36 ha managed organically since spring 2002. Carries self contained Aberdeen Angus suckler to beef herd, self contained Lleyn <u>sheep</u> flock, growing sufficient <u>cereals</u> to support the livestock and managed to be as sustainable as possible
	Department of Agriculture and Rural Development Northern Ireland	Networks	Northern Ireland	Greenmount Organic unit and commercial organic farms network used for research, communication and dissemination
UK6	Department of Agriculture and Rural Development Northern Ireland	Research Farm	Northern Ireland Plant Breeding Station, Loughgall, Co. Armagh <a href="mailto:sean.macantsaoir@dardni.gov.uk">sean.macantsaoir@dardni.gov.uk</a>	Organic <u>apple</u> orchard
UK7	Duchy College, Organic Studies Centre, Cornwall	Research farm	SW England Coswinsawsin Farm, Camborne, Cornwall Contact Organic Studies Centre on 01209 722148; <a href="mailto:j.burke@cornwall.ac.uk">j.burke@cornwall.ac.uk</a> <a href="mailto:s.roderick@cornwall.ac.uk">s.roderick@cornwall.ac.uk</a>	25 ha field <u>vegetables and cereals</u> . Rotation based on potatoes, brassicas, cereals, fertility building legumes. Fully organic since 2001
	Duchy College, Organic Studies Centre, Cornwall	Long-term crop experiments	SW England Contact: Organic Studies Centre <a href="mailto:s.roderick@cornwall.ac.uk">s.roderick@cornwall.ac.uk</a> Tel 01209 722113	Field scale comparison of <u>grass mixtures</u> ; cereal variety trial site; Six organic farm sites throughout Cornwall. Date?
	Duchy College, Organic	Contracts with farms or on-farm	SW England Contact: Organic Studies Centre <a href="mailto:j.burke@cornwall.ac.uk">j.burke@cornwall.ac.uk</a> ;	Protein crop production for <u>organic livestock</u> ; <u>organic cereal production surveys</u> ; potato, salad

	Studies Centre, Cornwall	studies	<a href="mailto:s.roderick@cornwall.ac.uk">s.roderick@cornwall.ac.uk</a> <a href="mailto:Rachel.moss@cornwall.ac.uk">Rachel.moss@cornwall.ac.uk</a>	<u>vegetable and brassica variety studies</u> . Contracts variable
	Duchy College, Organic Studies Centre, Cornwall	Other: Greenhouse	SW England Contact: <a href="mailto:j.burke@cornwall.ac.uk">j.burke@cornwall.ac.uk</a> <a href="mailto:Barry.mulholland@duchy.ac.uk">Barry.mulholland@duchy.ac.uk</a> <a href="mailto:Phil.legrice@cornwall.ac.uk">Phil.legrice@cornwall.ac.uk</a>	Purpose built, state of the art glass house research facility
UK8	Duchy College, Organic Studies Centre, Cornwall	Contracts with farms and on-farm studies	SW England Contact: Organic Studies Centre <a href="mailto:j.burke@cornwall.ac.uk">j.burke@cornwall.ac.uk</a> ; <a href="mailto:s.roderick@cornwall.ac.uk">s.roderick@cornwall.ac.uk</a> <a href="mailto:Rachel.moss@cornwall.ac.uk">Rachel.moss@cornwall.ac.uk</a>	<u>Parasite control in organic sheep flocks; herd health and welfare assessment and benchmarking; economic benchmarking</u> . Contracts variable
	Duchy College, Organic Studies Centre, Cornwall	Other: Laboratory	SW England Duchy College, Rosewarne Contact: <a href="mailto:j.burke@cornwall.ac.uk">j.burke@cornwall.ac.uk</a> <a href="mailto:phil.legrice@cornwall.ac.uk">phil.legrice@cornwall.ac.uk</a>	Micro-propagation, soil science, plant pathology, entomology research and training facility
	Duchy College, Organic Studies Centre, Cornwall	Networks	SW England Organic Studies Centre Contact: <a href="mailto:j.burke@cornwall.ac.uk">j.burke@cornwall.ac.uk</a>	<u>Dairy farmer</u> discussion group: information exchange on organic dairy production and systems management; dairy herd health, nutrition and breeding for organic production.
