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Coordination of European Transnational Research in Organic Food and Farming

Instrument: Co-ordination of Research Activities
Thematic Priority: Coordination of National Activities (ERA-net)

D 6.3 Prioritisation and co-ordination of collaborative R&D

Prepared by

Donal Murphy-Bokern, Flavie Salaun & Lucy Barnard
Department for Environment, Food and Rural Affairs, UK

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I – Executive Summary

The overall aim of the CORE Organic ERA-Net is to enhance the quality, relevance and utilisation of resources in European research in organic farming and food. To achieve this required a range of activities between 11 different European countries, which have been coordinated through a number of work packages.

The aim of work package 6 (WP6) was to identify, prioritise and coordinate future organic farming and food research between the 11 partners. WP6 had 6 objectives for achieving this goal, i) to identify and prioritise possible topics of common interest to all/some of the partners; ii) to identify research areas where increased cooperation could bring major synergies and progress; iii) to assess the level of interest in co-funding projects; iv) to provide recommendations on how to overcome barriers to joining activities; v) to make recommendations on best practice within research programmes; and vi) to assess opportunities for joint research programmes and describe the extent of transnational collaboration that is likely to occur. From these objectives, there were 3 key deliverables, i) a report providing a list of topics which require new research; ii) a matrix highlighting research priorities; and ii) plans for funding collaboration in relation to the research priorities identified. Report D 6.1 & 6.2 Identification and prioritisation of collaborative R&D, addresses deliverables i) and ii) and this report addresses deliverables ii) (updated) and iii).

Organic farming and food research topics were identified using a range of methods. Research strategies and other relevant documents were examined for each partner country in order to identify the full range of research areas for consideration. In March 2006, a workshop was held between all partners to identify those research topics that were of common interest to at least 3 of the partners. Those topics identified were placed in a matrix and scored for priority by each partner on a scale of 1 (low) to 3(high). This exercise was carried out twice. The results from the first exercise in May 2006 (provided in the report for D 6.1 and 6.2) were used to inform a call for research projects as part of WP7. The prioritisation exercise was repeated in August 2007 to highlight any shifts and to identify potential topics for future research.

A large range of research topics were identified, including crop production, livestock production, farming systems, environment/natural resources, socio-economics, legal issues/standards and knowledge transfer (see report for D 6.1 and 6.2). A minimum of 7 partners expressed interest in each research topic either as a low, medium or high priority. Topics selected for the WP7 call included animal disease and parasite management, food quality and innovative marketing strategies. When the prioritisation exercise was repeated, there were no major differences highlighted, though there was a slight shift in some of the rankings. The top three research topics after the second prioritisation exercise were the impact of organic farming on the environment, research on the effectiveness and scale of national policies and instruments, and animal disease and parasite management.

Overall, all partners were interested in co-funding transnational research in organic farming and food. Recommendations on how to avoid the legal and administrative barriers that currently exist in cooperating transnationally were identified, as well as recommendations on best practice within research programmes. Potential future research topics have been identified along with potential partners who could take this forward. Cooperating and co-funding transnational research on organic farming and food offers partners the potential to gain major synergies and progress. This report should be read with reference to the report for WP4 on the utilisation of research facilities.

II - Introduction

This is the final report for WP6.

1. The objectives for WP6 were:

    1) To identify and prioritise possible topics for future research which are of common interest to all or some of the ERA-Net partners.

2) To identify research areas where increased cooperation between national or regional programmes could bring major synergies and progress.

3) To assess the level of interest amongst the ERA-Net partners in co-funding projects.

4) To provide recommendations to the ERA-Net on how legal, organisational and administrative barriers for joining activities between national and regional research programmes could be addressed.

5) To make recommendations on best practice within research programmes.

6) To assess opportunities for specific joint research programmes and utilisation of common research facilities. To prioritise future research topics and describe the type and extent of transnational collaboration that is likely to occur.

From these objectives, there were three key deliverables as follows:-

- D6.1: Report providing list of topics, which require new research.
  - The first deliverable was to create a list of research needs and compare it with the information on existing research collated in WP 3 and WP 4, in order to identify knowledge gaps, which need to be addressed by future research.

- D6.2: Matrix showing research priorities.
  - The second deliverable was to put together a matrix of research priorities that could be used by each partner to assess the priorities for research within their own national programmes and to inform future collaboration decisions between national programmes.

- D6.3: Plans for funding collaboration in relation to 6.2.
  - The final deliverable was to identify potential collaboration opportunities and for those countries interested in any of the priority projects, to work together to develop a mutually acceptable specification for the research, and agree how the research should be let and funded. The aim was to identify specific projects where there was agreement to fund and the type of collaboration expected (e.g. aligning existing national research projects or committing national funds to a jointly funded project/programme)

2. Our work in meeting these objectives complements WP4, which is led by the Ministry of Agriculture and Forestry in Finland. WP4 also seeks to identify research areas where an increased cooperation between national or regional programmes, with an emphasis on national research facilities, could bring

major synergies and progress. In identifying, prioritising and coordinating future organic farming and food research topics of common interest to all or some ERA-Net partners, this report fulfils the WP6 objectives and deliverables.

III – Background

3. In June 2005, Defra (the UK partner) proposed that to further the key objectives of WP6, partners' current R&D strategies, research needs and investment plans could provide evidence for the identification of future research investments which are of common interest to all or some of the ERA-Net partners. All partners provided relevant documents up to 1st April 2006 (see report for D 6.1 and 6.2 for more information) which were subsequently analysed. In March 2006, a workshop between partners' representatives was conducted with the aim of collecting further information on research needs common to at least three partners. The partners were asked to provide themes, topics or researchable questions common to at least three partners. These topics were used to inform the call for research projects that was issued as part of WP7 in 2007. In August 2007, all partners were asked to provide an update on their research needs and to indicate whether these had changed from the previous year. Feedback from partners was used to identify future research priorities and to determine the extent of collaboration between partners.

4. This report quantifies the extent of partners' interest in research themes common to at least three partners. Report D 6.1 and 6.2 summarises the main research themes in detail and provides partners assessments of their research priorities up to May 2006. This report summarises partners updated research priorities up to August 2007. The report also responds to all other WP6 objectives, listed in the introduction.

5. This report is based on the written material provided by partners (Annex 1), the outputs of the WP6 workshop on 2nd March 2006 (Annex 2), and other evidence provided by partners up until August 2007.

IV - Possible topics for future research which are of common interest to all or some of the ERA-Net partners.

29. The information on research needs presented by partners, through comments on the initial report, country reports and the WP6 workshop in March 2006 in Florence was analysed. From the subject areas listed in the report for D 6.1 and 6.2, those that were supported by three or more partners were identified. Each individual partner was then asked to prioritise these topics by scoring them on a scale of 1 (low) to 3 (high). The number of interested partners, and the degree of their interest (i.e. whether the topic was a high, medium or low priority) was then calculated. This was done in 2006 (see report for D 6.1 and 6.2) and updated by partners in August 2007. Table 1 summarises this information on partners' updated priorities. Annex 3 provides a breakdown of the scores given to each topic by each partner. Formas (SE) provided two prioritisations, one for its own projects and one for the research needs that Formas would like to see developed transnationally. The Formas scores for transnational projects were used in this analysis.

Table 1: Research needs common to three or more CORE Organic partners.

Research needs common to at least three partners	Comments	Prioritisation (maximum of 30)	Number of interested partners	Number of high scores
Crop production				
Improving crop production	Due to the geographical and cultural differences in which crops are grown and used, and partners' need for their research activity to remain close to their research users, crop management research might not be a priority for transnational research activity.	11	9	0
Building and maintenance of soil fertility	Previous partners' research on the type of soil and crops used might help in developing a relevant transnational project.	21	10	4
Soil nutrient management in horticulture and its impact on the environment	Transnational research would need to be able to accommodate large scale variation in soils and variation in climate.	17	8	3
Weeds, pests and diseases management	Further work to identify the specific targets for transnational research is required on the part of collaborating partners if an effective research investment is to be made. According to WP4, a lot of work has been done and it would be necessary to have further details on what is required and has been done.	23	11	4
Intercropping systems: Crop protection, weed control, engineering improvement, nutrition management, ensuring adequate yields	Due to the geographical and cultural differences in which crops are grown and used, and partners' need for their research activity to remain close to their research users, crop management research might not be a priority for transnational research activity.	22	8	6

