

**HL0150LOF Varieties and integrated pest and disease management for organic apple production (LINK)**

01/04/00 To 31/03/05 Total MAFF Cost: £284636 Total Project Cost: £284636

Contractors Henry Doubleday Research Association  
Horticulture Research International

Description Horticulture Link Proposal No 237/3

The aim is to develop an effective Integrated Pest and Disease Management (IPDM) programme for organic apple production in the UK. Important components of this aim are the evaluation and refinement of a prototype IPDM programme, the identification of apple varieties of low disease susceptibility that meet a range of market requirements (dessert, culinary, processing, juice) for organic production and the evaluation of treatments for the control of the most important pests and diseases of apple - scab, mildew and rosy apple aphid.

**OF0114 Optimisation of phosphorus and potassium management within organic farming systems**

01/01/98 To 31/12/00 Total MAFF Cost: £149889 Total Project Cost: £149889

Contractors Elm Farm Research Centre  
IACR, Institute of Arable Crops Research  
Royal Agricultural College  
Scottish Agricultural College, Aberdeen

**Description** This study will aim to produce guidelines to enable organic farmers to manage P and K effectively, sustainably and economically, using both permitted fertilisers and on-farm sources of P and K. The study will be composed of 5 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Assessment of the balance between inputs and offtakes of P and K within a range of UK organic farming systems using whole farm nutrient budgeting. Data will be collected from relevant research, farmers, advisors and site managers on farm inputs, outputs and data allowing compilation of internal flows for a range of UK organic farming systems. Nutrient flow budgets will be produced using compiled data and budgets will be compared for different organic farming systems. A workshop on P and K use in organic agriculture will be conducted; 2. Evaluation of the chemical and bioavailability indices used to assess P and K status of soils. A review of relevant literature will be conducted and a report highlighting the key problem areas for P and K management in UK organic agriculture will be compiled, enabling key crops and soils for experimental work to be identified. Soils of a range of different textures and P and K statuses from certified organic farms around the UK will be collected and stored. Laboratory incubations of soils using 8 fertilisers (including sewage sludge and municipal compost), 4 application methods and 3 application rates will be established and monitored for soluble and available P and K; 3. Availability of a range of suitable P and K fertilisers to grass clover leys and tillage crops and identification of practical application methods for on-farm use. A subset of soils and application methods identified in the previous objectives will be used in a greenhouse experiment to determine the availability of P and K fertilisers to a grass-clover mixture, oats and a brassica crop. Plant uptake of P, K, Mn, Zn, Cu, Pb and Cd will be measured. Soluble and available P and K in soils at the end of the experiment will be determined. A limited range of treatments will also be tested in field experiments using established grass clover leys on 3 key soil types; 4. Development of a process-based dynamic simulation model of P and K turnover in the soil-crop system that includes a description of P and K availability from non-soluble sources and validation of this model using field experiment data. Model parameters for a range of crops and soil types will be obtained from literature survey data and results of field trials conducted in the previous phase of the project will be used to evaluate model performance. Whole farm nutrient budgets will be linked to the model using a single data input interface. A prototype farm assessment and recommendation system will also be developed in consultation with farmers to ensure that the final software is user-friendly; and 5. Provision of guidelines for farmers on the use of P and K fertilisers for organic systems. Technical notes will be compiled for farmers and advisors, while information on sustainable P and K management practices in organic systems will be provided as inputs for taught courses. Material for inclusion on World Wide Web sites will also be prepared.

**OF0118T Optimisation of nitrogen mineralisation from winter cover crops and utilisation by subsequent crops.**

01/08/95 To 30/06/99 Total MAFF Cost: £220120 Total Project Cost: £220120

Contractors Henry Doubleday Research Association  
Horticulture Research International

**Description** Winter cover crops are integral to organic cropping systems; however, lack of knowledge concerning the fate of N following their incorporation presents a major barrier for efficient use of these crops in practice. Use of this N source is not only limiting to the production systems itself, but can also lead to loss of N via groundwater. This study will aim to quantitatively assess the fate of N from winter cover crops and investigate ways of optimising utilisation of this N source by subsequent organically-grown crops. The study will involve a mixture of field experimentation and computer modelling which will be carried out concurrently. A series of field experiments will be conducted over 24 months on an organic site in order to quantitatively assess the fate of N from 2 winter cover crops (rye (*Secale cereale*) and winter vetch (*Vicia sativa*)). Mineral N content in soil following incorporation of these winter cover crops will be monitored at weekly or monthly intervals. Studies will be conducted to determine how effectively N mineralised from incorporated winter cover crops is used by subsequent arable and horticultural crops. The cover crops will be followed by sequences of cash crops covering a cropping period of up to 24 months. Cash crop sequences will consist of one of the following: a short term summer crop utilising rapidly mineralised N, followed by 2 successive winter cereals; a series of horticultural crops (including winter crops) maintaining as much ground cover during the year as possible; short term crops, maintaining ground cover during spring and summer only; and bare soil (control). Nitrate leaching will be assessed in these different crop sequences using ceramic cup samplers. Effects of cultural techniques (especially time of incorporation) on the pattern of N mineralization from incorporated winter cover crops will also be investigated. The existing HRI computer model for N mineralization will be refined and tested using experimental data as it becomes

available during the course of the project. Experimental data and information from computer modelling will be evaluated in the context of current farming advice on the use of winter cover crops and will also help to provide a basis which could aid future government policy development on related farming issues.

**OF0124T An investigation of the incidence, treatment strategies & financial implications of mastitis in organic & conventionally**

01/07/96 To 30/06/99 Total MAFF Cost: £148031 Total Project Cost: £148031

Contractors Reading University

**Description** Complete Title: An investigation of the incidence, treatment strategies and financial implications of mastitis in organic and conventionally managed UK dairy herds.