UK9	EFRC	Research farm	S England Elm Farm – Bruce Pearce ( <a href="mailto:bruce.p@efrc.com">bruce.p@efrc.com</a> ).	Elm Farm – 90 ha working organic farm (organic since 1980). <u>Beef, forage and arable enterprises</u> . Main office for the institute.
UK10	EFRC	Research farm	S England Sheepdrove Organic Farm – Lois Philipps ( <a href="mailto:lois.p@efrc.com">lois.p@efrc.com</a> )	Sheepdrove Organic Farm – 800 ha downland organic farm in southern England. Mixed farm of <u>arable, forage, beef, pigs and silvo-poultry</u> . Office and meeting facilities. Conversion began 1994. Monitoring since 2003/04 as base line data
UK11	EFRC	Research farm	E England Wakleyns Agroforestry – Martin Wolfe ( <a href="mailto:martin.w@efrc.com">martin.w@efrc.com</a> )	Wakleyns Agroforestry – 24 ha organic farm in eastern England. Stockless mixed cropping agroforestry system. Office and meeting facilities.
UK9	EFRC	Long-term crop experiments	S England Elm Farm – Lois Philipps ( <a href="mailto:lois.p@efrc.com">lois.p@efrc.com</a> )	10 years of stockless rotation. Nutrient management? Is this still running?
UK12	EFRC	Networks	Various sites through UK Hannah Jones – ( <a href="mailto:Hannah.j@efrc.com">Hannah.j@efrc.com</a> )	Network of commercial organic farmers working with EFRC on <u>cereal production and breeding</u> research projects. Started 2001
UK10	EFRC	Animal research facilities	S England Sheepdrove Organic Farm – Lois Philipps ( <a href="mailto:lois.p@efrc.com">lois.p@efrc.com</a> )	Innovative <u>poultry</u> production system used for research within production sheds and designated poultry research system including <u>feed trials and silvo-poultry</u> . Start date 2003/04
UK9	EFRC	Other:	S.England	Basic laboratory for undertaking

		Laboratory	Elm Farm. – Bruce Pearce ( <a href="mailto:Bruce.p@efrc.com">Bruce.p@efrc.com</a> )	preparation for field trials.
UK9	EFRC	Other: Policy and social	S.England <a href="mailto:Bruce.p@efrc.com">Bruce.p@efrc.com</a>	EFRC has facilities to undertake a range of policy and socio-economic research.
UK9	EFRC	Networks	England <a href="mailto:Bruce.p@efrc.com">Bruce.p@efrc.com</a>	Farm network and groups including Organic Systems Development Group of 10 farms with full range of enterprises, started in 2001, concerned with <u>research, dissemination and development of environmental benchmarking</u>
UK13	HDRA	Research farm	Central England HDRA Ryton Organic Gardens, Warwickshire <a href="mailto:tnunis@hdra.org.uk">tnunis@hdra.org.uk</a> <a href="mailto:ktippens@hdra.org.uk">ktippens@hdra.org.uk</a>	5ha field <u>vegetable</u> production, organic since 1984 5ha demonstration gardens, organic since 1984
UK14	HDRA	Research farm	SE England HDRA, Yalding Organic Gardens, Kent <a href="mailto:jmathias@hdra.org.uk">jmathias@hdra.org.uk</a>	5ha demonstration gardens, organic since 1994 Production system?
UK15	HDRA	Research farm	E England HDRA, Audley End, Essex <a href="mailto:mthurlow@hdra.org.uk">mthurlow@hdra.org.uk</a>	2.5 ha demonstration gardens, organic since 1999 Production system?
