

Department for Environment, Food and Rural Affairs - Final Project Report

A review of UK research and development for organic food and farming

Project Code OF0338

Contractor Organisation and Location
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Project Start Date - 14/01/03

Project End Date - 31/03/03

Executive Summary

The organic action plan published by DEFRA in July 2002 including three priority action points relating to research and development. These priority action points were;

- 13. to draw together information on the current levels of funding for research through all UK public sector, private and charitable sources;
- 14. the establishment of a Research sub-committee of the Advisory committee and
- 15. setting aside of £5m over 5 years for research under the LINK programmes.

This project was commissioned to address action point 13 and the consortium has been asked to undertake this work on behalf of Defra and the action plan group.

The objective of the project is to draw together information on current levels of funding for organic research throughout all UK public sector, private and charitable sources.

A list of 268 potential organic food and farming research funders and contractors throughout the UK was drawn together and questionnaires were mailed to them in the week of 24th February 2003. Final responses were received by the end of April 2003. With regular follow up of all recipients to achieve the best return rate possible a response rate of 41% was achieved. The results of the survey were compiled in an Excel spreadsheet for analysis.

We asked for details on all projects that were ongoing in the period between Jan 2000 and March 2003. Therefore a 3-year project may have started in 1997 and finished January 2000, or it may have started in January 2003 to complete in 2006. All projects that were on going in January 2000 are included. Thus the research reported refers to a period of at least nine years. Longer-term projects (running for more than three years) would extend this period.

The survey identified 168 individual projects. The total cost of this research was £23,578,902 of which nearly £20M was solely from the public purse with 72 *per cent* of this funding provided by DEFRA. However, nearly £3M was funded by sources other than the public purse including a range of charities and companies. There was also £0.75M of joint funding by public and non-public sources.

Of the 168 projects 151 were purely organic with a further 17 of relevance to organic systems. The majority of the research undertaken was field or bench research followed by desk studies.

The overwhelming majority of the research undertaken had been covering aspects of production. Whole farm systems, soils & nutrient cycling, cropping and livestock systems accounted for nearly 70 *per cent* of the total funding.

There were also a surprisingly small number of projects investigating the environment (8 projects) and funding only accounted for about 8 *per cent* of the total spend, although environmental considerations would be investigated in other topic areas such as soils & nutrient cycling. The amount of research undertaken on off-farm activities in the organic food production chain was limited. Only a small amount of research had been directed at processing, marketing or food quality. These three areas accounted for only 12 projects and 7 *per cent* of the total funding.

Understanding the other (non-environmental) benefits or disbenefits of organic farming have also been studied to a lesser extent. Only six Economics and rural development projects have been undertaken and account for only 4 *per cent* of the total funding.

Joint funding of research although limited was concentrated on Cropping and Livestock systems

The survey identified 35 separate research contractors for organic research in the UK. These were drawn from the established science base but also from Trusts, Farms and NGOs.

The Government's aim to expand organic farming through market pull rather than policy and subsidy push could be better addressed within the UK organic research programme. It is hoped that key production issues for organic farmers will be picked up and funded jointly by the industry and government through the range of agricultural and food LINK programmes. This has yet to be seen but there may be problems with accessing sufficient industry funds to undertake such work. In addition much of the work that is needed to improve the efficiency of production is not precompetitive research and is too 'developmental' to be funded under the LINK programmes.

This study has identified the breadth of projects that have been undertaken within the past three years but only gives a glimpse of the depth and impact of the research. Specifically it is recommended that DEFRA and the Organic Action Plan Group:

- Establish an Organic Research Priorities Board (ORPD) to work with all stakeholders including funders to ensure identification and a co-ordinated implementation of the research and technology transfer necessary to help achieve the objectives of the Action Plan.

It would then be appropriate for DEFRA, the Organic Action Plan Group and/or the ORPD to initiate;

- A consultation on organic R&D priorities, particularly focussing on the needs of the businesses that may be willing to participate in LINK or other joint funded projects.
- Further assessment of the benefit arising from the projects identified.
- Analysis of the intensity of research and the value to the end user (government, farmers, processors etc.) from the point of view of the priority research areas (crops, livestock etc) and the different types of research and development (desk, field, extension etc.). This should aim to define the most beneficial approach to organic research and development.
- Analysis of the quality and extent of the dissemination of the research results from the projects.
- An investigation into the possible conflict between organic research funding and the objectives and approaches of LINK programmes need to be addressed and if a real barrier is identified a solution must be found.

However, it is believed that it is important that research continues directed towards improving production methods and efficiency (financially, socially and environmentally) in those enterprises where the technical challenges are greatest or where the proportion of UK sourced farm products is relatively low.

Scientific Report

REPORT OUTLINE.

The Organic Action Plan published by Defra in July 2002 (Defra, 2002a) included three priority action points relating to research and development. These priority action points were:

- 13. to draw together information on the current levels of funding for research through all UK public sector, private and charitable sources;
- 14. the establishment of a Research sub-committee of the Advisory committee and
- 15. setting aside £5m over 5 years for research under the LINK programmes.

This project was commissioned to address action point 13 by Defra on behalf of the Organic Action Plan Team.

The objective of the project is to draw together information on current levels of funding for organic research throughout all UK public sector, private and charitable sources.

The results will be used by Defra and the proposed research sub-committee to facilitate discussion on the scope for better targeting and co-ordination of the research effort and for a greater input from non-Government sources of funding.

The project has involved two phases:

- Survey of all research centres, university departments, research councils, organisations to identify research ongoing or completed since 2000;
- Analysis and interpretation of research needs and projects for organic food and farming;

The structure of the this report reflects these two parts.

Organic Research And Development.

- What is organic research and development?

Survey Of Current Organic R&D In The UK.

- Methods and definitions
- Results
- Comments & Conclusions

Suggestions For Development Of The Organic Sector R&D

- Suggested research priorities and research needs.

ORGANIC RESEARCH AND DEVELOPMENT IN THE UK.

What is organic research and development?

Organic food and farming involves a more or less defined production system – as described in organic standards. However, the underlying scientific, philosophical and conceptual basis of organic food and farming is that the health of soil, plant, animal, man and environment is one and indivisible. Organic producers and processors make the organic system real through applying the standards on their farms and in their factories. However, the extent to which they deliver the whole system benefits depends on their skill, understanding and commitment.

The ‘whole-system’ basis of organic food and farming has tended to lead many to consider that organic farming research is or should be fundamentally different from research for conventional farming. In fact, Lockeretz (2000, 2002) has examined the objectives and methods of organic research projects in detail and reveals that there is little fundamental difference between the implementation of organic and conventional research. He argues that organic research should be brought closer to mainstream science rather than attempting to maintain there is a fundamental difference. Woodward (2001) argues that key concepts of organic production challenge the current scientific paradigm, particularly with regard to the nature and operation of the ‘whole system’.

Whether there is a different, more appropriate science for organic production, or whether ‘organic’ and ‘conventional’ merely represent different world-views is less important than defining the purpose of organic R&D.

The purpose of organic research and development

Organic farming research and development has the objective of improving the organic system. Defining what constitutes an improvement is clearly central to setting research priorities and evaluating the outcome of the research. It will of course depend on the interests of the funder – and thus since the overwhelming majority of

R&D funding comes from government, government policy goals relating to organic are of central importance.