Table 1: Research needs common to three or more CORE Organic partners

Research needs common to at least three partners	Comments	Prioritisation (maximum of 30)	Number of interested partners	Number of high scores
Developing and identifying varieties that are suited to organic conditions	This could potentially be developed as a collaborative project; but there are other current projects such as SUSVAR (Sustainable low-input cereal production: required varietal characteristics and crop diversity) that need to be taken into account.	20	9	2
Organic seeds: identifying and developing breeding methods acceptable to organic farming, which could then be applied for seed production	This could potentially be developed as a collaborative project.	17	9	2
Animal production				
Health and welfare	This is another area where differences in husbandry and farm practice between countries, and the need for research activity to remain close to research users. Nevertheless, because animals regulate their own physiological environment, there is more common ground between animal production related problems compared with crop production. According to the WP4 report, a lot of work has been done and further details on what is required and what has been done should be taken into account.	19*	8	4
Feeding livestock for meat with 100% organic fodder	According to the report for WP4, there is a lot of work being carried out within the partner countries on organic fodder production. Previous and ongoing research should be taken into account in the development of any transnational project.	21	9	5

*Formas (SE) : If focus on goal conflict aspects

Table 1: Research needs common to three or more CORE Organic partners

Research needs common to at least three partners	Comments	Prioritisation (maximum of 30)	Number of interested partners	Number of high scores
Identifying suitable animal breeds / crosses for organic production, that also improve animal welfare (particularly free-range conditions for animals, and animals for meat consumption)	This could be progressed in a way similar to that for crop production.	15	8	2
Identify breeding methods acceptable to organic farming to be identified and subsequently applied to produce breeds specific to organic production.	This could be progressed in a way similar to that for crop production.	15	9	1
Animal disease and parasite management, including preventative health and improving therapies to reduce reliance on antibiotics	Transnational research fostering the transfer of technology and knowledge between partners could be considered. This has the additional merit of fostering common standards and animal welfare aspirations in the future.	26	10	7
Quality of meat products and economic impact	Transnational research could be considered. Consideration would need to be given to the interdisciplinary nature of the subject area in developing a specific project (e.g. effects of animal breeding, husbandry etc).	17*	9	2
Farming and agricultural systems				
Multifunctional organic systems, including non-food products	Transnational research could be valuable in sharing experiences of partners, but national research would probably still be required to translate this into usable outputs.	20	10	4

*BMVEL (DE) = more interested if interdisciplinary; Formas (SE) = If quality of products in relation to production methods and health aspects

Table 1: Research needs common to three or more CORE Organic partners

Research needs common to at least three partners	Comments	Prioritisation (maximum of 30)	Number of interested partners	Number of high scores
Development of organic systems, such as stockless farming systems	There is a common need for research in this area.	20	10	3
Integration between different, complementary production systems (e.g. livestock and crop production). Understanding of what the barriers are prohibiting these linkages	This could be developed as a potential transnational project. However, it may be necessary to take into account geographical and cultural differences in production systems, differences in husbandry and farm practice between countries, and the need for research activity to remain close to research users.	16	8	2
Production efficiency / identification of successful practices	Transnational research could be valuable in sharing experiences of partners, but national research would probably still be required to translate this into usable outputs.	18*	9	4
Environment and natural resources				
The management and optimisation of nutrients within organic systems	According to WP4, some countries have procured specific research on this and more details on what has been done and what is required are necessary	23	10	5
Impact of organic farming on the environment (positive and negative), including biodiversity. Identification of agricultural practices that maintain biodiversity	With the differing countries, regions, landscapes, and farming practices, it would be necessary to clarify what outputs are expected by each partner undertaking the funding of a collaborative project. According to the WP4 report extensive work might have been already done and might be relevant on this issue. It would be necessary to gather further details on what is required and what has been done.	28	11	7

*Formas (SE): If focus on broader aspect on the concept of efficiency, i.e. use of renewable resources and ecosystem services

Table 1: Research needs common to three or more CORE Organic partners

Research needs common to at least three partners	**Comments**	**Prioritisation (maximum of 30)**	**Number of interested partners**	**Number of high scores**
Impact of conversion on the environment	Due to the geographical and cultural differences this research area may not be a priority for transnational research activity.	16	10	1
Organic farming and greenhouse gas (GHG) mitigation		18	8	3
Cycling and recycling of natural resources. Nutrient, water and energy management - Energy use - Energy efficiency - Production		23	9	5
Socio-economics				
Market research and consumer attitudes		19	10	3
Innovative marketing strategies. Identification of successful marketing methods. Local markets	Several partners seek a greater understanding of marketing and the food chain. A collaborative project, with a national and regional approach, to inform the improvement of national and local markets could be delivered through transnational investment.	24	11	4
Characteristics of the organic market		16	10	2

Table 1: Research needs common to three or more CORE Organic partners

Research needs common to at least three partners	Comments	Prioritisation (maximum of 30)	Number of interested partners	Number of high scores
Supply chain management / economics		18	8	3
Conversion: drivers and barriers to conversion (problems related and market prospective)		21	11	4
Research on the effectiveness and scale of national policies and instruments		27	11	7
Food				
Quality of organic food – health and safety	Further information on the research outputs sought by partners would help in the initiation of a transnational research project in this area. According to the WP4 report, a lot of work has already been done and it would be necessary to gather further details on what is required and what has been studied.	26	10	6
Quality of organic food – processing	Several partners seek to improve the quality of produce from primary production and also seek to improve the impact of storage and processing on organic food quality. This includes research on the appropriateness of additives and processing aids used with organic processing. This could be undertaken through transnational research.	17	9	2
Improving new storage and preservation for organic fresh products	Though this area of research was not highlighted as being of a high priority, research into the impact of storage (including additives) on organic food quality could be carried out through transnational research.	12	8	0

Table 1: Research needs common to three or more CORE Organic partners

Research needs common to at least three partners	Comments	Prioritisation (maximum of 30)	Number of interested partners	Number of high scores
Development of holistic food quality measurement methods		13	8	1
Legal issues and standards				
Consumer trust (process quality of organic goods, consumer related research) Regional aspects Risks of conventionalisation		17	8	3
The impact of organic standards on trade, both for domestic producers and for those wishing to import into the EU	A transnational approach to research could be used.	15	8	3
Understanding how standards have an impact on international trade	A transnational approach to research could be used.	11	8	1
Knowledge Transfer				
How are methods perceived by the different target groups? How to communicate effectively? (e.g. Organic Eprints) Channels of communication optimisation of communication to target groups	Taking into account cultural differences and the need to target information at specific target groups, it would be valuable for partners to share knowledge and information arising from research and on communication strategies and channels used on an ongoing basis.	19	9	3

V - Research areas where increased cooperation between national or regional programmes could bring major synergies and progress.

30. Based on partners' inputs, research topics that could benefit from a transnational approach are identified in Table 1. This reflects partners research priorities up to August 2007. The report for D 6.1 and 6.2 provides initial information up to May 2006. The report for WP4 will provide additional information on the available expertise in organic food and farming across the partner countries and the types of research facilities available. This report should be consulted in parallel with the WP6 report.

31. The information in Table 1 is only indicative. Prospective partners who express/have expressed an interest in funding research in specific areas will need to discuss in more detail the relevance and applicability of the research for transnational funding and the research facilities available/appropriate. Some of the research topics identified were very broad in comparison with others, which consequently may have affected the scoring. Again, where partners express/have expressed interest in these broad areas, further discussion amongst themselves will be required to identify specific projects that would benefit from transnational research. Taking into consideration these limitations, the following broad areas were identified as potential research areas for improving cooperation between national or regional research programmes.

32. The effectiveness and scale of national support instruments

This is potentially useful to a wide range of partners and illustrates the potential for research that addresses partners' needs directly. It could inform a rationalisation or levelling of national support programmes.

33. Crop varieties

The identification of crop varieties that are better suited to organic conditions, depending on further input from partners could potentially be developed as a collaborative project, led possibly by a study of partners' current cultivar assessment methodologies, and the statistical basis behind current assessments. This would inform the optimisation of any subsequent transnational research. Other relevant work needs to be taken into consideration, such as the COST action 860 (SUSVAR = Sustainable low-input cereal production: required varietal characteristics and crop diversity) which might cover a great deal of this topic. There is also on-going collaboration between COST 860 and the European Consortium for Organic Plant Breeding (ECO-PB).

34. Animal health and welfare

Animal health and welfare, particularly with respect to disease and parasite management, including preventative health and improving therapies to reduce reliance on antibiotics is highlighted. Transnational research fostering the transfer of technology and knowledge between partners could be considered. This has the additional merit of fostering common standards and animal welfare aspirations in the future.

35. Production systems

Much of the research needs in farming and agricultural systems cuts across other themes, such as crop and animal production, as well as environment and resources. Much could be learnt from the experiences of partners within a transnational project but national programmes would probably still need to invest in the translation of such transnational research into usable outputs. There is common need for the development of organic farming systems, such as stockless farming systems.