UK16	HDRA	Long-term crop experiments	Central England <a href="mailto:frayns@hdra.org.uk">frayns@hdra.org.uk</a> <a href="mailto:rosemary.collier@warwick.ac.uk">rosemary.collier@warwick.ac.uk</a>	Hunts Mill Warwick HRI Wellesbourne – 13 ha, since 1996, investigating the performance of three cropping strategies contrasting in terms of <u>cropping and fertility building regimes (vegetable/arable systems)</u> Organic Unit Warwick HRI Kirton – 3.2ha, since 1997, investigating the performance of a field <u>vegetable cropping strategy</u> (DEFRA)
UK17	HDRA	Other: Greenhouse	Central Engalnd HDRA, Coventry <a href="mailto:tnunis@hdra.co.uk">tnunis@hdra.co.uk</a>	State of the art glasshouse facilities (with compartments licensed by Defra to handle quarantine plant pathogens)
	HDRA	Other: Laboratory	Central England HDRA, Coventry <a href="mailto:frayns@hdra.org.uk">frayns@hdra.org.uk</a>	State of the art laboratories for research related to plant genetic resources, soils, seed pathology and microbiology (licensed by Defra to handle quarantine plant pathogens)
UK18	HDRA	Network	England <a href="mailto:arosenfeldt@hdra.org.uk">arosenfeldt@hdra.org.uk</a> <a href="http://www.organicveg.org.uk">www.organicveg.org.uk</a>	The Sustainable Organic Vegetable Systems Network A network of 10 farms with organic field <u>vegetable</u> production, agronomic and <u>economic</u> performance monitored, on-farm innovation supported and documented
UK19	HDRA	Network	England <a href="mailto:gdavies@hdra.org.uk">gdavies@hdra.org.uk</a> <a href="http://www.organicweeds.org.uk">www.organicweeds.org.uk</a>	Organic Weed Management Network. A network of 350 farmers participating to explore management of <u>weeds</u> on organic



				farms, with 25 farmers conducting monitored on-farm trials. Started 2001
UK20	HDRA	Contracts with farms and on-farm studies	England <a href="mailto:psumption@hdra.org.uk">psumption@hdra.org.uk</a> <a href="mailto:mike.day@niab.com">mike.day@niab.com</a>	Vegetable variety testing Collaboration between HDRA and NIAB Five farms since 1990, expanded to 18 farms since 2005
UK21	HDRA	Other: Vegetable Genetic Resources	Central England <a href="mailto:sbywater@hdra.org.uk">sbywater@hdra.org.uk</a>	Heritage Seed Library. Collection of 700 accessions of rare and endangered vegetable varieties
UK22	HDRA	Networks	UK	Garden Organic (HDRA membership scheme) 32,000 members (gardeners, consumers, organic citizens) used for communication and dissemination
UK23	HDRA	Network	UK	Garden Organic Members' Experiment Network. A network of approx 500 Garden Organic members who actively participate with in-garden research activities on an annual basis
UK24	IGER	Research farm	W Wales IGER, Trawsgoed, Aberystwyth, Ceredigion, SY23 4LL, UK. Contact: <a href="mailto:Richard.weller@bbsrc.ac.uk">Richard.weller@bbsrc.ac.uk</a>	86 hectare organic <u>dairy farm</u> converted in 1992-94 period. Facilities currently evaluating two contrasting systems of milk production including changes in nutrient budgets, efficiency of nutrient utilisation, soil fertility, crop quality, animal health, animal performance and financial margins. Linked to six commercial organic dairy farms.
	IGER	Animal research facilities	W Wales IGER, Trawsgoed, Aberystwyth, Ceredigion, SY23 4LL, UK. Contact: <a href="mailto:Richard.weller@bbsrc.ac.uk">Richard.weller@bbsrc.ac.uk</a>	<u>Dairy herd</u>
UK25	NIAB	Other: Laboratories	E England NIAB Cambridge <a href="mailto:Jane.thomas@niab.com">Jane.thomas@niab.com</a>	state of the art laboratories for molecular biology, plant pathology, produce quality
	NIAB	Other: Greenhouse	E England NIAB Cambridge <a href="mailto:Jane.thomas@niab.com">Jane.thomas@niab.com</a>	Extensive glasshouse facilities for growing ornamental species, specialist glasshouse facilities for plant pathology purposes and general arable crop research
	NIAB	Networks	E England Cambridge, and eight regional centres around the UK <a href="mailto:Simon.kerr@niab.com">Simon.kerr@niab.com</a>	Access to organic research sites on grower holdings. Access to a wide range of non-organic arable and vegetable growing situations. Specialist irrigated facilities at Cambridge for <u>plant disease</u> work. Used for research including <u>variety trials</u> and <u>dissemination</u> .