This study will aim to develop and promote improved techniques and systems for the control and treatment of mastitis in both organic and conventional dairy cattle. The study will be composed of 6 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Measurement of the level of mastitis in organic and conventional dairy production systems. Initially, a review of relevant literature will be conducted. The DAISY database of 100 sentinel herds throughout the country will be analysed to estimate the incidence of mastitis in these herds. Results from a Soil Association questionnaire will also be analysed to survey the incidence of mastitis in organic dairy herds. The incidence of mastitis in dairy herds (selected from a survey of all organic dairy farms) of varying size with different management systems will be monitored; this will include monthly California Milk Test monitoring of all lactating cows and collection of somatic cell count data. Milk records will also be collected from study farms; 2. Identification of predisposing factors influencing the incidence of mastitis in dairy cattle. Data on herd structure and dynamics will be collected and information on the ratio and nature of forage and concentrates used, grazing policy, mineral supplementation and feeding regimes will be obtained from all study herds. Different disease control therapies used to control mastitis and other common diseases will be evaluated and management strategies that may influence the incidence of mastitis will be identified; 3. Description of different control strategies adopted by farmers to identify and treat mastitis in dairy cattle. Matched conventional and organic farms will be identified for individual case studies to investigate in detail management strategies that influence mastitis. Detection procedures, principal control strategies, outcomes of treatment and recording systems for mastitis will be monitored on all study farms; 4. Quantification of the production and financial losses due to mastitis and estimation of the cost benefit ratios of different control strategies. Data will be collected from study farms to quantify production losses attributable to mastitis. A financial analysis of costs and inputs required for mastitis control on organic and conventional farms will be conducted; 5. Comparison of the public health implications of mastitis control strategies employed on organic and conventional dairy farms. Milk sampling and laboratory analysis will be conducted on all cows on study farms exhibiting clinical mastitis. Bulk milk samples will be regularly tested for antibiotic residues, and antibiotic use on study farms will be monitored; 6. Dissemination of study findings and promotion of improved mastitis control techniques to farmers. Results from the project will be published in appropriate scientific journals and released as press releases. Training workshops and seminars for farmers will be run and a scientific conference to discuss study findings will be organised. The study will help to highlight alternative mastitis control strategies which minimise farmers' dependence on antibiotic therapies while ensuring the health and welfare of the dairy cow and the production of high quality milk.

**OF0125 Economics of Organic Farming: Economic Modelling**

01/07/96 To 30/06/99 Total MAFF Cost: £81874 Total Project Cost: £81874

Contractors University Wales, Aberystwyth

**Description** This study will aim to collect and collate data on the financial performance of organic farms differentiated by farm type. Financial data over a 3 year period will be collated for 25-35 organic dairy, hill livestock and arable farms; this data will be collected under 3 different MAFF-funded research projects and analysed using standard Farm Business Survey procedures and parameters. Data collection will be carried out with the aid of specially developed Microsoft Excel spreadsheet software. Financial data will be collected from an additional 20 farms of a type or types selected to complement the studied organic farms. Appropriate clusters (10-15 farms) of similar conventional farms will be selected for comparison of data with those obtained from individual organic farms matched to each cluster. Data for conventional farms (preferably consisting of identical samples collected over the same time period) will be sourced from the ESRC data archive. Matching each organic farm with a cluster of specially selected conventional farms will allow individual farms to be analysed as case studies (subject to confidentiality constraints) and for group averages to be estimated with reliable statistical interpretation. Results will be used to produce an annual Organic Farm Incomes report to Farm Business Survey specifications, incorporating comparisons with data from conventional farms. Draft reports will be produced by the end of January during each year of the study; these reports will only contain organic farm data. Final reports (including the conventional farm comparison data) will be produced and published by the end of June during each year of the study. Subject to their agreement, participating farmers will receive a summary of their individual farm financial results and a league table indicating their performance relative to others in the group. Results of the study will inform MAFF policy with respect to organic farming, arable and livestock commodity support programmes and agri-environment policy, and will provide a basis for assessments by farmers and advisors of the farm-level implications of conversion to and continuation of organic farming.

**OF0126T Conversion to organic field vegetable production.**

01/08/96 To 31/07/00 Total MAFF Cost: £506544 Total Project Cost: £506544

Contractors Elm Farm Research Centre  
Henry Doubleday Research Association  
Horticulture Research International

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**Description** Current lack of information and advice relating to conversion to organic field vegetable production systems presents a major barrier to individual farmers intending to convert their land over to this form of farming. This study will aim to provide information on the physical and economic performance during conversion to organic field vegetable production. A 12 hectare unit of the farm at HRI Wellesbourne will be converted over a 6 year period to an organic system with a rotation including field vegetables and arable crops. Physical and economic performance of this conversion will be assessed by quantitatively and qualitatively monitoring individual fields and crops for the following: yields of cash crops and fertility-building crops; soil nutrient status, nutrients removed and replaced within the cropping programmes; assessment of the weeds and the weed seed bank; assessment of pest and disease problems; and assessment of economic performance of individual crops and of the unit as a whole, considering crop gross margins, fixed costs and costs of new investments. The conversion plan will be developed in conjunction with the EFRC Organic Advisory Service. The plan will be progressive, developing throughout the study period on the basis of results as they become available. The overall physical and financial performance of the unit during conversion will be assessed by comparing scenarios where the initial fertility-building phase is 29, 17 or 7 months. Performance during conversion schemes at 3 different commercial farms, representing contrasting scenarios of conversion strategy and field vegetable production, will also be monitored. This will be achieved by regularly collecting and assessing basic data of yields, soil nutrient status, weeds, pests and disease problems, crop gross margins, fixed costs and capital investment, with particular emphasis on the vegetable crops in the rotation. Results provided by each of the 4 conversion scenario case studies will be interpreted and evaluated to provide actual performance data, information and recommendations for farmers undergoing conversion and for potential organic farmers. This will be performed in collaboration with the EFRC Organic Advisory Service. Results will also be incorporated into the Organic Farm Management Handbook and demonstrated in open days and workshops.