A research project should lead to optimised production consistent with organic standards – however, these are themselves developmental, so that the goalposts are constantly moving.

Niggli (2002) has provided a clear presentation of the way in which research and development has contributed to the development of organic farming in Europe since the origins of the organic movement in the first half of the 20th Century.

In the UK, the definition of needs and priorities for research in organic food and farming has been pursued initially by organic organisations and subsequently by government. In 1981, Elm Farm Research Centre published a report on organic research needs (EFRC, 1981), arising from a meeting of pioneering organic producers and organic researchers active at the time.

In 1995, UKROFS, through the work of its R&D sub-committee and following consultation published a list of organic R&D priorities (UKROFS, 1995). This served the then MAFF as a guideline for allocation of research resources.

MAFF commissioned Organic Centre Wales to complete a consultation on organic farming research priorities in the UK (Organic Centre Wales, 2001) in 2001.

Research reviews

Elm Farm Research Centre, with the International Federation of Organic Agriculture Movements (IFOAM) reviewed research projects in biological agriculture in Europe and the USA at a meeting in March 1982 (EFRC 1983). The progress in organic R&D worldwide over the years since then is most comprehensively reviewed in the biennial international scientific conferences organised by IFOAM (most recent: IFOAM, 2002). In the UK, there have been several scientific conferences on organic food and farming, the most recent being organised by the Colloquium of Organic Researchers and Organic Centre Wales in 2002 (COR & OCW, 2002).

MAFF commissioned Elm Farm Research Centre to undertake a survey of UK organic farming R&D between 1993 and 1996 (EFRC, 1996) in the light of the UKROFS R&D priorities. Subsequently a review of European research was completed (Keatinge *et al*, 2000), including a report of study tours to several European countries (Keatinge *et al*, 2000a). Defra reviewed their organic research programme in 2001 (Defra, 2001).

The present study therefore represents a further review, which should be seen in a wider context. In view of the ‘mainstreaming’ of organic food and farming (although total market penetration is still relatively small), it is essential that research actually makes a difference to farmers’ livelihoods, and the sustainability of organic production systems.

Institute based or on-farm research

There is a tendency to focus on formal research – ignoring the fact that much informal research and development takes place outside the laboratory or the research institute. It is important to recognise that farmers and growers are

themselves innovators, undertaking research and thus should be utilised and not ignored.

Also if the objective of R&D is system improvement, then extension and dissemination are of paramount importance to achieving successful outcomes from the research effort. This may best be achieved by engaging the research programme directly with farmers, in a way that is complementary to institute based research. Defra has made moves to address this need by recently commissioning two projects using and developing participatory methods (OF0315 and OF0330) where farmers play an integral part of the project.

There is an important connection between on-farm and organic research – and it is probably the case that appreciably more organic research is conducted on working farms than with conventionally oriented agriculture Lockeretz & Stopes (1999) summarise the main reasons for conducting on-farm R&D:

- The performance of organic systems generally are more closely linked to the conditions on a specific site, thus on-farm multi-site research is relevant;
- An important concept in organic farming is that the whole farm is a whole system, and this coherence is a critical feature, thus organic R&D should reflect this by operating within a whole system
- Practising organic farmers have been involved in organic production for longer than researchers, and thus know more. Much of this information can only be accessed if the research is conducted on-farm.

SURVEY OF CURRENT ORGANIC R&D IN THE UK.

METHODS.

The key objective of the survey was to draw together information on current levels of funding for organic research throughout all UK public sector, private and charitable sources.

A comprehensive list of all UK research funders and contractors was drawn up (Appendix 1), however, individual businesses were not contacted – “Why businesses were not contacted?”. A brief questionnaire (Appendix 2) was sent to nominated individuals in organisations, following initial telephone or e-mail contact. This requested basic information on organic and related research projects (title, summary, duration, cost, source of funding, research area and relevance to organic farming).

Warnings on extrapolation of data provided.

We asked for the above details on all projects that were ongoing in the period between Jan 2000 and March 2003. Therefore a 3-year project may have started in 1997 and finished January 2000, or it may have started in January 2003 to complete in 2006. All projects that were on going in January 2000 are included. Thus the research reported refers to a period of at least nine years. Longer-term projects (running for more than three years) would extend this period. Therefore it would not be accurate or appropriate to divide any of the figures included in this project by a 3, or 9 years and expect to obtain an annual figure.

The questionnaire was mailed in the week of 24th February 2003. Final responses were received by the end of April 2003, with regular follow up of all recipients to achieve the best return rate possible. The results of the survey were compiled in an Excel spreadsheet for analysis.

Why businesses were not contacted?

Individual businesses were not contacted as we were expecting to pick up most research projects via the research contractor. There may have been some research undertaken in-house by the individual businesses that we did not pick up within the survey. However, this research is also likely to be commercially sensitive and is unlikely to have been divulged by the business.

Relevance of research to organic food and farming.

Not all organic research and development is solely within and directed towards the development of organic production systems, there are degrees of relevance that must be allowed for:

- Fully relevant – all organic: The work is solely within and about organic farming systems.
- Partially relevant – some organic: The research includes work on organic farming and food systems
- Relevant – but not organic: This type research could include all the epidemiology, breeding or nutrient cycling research.

The last category is particularly difficult to delineate; it could be argued that much conventional research has relevance to the development of organic farming, even if any direct use or application within organic farming systems is a very distant possibility. Furthermore the application of such knowledge to the organic system may not be straightforward. However, the findings of this type of research are important to organic researchers (as blue skies research is to strategic and applied research) as it provides a knowledge base for organic research to draw upon.

Consequently, the survey undertaken and presented in this report does not include information on projects that fall within this category. In the context of this report, R&D projects that have no organic component would not be recognised by many funders, research contractors and the end users as organic research. Inclusion of them would also grossly exaggerate the level of funding for organic farming research.

Organic R&D types and topics

A diverse system such as organic food and farming, which includes many types of production and processing, inevitably has a broad research agenda. The type of research undertaken will vary due to the level of knowledge in an each specific research topic and the funding available.

Research Type .

We have split the research and development projects into six types.

1. Desk study: Desk research based on published and un-published sources.
2. Experimental research: Field or practical research.

3. Extension & Demonstration: Events and meetings to communicate research findings to farmers.
4. Advice & Dissemination: Specifics products including hard copy or CD or web type information.
5. Participative & Farmer Group Activity: The approach differs from extension in that it engages with the end user to deliver the result.
6. Marketing: Provision of information and development of organic markets

Research and Development Project Topics

We have also identified the following range of organic research topics.