36. Integration between production systems

The integration between different, complementary production systems (e.g. livestock and crop production) is seen as important. Transnational research could be undertaken to improve our understanding of what the barriers are prohibiting these linkages. However, it may be necessary to take into account geographical and cultural differences in production systems, differences in husbandry and farm practice between countries, and the need for research activity to remain close to research users.

37. Socio-economics

Socio-economic research is a common research need, with emphasis on the economic side. Partners seek a greater understanding of marketing and the food chain. A collaborative project, with a national and regional approach, to inform the improvement of national and local markets could be delivered through transnational investment.

38. Product quality

A number of partners seek to improve the quality of produce from primary production and also seek to improve the impact of storage and processing on organic food quality. This includes research on the appropriateness of additives and processing aids used within organic processing. This could be undertaken through transnational research. It potentially has the additional merit of fostering a common approach and common aspirations.

39. Food safety

Partners identified food safety as a research theme, in particular, the risks of the use of manure related contamination, and of mycotoxins in organic produce. Further information on the research outputs sought by partners would help in the initiation of a transnational research project in this area.

40. Standards and trade

The impact of organic standards on trade is an important issue common to partners, both for domestic producers and for those wishing to import into the EU. Several partners are also interested in understanding how standards have an impact on international trade. These needs could be undertaken under transnational research.

41. Livestock nutrition

There is strong interest in the nutrition of livestock for meat. Since local environment is a relatively minor factor, this is an area worth developing into a transnational project.

VI - Interest amongst the ERA-NET partners in co-funding projects.

42. All partners are interested in participating in transnational projects. Annex 1 presents a summary of each partners general research interests and needs. Annex 3 summarises each partner's individual prioritisations of the topics listed in Table 1. Both of these annexes were updated in August 2007. The report for D 6.1 and 6.2 summarised both sets of information up to May 2006.

43. Based on Table 1, three categories of priority research needs can be identified; the highest (>20), the medium (between 16 and 20), and the lowest (<16). Most of the partners expressed an interest in most of the research needs listed. The number of partners interested in each topic ranged from 7 to 11 (maximum possible). All partners scored each topic in 2006 (see report for D 6.1 and 6.2), which helped inform the call for projects for WP7, and again in August 2007. This was to take into account any changes in research priorities and the projects funded from the WP7 call (more details will be provided later in the report). The results presented below are based on partners updated research priorities for 2007.

44. Based on partners input to the research prioritisation exercise, eleven topics have been identified as being the highest priority for research in organic food and farming (high scores of 21-27 in Annex 3). The partner countries that rated each topic as a high priority are listed below each one. Individual partners were asked to identify specific research topics where funding from their own institutes had been agreed, but in light of the above limitations, it was not possible to get full agreement before the formal end of the ERA-Net. These results were presented to all ERA-Net partners at the kick-off meeting in Vienna in September 2007. It is suggested that the partners identified below undertake further discussions to identify specific projects within these research areas that could be funded transnationally, (or nationally as part of a transnational effort).

- Impact of organic farming on the environment (positive and negative), including biodiversity. Identification of agricultural practices that maintain biodiversity.

This topic had the highest score of 28 and was scored high by 7 out of the 11 interested partners.

(Denmark, Finland, Germany, Norway, Sweden, Switzerland, United Kingdom)

- Research on the effectiveness and scale of national policies and instruments.

This topic had the second highest score of 27 and was scored high by 7 out of the 11 interested partners.

(Denmark, France, Italy, Netherlands, Norway, Sweden, United Kingdom)

- Animal disease and parasite management, including preventative health and improving therapies to reduce reliance on antibiotics.

This topic had the third highest score of 26 and was scored high by 7 out of the 10 interested partners.
(Austria, Denmark, France, Germany, Sweden, Switzerland, United Kingdom)

- Quality of organic food – health and safety
(Denmark, Finland, France, Germany, Norway, Switzerland)

- Innovative marketing strategies. Identification of successful marketing methods. Local markets
(Finland, Germany, Netherlands, Norway, Switzerland)

- Weeds, pests and diseases management
(Finland, France, Switzerland, United Kingdom)

- The management and optimisation of nutrients within organic systems
(Austria, Denmark, Finland, France, United Kingdom)

- Intercropping systems: Crop protection, weed control, engineering improvement, nutrition management, ensuring adequate yields
(Austria, Finland, France, Germany, Sweden, Switzerland)

- Feeding livestock for meat with 100% organic fodder
(Austria, Germany, Italy, Sweden, United Kingdom)

- Cycling and recycling of natural resources; nutrient, water and energy management
(Austria, France, Sweden, Switzerland)

- Building and maintenance of soil fertility
(Austria, Finland, Germany, Switzerland)

In addition to the research priorities listed above, there were further research topics which, though received lower total scores, were scored high (3) by 3 or more partners. This suggests there is the potential for collaboration between these specific partners.

- Animal health and welfare (Austria, Norway, Sweden, Switzerland)
- Multifunctional organic systems, including non-food products (Denmark, Germany, Italy, Switzerland)
- Development of organic systems, such as stockless systems (Austria, Finland, Italy)
- Production efficiency/identification of successful practices (Austria, Finland, Sweden, Switzerland)
- Market research and consumer attitudes (Norway, Switzerland, Netherlands)
- Organic food and farming and GHG emissions (Austria, Denmark, Germany)

- Supply chain management/economics (France, Italy, Switzerland)
- Drivers and barriers to conversion (France, Sweden, Netherlands)
- Consumer trust (process, quality etc); regional aspects; risks of conventionalisation (Germany, Sweden, Switzerland)
- Impact of organic standards on trade (domestic producers and those wishing to import to the EU) (Denmark, France, Sweden)
- Knowledge transfer (Austria, Germany, Switzerland)
- Soil nutrient management in horticulture and its impact on the environment (Denmark, Finland, Italy)

45. Projects approved through Work Package 7

As part of WP7, a pilot call for proposals that addressed the research priority areas outlined by the CORE Organic programme was issued. The thematic areas selected for the pilot call included animal disease and parasite management (mainly focusing on preventive health and improving therapies to reduce reliance on antibiotics), quality of organic food (health and safety) and innovative marketing strategies (identification of successful marketing methods, local markets). For further information, see report of WP7. The priority areas identified in the interim report for D 6.1 and 6.2 were used to inform the call. Below is a brief summary of 8 projects that were approved for funding by the CORE Organic Management Board. All partners were asked to take into consideration these approved projects when re-assessing the scores allocated to specific research topics in Annex 3 in August 2007.

PATHORGANIC – Risks and recommendations regarding human pathogens in organic vegetable production chains

'As consumers strive to eat healthy diets, they show an increasing demand for uncooked and minimally processed vegetables preferentially from organic production lines. At the same time, outbreaks of disease have been traced back to the consumption of fresh plant produce contaminated with enteric pathogens. PathOrganic addresses the quality and safety of organically produced vegetables throughout the production chain. The project's main concern is the contamination of fresh plant produce with bacterial pathogens. Thus, it examines how factors such as environment, plant genotype, fertilizer application technique or soil buffering affect pathogen spread and persistence in organic vegetable products' (http://pathorganic.coreportal.org).
CORE Organic funders: Austria, Denmark, Sweden, Switzerland, Germany

AGTEC-ORG – Agronomical and technological methods to improve organic wheat quality

'It is a challenge to organic farmers, millers and bakeries to fulfil consumer expectations of providing healthy and safe products without impairing yield performance. The quality of organic grain can be modified by agronomic conditions such as crop management, crop rotation and soil fertility. Therefore, food processing technologies such as the post-harvest handling of the grain and the flour processing are also key factors in producing bread of high nutritional value without contaminants. The overall objective of the AGTEC-Org project is to identify agronomical and food processing technologies that enhance the

baking quality and the nutritional value of organic wheat and reduce mycotoxin contamination' (http://agtec.coreportal.org).
CORE Organic funders: Denmark, France, Italy, Switzerland, Austria

PHYTOMILK – Potential improvement of the salutary effect of organic milk by forage species and by supplementation
'Due to a higher proportion of forage in the organic ration, with more legumes and other herbs, organic milk quality is more and differently affected by the forage than conventionally produced milk, which is often based on grass silage. But the knowledge of the chemical and sensory characteristics of organic milk is limited, and not much research has been carried out on organic grassland management and milk salutary properties. The PHYTOMILK project will give increased knowledge about the nutritional and salutary quality of organic milk. It will also increase the knowledge of the relationship between production systems, environmental conditions and milk properties' (http://phytomilk.coreportal.org).
CORE Organic funders: Norway, Denmark, Sweden, Finland

iPOPY – Innovative public organic food procurement for youth
'Governments, companies, producers and caterers are increasingly committed to public procurement of organic food, but many challenges remain. This project will suggest efficient policies and instruments for increased consumption of organic products in public food serving outlets for youth' (http://ipopy.coreportal.org).
CORE Organic funders: Norway, Denmark, Germany, Italy, Finland