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**OF0142 Varieties of field vegetables and potatoes for organic production and marketing**

01/04/97 To 31/03/01 Total MAFF Cost: £123991 Total Project Cost: £123991

Contractors National Inst of Agricultural Botany

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**Description** During organic farming of field vegetables, choice of variety is more critical than in conventional farming, where problems can be solved at a later date by application of pesticides or fertilisers; varieties are required that can respond favourably to the sometimes sub-optimal conditions imposed by organic cultivation. This study will aim to investigate the suitability of selected varieties of vegetables and potatoes for organic production. Trials will be conducted on UKROFS approved sites with early carrots (12 varieties), broccoli (var. calabrese; summer and autumn crops), lettuce (iceberg types), onions (5 set varieties and 5 module set types), novelty salads, parsnips (up to 10 varieties) and potatoes in order to generate information and advice on the most appropriate variety choice for organic producers and to assist the breeding industry in identifying important characteristics for organic production. Trials will involve measurements of a range of growth parameters and quality attributes on crops selected for study. Shelf life tests will be conducted with selected crops from trials and compared with results from conventional produce. Individual trial and crop one year results will be prepared in a form presenting data obtained with a summary of variety performance. For crops studied, summary information and advisory guidelines for organic production will be prepared, including strategies for disease control and avoidance. Results of the study will assist in reducing the uncertainty of organic production by identifying varieties and strategies that will provide a greater possibility of producing high quality crops having high consumer appeal. Results will be widely circulated to the organic and horticultural industries via NIAB's well established results and publication schemes and will be reported to the horticultural and organic press.

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**OF0143 A study of the advantages and disadvantages of break crops for organic rotations**

01/10/98 To 30/09/02 Total MAFF Cost: £120044 Total Project Cost: £120044

Contractors Scottish Agricultural College, Aberdeen  
University of Aberdeen

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**Description** Organic grass/arable rotations lack sufficient crop and root system diversity; this is thought to result in low soil nutrient status and fertility, higher disease, pest and weed incidence and poor economic returns to the farmer. This study will aim to identify agronomically, environmentally and economically suitable break crops for organic grass/arable rotations. The study will be composed of 5 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Review of the scientific literature to evaluate known agronomic advantages and disadvantages of 15 potential break crops (including the 10 crops proposed for field trials) for organic arable/grass rotations. Information on the specific requirements of break crops, their weed, pest and disease problems and their compatibility with preceding and succeeding crops will be evaluated. A report will be produced including the ranking of all 15 crops according to their agronomic potential as break crops in organic rotations in the UK; 2. Evaluation of the economic potential of the 15 potential break crops. Information from public trade databases, and "in house" marketing surveys and sales figures from a major UK food retailer will be analysed to rank the 15 most agronomically suitable break crops in order of economic importance. The study will also analyse and quantify potential labour and capital costs associated with the crops, thus allowing an initial cost/benefit analysis. This analysis will be used to grade break crops according to economic suitability; 3. Identification of agronomic and environmental suitability of 10 break crops in small-scale field trials. Replicated field trials will be conducted in small-scale experimental plots on fully converted organic land. Break crops and the following spring barley crops will be monitored for characteristics such as soil fertility, nitrate leaching, disease, pest and weed incidence and crop nutrient content, yield and quality. Data will be used to identify specific problems associated with crops and allow them to be ranked according to agronomic suitability and economic potential; 4. Identification of agronomic and environmental suitability of potato, carrot, swede and borage in a large scale experimental organic rotation. Each crop in the rotation will be grown on two separate 5 acre fields every year and fields will be monitored for the same range of soil and crop characteristics as in the previous phase; and 5. Assessment of consumer acceptability, sensory characteristics and market potential of harvested crops grown in field trials. Crops produced will be assessed by the Tesco Fresh Produce Department and compared with organic produce from other sources in the UK and overseas.

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**OF0144 Overwinter transplant production for extended season organic cropping**

01/12/97 To 31/03/01 Total MAFF Cost: £120999 Total Project Cost: £120999

Contractors Elm Farm Research Centre

**Description** This study will aim to develop and evaluate protocols for organic transplant production during the autumn, winter and early spring, with particular focus on nutrient supply, cell size and disease control for brassica, allium and lettuce. The study will be composed of 4 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Identification and evaluation of organically acceptable fungicides to control mildew in transplant production systems for brassicas, alliums and lettuce. Specific organically acceptable products will be identified and sourced from UK and other EU countries and permission will be gained for their use in experimental trials to evaluate efficacy. These will be included in replicated glasshouse trials with inoculation of specific fungal pathogens to provide evaluation (with statistical significance) of the efficacy of the selected products; 2. Production of integrated organic transplant production systems for brassica, allium and lettuce over the autumn and winter period by identifying optimum cell block size(s) in relation to nutrient requirements, sources, growing media formulation, supplementary feeding and watering during plant raising. Transplant production systems will also be assessed in terms of risks and opportunities for control of mildew in the light of products evaluated in the previous phase of the study; 3. Evaluation of developed transplant production protocols during the winter period for early production in replicated trials and commercial situations. Replicated glasshouse trials will be completed under winter (low light, low temp.) conditions on selected production protocols found to be satisfactory under better conditions. Trials will include cell/block size, compost and feeding regimes using a range of proposed treatments. Transplant quality will be assessed at the end of the plant raising period. Larger scale trials will be completed with a commercial plant raiser in years 2 and 3 of the project to evaluate production protocols under commercial conditions; and 4. Transfer of technology and dissemination of results to end users (organic growers and plant raisers). This will be achieved through the activities of a Project Steering Committee, consultation and workshop meetings and internal reporting of project findings to Steering Group members and MAFF. Specific targeted contact with control agencies (MAFF and EU) will be developed for assisting the successful commercial implementation of the developed over-winter transplant production systems.