	NIAB	Other: Growth rooms	E England NIAB Cambridge <a href="mailto:jane.thomas@niab.com">jane.thomas@niab.com</a>	8 temperature controlled rooms for plant pathology work
UK26	SAC	Research Farm	E Scotland Craibstone Estate, Aberdeen Contact: <a href="mailto:david.younie@sac.co.uk">david.younie@sac.co.uk</a>	Organic since 1992. 89ha ploughed land, 60 ha permanent pasture. 350 breeding <u>ewes</u> and

				100 <u>finishing cattle</u> .
	SAC	Long-term crop experiments	E Scotland Craibstone Estate, Aberdeen Contact: christine.watson@sac.ac.uk	Replicated rotation trial comparing 2 organic rotations including different <u>ley:arable ratios</u> . Established 1991.
	SAC	Other: Greenhouse	E Scotland Craibstone Estate, Aberdeen and Kings Buildings, Edinburgh Contact: christine.watson@sac.ac.uk	Greenhouse facilities for soil and plant science
	SAC	Animal research facilities	E Scotland Craibstone Estate, Aberdeen Organic Farms and Veterinary Laboratory. Contact: Douglas.Gray@sac.co.uk	Purpose-built animal housing for <u>cattle and sheep</u> . Currently buildings, fields and post mortem room facility are approved for animal use research purposes (Animals (Scientific Procedures) Act). Complete range of veterinary pathology services.
UK27	SAC	Animal research facilities	W Scotland Auchincruive, Ayr, KA5 6HW Contact nick.sparks@sac.ac.uk	Free-range (replicated) <u>poultry</u> unit, controlled environment growth rooms, hatchery, processing plant and feed mill
	SAC	Other: Laboratory	W Scotland Craibstone Estate, Aberdeen and Kings Buildings, Edinburgh Contact: christine.watson@sac.ac.uk	State-of-the-art laboratories for soil and plant sciences
	SAC	Other: Phytotron	W Scotland Craibstone Estate, Aberdeen and Kings Buildings, Edinburgh Contact: christine.watson@sac.ac.uk	Controlled environment facilities for soil and plant science
UK28	SAC	Network	Scotland. Contact: david.younie@sac.co.uk	2 demonstration farms: 1. Godscroft Abbey, Duns - upland <u>mixed farm</u> 750 ha (576 ha crops and grass. 1800 breeding <u>ewes</u> and 160 <u>suckler cows</u> . 2. East Mains, Dundee - lowland mixed farm 160 ha (all ploughable). 60 breeding ewes, 60 suckler cows, finishing <u>pigs</u> (2000 per annum). 4 ha <u>vegetables</u> , 25 ha <u>seed potatoes</u> Used for research and dissemination
UK29	University of Bristol	Animal research facilities	SW England Wyndhurst Farm Contact: David Main	Non-organic 100 cow dairy unit and sheep farm. Animal research facilities: behavior and production research. Complete range of veterinary services laboratories. Specialising in organic husbandry, organic certification, welfare assessment, experimental design and statistical analysis.
UK30	University of Newcastle	Research farm	N England Nafferton Ecological Farming Group – contact c.leifert@ncl.ac.uk	320 hectares conventional, 160 hectares organic, 160 dairy cows, 80 organic <u>dairy cows</u> , –Compost Tea Maker, Sandberger <u>Composting Unit</u> Converted

	University of Newcastle	Long-term crop experiments	N England Nafferton Ecological Farming Group – contact p.n.shotton@ncl.ac.uk	Nafferton <u>systems comparison study</u> .
	University of Newcastle	Network	N England Nafferton Ecological Farming Group – contact p.n.shottong@ncl.ac.uk	Agronomic experiments into the effect of <u>variety choice fertility management and/or crop protection methods on crop yield and quality</u> .
UK31	University of Newcastle	Other: Greenhouse	N England Close House and Stockbridge Technology Centre – contact c.leifert@ncl.ac.uk	Access to 8 hectares of new glasshouses at Close House – University of Newcastle and Stockbridge Technology Centre
UK30	University of Newcastle	Animal research facilities	N England Nafferton Ecological Farming Group – contact gillian.butler@ncl.ac.uk	160 <u>dairy cow</u> experimental herd, 40 head beef cattle rearing unit, 100 <u>lamb</u> finishing unit.