ANIPLAN – Planning for better animal health and welfare in dairy herds
'It is a main goal for livestock farming that animals should always have excellent health and welfare. However, there are indications that this is not always guaranteed even though organic standards are being followed. On this background the ANIPLAN project aims at minimising medicine use in organic dairy herds through active and well-planned animal health and welfare promotion and disease prevention' (http://aniplan.coreportal.org).
CORE Organic funders: Austria, Denmark, Norway, Switzerland, United Kingdom, the Netherlands, Germany

FCP – Farmer consumer partnerships
'The market for organic products does not look the same throughout Europe and the cultural and behavioural backgrounds of European consumers vary a lot. Is it possible to develop communication strategies for organic companies and farmers that can be successful on all those different contexts and varying consumer approaches? Which are the most convincing arguments when communicating added values such as higher social responsibility? This project will investigate marketing and communication strategies by which organic farmers try to include ethical values in their production methods that are higher than those set out in the governmental standards for organic production. The overall objective is to analyse and test innovative communication strategies and arguments that are related to the concept of "Corporate Social Responsibility" (CSR)' (http://fcp.coreportal.org).
CORE Organic funders: Italy, Germany, United Kingdom, Austria, Switzerland

QACCP – Quality analysis of critical control points within the whole food chain and their impact on food quality, safety and health

'Consumer demand for healthy, safe and high quality food is increasing. Against this background, the demand for organic food has been rapidly growing. But health effects and sensory qualities of organic products need to be assured. The objective of this project is to improve product-related quality management in farming and processing' (http://qaccp.coreportal.org).

CORE Organic funders: Germany, Italy, Denmark, Norway, Switzerland, Austria, France, Finland

COREPIG – Prevention of selected diseases and parasites on organic pig herds – by means of a HACCP based management and surveillance programme

'The health of pigs varies a lot between different organic pig herds. This is likely to be caused by the different management routines implemented in the herd. Since the use of antibiotics and anti-parasitic drugs is undesirable in organic pig production, the main focus is on prevention of diseases and parasites. It is therefore important to acquire knowledge of the correlation between management routines and disease incidence in organic pig production and convert this knowledge into a management tool that the individual farmer can use to improve livestock health on the farm. The overall objective of the COREPIG project is to promote animal health and welfare in organic pig herds in Europe' (http://corepig.coreportal.org).

CORE Organic funders: Denmark, Sweden, Germany, Austria, France, Italy, Switzerland, United Kingdom

These projects will contribute towards meeting some of the research priorities identified within this report (Table 1 and section VII above), and have already contributed towards improving cooperation between partners and in attaining wider synergies and progress in organic food and farming.

46. Changes in research priorities during the CORE Organic ERA-Net project

Between 2006 and 2007 and the research prioritisation exercises that were carried out by the ERA-Net partners, the overall priorities for research did not change significantly. For the highest priority topics, there were some minor changes in the rankings of topics, e.g. animal disease and parasite management fell from being the highest priority topic to the third (though the total score did not change). New research funded through the WP7 pilot call (projects 1879, 1904, 1905 and 1903 above) will have contributed towards addressing this priority area and therefore may have influenced partners' assessments of current research needs.

Research topics that increased in priority between exercises, thereby gaining in ranking, included topics focussed on the environmental impact of organic farming (resource use, GHG mitigation, positive/negative impacts including biodiversity), market research and consumer attitudes and knowledge transfer. This is an interesting observation, though the small difference in scores between the two prioritisation exercises limits the conclusions that can be drawn from this.

VII - Recommendations to the ERA-Net on how legal, organisational and administrative barriers for joining activities between national and regional research programmes could be addressed.

47. With the exception of a few partners, national funding can only flow directly to partners' own national research establishments. There are also other constraints. This has implications for partners' input into both prioritisation and implementation. Despite these constraints, investment by partners in pursuit of common research outputs remains possible through mutual alignment of partners' national investment in national projects. We recommend that this be the principal means of pursuing transnational research. This would essentially be a bottom-up approach with interested partners clustering around themes common to them on a case-by-case basis, and individually funding projects nationally to meet the common objective. Instead of jointly funded projects, the procurement of each national component would be a matter for the relevant partner. The administration and organisation of each project will be managed at national level. Collaborative activities therefore would involve mainly extensive communication between the relevant partners and between the research providers each partner chooses. This approach avoids legal barriers as the partners involved will conduct their part of the project in their own country following their normal way of procuring research.

48. Due to most partners only being able to fund projects with their own national based research providers, the goal of establishing a joint pool (common pot) of at least €3 million per year cannot be achieved. However, following the selection and funding of projects through the WP7 call, a virtual pool of approximately €8.4 million over three years has been achieved by partners funding components of projects being carried out by their own research institutes.

49. Specific administrative issues were highlighted by some partners, not as barriers to joining activities between research programmes, but as additional factors to take into consideration. For example for some partners, if the total cost of a project is over a certain amount, additional financial checks are required which can cause delays to the contract formulation stage. It is not possible for these issues to be overcome, but they should be taken into consideration regarding joining activities.

50. The main research management challenge is the definition of the research outputs that each partner will fund, and the co-ordination of the resultant procurement so that the suite of national projects are mutually complementary. We suggest that the imposition or presumption of a common procurement method (e.g. open calls) should be avoided leaving the investment route open to each partner. The focus of joint planning should be on what each partner procures and when it will be delivered, not how the investment would be made.

51. Further details are available from WP7 and WP5.

VIII - Recommendations on best practice within research programmes.

52. Informed by WP5 analysis, and additional analysis, WP7 has delivered recommendations on how a call and subsequent activities would be undertaken. These recommendations follow standard best practice and should be expanded and adopted. Further details are available from WP7.

53. In the longer term, most partners could give consideration to removing the constraints on where they fund research so that they can fund research jointly and pro-actively to meet a common partners' research agenda. In addition, for the research priorities identified above, consideration should be given to the options for issuing a second call. Partners would need to decide whether to issue specific, more detailed research questions with funding having been agreed in advance of the call, or to issue broader and less detailed research questions (as for the WP7 call), with partners selecting proposals that meet their priorities and agreeing funding after bids have been submitted.

54. With respect to best practice within research programmes and in the context of the long-term effectiveness of ERA-Net based R&D, we recommend that the role of partners (i.e. the Ministries and Research Councils) in the definition of research targets and longer term research outcomes be strengthened. A stronger 'intelligent customer function' within partner organisations will help CORE Organic partners set the research agenda together and direct common research activities. This will complement the input from research providers. A stronger internal research management capability will also allow ERA-Net partners to use a wider range of procurement options without compromising the effectiveness of research spending enabling more strategic managed programmes and long term commitments to be made than is possible through open competition calls.

55. External stakeholder engagement can inform partners' development of their individual research strategies and needs. Stakeholders are defined here as anyone outside the partner Ministry or Research Council that is affected by the research investment decision. We have presented our experience of using stakeholder engagement in developing research needs, to inform others partners. A report on our project 'Stakeholders issues and aspirations to inform future public funded research in organic farming (OF0350) is available on the Defra website and on the Organic Eprints website:
http://www2.defra.gov.uk/research/Project_Data/More.asp?I=OF0350

IX - Opportunities for specific joint research programmes and utilisation of common research facilities.

56. Facilities listed in the WP4 report show common research facilities where collaboration might be encouraged. There are many national facilities that can cover common research topics and fewer in some more marginal research area as for example the study of specific crops (i.e. olive). However, work can be undertaken where there is a clear need identified by three or more partners. It is also important to remember that most partners can provide funds for their own

institutes only, and therefore will participate in the project if relevant national research facilities are available.

57. To support the CORE Organic project and any other transnational agricultural research efforts, Defra funded a project (OF0355) that aimed to deliver a tool to help identify common production conditions across the EU. In determining research priorities and opportunities for transnational research, it will be important to take into account geographical differences. A recommendation from the OF0355 report was that an ability to identify i) broad climate zones, and ii) user-defined areas with specific agro-ecological advantages or stress would aid research prioritisation in the CORE Organic project. This approach may also be useful in informing future transnational research after the CORE Organic project has ended. The executive summary for this project is in Annex 4 of this report. The full final report is available on the Defra website and on Organic Eprints, (http://www2.defra.gov.uk/research/Project_Data/More.asp?I=OF0355&M=KWS&V=Crops). In addition to the common research themes identified in this ERA-Net, this project provides partners with the opportunity to systematically look at the use of agro-ecological and other spatial data to inform the prioritisation of organic farming transnational research in Europe.