**OF0145 Testing the sustainability of stockless arable organic farming on a fertile soil**

01/04/98 To 31/03/01 Total MAFF Cost: £540828 Total Project Cost: £540828

Contractors ADAS Consulting Ltd

**Description** This bid is for a continuation and development of the MAFF funded organic arable project at ADAS Terrington. The work is in support of MAFF policy for a greater uptake of organic systems both to supply an increasing demand for organic produce and to benefit the environment. For a substantial increase in organic farming in the Eastern arable areas of the UK sustainable systems without livestock or manures are necessary. The main objective of this proposal is to test the sustainability of a stockless arable rotation on a fertile soil. The core experiment will be supported by data collection and analysis from ten commercial organic farms on a wider range of soil types and with a variety of rotations. There will also be a number of specific experiments examining particular constraints to sustainability, for example the establishment of legumes and the control of perennial weeds. Results will be used in support of MAFF policy and will be transmitted to current organic farmers and those intending to convert by visits, conference papers, press articles, a study day and scientific papers. A particular Technology Transfer initiative will be the production of a manure management booklet because manures are an important source of nutrients in many organic systems, but they bring with them an environmental risk if used incorrectly.

**OF0146 Organic milk production**

01/10/98 To 30/09/02 Total MAFF Cost: £697354 Total Project Cost: £697354

Contractors IGER, Inst. of Grasslands and Environmen

**Description** The aim of the proposed work is to evaluate the factors determining the physical and financial performance of different organic dairy farming systems with particular emphasis on feed imports and degree of self-sufficiency. Data collected from this and other studies will be used to produce a model on the physical and financial consequences of the different management options available to organic dairy farmers. This will assist farmers in improving the efficiency and viability of organic milk production, thus encouraging the wider adoption of organic systems, as well as providing policy makers with a tool to compare the sustainability of alternative systems. The work will also provide information on the practical implementation of standards for organic milk production.

**OF0147 Organic beef and sheep production**

01/04/98 To 31/03/01 Total MAFF Cost: £648022 Total Project Cost: £648022

Contractors ADAS Consulting Ltd

**Description** It is government policy to support the development of organic farming in the UK. Scientific information is required on the development, performance and limitations of organic systems, to facilitate informed decision making and to aid policy formulation. On the organic unit at ADAS Redesdale, conversion of 400 ha, 600 breeding ewes (in 3 flocks) and 35 suckler cows was completed in 1993. The unit is now recognised as a valuable source of research and information on upland organic production. The continuing objective is to assess the effects of converting a

hill/upland farming system to organic management. This will take account of longer term trends in grassland and livestock performance, the continuing evolution of markets for organic produce and the development of production standards for organic livestock. Detailed measurements will be made of physical and financial performance, animal health and welfare, and botanical change. Specific investigations will be undertaken into parasite control and trace element nutrition. Data from 10 commercial organic farms linked to the main project will be used to broaden the information base, particularly for financial performance. Results from the project will be communicated through appropriate media to current and prospective organic farmers, research and extension workers and to MAFF to aid policy formulation on organic farming.

**OF0151 Economics of organic fruit production**

01/07/98 To 30/06/99 Total MAFF Cost: £11113 Total Project Cost: £11113

Contractors Henry Doubleday Research Association

**Description** This study will aim to estimate the present size of the organic fruit market and its potential for growth as well as provide detailed costings for organic production of major top and soft fruit. The study will be composed of 4 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Assessment of the present size of the organic fruit market, differentiating between the various market outlets and identifying potential future growth of the market. The size of the market and potential for future growth will be determined through discussion with, and visits to, processors and other organic fruit buyers, growers and other people with specialised knowledge of the market; 2. Collection of data on organic fruit prices and production costs. The methodology for this phase of the project will be agreed between HDRA, WIRS and the Organic Fruit Focus Group. The Fruit Focus Group will help identify suitable growers and processors to visit. Collection of financial and physical data will be performed by means of a half day visit to 10 growers and 5 processors/fruit buyers to help fill in basic data sheets, and through discussion with the Organic Advisory and Information Service; 3. Implementation of an economic analysis on the major top (apples and pears) and soft (raspberries, strawberries and blackcurrants) fruit in order to produce the following data: gross margins for each crop; fixed costs and estimated whole farm performance for organic fruit growers; costs of establishing/converting to organic fruit production; break-even budgets to indicate yields and prices required to make fruit production economically viable; and estimations of economic optimum size (in terms of crop area) for holding. Techniques used to analyse data will be those currently used by agricultural economics departments at universities as well as those used by conventional horticulture. Gross margin analysis will be conducted as recommended in the Organic Farm Management Handbook, while whole farm performance methods will be calculated using Farm Business Survey Standards; and 4. Interpretation and evaluation of data and provision of recommendations to potential growers, advisors and policy makers. Results will be submitted to MAFF and shared with the Organic Fruit Focus Group, together with growers and advisors through a workshop; selected findings of the study will be incorporated into technical guides for organic growers.

**OF0153 Effect of breed suitability, system design and management on welfare & performance in traditional & organic poultrymeat**