1. Policy: Research priorities, funding, organisation, Organic Action Plan, agri-environment, CAP.
2. Marketing: Information that is directed at getting organic product better sold.
3. Soils & Nutrient Cycling: Soil biota, cultivation & soil structure, manures & composts, fertility building crops & green manures, nutrient cycles for macro and micronutrients.
4. Cropping Systems & Crops: Seed production, variety choice, plant breeding, weed population dynamics & control strategies, pest & disease dynamics and control strategies, specific crop agronomy including novel crops; grass & pastures.
5. Livestock Systems & Livestock: Breeding, animal welfare and housing, animal health & veterinary pigs and poultry, ruminants & grazing, animal nutrition.
6. Processing & Storage: Post harvest technology and biology, processing techniques, storage methods.
7. Economics & Rural Development: Farm level economics, support to farmers, fair trade models, rural development, socio-economic impact.
8. Environment & Conservation: Pollution from organic farming, biodiversity, food chains.
9. Marketing: Infrastructure, regional and local marketing public attitudes.
10. Food Quality & Safety: Quality & safety definition, novel methods, end product testing, effects of subsystem components on quality, consumer/citizen & stakeholder attitudes.
11. Research Methodology: On-farm, participative, novel methods.
12. Conversion: Studies of the implications and issues of conversion of organic production.
13. Information & Demonstration: Advisory services; farmer groups, printed and electronic media.

The data was collated and classified against the above research type and topics. An analysis of the data was then undertaken to answer a range of questions on levels and type of funding and research.

RESULTS.

A total of 268 questionnaires were mailed, and an overall response rate of 41% was achieved (110 organisations responding). This relatively good response rate was achieved through repeated follow up.

Of the 110 respondents 59 stated that they were not undertaking organic research. Of the remaining 51 there were a number of duplicate projects – due to either funder and researcher or lead and secondary researchers providing the same information. There were also problems in getting complete information from some research

contractors and so although this is a comprehensive list it is by no means exhaustive. It cannot be assumed that the 158 organisations that did not respond were not undertaking organic research. However we can be confident from the authors experience that we have accessed the vast majority of the UK organic research. (A full list of all projects reported is in Appendix 3).

Noting the above caveats we identified 35 contractors (Table 5) who were undertaking 168 projects (Appendix 4) over 4500 project months. This represents a total of over £23.5 million of research funding, approximately £2.6 million per year over the nine years (assuming projects last for three years).

Public Funders	Private & Charitable Funders
BBSRC	BBRO
Bedfordshire Council	Bulmers Trust
Cornwall College Research Committee	County Environmental Trust Ltd
Countryside Agency	Cyril Corden Trust
Countryside Council for Wales	EFRC
Coventry University	HDRA
Defra	HGCA
Devon County Council	JJ Trust
DfID	JMG Foundation
English Nature	Kintail Land Research Foundation
ESRC	Marks & Sepncer plc
European Union	Movement for Compassionate Living
Kerrier District Council	National Trust
National Assembly for Wales	Organix Brands
SEERAD	PGRO
Welsh Development Agency	Roses UK
	Rowan charitable Trust
	Sheepdrove Trust
	Soil Association
	Tesco
	WWF
	Wyvern Waste Services Ltd

How much research is being funded and by who?

The survey identified £23,578,902 worth of research and development that was ongoing since January 2000. The breakdown of the figures can be seen in Table 1.

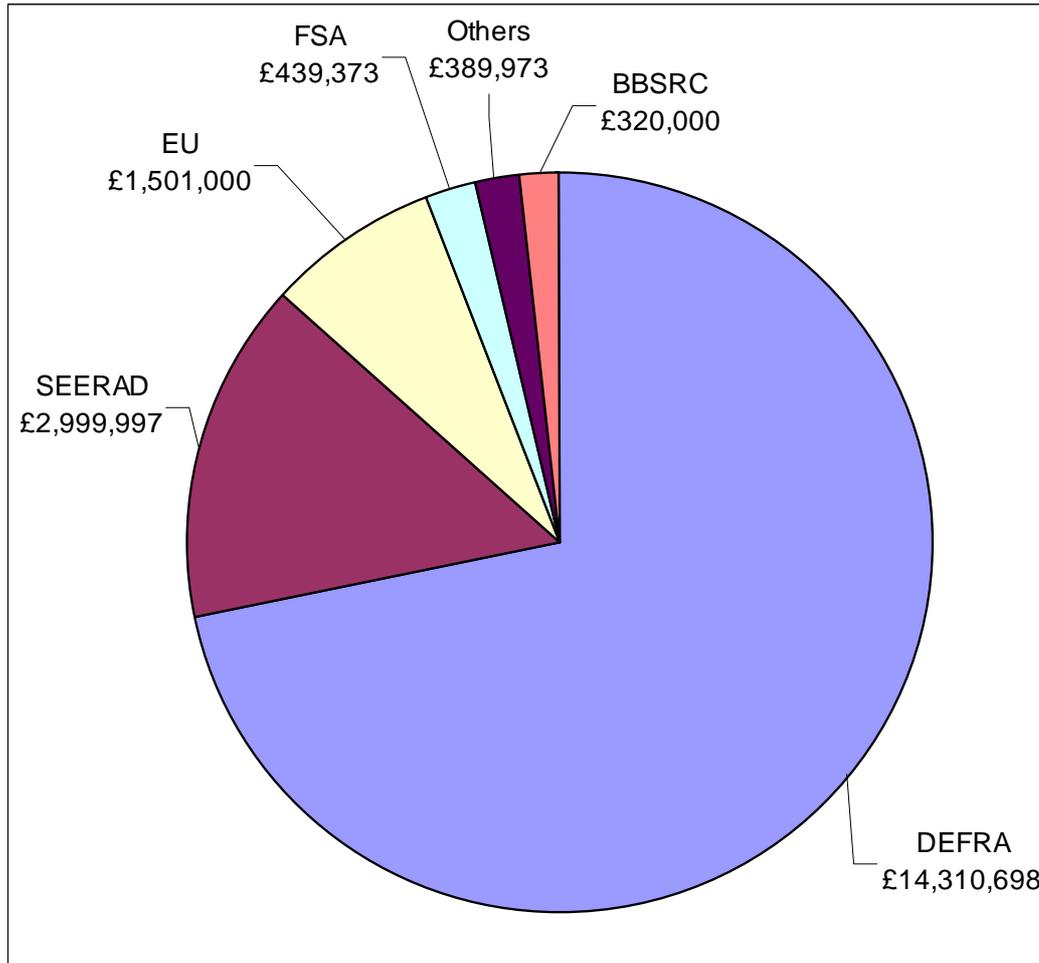
Table 1: Numbers, amount of time and level of funding by funder type.

Funding	No. Projects	Months	Total spend (£)*
Public	118	3264.17	£19,961,041
Private/charitable	44	115.50	£2,865,545
Joint	6	154.90	£752,316
Total	168	4535.00	£23,578,902

* due to the way in which financial data has been collated it is not appropriate to divide these figures by a number of years to obtain annual values.

This identifies that 85 per cent of funding for organic research in the UK comes from the public purse. The breakdown of this funding can be seen in Figure 1a. Defra is the main funder within this category funding £14,310,698 (72 per cent) of the £19,961,041, while SEERAD funds £2,999,997, £1,501,000 from EU research programmes, the FSA £439,373, BBSRC £320,000 with the remaining £389,973 coming from Welsh Assembly and agencies, local authorities etc).