X – Conclusions

All partners within the CORE Organic ERA-Net project are interested in participating in transnational research in organic farming and food. Specific research priorities have been identified, the highest of which include examining the impact of organic farming on the environment, research on the effectiveness and scale of national policies and research on animal disease and parasite management. Research topics within the general areas of organic food quality, consumer attitudes and farming systems research were also identified as potential area for transnational collaboration. During the course of the ERA-Net there has been a slight shift in the rankings of research priorities for organic farming and food.

A number of legal, organisational and administrative barriers were highlighted which limited the ability of the partners to produce a joint pool (common pot) of at least €3 million per year. However, a virtual pool of approximately €8.4 million over three years has been achieved, through the WP7 call, by partners funding components of projects being conducted by their own research providers. Following the WP7 call, research priorities were updated and potential partners for co-funding future research topics identified. It has not been possible at this stage to get agreement from partners for co-funding future research topics, but it is recommended that the partners identified decide on the type of collaboration that can be achieved, develop the detailed specification for the research and decide how the research will be coordinated. Some suggestions and recommendations on how this could be achieved have been provided in this report.

Reference should be made to the reports from D 6.1 and 6.2 and WP4, WP5 and WP7.

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Annex 1 - Overview of partners' research interest and needs

Partners	Process on how research needs / interests and strategy are developed (*More details in the CR*)	Research needs and interests							
		Crop production	**Animal production**	**Farming and agricultural systems**	**Environment and natural resources**	**Socio-Economics**	**Food**	**Legal and standards**	**R&D methods**
BMLFUW Austria	Overaching annual discussion on further directions in OF each year (Bio-Enquete). Scientific and policy maker consultation. Stakeholder conference to discuss all agri-science priorities. Organic R&D are part of a broad programme	- Development of holistic production systems which consider that reflects site, nutrition, crop protection, cultivation, ecological factors, resistance and tolerance - Increase in production diversity - rotations, varieties and breeds appropriate to site. - Use of varieties and biotype with respect to careful use of energy and materials - Organic production of special crops. Additional work in the horticultural and viticultural sectors - Improvement of the biological crop protection, alternative fertilisation systems.	- Profitability of organic animal husbandry together with animal welfare considerations - Composition of specific feeding rations. - Suitability of breeds for organic agriculture - Development and testing new housing systems in connection with guidelines studies on the design of facilities to give the animals space to move (surfacing, cleanness, hygienic safety, labour economics, possibility for the animals to root and grub) -Development of suitable therapeutic agents for organic animal husbandry	- Closed material cycles (farm and region)	- Energy efficiency and exploitation of solar energy - productivity.	- Strategies for the conversion of enterprises, model farms and aspects of labour economy, further development of organic farming	- Unified quality standards and production guidelines for organic food with an emphasis on health, product quality and quality of life	- Influence of statutory norms and standards (especially VO 2092/91) on the development of organic farms and organic farming in general	

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Partners	**Process on how research needs / interests and strategy are developed (*More details in the CR*)**	**Research needs and interests**							
		Crop production	**Animal production**	**Farming and agricultural systems**	**Environment and natural resources**	**Socio-Economics**	**Food**	**Legal and standards**	**R&D methods**
DFFAB, Denmark	Strategy for research in O F& F Stakeholder consultation - expressions of interest. Organic R&D are part of an Organic R&D programme	- Integrity and efficiency in organic crops	- Integrity and efficiency in organic livestock	- Multifunctionality and different production systems significance for sustainable development	- Bio energy, biodiversity and Nutrient management Organic aquaculture	- OF in a global perspective - The effect of different policies for promoting O F & F	- Nutrition, health & safety - Processing, Integrity, quality and consumption	- Regulation and trade	Strategy for research in O F& F Stakeholder consultation - expressions of interest.
MMM, Finland	The ministry appoints an Advisory Board for Agri-Food Research (experts/stakeholders). The Advisory Board is for the overall research program. In addition, ReNOAF (Network of organic researchers) is consulted especially for OFF. Ministry funded programme with the following priority areas (2003-2005). Organic R&D are part of a broad programme	- Maintenance of soil fertility. - Improved production of seeds.	- Improved production of organic milk and meat. - Animal welfare and organic farming.	- Role of organic farming in multifunctional and pluri-active agriculture.	- Maintenance of soil fertility. - Safe recycling of organic waste.	- Consumer oriented product development. - Local food systems.	- Quality and risks of organic food.		

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		Crop production	**Animal production**	**Farming and agricultural systems**	**Environment and natural resources**	**Socio-Economics**	**Food**	**Legal and standards**	**R&D methods**
MAAPAR France*	Priorities set on the basis of a survey / workshop carried out in INRA and ITAB. Organic R&D are part of a broad programme Meeting Inra-MAAPAR (within the frame of a convention), dec. 2005 in Paris	- Seeds: p&d, natural defence, disinfection - Vineyards: *Flavescence doree* Wood diseases in vineyards - Impact of copper reduction - Emerging diseases (eg wheat bunt) - Fertilization in organic farming. Better use of fertilisers, impact on soil and climate	- Integrated control of herbivorous parasites using cattle management and landscape - Possibility for 100% organic feed for poultry and pig operations	- Enhancing OF experiences in other production systems - Coexistence organic farming and GMOs (territorial biological monitoring)	- Impact of copper reduction - Fertilisation in organic - Genotype environment interactions - Impact of OF on the environment	- Impact of Organic conversion practices on labour utilization and economic results - OF&F systems and territorial development	- Quality of wheat proteins, impact on organic bread value and quality - Assessment and control of organic products quality	- Possible evolutions in regulations, as related with OF&F technical models	- Evaluation methods for alternative inputs - Definition of specific processes in food chains (getting rid of sulfites, food safety ..)

BMVEL, Germany	Federal Organic Farming Scheme (FOFS) 2002 - 2008: Themes and priorities established through extensive stakeholder participation and consultation. Researcher orientated?? Organic R&D are part of an Organic R&D programme	- Plant breeding methodology - Copper substitution - Predators - Fodder production and animal feeding - Improving organic viniculture from production to marketing - potential of herbs and spices for veterinary medicine	- Animal production and food quality - Feeding in relation to health and veterinary medicine - Economic survey of appropriate rearing systems - Aquaculture - Emissions from animal rearing	- Biogas - Stockless farms - Monitoring farm economics - Climate change and agriculture - Phosphorus and Sulphur in organic systems - Soil additives - Use of Computer models - Improving and adapting agricultural machinery	- Renewable resources - Functional biodiversity - Agroforestry systems - Effects of soil management on the production systems	-Effects of consumer approach in marketing - Economic and social framework circumstances - Contribution to societal aims - Quantification of societal benefits	- Storage, handling, recording and processing of produce (food chain management) - Food culture and education - Parameters indicating health value of organic food - Food and risk	- Legal and policy framework - Inter-national certification	Knowledge transfer: methods, ways, multiplication - Publication possibilities with impact factors on scientists

- * Itab (Technical Institute for Organic Farming) organised in may 2006 a meeting on “Research-Experiments and Extension” in Organic Farming. A working agenda was defined in the proceedings (see: http://www.itab.asso.fr/temporaire/Assises%20ITAB%20pour%20impression.pdf)
- A new national program will be defined early in 2008, based on the evaluation of past research projects in partnership conducted by Inra & Acta, involving several Technical Institutes (such as Itab).