01/10/98 To 30/09/02 Total MAFF Cost: £288231 Total Project Cost: £288231

Contractors ADAS Consulting Ltd

**Description** This study will aim to systematically identify breeds, first crosses and/or hybrids suited for use in extensive poultrymeat production, in terms of bird welfare, growth profile, energy and protein utilisation efficiency, carcass conformation and meat quality. The study will also aim to establish aspects of system design and management that are important in optimising bird welfare, range usage and economic performance. Research will consider the differing requirements for barn, free range, traditional free range and organic poultrymeat production. The project will consist of 3 phases. Phase 1 will characterise and systematically identify suitable breeds, first crosses and/or hybrids for use in extensive poultrymeat production systems which meet market requirements for growth and product quality and show acceptable economic performance. Interactions between breed and temperature and breed and feed regime on carcass fat content will be studied. Similarly, breed differences and interactions between breed and feed regime on meat flavour will be identified. Welfare of birds (fearfulness, response to handling, injury and mortality rates) will be a key selection criterion for breeds. Breeds, first crosses and/or hybrids identified in phase 1 will be used in phases 2 and 3. In phase 2, aspects of range design that optimise range usage by birds in summer and winter, without compromising bird welfare, will be identified. In addition bird movement within the house will be characterised in flocks of free range broilers using 2 commercially available housing systems (a standard controlled environment house with pop hole access to range and a thermostatically controlled house with curtain sides and part wire mesh walls with pop hole range access). Successful completion of Phases 1 and 2 will allow recommendations for free range and traditional free range poultrymeat production to be made. Phase 3 will aim to identify management and design aspects that are important in commercial organic poultrymeat production. An economic appraisal will be made for all treatments/management practices examined. It is intended that the cereal component of feeds will be of organic origin. Coccidiosis control will be achieved using either Amprolium in the starter ration or vaccination with Paracox during early life, depending on EC legislation or proposed changes to legislation. Successful completion of the project would provide information for improving sustainability of the UK poultrymeat industry and organic production enterprises, as well as increase consumer choice and improve bird welfare.

**OF0154 Production of organic seed for the organic sector**

04/01/99 To 03/01/00 Total MAFF Cost: £20000 Total Project Cost: £20000

Contractors Elm Farm Research Centre

**Description** Regulation of organic farming in Europe requires that organic crops should be grown only from organic seed by the year 2000, although the likelihood of this being achieved is low. Problems such as controlling fungal diseases, and ensuring seed vigour and longevity need to be addressed. The aim of this study will be to find and disseminate information on sources of organic seed, identify and evaluate problems which

require further research, and stimulate production of organic seed in organic agriculture. The study will be composed of 6 specific objectives outlined as follows together with ways in which they might be achieved: 1. Assessment of the current and potential availability of organic seed in the UK, elsewhere in Europe and further afield, including consideration of possible quarantine problems, and the health and quality of seed from different sources; 2. Development of a forecast of demand for organic seed in the UK over the next 5-10 years based on a European survey, modelling data and UK producer requirements. An outline forecast for the EU as a whole should also be produced; 3. Identification of obstacles that need to be overcome with respect to potential seed shortages and whether they can be dealt with through UK or European cooperation. Much of the information will be gained from consultations with research organisations involved in seed research and from appropriate literature surveys; 4. Highlighting of problems that need further research, with emphasis on seed production methods, seed quality, seed treatment for disease and pest control, carryover of unwanted seeds, and seed longevity and maintenance of stocks; 5. Production of a report covering the availability of organically produced crop seed for commercial organic use, including details of species and varieties where further work is needed, and recommendations for action in those cases. A list of seed companies and their organic seed products, both in the UK and throughout the EU, will also be included; and 6. Organisation of a meeting involving all those with an interest, including seed producers and growers, and EU representatives. For objectives 1-4, information will be obtained through structured interviews and focus groups involving research institutions, producer organisations and companies. This will be integrated closely with the newly established task force on organic seeds and will allow development of an information network and a computer database. Results will be used primarily to inform UK organic farmers, but will also be made available to European partners on an exchange basis.

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**OF0156 Shelf life of organic vegetables**

01/06/98 To 31/05/01 Total MAFF Cost: £67195 Total Project Cost: £67195

Contractors National Inst of Agricultural Botany

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**Description** Choice of variety is more important when growing organic vegetables than when growing conventional crops since severe restrictions are placed on the treatments which organic growers can apply to maximise yield and maintain quality. In addition, shelf life can be affected by the low nutrient levels available under organic conditions as well as the slower growth and later maturity of organic produce. Organic produce may also have higher disease and pest loads which will affect crop value and shelf life. In this study, the shelf life of selected varieties of organically grown early carrots, broccoli, lettuce, novelty salads, parsnips and potatoes will be investigated under cool cabinet (20°C, 50% relative humidity, 1200 lux lighting) and ambient (1°C, 80% relative humidity, 1200 lux lighting) conditions. Measurements will be made on a daily basis until 10% weight loss has occurred or until material falls outside market specification in other quality characteristics. Several measurements will be performed on each sample as appropriate, taken from the following: skin appearance, weight loss, root quality, rotting, spear quality, head quality, sprouting, bulb quality, disease and pest levels, plant quality, root quality and colour, and greening. Root and tuber material will be washed prior to tests. In addition, storage potential of organic onions and potatoes will be examined under ambient conditions with frost protection and an absence of sprout suppressant. Results will be used to provide advice to organic growers, breeders and the retail sector as to selection of the most appropriate varieties which will allow cost effective production and presentation of high quality organic material.

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**OF0158 Integrated control of slug damage**