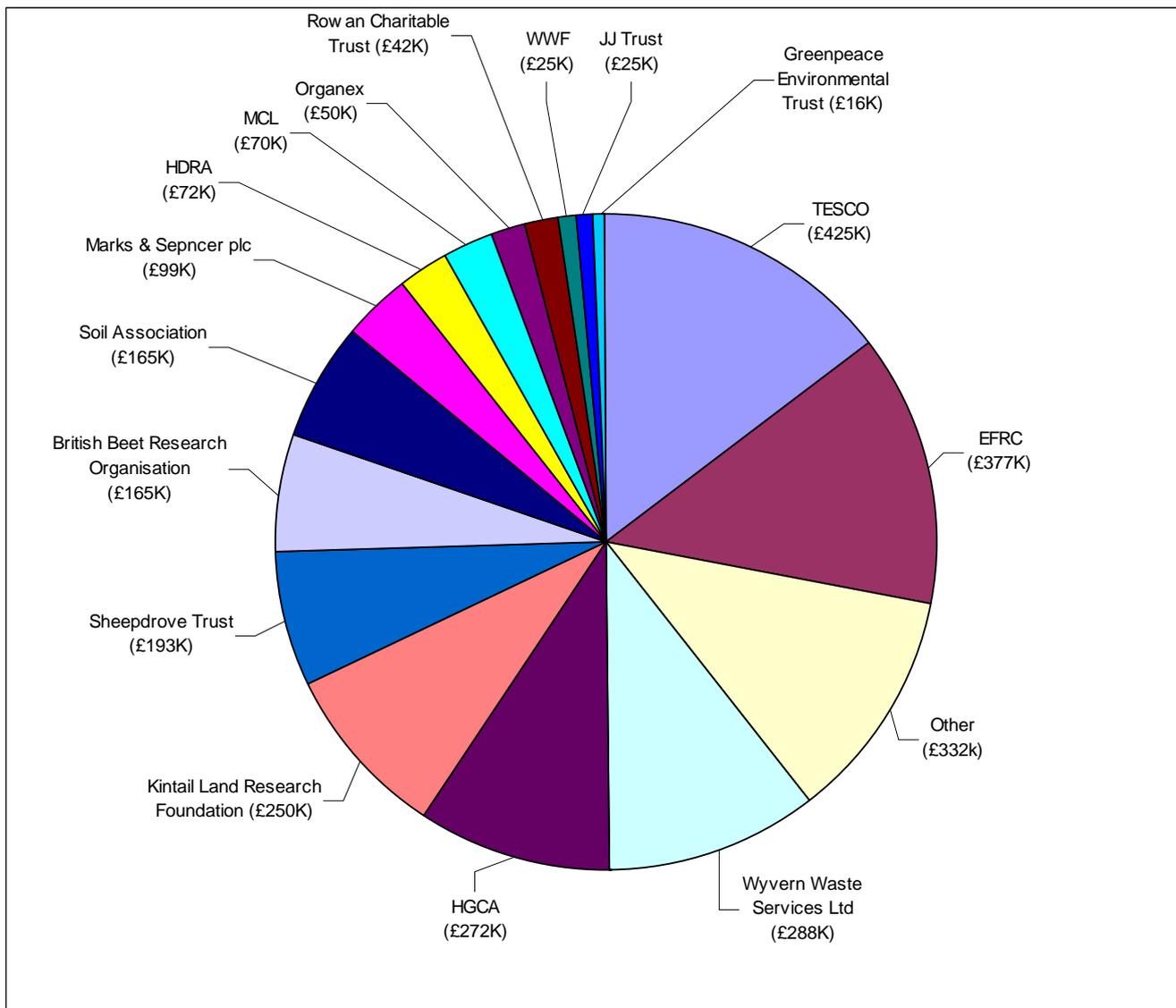
Figure 1b: Breakdown of Public funding of organic research in the UK (Total = £19,961,041).



* due to the way in which financial data has been collated it is not appropriate to divide these figures by a number of years to obtain annual values.

Of the nearly £20M almost 15 per cent is coming from the Private/Charitable section of the sector itself with the overwhelming majority of this funding being monetary payments rather than in-kind contributions. The main funders of this research are Tesco, EFRC, Wyvern Waste Services Ltd, HGCA and Kintail Land Research Foundation.

Figure 1b: Breakdown of funding by Private/Charitable sources of organic research in the UK (Total = £2,865,545).



* due to the way in which financial data has been collated it is not appropriate to divide these figures by a number of years to obtain annual values.

Little research is currently being undertaken with joint funding from both public and non-public sectors. However, this figure is bound to underestimate the value of organic research that is being undertaken by commercial companies who for confidentiality reasons will not have divulged this information.

How “organic” is the research?

Discounting the “Relevant – but not organic” the 168 projects were overwhelmingly fully organic (Table 2) with 90 *per cent* or 151 projects falling within this area and the remaining 10 *per cent* or 17 projects being partially relevant.

Table 2: R&D by organicness.

Funding	No. Projects	Months	Total spend (£)*
Fully relevant	151	4118.17	£21,220,830.76
Partially relevant	17	416.40	£2,358,071.50
Total	168	4534.57	£23,578,902.26

* due to the way in which financial data has been collated it is not appropriate to divide these figures by a number of years to obtain annual values.

What types of projects are being undertaken?

The type of research that has been undertaken will vary with the needs of that particular topic. Some topics have been more fully researched than others. An area where research is just beginning may need a desk study to start the process while areas where a greater understanding has been achieved may need bench or field research. The breakdown of the information can be seen in Table 3.

Table 3: R&D by project type.

Project type	No. Projects	Months	Total spend (£)*	Research intensity §
Desk Study	57	1014.03	£3,544,639	7.82
Experimental Research	73	2640.57	£16,838,197	37.13
Extension	12	263.57	£875,488	1.93
Advice	16	319.97	£698,218	1.54
Participation	6	224.57	£974,861	2.15
Marketing	4	71.87	£647,500	1.43
Total	168	4534.57	£23,578,902	

* due to the way in which financial data has been collated it is not appropriate to divide these figures by a number of years to obtain annual values.

§Research Intensity: Research intensity is an attempt to balance out the differing costs in the types and topics of research.

Research type intensity = ((months on type/total months) x spend per month)/100.

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Of the 168 projects over 40 *per cent* are what can be described as Experimental research projects, the amount of funding in this type of research activity accounts for two-thirds of the monies spent and over half of the research months. There is also a considerable amount of time and resource allocated to desk studies. This activity accounts for a third of all projects, nearly a quarter of the funding and 15 *per cent* of the research spend.

To investigate the relevance of this information an indicator of research intensity has been calculated (see foot note to Table 3) This balances out the differing costs and months spent on the project across all types of research. This still shows that “Experimental research” had the greatest intensity of work followed by desk studies.

What topics are being studied?

The research topics are described in the previous section. Table 4 shows the numbers of projects, time spent and total spend and research intensity for each of the topics.

Cropping systems & crops have the overwhelming majority of projects, funding and intensity of research. Livestock systems & livestock follow this. These two production orientated topics are followed by information & dissemination and soil & nutrient cycling. The other topics receive considerably less resources, with environment, sustainability & conservation having relatively few expensive and long running projects, resulting in much lower research intensity.

This data can be further analysed to identify what public and private/charitable funding is being directed at each of these topic areas. Figure 2 shows the value of spend in each topic area that is public, private/charitable or jointly funded.

The data shows that the public is funding most of the work in most topics. However, Crops, Conversion and information have a significant proportion of non-public funding.