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MiPAF, Italy* *new items in updating OF national Action Plan in force at the moment.	Wide range of consultations are undertaken with stakeholders, regional governments, farmers and industrial associations, academia and public and private research. Permanent consultation groups with farmers, agro-industry associations, scientific community and region government are active on organic farming. Organic R&D are part of an Organic R&D programme under revision.	Strengthening of low impact techniques in weed control and crop protection using natural enemies and biodiversity resources. Use of crop rotation, intercropping, reduced tillage and recycling of organic manure (OM) residues to preserve/increase soil biological activity and production yields minimising the use of non-renewable resources. Identification, characterisation and exploitation of germplasm suitable for the organic production method.	Under definition: No specific programme on organic animal production. ***Organic fodder for meat production livestock.** ***Specific breeding for organic livestock.** ***Quality of meat products.** ***Animal disease and parasite management.**	Definition, validation and dissemination of best practices suitable for organic methods, focussed on conservative techniques to test and improve soil fertility and optimal use of water and energy resources. Identfication and testing of advanced technologies (***suitable for multifunctional/stockless systems**) compatible with the organic production method.	Biodiversity valorisation in terms of rescue and exploitation of wild-type species, varieties and biotypes suitable for organic production methods, linked to local production and the safeguarding of rural heritage.	Evaluation of the economic impact of organic farming productin system using as main indicators the sustainability of farmer/stakeholders incomes and the quality/price equity ratio for the consumers. ***Evaluation of effectiveness and scale of national policies and instruments to promote Organic Food and Farming (OFF).**	Storage and processing methods suitable to safeguard food quality and valorise organoleptic characteristics of organic products. Methods to prevent and control toxins in organic farming products and harmful residues in soil and methods suitable to monitor critical points of the whole organic agri-food production chain.	No particular references in OF Action Plan I force. ***Impact of organic standards on trades.**	No specific reference in OF Aciton Plan in force. ***Communications tools to improve knowledge transfer to target groups.**

RCN, Norway	Consultation groups with stakeholders from Governmental bodies, research institutions, farmers associations, agro-industry associations etc, both on an ad hoc and permanent basis.	Production- and process oriented technology and logistics Competitive production of raw materials	Production- and process oriented technology and logistics Competitive production of raw materials	Production- and process oriented technology and logistics Competitive production of raw materials	Societal concerns/benefits	- Market research and consumer science Innovative and market-adjusted products and entrepreneurship National and international framework conditions	- Food related to health, quality and quality of life Innovative and market-adjusted products and entrepreneurship Production- and process oriented technology and logistics	- Innovation in public sector /food administration Industrial policy in agriculture, aquaculture etc	

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		Crop production	**Animal production**	**Farming and agricultural systems**	**Environment and natural resources**	**Socio-Economics**	**Food**	**Legal and standards**	**R&D methods**
Formas, Sweden	Triennial direct stakeholder engagement. Both direct consultation and workshop. Organic R&D are part of an Organic R&D programme	- Crop systems and plant protection - Turnover of plant nutrients and nutrient cycles.	- Optimising production systems including livestock (is livestock). - Animal health and animal welfare (goal conflicts and needs for new ecological problem solving, goal conflict between ethical values and economical value)	- Multifunctional farming systems - Increase efficiency at farm level (use/miss-use of plant nutrients, recycling from societies, parasitical problems in free range animal systems, goal conflicts on efficient economy and efficient ecosystem design, machinery efficiency and collaboration, holistic design and optimisation	- Turnover of plant nutrients and nutrient cycles. - Resources dependency (energy?) of the food system. - Increased efficiency as energy (agriculture without fossil fuel), water and capacity for ecosystem services	- Large scale change to organic ecological production - driving forces and barriers, and consequences for the market. - Increase economic efficiency - Implement global equity and social sustainability (special and time scale perspectives) - Consumers perspectives on safety, values and "quality" (including value and goal conflicts, e.g. in infectious disease control and scales – means for risk reductions and means for efficient control)	- Food quality and health. - Communication in the food chain (including tighter feedback between consumer and producer, as well as logistical problems and goal conflicts – as between bigger for saving money and smaller for increasing sustainability in general and resilience in special)	- Rules settings and implementation in certified organic production (goal conflicts, societies means for control, social power structures and values in rule settings – who have a say, and from what basis?)	- Experimental farms and technical development projects

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		Crop production	**Animal production**	**Farming and agricultural systems**	**Environment and natural resources**	**Socio-Economics**	**Food**	**Legal and standards**	**R&D methods**
FOAG, Switzerland	Foresight and evaluation of current R&D: No official organic platform for stakeholder engagement. On a strategic level: Governing Board of FiBL ("Stiftungsrat"), in Agroscope Agricultural Research Council on a strategic level and Expert groups on an operational level. Researchers are in contact with stakeholders at an individual level. Periodically joint workshops between Agroscope, FiBL and research users are carried out with the aim to formulate recommendations on research priorities.	Development of sustainable production systems; Competitive production; Substitution of undesirable inputs (e.g. copper); Interrelations between soil – product – quality human or animal health; Deal with current and future tasks like fire blight by a system approach	Development of sustainable production systems; Competitive production; Substitution of undesirable inputs (e.g. Anti-biotica)	Closed material cycles (farm and region); Energy saving (efficient) systems; Agricultural systems and climate change	- An ecologically responsible agricultural sector.	- Economically efficient agriculture sector. - Socially acceptable development of the agricultural sector.	Food, consumption, consumer behaviour and health (health costs, obesity); Product innovation	Early warning; Quality standards for own and imported food and feedstuffs	- Knowledge exchange and knowledge management - Disciplinary, interdisciplinary and trans-disciplinary research.

MinLNV, The Netherlands	Bioconnect (KNOS) work out what needs to be done - representatives of OF stakeholders. Preferred supplier Wageningen. A consultative conference each year with stakeholders and ministry officials. Organic R&D are part of an Organic R&D programme	- Weed, pests and disease management - Crop production - Crop resistant variety breeding	- animal welfare versus animal health, animal welfare versus human health, animal welfare versus environmental criteria. - Animal health alternative treatments (antibiotic free) -Improving dairy farming	- Production efficiency / identification of successful practices	- Impact of organic farming on the rural environment, including regional aspects. (this may be covered partly in theme "Local markets"; - Impact of Organic Farming on the environment - Integration of production and conservation to maintenance of biodiversity - Using 100% manure - Limitation of greenhouses gases	- Function of organic farming at the periphery of urban conglomerates. - Identification of successful marketing methods / innovative marketing strategies - Market research and consumer attitudes / characterisation of the organic market - Conversion drivers and barriers related to market prospective - Communication, Education - Economic evaluation of large scale price-experiment	- Food quality, safety and human health - Food processing: Improve new storage and preservation for organic fresh products	- Simplification of legislation for organic agriculture - Research in national policies and instruments	- Knowledge transfer and knowledge management

ANNEX 1 - OVERVIEW OF PARTNERS' RESEARCH INTERESTS AND NEEDS

Partners	Process on how research needs / interests and strategy are developed (*More details in the CR*)	Research needs and interests							
		Crop production	**Animal production**	**Farming and agricultural systems**	**Environment and natural resources**	**Socio-Economics**	**Food**	**Legal and standards**	**R&D methods**
Defra, UK	On-going input from an advisory committee informed by stakeholder consultation. Investment and decision are then made jointly by Defra scientists and policy makers. Organic R&D is part of a Sustainable Farming Systems R&D programme	- Effective weed control - Pest and disease control - Improvement of varieties suitable for OF - Fertility building, especially in stockless and horticultural systems - Improve seed production	- Health and welfare - Animal nutrition - particularly poultry - Improvement of breed suitable for OF	- Identification of sustainable and resource efficient practices.	- OF and environment - soil function, management, health and fertility - Impact of climate change on and from OF - Biodiversity impact of OF - Effect of conversion on ecology - Energy use and pollution in OF	- Conversion – economics, barriers - Conversion - is organic production viable - Data on current market development - Market supply per region - Socio-economic impacts of OF - Identification of successful marketing methods - Increase access to lower income groups	- Storage and preservation methods	- Defining what is considered as organic - CAP reform on OF	- Life-cycle analysis (LCA) alongside other indicators.

All partners were asked to update their research needs and interests in August 2007 to reflect any changes in research requirements that may have occurred during the course of the CORE Organic ERA-Net. This was carried out following the partner meeting in April 2007 in London, UK.