01/09/98 To 31/03/02 Total MAFF Cost: £262979 Total Project Cost: £262979

Contractors IACR, Institute of Arable Crops Research

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**Description** Problems associated with slugs as pests of organic vegetable crops are exacerbated by the fact that chemical control measures are prohibited in organic systems. The aim of this study will be develop effective integrated management techniques for control of slug damage to organic vegetables. Patterns of slug populations and damage in representative organic vegetable crops will be examined, together with the potential contribution of individual methods of control, alone and in combination. The study will be composed of 9 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Evaluation of biocontrol methods using the nematode *Phasmarhhabditis hermaphrodita* in combination with other methods; 2. Quantification of the impact of carabid beetle predators, in particular the common large carabid beetle *Pterostichus melanarius*, on slug populations, and development of techniques to manage and manipulate their numbers to maximise their impact on slug populations. Predation of beetles against slugs will be examined by testing beetle fore-gut contents with general, genus-specific and species-specific anti-slug antibodies. Possible options for manipulating predator numbers include modification of time or method of cultivation prior to planting of crops to reduce the impact on beetle populations, and provision of "beetle banks" or field margin strips where beetle pupae may survive. Emergence of beetles in such habitats will be monitored together with movement into adjacent crops; 3. Evaluation of mechanical and cultural methods of slug control, particularly methods of weed control. Mechanical cultivation methods will be tested initially in polytunnels, alone and in combination with nematodes, and then in larger scale field experiments; 4. Evaluation of intercropping with attractive (e.g. basil and clover) or repellent (coriander) crops; 5. Assessment of the potential value of modified crop rotations. Slug population growth in a range of fertility building crops will be compared, initially in mini-plots; 6. Potential of molluscicidal composts for control of slug damage and potential use of plant extracts as additives to repellent mulch material; 7. Determination of spatial patterns of slug populations and damage in key organic vegetable crops. Slug population distribution patterns will be measured at intervals during the cropping season for at least 2 different vegetable crops, chosen to represent differences in ecology of the crop and their slug pests; likely options are a salad crop (short growing season) and a brassica crop (long growing season). Distribution patterns will be modelled to develop rules for targeting areas where control measures are needed most; 8. Use of combinations of control measures, e.g. nematodes applied to soil in crop rows combined with mechanical cultivation between rows, nematodes combined with carabid beetles, and application of nematodes in strips of slug repellent crops at field edges (the efficacy of which may be enhanced further if field margins also represent good sources of carabid beetle predators); and 9. Production of recommendations, to be published as a booklet or pamphlet, for best practice in integrated pest management of slugs in organic vegetable production.

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**OF0159 Conversion to Organic Production software (COP)**

01/09/99 To 30/11/00 Total MAFF Cost: £78755 Total Project Cost: £78755

Contractors University Wales, Aberystwth, Inst of Ru

**Description** This study will aim to develop software that can assist farmers and advisors in assessing the feasibility of a conversion to organic farming for use in connection with OCIS (Organic Conversion Information Service) and in carrying out more detailed conversion planning. The conversion to organic planning (COP) software will be developed as a Technical Systems Module within the Environmental Management of Agriculture (EMA) programme, but will also be available in stand-alone form. The project will be composed of 4 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Development of a detailed outline of the programme. The outline will need to include 5 areas: format for standard data for use in programmes; required input data; envisaged calculations and budgets; likely output data such as performance indicators; and envisaged linkages with EMA. Comparisons will be made with the format of standard data in the Organic farm management handbook and conventional standard data collections. Previously developed spreadsheet models for conversion to organic production will be examined to provide guidance for the programmer. Consultation with potential users of the COP software will ensure the relevance of its performance output; 2. Writing of draft software and documentation. Two underlying databases for standard data collection and individual farm data will be developed. A graphical user interface will be designed on the basis of the output of objective 1. Programming of the necessary calculations for financial, forage, concentrate and farm gate nutrient budgets will be conducted. The COP will be linked to other technical systems modules in EMA in order to establish links with existing environmental evaluations. Information and documentation for users and maintainers of the programme will be provided; 3. Testing of draft software and corrections. The piloting of a first draft version of the software will use existing contacts to potential users within EMA and through the EFRC organic advisory service, based on a fault report form. The programme will be tested on several real farm examples and the outcome of testing will be reported to the programmers; and 4. Refinement and release of the software. Any final amendments will be made following feedback from the piloting stage and the software will be released through the University of Hertfordshire, who are responsible for the EMA-programme.

**OF0160 Organic farming research database**

01/09/99 To 28/02/02 Total MAFF Cost: £20711 Total Project Cost: £20711

Contractors CABI Bioscience

**Description** MAFF is encouraging expansion of organic farming in the UK and has increased the budget for Organic Farming R&D. In order for this budget to be used effectively and efficiently, good information on current and past research is needed.

To fulfil this need, it is proposed to create a comprehensive bibliographic database on all aspects of organic farming research relevant to the UK (and temperate regions) covering literature published in the last 25 years. The database will be created from a subset of the general agriculture database, CAB ABSTRACTS, and supplied on CD-ROM in industry standard format. All necessary software will be included.

The purpose of the database is:

- \* to provide a comprehensive bibliographic information resource on organic farming research relevant to temperate regions;
- \* to supply the database in a stand-alone package, that needs no unusual hardware or software;
- \* to support MAFF-sponsored and other research and development programmes in organic farming in the UK.

The CD-ROM will contain the following:

- \* approximately 80,000 bibliographic records with fully informative abstracts on organic farming research from 1972 to the present selected from the approximately 10000 journal titles that are scanned for the CAB ABSTRACTS database, as well as conference proceedings, reports, and books;
- \* integrated search software.

The CD-ROM will be updated annually.

**OF0161 The environmental implications of manure use in organic farming systems**

01/08/98 To 30/11/99 Total MAFF Cost: £58755 Total Project Cost: £58755

Contractors ADAS Consulting Ltd

**Description** The main aim of this study will be to review the environmental impact of manure use in organic farming systems, particularly in relation to nitrate, ammonia, nitrous oxide and methane. The study will be composed of 4 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Review of the use of manures in organic farming systems. Current recommendations for manure use in organic farming systems will be summarised, with any discrepancies between the different codes (UKROFS and Soil Association) highlighted. This will include information on manure types, storage and spreading practices and application rates. Developments likely to take place in the future will also be included; 2. Comparison of the nutrient and heavy metal composition of cattle manures derived from organic and conventionally farmed animals. Existing data on manure and feed compositions from organic systems will be identified and collated. In addition, 60 samples of manure will be collected from organic farming systems. Sampling will be structured to obtain sufficient representative samples of the main systems (e.g. fresh vs. stacked manures, solid vs. liquid fractions). Detailed background management information will also be

collected; 3. Review of the environmental impacts of manure use in organic farming systems. This will be assessed by means of a modelling exercise for 3 theoretical organic farming systems (extensive upland, mixed lowland and stockless arable systems). On established farms, key points in the farm and manure management system that influence flows of N, methane, P and K will be identified. Values for each of these flows will be obtained by literature search and by identification and adaptation of existing models (e.g. NYCYCLE and MANNER). Ammonia and nitrous oxide emission inventories already calculated for conventional systems will be used to assess the difference between the environmental impact of conventional and organic systems; and 4. Provision of recommendations for the use of organic manures in organic systems. Findings of the study will provide information on the environmental impact of manure use in organic farming systems and on the nutrient (and heavy metal) composition of cattle manures derived from organic livestock production systems. Results will be written up as a review, with conclusions and suggestions for future work. A leaflet giving recommendations for the best use of manures in organic farming systems will also be drafted.