Table 4: R&D by project topic.

Project topic	No. Proj	Months	Total spend (£)*	% Public only	Research intensity
Policy	17	282	£647,388	73.59	1.43
Whole farm systems	16	513	£4,482,806	92.42	9.89
Soils & nutrient cycling	16	440	£3,251,756	90.04	7.17
Cropping systems & crops	45	1,506	£5,418,901	76.10	11.95
Livestock systems & livestock	24	527	£3,108,844	82.05	6.86
Processing & storage	2	60	£101,648	100.00	0.22
Economics & rural development	6	113	£997,506	95.64	2.20
Environment, sustainability & conservation	8	264	£1,737,982	97.84	3.83
Marketing	7	171	£1,014,284	100.00	2.24
Food quality & safety	3	50	£513,263	95.13	1.13
Research methodology	2	96	£696,448	100.00	1.54

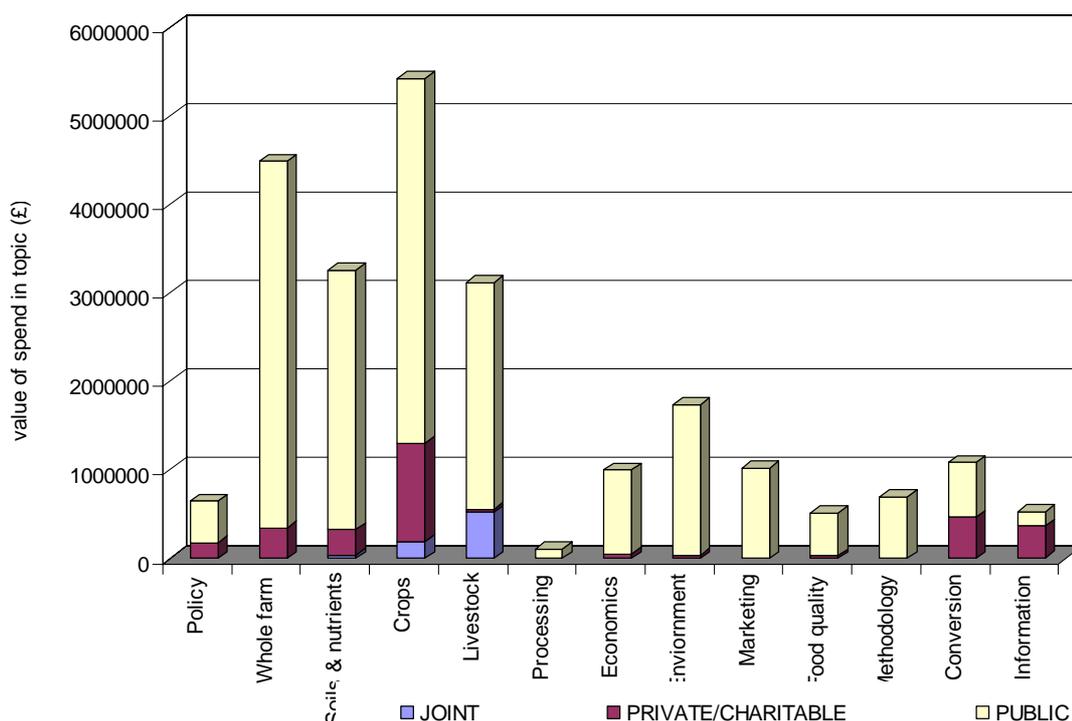
Conversion	6	201	£1,081,884	57.43	2.39
Information & Demonstration	16	312	£526,193	31.01	1.16
Totals	168	4535	£23,578,902		

* due to the way in which financial data has been collated it is not appropriate to divide these figures by a number of years to obtain annual values.

Who is doing the research?

The survey identified 35 separate research contractors for organic research in the UK (Table 5). That were spread throughout the UK and showed differing dependency on public funding for their organic research.

Figure 2: R&D spend by funder type as a fraction of the total spend per topic.



COMMENTS AND CONCLUSIONS.

The survey that was carried out of organic farming research funders and contractors in the UK is probably the most comprehensive carried out in recent times. The response rate of over 40 *per cent* was satisfactory and was met through much chasing and following up of incomplete returns. We believe that the picture presented above is comprehensive and realistic.

The survey has identified 168 individual projects ongoing since January 2000 – this represents a period of up to nine years for projects lasting three years or less. The total cost of this research was £23,578,902 of which nearly £20M (85 *per cent*) was solely from the public purse with 72 *per cent* of this funding provided by DEFRA. However, nearly £3M (12 *per cent*) was funded by sources other than the public purse including a range of charities and companies. There was also £0.75M (3 *per cent*) of joint funding by public and non-public sources. This can only be seen as positive coming from a relatively immature and still developing sector.

This level of funding would sit well with the commitment of Defra to increase funding in organic farming through the LINK schemes, which it sponsors and Defra have produced a document further from the Organic Action Plan to set out how they wish for organic research to be included within existing LINK programmes (Defra 2003). However, as little of this money was directly from the organic industry itself (most being from charities and trusts) there is justifiable concern that there will be inadequate organic business backing to take up the money that has been set aside by Defra. This may have a particular impact on the livestock research area as currently only 8 *per cent* of its funding is from non-public sources compared to nearly 30 *per cent* for crops. There have also been some questions raised about how organic research fits within a LINK programme (see below LINK Programmes and Organic Agriculture).

Unlike previous surveys and studies commissioned and information provided by Defra (Keatinge *et al* 2000, Defra 2002a) on organic research we have only included those projects that are entirely organic or include a clearly organic component. Projects that are not conducted within an organic system at all might have some relevance to organic food and farming for example: strategic epidemiology of pests and diseases or any basic research, but these have not been included. It is possible to include a great number of mainly irrelevant projects, however, this would not help define a future research and development strategy for organic farming. Nevertheless, priorities for UK organic research and development must be embedded within the broader arena of UK and international science, developing and applying appropriate knowledge within an organic context.

Table 5: Research Contractors.

Research contractor	No. proj	Total £*	Public funded	Public as % of contractor total	Other income
Aberdeen University	2	£421,691	£171,691	40.71%	£250,000
ADAS	38	£5,891,824	£5,627,515	95.51%	£264,309
Arable Research Centres	1	£36,173	£0	0.00%	£36,173
Bedfordshire County Council	1	£5,000	£5,000	100.00%	£0
BTO	1	£415,141	£415,141	100.00%	£0
CABI Bioscience	1	£20,711	£20,711	100.00%	£0
CSL	3	£498,555	£498,555	100.00%	£0
Devon County Council	1	£10,000	£0	0.00%	£10,000
Duchy College	5	£366,934	£321,334	87.57%	£45,600
EFRC	20	£1,410,066	£870,066	61.70%	£540,000
HDRA	14	£2,644,369	£2,264,199	85.62%	£380,170
Holme Lacy College	1	£2,000	£0	0.00%	£2,000
HRI	6	£369,192	£369,192	100.00%	£0
IGER	5	£1,180,646	£1,180,646	100.00%	£0
John Innes Centre	1	£48,890	£48,890	100.00%	£0
New Economic Foundation	1	£2,000	£0	0.00%	£2,000
Newcastle University	1	£320,000	£320,000	100.00%	£0
NIAB	4	£448,869	£448,869	100.00%	£0
Norton Organic Grain	1	£497,500	£497,500	100.00%	£0
Reading University	7	£591,027	£591,027	100.00%	£0
Rothamsted Research Station	2	£282,979	£282,979	100.00%	£0
Scottish Agricultural College	9	£3,028,911	£3,003,701	99.17%	£25,210
SCRI	2	£256,292	£256,292	100.00%	£0
Sheepdrove Organic Farm	1	£30,000	£0	0.00%	£30,000
Silsoe Research Institute	1	£43,316	£0	0.00%	£43,316
Soil Association	8	£316,500	£0	0.00%	£316,500