UK31	University of Newcastle	Other	N England University of Newcastle – contact c.leifert@ncl.ac.uk	State of the art soil physics, chemistry and biological assessment labs. State of the art fixed climate chambers (8) Phytotron
UK32	University of Nottingham	Research farm	Central England University of Nottingham Debbie.sparkes@nottingham.ac.uk	20ha <u>stockless organic area</u> within 400ha farm. Organic since 2002
	University of Nottingham	Long-term crop experiments	Central England University of Nottingham Debbie.sparkes@nottingham.ac.uk	Replicated experiment, set up in 2000 to investigate <u>conversion strategies for stockless organic systems</u>
	University of Nottingham	Other: Greenhouse	Central England UoN Debbie.sparkes@nottingham.ac.uk	Suite of glasshouses and controlled environment rooms
	University of Nottingham	Other: Laboratory	Central England UoN Debbie.sparkes@nottingham.ac.uk	State of the art laboratories for crop physiology, soil, plant and food related research.
UK33	University of Wales	Other: Greenhouse	Wales Dr N Lampkin, nhl@aber.ac.uk	Existing facilities could be applied to organic research, but not currently used for this.
	University of Wales	Animal research facilities	Wales Dr N Lampkin, nhl@aber.ac.uk	Existing facilities could be applied to organic research, but not currently used for this.
	University of Wales	Other: Laboratory	Wales Dr N Lampkin, nhl@aber.ac.uk	Existing facilities could be applied to organic research, but not currently used for this.
	University of Wales	Others – policy, socio-economic research	Wales Dr N Lampkin, nhl@aber.ac.uk	Databases of financial and statistical data, and documents relating to organic farming policy and marketing, consistent with the socio-economic focus of our work.
	University of Wales,	Research farm	Wales Dr N Lampkin, nhl@aber.ac.uk	50 ha mainly <u>cattle and sheep</u> - organic since 1996
UK34	Warwick HRI	Research farm Experimental fields	Central England Wellesbourne, Warwickshire, UK  E England Kirton, Lincolnshire, UK	Wellesbourne - 100 ha arable land farmed conventionally with wheat and barley crops – sandy loam soil. 12 ha organic since 1995 available annually for trials with separate dedicated trials sites for <u>soil borne diseases, pest insects,</u>

			Sally.mann@warwick.ac.uk	<u>nutrient gradients</u>  Kirton - 46 ha grade one silt land ideal for a range of crops and 4 ha organic site registered with Soil Association.
UK34 UK35	Warwick HRI	Long-term experiments	Central and E England Wellesbourne, Warwickshire, UK Kirton, Lincolnshire, UK Rosemary.collier@warwick.ac.uk	Long-term trials on production of organic field <u>vegetables</u> at Wellesbourne and Kirton. Organic plots have been monitored from the start of conversion in 1995-6. A full cropping history and soil analysis data are available.
	Warwick HRI	Other: Greenhouse	Central England Variety of greenhouse facilities  Sally.mann@warwick.ac.uk	Approx 5000 m <sup>2</sup> space in various sizes of compartment with heating, lighting, forced fan ventilation, shade screen, A/C and pollen filtration. Virus glasshouse Unit (10 A/C compartments) in self contained quarantine unit with own potting area and autoclave. Range of polytunnels, cold frames and sandbeds
	Warwick HRI	Other: Laboratory	Central England Rosemary.collier@warwick.ac.uk	Laboratories for molecular biology, plant science, soil science, plant pathology, entomology, microbial science. Controlled-temperature storage facilities. Shelf-and vase-life testing facilities.
	Warwick HRI	Other: Climate chamber	Central England Rosemary.collier@warwick.ac.uk	Plant growth chambers, insect rearing facility.
	Warwick HRI	Other: genetic material	Central England Genetic Resources Unit dave.astley@warwick.ac.uk	Involved in the conservation of a variety of vegetable crops and their wild relatives