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**OF0162      Organic animal health, welfare & husbandry: assess existing knowledge & production of advisory resource compendia**

01/10/98      To      31/03/00              Total MAFF Cost: £96775              Total Project Cost: £96775

Contractors      Reading University

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**Description**      The large body of advisory material available to conventional livestock farmers is often considered unsuitable for the organic sector and is subsequently under-utilised. Assessment and collation of all this information would bring the relevant parts of existing advisory material within easy access of both livestock producers and advisory bodies within the organic sector. The primary aim of this study will be to assess the existing knowledge and available information on animal health, welfare and husbandry and its relevance to livestock production under organic standards. A database and archive of information on animal health, welfare and husbandry aspects relevant to organic livestock producers will be created following a review of existing information sources. The database will be screened for potential advisory resource material on organic livestock production systems; screened material will then be assessed by the project team and outside parties with relevant knowledge of the organic sector. A series of 5 compendia of advisory resource material will be produced in printed and in CD-ROM formats. The compendia will cover poultry, pig, sheep/goat, beef and dairy production systems and will include: lists of organisations involved in research in each particular livestock production system; reference lists; abstracts of relevant publications, documents and existing advisory materials; and a summary of the results of the consultation process and project group assessment, indicating the potential of the materials in developing advice and their significance to organic livestock production standards. The main aim of the compendia will be to serve as a resource material for advice and further development of organic standards for livestock production.

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**OF0163      Optimising the synergism between organic poultry production and whole farm rotations, including home grown protein**

08/02/99      To      31/03/02              Total MAFF Cost: £89807              Total Project Cost: £99307

Contractors      ADAS Consulting Ltd

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**Description**      The objectives of the research are: 1) to review the scientific literature on home grown protein sources so as to identify their maximum inclusion rate in organic rations for laying hens and meat birds. This will be done both for the home mixing of rations (i.e., limited treatment options for the removal of anti-nutritive factors from the raw ingredients) and as produced by specialist compounders. 2) To identify the optimum position for poultry in a whole farm rotation (including the best strategies for use of poultry manures in sustaining soil fertility and minimising nitrogen loss, provision of pasture and the production of plant protein sources). 3) To promote management techniques to producers who have little or no experience of poultry as they apply to an organic system of poultrymeat or egg production.

The work consists primarily of desk studies, where information and prediction models developed from findings for conventional farming systems will be used and updated to take into account the requirements of organic farming systems. Examples of enterprise costings, including gross margins over variable costs, for mixed farms will be provided. There is some experimental work which is essential to meeting this projects' objectives. However, the experimental work fully complements the MAFF-funded project OF0153 and the resources allocated to the latter project will be utilised in this project.

The proposal is of high policy relevance as it aims to support the development of organic mixed farming systems within the UK. It is important to the sustainability of UK agriculture that there is a diverse home-product range. Consumer demand for organic poultrymeat currently exceeds supply by an estimated 50%. Although there is a similar differential between supply and demand for organic poultrymeat in other EU countries (e.g., Germany), they already have a greater proportion of agricultural land in organic farming and therefore they have an advantage in terms of tonnages of home-produced feed ingredients. France has a well-established market for extensive poultrymeat production, i.e. the 'Label Rouge', and is also one of the world's major exporters of poultrymeat. Consumer demand for organic eggs is also increasing and these may be a more promising on-going commodity. There has been an increased retail value of organic eggs within the UK since 1996 (personal communication, Soil Association). The increase in production is likely to have been met to a large extent by conventional free range producers converting to an organic farming system. The latter production units are likely to be on a large scale (e.g., 5000 hens), but with limited paddock size. Thus the proposed EU legislation on organic livestock production (EC 2092/91) and a stocking rate limit of 2.0 LU per farm ha may require a significant reduction in flock size for a proportion of producers who are currently operating at a commercially viable scale. It is likely that the increasing demand for organic poultrymeat and eggs would be met by imports from EU countries if the home market is not developed.

Thus it is essential that information is available for: 1) producers to make an informed decision when considering the development of new enterprises on an organic mixed farm, and 2) optimising the integration of poultry within whole farm rotations, in terms of the cycling of nutrients and maintaining the ethos of maximum livestock welfare.

The results of the project will contribute towards improved sustainability of UK organic farming, mixed farming and poultry production (eggs

and meat), improved consumer choice, improved cycling of nutrients within a whole farm system and improved bird well-being. These improvements are in line with Government Policies. The results would be of use to MAFF in drafting policy initiatives.

Technology transfer will be a major component of the project. It will be achieved by: 1) holding 2 study days. The target audience will be organic producers and producers having expressed an interest in converting to an organic farming system. These will be organised in collaboration with the Soil Association. 2) Presentations at suitable industry conferences. 3) Publication of scientific findings in suitable journals. 4) Drafting a script for an extension leaflet for publication by MAFF.