Sustain	2	£20,000	£0	0.00%	£20,000
Tesco Centre for Organic Agriculture.	8	£2,080,000	£713,000	34.28%	£1,367,000
University of Bristol	1	£253,202	£253,202	100.00%	£0
University of Cardiff	1	£101,187	£101,187	100.00%	£0
University of Exeter	1	£136,608	£136,608	100.00%	£0
University of Gloucestershire	1	£10,000	£10,000	100.00%	£0
University of Nottingham	2	£210,583	£0	0.00%	£210,583
University of Wales, Aberystwyth	13	£1,553,737	£1,553,737	100.00%	£0
Vegan Organic Trust	2	£75,000	£0	0.00%	£75,000
Totals	168	£23,578,902	£19,961,041		£3,617,861

* due to the way in which financial data has been collated it is not appropriate to divide these figures by a number of years to obtain annual values.

Of the 168 projects surveyed 151 were purely organic with a further 17 of relevance to organic systems. With the increasing understanding and acceptance of organic methods it is likely that in the future a greater number of partially relevant projects will be undertaken. This could be at the farm level looking at methods of pests, disease, weeds or nutrient management but also looking at impacts of local/organic production on the rural landscape and economies.

The majority of the research undertaken was experimental research followed by desk studies (34 *per cent* of projects and 15 *per cent* by value). The research intensity for “research “ is considerably higher than for all other methods of types of research. This is as would have been expected as a greater amount and time has been spent in this area. However, the intensity of desk studies is also high when compared to the other activities. The time-scale of this survey, covering a nine year period (for up to three year projects) between 1997 and 2006 does not enable us to identify how successful the relatively high number of projects, spend and intensity of desk studies has been and this may be a useful activity that could be undertaken at a later date.

There is a clear distinction between level of resources utilised for research projects (including both desk and experimental research) and dissemination activities. Eighty five *per cent* of funding is used for experimental research activities while 15 *per cent* is used specifically for dissemination (this likely to under estimate the total effort on dissemination as many projects will have an element of dissemination built into them, although it could be argued that not enough attention is paid to dissemination and it is often restricted to the life time of the project). This is encouraging as it suggests that significant resources are directed towards technology transfer from the science base to the end user. However, this study cannot identify how successful this dissemination has been.

We identified 168 individual projects that covered all areas of organic research from field to fork. The overwhelming majority of the research undertaken had been covering aspects of production. Whole farm systems, soils & nutrients, cropping and livestock systems accounted for nearly 70 *per cent* of the total funding. The research intensities also support this with Cropping systems having the greatest intensity followed by whole farm systems, soils and livestock systems.

The Cropping systems category is also a wide one ranging from grassland and arable to horticulture. The data for this category masks the fact that the vast majority of this work (nearly £4M) has been undertaken on arable and grass systems with only limited research being undertaken on the higher value horticultural systems (£1.5M), which represents an important sector of the organic market, subject to high levels of imports and with significant technical challenges.

There were also a surprisingly small number of projects investigating the environment (8 projects or 5 *per cent*) and funding only accounted for nearly 8 *per cent* of the total spend. The research intensity was in the middle of the spectrum. Again this may be an under estimate of the total spend on Environmental research as some work addressing environmental issues would fall within other main categories such as Soils and Nutrient Cycling.

The amount of research undertaken on off-farm activities in the organic food production chain was limited. Only a small amount of research had been directed at processing, marketing or food quality. These three areas accounted for only 12 projects and only 7 *per cent* of the total funding.

Understanding the other (non-environmental) benefits or disbenefits of organic farming have also been studied to a lesser extent. Only six Economics and rural development projects have been undertaken and account for only 4 *per cent* of the total funding. However, the levels of research funding by government (from both Defra and the devolved administrations) have increased in these areas in recent years and further projects have been commissioned after the cut off date for the survey.

The public purse funds 85 *per cent* of the research overall. However, certain topics have attracted a greater amount of private or joint funding. The key areas where private funding has been placed have been in Whole farm systems, Soils, Cropping systems, Conversion and Information. There was none in Processing or Marketing. However, this may have been due to the limitations of the survey. Individual businesses were not contacted, as we were expecting to pick up most research projects via the research contractor. Much of this type of research is likely to have been undertaken in-house by the individual businesses. This research is also likely to be commercially sensitive and would have been confidential to the businesses.

Joint funding of research although limited (3 *per cent* of the total spend) was concentrated in two specific areas; Cropping and Livestock systems. It accounted for over 5 *per cent* of Cropping systems funding and nearly 10 *per cent* of livestock systems. This is probably due to the funding from levy boards and one specific industrial partner (Tesco) in this area.

We identified 35 separate research contractors for organic research in the UK. These were drawn from the expected science base such as ADAS, EFRC, University of Wales (Aberystwyth) and HDRA but also from Trusts, Farms and NGOs. The survey showed that ADAS was lead contractor on the largest number of projects (38) with over 95 *per cent* of their funding coming from the public and the remaining from private sources. EFRC, The University of Wales (Aberystwyth), HDRA, SAC and Tesco Centre for Organic Agriculture followed. EFRC had a 62 *per cent* reliance on public sources of funding, Aberystwyth had 100 *per cent*, HDRA 86 *per cent*, SAC 99 *per cent* and Tesco Centre for Organic Agriculture 34 *per cent*. Of the small research contractors the universities generally relied on public funding while NGOs and trusts did not.

The Organic Action Plan (Defra, 2002a), proposes (Action point 14) the establishment of a Research sub-committee, this review of ongoing research will provide a basis on which the sub-committee could review the research priorities and needs of the organic sector also taking into account ORG 17 (DEFRA, 2002b) which gives a comprehensive overview of R&D, training, business advice and demonstration advice activities. These must be set against the priorities of government policy regarding organic food and farming, as laid out in the Action Plan. Perhaps the most important is the commitment to increase the proportion of organic food sourced from the UK, to replace imported organic food. This will continue to present technical challenges that must be resolved through effective organic research and development.

SUGGESTIONS FOR DEVELOPMENT OF THE ORGANIC SECTOR R&D.

The research that has been identified within this survey has shown that there is a considerable amount of work being undertaken by a range of research contractors and funders within the UK. However, it does appear to reflect the history of organic food and farming in the UK rather than our present situation. Historically the organic

research that has been funded in the UK has focused on production systems with a small but politically important amount of environmental research. There is still a clear need to continue work in these areas to improve the organic system both financially and environmentally. There is also a need to address the other areas of the organic farming and food chain – storage, processing and marketing; as well as a fuller understanding of the perceived benefits of organic farming to the environment, socially (including health) and economically.