Annex 2 - Outputs from the groups discussion during the workshop in Florence, March 2006, on Research needs which are common to at least three partners

Common research area	Researchable issue/question common to three / four partners:
Socio-economics	Market research and consumer attitudes
Environment	Environmental impacts (positives and negatives) Integration of production and conservation for maintenance of biodiversity
Legal/standards	Research in national policies and instruments (efficiency in off-money to promote OFF
Food	Food quality and human health (nutritional and safety)
Process food	Improving new storage and preservation for organic fresh products
Crops / Environment	Soil nutrient management in horticulture including the impact on the environment
Environment	Impact of OF on the environment
Market	Characteristics of the organic market
Crops	Discovering new varieties and identify other suitable European varieties
Intercropping systems (holistic approach)	Plant protection, weed control Engineering improvement Nutrition management Yield assurance
Meat production	100% organic fodder Quality of products / economics Suitable breeds / hybrids for organic production
Animal welfare Animal health	Refer to point 6. in the report
Food	Food chain management / economics Improvement of storage and processing Food safety Development of holistic food quality measurement methods

ANNEX 2 - OUTPUTS FROM THE GROUPS DISCUSSION DURING THE WORKSHOP IN FLORENCE 2006, ON RESEARCH NEEDS WHICH ARE COMMON TO AT LEAST THREE PARTNERS

Common research area	Researchable issue/question common to three / four partners:
Environment and natural resources	Nutrients, water and energy (diff types0 - Energy using - Energy efficiency - Production
Environment and resource	How can OFF contribute to reduce greenhouse gas
Food quality and safety	Food quality, safety and health for human, does organic food improve human health
Farming and agricultural systems	Multifunctionality in OFF, including non food products
Socio-economics	Innovative marketing strategy
Sustainability and interpretation of organic values	Consumers trust (communicate process quality, consumer related research) Regional aspects Risks of conventionalisation
Food safety, quality and human health	
Knowledge transfer	How are instruments perceived by the different target groups? How to communicate effectively? (organic eprint e.g.) Channels of communication optimisation of communication to target groups
Farming	Production efficiency / identification of successful practices
Socio-economics	Conversion: drivers to conversion and barriers (problems related and market prospective)
Crops	Pests and diseases management
Food	Food safety
Market	Identification of successful marketing methods Local market

Annex 3 – Partners' individual prioritisation of the research themes identified to be common to at least three partners

Research needs common to at least three partners	BMLFUW AT	DFFAB DK	MMM FI	MAAPAR FR	BMVEL DE	MiPAF IT	RCN NO	Formas SE	FOAG CH	MinLNV NL	Defra UK	Total
Crop Production												
Improving crop production	2	1	1	1	?	1	1	1	2	0	1	11
Building and maintenance of soil fertility.	3	1	3	2	3	2	1	1	3	0	2	21
Soil nutrient management in horticulture and its impact on the environment	2	3	3	1	2	3	0	2	0	0	1	17
Weeds, pests and diseases management	2	1	3	3	2	2	1	1	3	2	3	23
Intercropping systems: Crop protection, weed control, engineering improvement, nutrition management, ensuring adequate yields	3	?	3	3	3	2	0	3	3	0	2	22

Prioritisation: 1= Low; 2= medium; 3= high - ?= need clarification

ANNEX 3 – PARTNERS' INDIVIDUAL PRIORITISATION OF THE RESEARCH THEMES IDENTIFIED TO BE COMMON TO AT LEAST THREE PARTNERS

Research needs common to at least three partners	BMLFUW AT	DFFAB DK	MMM FI	MAAPAR FR	BMVEL DE	MiPAF IT	RCN NO	Formas, SE	FOAG CH	MinLNV NL	Defra UK	Total
Developing and identifying varieties that are suited to organic conditions.	2	3	2	2	2	2	0	2	3	0	2	20
Organic seeds: identifying and developing breeding methods acceptable to organic farming which could then be applied for seed production	2	2	1	3	3	2	0	1	1	0	2	17
Animal production												
Health and Welfare.	3	2	2	1	?	0	3	3*	3	0	2	19
Feeding livestock for meat with with 100% organic fodder	3	2	2	1	3	3	0	3	1	0	3	21

Prioritisation: 1= Low; 2= medium; 3= high - ?= need clarification – Formas (SE)* : If focus on goal conflict aspects

ANNEX 3 – PARTNERS' INDIVIDUAL PRIORITISATION OF THE RESEARCH THEMES IDENTIFIED TO BE COMMON TO AT LEAST THREE PARTNERS

Research needs common to at least three partners	BMLFUW AT	DFFAB DK	MMM FI	MAAPAR FR	BMVEL DE	MiPAF IT	RCN NO	Formas, SE	FOAG CH	MinLNV NL	Defra UK	Total
Identifying suitable animal breeds / crosses for organic production, that also improve animal welfare (particularly free-range conditions for animal, and animal for meat consumption).	2	2	1	1	3	0	0	3	1	0	2	15
Identify breeding methods acceptable to organic farming to be identified and subsequently applied to produce breeds specific to organic production	2	1	1	3	2	2	0	1	1	0	2	15
Animal disease and parasite management, including preventative health and improving therapies to reduce reliance on antibiotics	3	3	2	3	3	1	2	3	3	0	3	26
Quality of meat products and economical analysis.	2	?	3	2	2/3*	1	2	1*	3	0	1	17
Farming and Agricultural systems												
Multifunctional Organic systems, including non food products	1	3	1	1	3	3	2	2	3	0	1	20
Development of organic systems, such as stockless farming systems	3	2	3	2	1	3	1	1	2	0	2	20

Prioritisation: 1= Low; 2= medium; 3= high - ?= need clarification - DFFAB (DE)* = 3 if interdisciplinary; if not = 2 – Formas (SE) * = If quality of products in relation to production methods and health aspects

ANNEX 3 – PARTNERS' INDIVIDUAL PRIORITISATION OF THE RESEARCH THEMES IDENTIFIED TO BE COMMON TO AT LEAST THREE PARTNERS

Research needs common to at least three partners	BMLFUW AT	DFFAB DK	MMM FI	MAAPAR FR	BMVEL DE	MiPAF IT	RCN NO	Formas, SE	FOAG CH	MinLNV NL	Defra UK	Total
Integration between different, complementary production systems (e.g. livestock and crop production). Understanding of what the barriers are prohibiting these linkages.	1	1	2	3	2	0	0	2	2	0	2	15
Production efficiency / identification of successful practices	3	1	3	1	1	1	2	3*	3	0	0	18
Environment and Natural Resources												
The management and optimisation of nutrients, soil and soil fertility within organic systems	3	3	3	3	2	2	1	1	2	0	3	23
Impact of Organic Farming on the environment (positive and negative) including biodiversity. Identification of agricultural practices that maintain biodiversity	2	3	3	2	3	2	3	3	3	1	3	28
Impact of conversion on the environment	2	?	2	2	1	1	3	1	2	1	1	16
Organic Food and Farming and GHG mitigation	3	3	2	2	3	0	0	1	2	0	2	18

Prioritisation: 1= Low; 2= medium; 3= high - ?= need clarification – Formas (SE)*: If focus on broader aspect on the concept of efficiency, ie use of renewable resources and ecosystem services

ANNEX 3 – PARTNERS' INDIVIDUAL PRIORITISATION OF THE RESEARCH THEMES IDENTIFIED TO BE COMMON TO AT LEAST THREE PARTNERS

Research needs common to at least three partners	BMLFUW AT	DFFAB DK	MMM FI	MAAPAR FR	BMVEL DE	MiPAF IT	RCN NO	Formas, SE	FOAG CH	MinLNV NL	Defra UK	Total
Cycling and recycling of natural resources. Nutrient, water and energy management (diff types) - Energy using - Energy efficiency - Production	3	2	3	3	2	2	0	3	3	0	2	23
Socio-Economics												
Market research and consumer attitudes.	2	?	1	1	2	1	3	2	3	3	1	19
Innovative marketing strategies. Identification of successful marketing methods. Local market.	1	2	2	2	3	1	3	2	3	3	2	24
Characteristics of the organic market	1	?	2	1	1	1	3	1	3	1	2	16
Supply chain management / economics	1	?	2	3	2	3	0	2	3	0	2	18
Conversion: drivers to conversion and barriers to conversion (problems related and market prospective)	2	1	1	3	3	1	2	3	1	3	1	21

Prioritisation: 1= Low; 2= medium; 3= high - ?= need clarification

ANNEX 3 – PARTNERS' INDIVIDUAL PRIORITISATION OF THE RESEARCH THEMES IDENTIFIED TO BE COMMON TO AT LEAST THREE PARTNERS

Research needs common to at least three partners	BMLFUW AT	DFFAB DK	MMM FI	MAAPAR FR	BMVEL DE	MiPAF IT	RCN NO	Formas, SE	FOAG CH	MinLNV NL	Defra UK	Total
Research of the effectiveness and scale of national policies and instruments (efficiency in off-money to promote OFF	2	3	1	3	1	3	3	3	2	3	3	27
Food												
Quality of organic food – health and safety.	2	3	3	3	3	0	3	2	3	2	2	26
Quality of organic food – processing.	2	?	2	2	3	1	1	2	3	0	1	17
Improving new storage and preservation for organic fresh products	2	?	1	2	2	1	2	1	1	0	0	12
Development of holistic food quality measurement methods	3	?	2	1	2	1	1	1	2	0	0	13
Legal and Standards												
Consumers trust (process quality of organic goods, consumer related research) Regional aspects Risks of conventionalisation	2	?	1	2	3	0	2	3	3	0	1	17