The Government's aim to expand organic farming through market pull rather than policy and subsidy push could be better addressed within the UK organic research programme. It is hoped that key production issues for organic farmers will be picked up and funded jointly by the industry and government through the range of agricultural and food LINK programmes. This has yet to be seen but there may be problems with accessing sufficient industry funds to undertake such work. In addition much of the work that is needed to improve the efficiency of production is not precompetitive research and is too 'developmental' to be funded under the LINK programmes. (See box: "The LINK Programme and Organic agriculture").

It has to be accepted that any organic farming R&D programme is addressing the needs of a microcosm of the whole food production system and will therefore be addressing not only a very diverse range of needs (from field to fork) but also a range of production and marketing systems (local to supermarkets and international trade). To establish a co-ordinated organic R&D programme for the UK will not be an easy task. However, future research priorities should be established in the light of the Organic Action Plan. The establishment of an Organic Research Priorities Board (ORPD), possibly as part of ACOS (addressing Action Plan Action point 14), to work with all stakeholders including funders to ensure identification and a co-ordinated implementation of the research and technology transfer necessary to help achieve the objectives of the Action Plan. As a first step the current research priorities lists should be examined in the light of the action plan along side the known upcoming standards changes (e.g. animal feed, organic seed, copper etc). Short, medium and long-term priorities should be identified and promoted to all relevant funders. A strategy for public funding must be established and within such a strategy a clear indication must be given, not only of what is appropriate for public funding but also what is not. This will enable non-public funders to identify and potentially fill these gaps.

LINK Programmes and Organic Agriculture

LINK programmes had their origins in earlier Conservative government policy when it was believed that industries that benefit from public funded research should contribute directly to that research. This principle has some merit where it is applied to particular industries that would directly benefit from the research and were able and used to funding such research. In this sense, it was applied to industrialised agriculture and has been relatively successful over a wide range of agriculture for a number of years

Funding of organic research is now being encouraged to progress down the path to LINK funding. However, there is a crucial issue of principle may seriously question the appropriateness of this approach for much of the research required for organic food production.

As a form of ecological agriculture, organic agriculture is concerned to place the farmer back in the centre of developing and guiding the farming system. That farming system should be so designed and operated that, as far as possible, soil structure and condition, crop and animal fertility and the control of diseases, pests and weeds are all maintained and improved by the system itself. Recourse to external inputs should follow only as a final measure if the system fails or is unable to deliver the necessary services. It follows that improvement in organic agriculture must come from research and development in systems and aspects of those systems. In this sense, there are no input industries other than the farmers themselves.

As a result, in trying to formulate project proposals based on the existing LINK system, consortia find themselves continually trying to invent “industrial partners” to provide the required “industrial” funding. There are, of course, some businesses interested in organic inputs, including, for example, organic fertiliser amendments and biological controls. However, these are not front-line partners and by definition, should play only a minor role in successful organic agriculture.

There is, of course, a larger external element at the stage of marketing and processing of organic produce. Even here, however, organic agriculture places much more emphasis on decentralised, direct marketing systems and wider diversity of local and smaller-scale processing to deal with a greater diversity of produce and quality. “Industrial” partners can be found, but they are usually able to help on only a very small scale.

The Future?

This study has identified the breadth of projects that have been undertaken within the past three years but only gives a glimpse of the depth and impact of the research. Specifically it is recommended that DEFRA and the Organic Action Plan Group:

- Establish an Organic Research Priorities Board (ORPD) to work with all stakeholders including funders to ensure identification and a co-ordinated implementation of the research and technology transfer necessary to help achieve the objectives of the Action Plan.

It would then be appropriate for DEFRA , the Organic Action Plan Group and/or the ORPD to initiate;

- A consultation on organic R&D priorities, particularly focussing on the needs of the businesses that may be willing to participate in LINK or other joint funded projects.
- Further assessment of the benefit arising from the projects identified.
- Analysis of the intensity of research and the value to the end user (government, farmers, processors etc.) from the point of view of the priority research areas (crops, livestock etc) and the different types of research and development (desk, field, extension etc.). This should aim to define the most beneficial approach to organic research and development.
- Analysis of the quality and extent of the dissemination of the research results from the projects.

- An investigation into the possible conflict between organic research funding and the objectives and approaches of LINK programmes need to be addressed and if a real barrier is identified a solution must be found.

However, it is believed that it is important that research continues directed towards improving production methods and efficiency (financially, socially and environmentally) in those enterprises where the technical challenges are greatest or where the proportion of UK sourced farm products is relatively low.

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APPENDICES.

Appendix 1: List of organisations contacted.

Abacus Organics Association
Aberdeen City Council
Aberdeenshire Council
Action Plan DEFRA
Action with Communities in Rural England
ADAS
Amateur Gardening
Angling Foundation
Angus Council
Animal Health Trust
Animal Welfare Trust
Arboricultural Association
Argyll and Bute Council
Askham Bryan College
Bath Spa University College
BBSRC Office
Bedfordshire County Council
Bicton College of Agriculture
Bio-dynamics Association
Bishop Burton College of Agriculture
Blaenau Gwent County Borough Council
Bournemouth University
Bridgend County Borough Council
British Agrochemicals Association
British Crop Protection Council
British Goat Society
British Grassland Society
British Sugar
British Trust for Ornithology
British Veterinary Association Animal Welfare Foundation
Broom's Barn
Buckinghamshire County Council
Bulmers Trust
Butterfly conservation
CAB International
Caerphilly County Borough Council
Cambridgeshire County Council
Cannington College
Cardiff Business School
Cardiff City & County Council
Carmarthen
Carmathenshire County Council
Central Science Laboratory
Centre Energy & Environment
Centre for Ecology and Hydrology
Centre for Genome Research
Ceredigion County Council
Cheshire County Council
Clackmannshire Council
Commonwork Trust
Compassion in World Farming
Conwy County Borough Council
Cornwall County Council
Country Land & Business Association
Countryside Agency
Countryside Council for Wales
Countryside Foundation
Cumbria County Council
Daresbury Laboratory
Dartington Hall Trust
DEFRA
Denbighshire County Council
Dept. Agriculture and Rural Development Northern Ireland (DARDNI)
Dept. of Health
Dept. of Trade & industry
Derby College of Agriculture/Horticulture
Derbyshire County Council
Devon County Council
Dorset County Council
Duchy College,

Dumfries and Galloway Council
Dundee City Council
Durham County Council
East Ayrshire Council
East Dunbartonshire Council
East Lothian Council
East Renfrewshire Council
East Sussex County Council
Economic and Social Research council
Edinburgh City Council,
Elm Farm Research Centre
Engineering & Physical Science Research Council (EPSRC)
England Rural Development - Main Contact
England Rural Development Programme, East Midlands Region
England Rural Development Programme, East of Midlands Region
England Rural Development Programme, North East Region
England Rural Development Programme, North West Region
England Rural Development Programme, South East Region
England Rural Development Programme, South West Region
England Rural Development Programme, West Midlands Region
England Rural Development Programme, Yorkshire and the Humberside Region
English Nature
Environment Agency
Essex County Council
Falkirk Council
Farm Animal Welfare Council
Farming and Wildlife Advisory Group
Fife Council
Flintshire County Council
Forestry Commission
Forum for the Future
Friends of the Earth
FSA
Game Conservancy trust
Glasgow City council
Gloucestershire County Council
Green Alliance
Greenmount College of Agriculture & Horticulture
Greenpeace
Gwynedd County Council
Hampshire County Council
Hannah Research Institute
Harper Adams College
Henry Doubleday Research Association
Hertfordshire County Council
HGCA
Highland Council
Horticulture Research International, Pest Control Strategies
Imperial College, Dept of Agricultural Science, Wye Campus
Institute for Animal Health, Compton
Institute for European Environmental Policy
Institute of Biological Science, Aberystwyth, IBS
Institute of Biological Science, Aberystwyth, School of Management & Business
Institute of Food Research
Institute of Grassland & Environmental Research (IGER)
Inverclyde Council
Isle of Anglesey County Council
Isle of Wight County Council
John Innes Centre
Kent County Council
Kingshay Trust
Lackham Agricultural College
Lancashire County Council
Land Heritage
Leicestershire County Council
Lincolnshire College of Agriculture & Horticulture, De Montford Uni.
Lincolnshire County Council
Linking Environment and Farming
Macauley Institute
Mark Measures Associates
Merthyr Tydfil County Borough Council
Midlothian Council
Monmouthshire County Council
Moray Council
Moredun Research Institute

Morley research Centre
Mother Earth
National Assembly for Wales
National Farmers Union
National Federation of Anglers
National Federation of City Farms
National Trust
Natural Environment Research Council
Neath Port Talbot County Borough Council
New Consumer
New Economic Foundation
Newport County Council
NIAB, Plant Pathology Dept, (cereal seed health)
Norfolk County Council
North Ayrshire Council
North Lanarkshire Council
North Yorkshire County Council
Northamptonshire County Council
Northern Ireland Horticultural and Plant Breeding Station
Northumberland County Council
Norton Organic Grain
Nottinghamshire County Council
OMSCO
Organic Centre Wales
Organic Farmers and Growers
Organic Living Association
Organic Systems Development Program
Orkney Council
Otley College of Agriculture
Oxfordshire County Council
Pan UK
Pembrokeshire County Council
Permaculture Association
Pershore College
Perth and Kinross Council,
Pirbright Lab
Policy Studies Institute
Powys County Council
Project Carrot, Holme Lacy College
Queens University of Belfast
Ramblers Association
Rare Breeds Survival Trust
Reaseheath College
Renfrewshire Council
Rhondda Cynon Taff County Borough Council
Roslin Institute
Rothamsted Research
Rowett Research Institute
Royal Agricultural Society of England (RASE)
Royal Agriculture College
Royal Commission for Environmental Pollution
Royal Horticultural Society
Royal Society for the Prevention of Cruelty to Animals
Royal Society for the Protection of Birds
Schumacher College
Schumacher Society
Scottish Agricultural College,
Scottish Borders Council
Scottish Crop Research Institute
Scottish Natural Heritage
Scottish Universities Policy
SEERAD
Sheepdrove Trust
Sheffield Hallam University
Shetland Islands Council
Shropshire County Council
Shuttleworth College
Silsoe College
Silsoe Research Institute
Soil Association
Somerset County Council
South Ayrshire Council,
South Lanarkshire Council
Staffordshire County Council
Stirling Council

Suffolk County council
SUSTAIN
Surrey County Council
Swansea County Council
Tesco Centre for Organic Agriculture
Torfaen County Borough Council
UCAS
UK Ecolabelling Board
UKROFS
Universities Federation for Animal Welfare
University College London
University of Aberdeen
University of Bristol
University of Cambridge
University of Central Lancashire
University of Essex
University of Exeter
University of Gloucestershire
University of Lancaster
University of Leeds
University of Leicester
University of Nottingham
University of Oxford
University of Plymouth
University of Reading
University of Sheffield
University of Southampton
University of Sussex
University of Wales, Bangor
Vale of Glamorgan County Council
Vegan Organic Network
Vegetarian Society of the UK
Warwickshire County Council
Welsh Institute of Rural Studies, Aberystwyth
West Berkshire County Council
West Dunbartonshire Council
West Lothian
West Sussex County Council
Western Isles Council
Wildlife and Countryside Link
Wiltshire County Council
Womans Environment Network
Woodland Trust
Worcestershire County Council
World Wide Fund for Nature
Wrexham County Borough Council
Writtle College

Appendix 2: Letter and questionnaire circulated.

ELM FARM RESEARCH CENTRE

Centre de Recherche Ferme des Ormes
Forschungszentrum Ulmenhof

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E-mail: elmfarm@efrc.com
Website: www.efrc.com

24th February 2003.

Dear Colleague

Organic Farming Research.

I am writing to you as part of a DEFRA-funded project that has come out of the recommendations of the Organic Action Plan (www.defra.gov.uk/farm/organic/actionplan/actionplan.pdf). Action point 13 is "to draw together information on the current levels of funding for research through all UK public sector, private and charitable sources".

Elm Farm Research Centre and Eco-Stopes Consultancy are undertaking the work and we are due to report to DEFRA by the end of March. The information that we will collect and collate will be used by DEFRA to facilitate discussion on the scope for better targeting and co-ordination of the research effort and for a greater input from non-Government sources of funding.

What I am asking from you is information on any recent and current research and development that is relevant to organic farming in the UK. We are interested in all R&D including public, private and charitable funded. We understand that there may be commercial and confidential reasons why you may not want to provide all the information to us but the information you provide will be in confidence and the fuller the picture we can gather the greater benefit it will be to organic research in the UK. Please only provide information on projects where you have been the funder or lead research provider.

You will find attached a general information form that we request you complete and a spreadsheet with headings for the information that we are looking for. Can you please complete both forms and e-mail back to Kirstie Dyke at EFRC on elmfarmres@efrc.com by Monday 10th March 2003. If you have any questions please contact either Kirstie or myself on the number above.

Yours sincerely



Dr Bruce D Pearce
Head of Operations & Deputy Research Director

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Council of Management: C. A. Bielerberg (Chairman), J. Cornford, D. R. Hanson,
Dr A. Onken, J. S. Skinner, Prof. Dr. H. Vogtmann

OF0338: To draw together information on organic farming research through all UK public sector, private and charitable sources.

Section 1: General and Background information.

1. Organisational information.

1.1. Name:

1.2. Position:

1.3. Organisation or institute (full postal address with department, phone, fax & e-mail).

1.4. Has your organisation or institute undertaken or have you completed in the last 3 years any research and development activities (including reports) involving organic farming and food?

Yes/No

1.5. If "Yes" please go on to complete Section 2 for all activities.

1.5.1. Please complete a row for each activity or project.

1.5.2. The key and information for completion of the form is on the second sheet of the spreadsheet.

1.6. If "No" would your organisation or institute consider undertaking organic research in the future?

Yes/No.

Appendix 3: Full list of projects reported.

(See attached Excel file appendix3full list of projects reported.xls).

Appendix 4: Full list of organic projects.

(See attached Excel file appendix4 full list of organic projects.xls).