Prioritisation: 1= Low; 2= medium; 3= high - ?= need clarification

ANNEX 3 – PARTNERS' INDIVIDUAL PRIORITISATION OF THE RESEARCH THEMES IDENTIFIED TO BE TO AT LEAST THREE PARTNERS

Research needs common to at least three partners	BMLFUW AT	DFFAB DK	MMM FI	MAAPAR FR	BMVEL DE	MiPAF IT	RCN NO	Formas, SE	FOAG CH	MinLNV NL	Defra UK	Total
The impact of organic standards on trade, both for domestic producers and for those wishing to import into the EU	1	3	2	3	1	1	0	3	1	0	0	15
COMMON Understanding how standards have an impact on international trade	2	?	1	3	1	1	0	1	1	0	1	11
Knowledge transfer												
How are methods perceived by the different target groups? How to communicate effectively? (organic eprint e.g.) Channels of communication optimisation of communication to target groups	3	?	2	2	3	2	1	1	3	0	2	19

Prioritisation: 1= Low; 2= medium; 3= high - ?= need clarification

ANNEX 4 – OF0355 EXECUIVE SUMMARY

The full final report for this project is available through Defra's website at:-
http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=13642&FromSearch=Y&Publisher=1&SearchText=of0355&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description

Executive Summary

Use of agro-ecological and other spatial data to inform prioritisation of organic farming research in Europe

P.J. Burgess, C.A.D. Sannier, W. Stephens and J. Morris
Institute of Water and Environment, Cranfield University, Silsoe, Bedfordshire, MK45 4DT, UK
E-mail: P.Burgess@cranfield.ac.uk

1. Introduction

From 1985 to 2002, certified organic farming in the European Union (EU-15) expanded from 0.1 to about 4.8 million ha, representing 3.7% of the total utilisable agricultural area (European Commission, 2004b; EEA, 2005), and this has increased the demand for organic farming research. The EU-sponsored CORE Organic project aims to enhance the quality, relevance and use of resources in European research in organic food and farming. Within the CORE Organic project, Defra is leading a work-package entitled "Identification and co-ordination of future research projects" (CORE Organic, 2004). Within this context the project reported here had three objectives:

1. To identify the key agro-ecological and associated spatial characteristics that may be useful in providing a coherent approach to help inform research priorities related to organic farming.
2. To describe available data and methods and their spatial resolution for characterising zones in Europe in terms of the key characteristics defined in Objective 1.
3. To propose how a spatial approach could be used by the CORE Organic project.

2. Methodology

This project was undertaken as a scoping study using information from scientific papers, research reports, websites, and discussions. The project focussed on agro-ecological data which includes climate, landform, and soil characteristics (FAO, 1996), but it also considered land cover, administrative, agricultural, and environmental spatial data. Two methods for characterising zones at a European scale were also piloted with case studies and a geographic information system (GIS). The first objective is addressed in section 3, the data and methods that can be used to characterise zones in Europe are described in sections 4 and 5 respectively, the third objective is addressed in section 6, and Appendix A contains a list of acronyms.

3. Spatial data and the decision making process

European governments have limited budgets and research managers need robust, comprehensive and defensible frameworks to prioritise research. Building on Defra's (2005) framework for evidence-based policy decision making, key steps in the prioritisation of collaborative organic research were identified:

- *Understanding the sector*: spatial data and maps developed using a GIS can aid the

understanding and communication of the magnitude and regional extent of numerous issues related to organic farming.

- *Establishing criteria*: in the USA, a criterion for national funding of agricultural research programmes is that they deal with a national or regional, rather than a local problem (US Department of Agriculture, 2006). This can partly be appraised through the use of spatial data. A second criterion is that nationally funded work should not duplicate other research. Spatial agro-ecological data can support the transfer and appropriate application of research completed in one area to another.
- *Appraising options:* tools to aid the appraisal of research options are available (Fisher et al., 2005). In some situations, research prioritisation has been informed by cost-benefit and multi-criteria analyses with agro-ecological zones as a key factor (Mutangadura and Norton, 1999). Matrices, in which the rows are options and the columns represent factors that affect them, can also help decision makers focus on the important issues when appraising alternatives (Smith, 2001; Fisher et al., 2005). An analysis of data from the IFOAM EU Group (2004a) suggests that agro-ecological variation across the Europe could be relevant in 15 out of 25 proposed research topics related to organic farming. The same dataset suggests that the key potential uses of agro-ecological spatial data in relation to the prioritisation of organic farming research are i) identification of broad climatic zones, ii) identification of particular areas of advantage or stress and iii) to provide data for detailed computer modelling.

4. Available data for identifying agro-ecological and other zones

Geographic information systems are useful tools to capture, store, check, integrate, manipulate, analyse and display spatially-referenced data. The spatial data are usually in the form of vectors or rasters. Vectors delineate geographical objects as a point or their outline, whereas rasters use a regular grid cell-based representation which covers a set area.

A description of available sources of agro-ecological and other spatial data is provided to give an idea of the most suitable data in terms of spatial coverage (the whole of Europe), spatial resolution (the level of spatial detail) and temporal coverage. In addition, the selected datasets were only chosen if they were freely-available and easily accessible on the internet. The main types and sources of information identified for agro-ecological zoning were:

Climate spatial data: daily and monthly data are available from the Climate Research Unit and the International Water Management Institute (IWMI) respectively.

Elevation spatial data: can be used to determine parameters such as slope and aspect. The Hydro 1k dataset seems the most appropriate for an agro-ecological analysis of Europe.

Soils spatial data: can be used to identify areas with soil-related limitations and can provide a basis for modelled estimates of erosion risk and drought stress. The European Soil Bureau provides a useful European dataset.

Land cover data: sources include the Global Land Cover Map 2000, USGS Land Cover data, and Corine.

Physical and administrative boundaries: datasets including coastal and country boundaries and administrative areas, termed NUTS (Nomenclature of Units for Territorial Statistics) areas, are freely downloadable from the EEA (2006b).

Economic and environmental spatial data: the Farm Accountancy Data Network (FADN) is a useful source of spatial financial and production data information

relating to European agriculture at the NUTS 1 or 2 levels. The European Environment Agency (EEA) is starting to collate spatially-related environmental data such as the area of organic agriculture. Other spatial socio-economic and political/institutional data, for example consumer expenditure on organic products, were outside the remit of this project.

5. Using agro-ecological and other spatial data

The three uses of spatial data, identified in section 3, which could help inform organic research prioritisation, were examined.

Broad climate zones: the European Environment Classification (Metzger et al., 2005) is available as a vector dataset and provides an appropriate method to allow stratified identification or sampling of representative areas and to provide strata for modelling exercises.

User-defined zones: for specific situations, such as plant breeding or livestock husbandry research, it is helpful to identify user-defined agro-ecological zones. Heat stress in cattle is used as an example to illustrate the use of spatial climate data from IWMI to identify particular agro-ecological zones. The ability of the user to identify the parameters describing a particular zone could be a limiting factor.

User-defined zones linked with detailed computer modelling: potential examples include European assessments of erosion risk, potential crop yield, and vulnerability to global change (EEA, 2006a; Fischer et al., 2002; Metzger et al., 2004b). FAO have established a standardised framework to assess, for specified conditions, feasible agricultural land use options and the expected production. The main stages of this framework, used in the Global Agro-ecological Zone (GAEZ) project, are explained (Fischer et al., 2002). Using a GIS and climate data from IWMI, a case study illustrates the use of the FAO approach to calculate the yield potential of alfalfa under irrigated conditions.

6. Proposed spatial approach to be used by the CORE Organic project

It is recommended that:

- an ability to identify i) broad climate zones, and ii) user-defined areas with specific agro-ecological advantages or stress would aid research prioritisation in the CORE Organic project.
- using agro-ecological data to support new computer modelling is of limited relevance to research prioritisation, but it would be important within selected new projects (e.g. modelling the effect of climate change) and there are useful datasets from completed research projects (e.g. GAEZ).
- a geographic information system, because of its ability to integrate, manipulate, analyse and display spatially-referenced data, should be used as a tool to inform research prioritisation in CORE Organic.
- the broad climate zones (e.g. Mediterranean, Atlantic) described by the European Environmental Classification (Metzger et al., 2005) should be included in the GIS.
- freely available datasets including climate data from the International Water Management Institute, elevation data from Hydro 1k, and selected soils data from the European Soils Bureau should be included in the GIS, as these would allow the definition of user-defined agro-ecological zones.
- the GIS should include administrative information, available from the EEA, and selected agricultural information collected by FADN. The latter should start with the extent of organic agriculture within NUTS 1 or 2 areas, and it could be developed further later if required. Initiatives such as the collation of European-

scale environmental data on the internet, by the EEA, should be supported.
the results presented here should be presented at a CORE Organic workshop and funding should be sought to pilot the use of a GIS, with supporting agro-ecological and other spatial data, to inform the prioritisation of collaborative organic farming research within the CORE Organic project.