**OF0164 Understanding soil fertility in organically farmed systems**

01/04/99 To 31/03/02 Total MAFF Cost: £310732 Total Project Cost: £310732

Contractors ADAS Consulting Ltd  
Henry Doubleday Research Association  
IGER, Inst. of Grasslands and Environmen  
University Wales, Bangor

**Description** Maintaining soil fertility is crucial to all forms of sustainable agriculture; this is especially pertinent to organic systems in which crops rely on nutrient supply from the soil without additions of water soluble fertilisers. The main aim of this study is to provide a better understanding of the nutrient cycling aspects of soil fertility in organically managed soils, targeting the processes involved and their controlling factors (including the role of biological diversity). Initially, an extensive literature review will be conducted on all aspects of fertility in organically managed soils. The output of this review will take the form of a written report presented to MAFF, at least one scientific review and a draft leaflet or booklet for farmers. Prior to the experimental phase of the study, appropriate measurement techniques for detailed nutrient cycling measurement will be selected. A handbook of standard operating procedures for techniques to be used in the study will be produced in which sampling strategies will be finalised. Experimental sites will be identified and those most appropriate for detailed nutrient cycling measurement will be selected. Sufficient sites will be selected to cover a mix of farm types (arable vs. mixed), soils and climates and rotational position. At these sites, initial assessment of key physical aspects of soil fertility will be made and soil samples will be collected for measurement of nutrient cycling indicators. Measurements will focus on: nutrient pool sizes; rates of transfer between nutrient pools; soil biological activity and processes influencing rates of transfer and nutrient availability; changes in form and function of soil organic matter; and residues returned to the soil. The effects of age since conversion to organic management on soil fertility will be investigated by identifying well established organic soils and pairing these with newly converted soils of the same texture and similar rotational position. Comparisons with conventionally managed soils will also be made and effects of rotational position on nutrient cycling will be studied. Short-term pot studies will be used to provide information on soil fertility as indicated by yield and nutrient uptake by test crops. Replicated pots containing a range of organically and conventionally managed soils will be sown with test crops (ryegrass and tomatoes) and monitored for inherent fertility and the contribution of added organic manure to soil fertility. Results of the review and of the experiments will be used to provide practical advice to both MAFF and the organic farming community in terms of factors affecting soil fertility, sources of nutrient supplies, measuring and optimising nutrient supply and providing the basis for field diagnosis of fertility.

**OF0165 Factors influencing biodiversity within organic and conventional systems of arable farming**

01/01/99 To 31/03/03 Total MAFF Cost: £375613 Total Project Cost: £412613

Contractors British Trust For Ornithology

**Description** The consortium, which consists of BTO, ITE and Oxford University, and subcontractors with extensive experience of organic and conventional farming, will pursue four broad aims. First, we will quantify biodiversity differences between organic and conventional systems. Second, we will determine to what extent biodiversity differences between organic and conventional farms arise from differences in quantity and management of non-crop habitats. This is an important focus of the proposed research because previous studies have been unable to clarify the relative importance of differences in farming practices and non-crop habitat as factors influencing biodiversity. Third, we will examine the importance of duration under organic management as a factor influencing biodiversity. Fourth, recommendations will be made concerning features that maintain or enhance biodiversity within organic and conventional systems. The project will concentrate on arable systems, which include mixed farms with grass leys or legumes as part of an arable rotation.

The objectives will be pursued through an extensive survey of a large stratified random sample of organic and conventional farms. These new data will be coupled with further analysis of existing data from previous MAFF-funded work undertaken by the contractors. New data will be collected at both field and farm scales on higher plants, carabid beetles, spiders, bats and birds. In selecting species groups, special emphasis has been given to their value as 'ecological indicators'. Random samples will be selected within the following strata: (1) ITE landscape types; (2) farm type (conventional, recently converted to organic, old organic); (3) field type (focusing on winter wheat and spring barley). At the field scale, data will be collected separately for the edge (field boundary and crop margin) and field interior. Woodland and semi-natural habitats will be mapped at the farm scale according to BAP habitat type. Quantity and structure of hedgerows will be measured at both field and farm scales. By identifying elements of arable systems that are associated with biodiversity benefits, the findings will be highly relevant to current and future agri-environment policies that seek to restore biodiversity within arable farming systems.

**OF0166 Economic and agronomic feasibility of organic vegetable seed production in the UK, and subsequent seed quality**

01/03/99 To 31/08/03 Total MAFF Cost: £230208 Total Project Cost: £256708

Contractors Horticulture Research International

**Description** This study will aim to evaluate the economics and practical feasibility surrounding production and use of organic seed. The study will be composed of 5 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Performance of a desk study to interpret the technical issues involved in organic seed production and sales and relation of this to approved procedures of regulatory bodies set out on a crop by crop basis. Reviews of world literature and collaboration and discussions with HDRA and Elm Farm Research Centre will assist strategies involved in subsequent seed production work. Information collated will include production strategies, hygiene, seed treatments and field performance; 2. Implementation of a feasibility study of organic seed production under protected structures using a restricted number of species as model crops, together with evaluation of potential biotic constraints and assessment of economic viability. Work on seed production strategies will focus upon parsnips, bulb onions, winter cauliflower and lettuce. Seed production will take place in polyethylene tunnels. Factors assessed will include crop spacing and its effect on yield and seed health status and the effects of fertiliser inputs; 3. Determination of seed vigour and plant health problems and comparison with conventionally produced seed. Seed produced during the course of the project will be monitored for germination and vigour using International Seed Testing Association procedures. Seed health status will be assessed by monitoring for a range of pathogens. Organically produced seed will be compared with that produced conventionally from the same seedlots; 4. Evaluation of the range and efficacy of allowable seed treatments on organic seed, comparison with conventional treatments and assessment of the potential for novel seed treatments (such as primary and biological control agents). During the course of the project, organically produced seed will be subjected to various allowable organic seed treatments. Preliminary investigations will be made into the efficacy of allowable seed treatments and potential effects on seed vigour. This will link in with work conducted under the previous objective. Treatments will be identified from work conducted during the first objective; and 5. Presentation of results and conclusions in a form for easy technology transfer to seed growers and provision of organic growers with information that will ensure confidence in the product. Project findings will be promoted at events such as open days and via articles in the trade press.

**OF0167 A study to develop alternative strategies for the control of potato blight in organically grown crops**

01/01/00 To 31/12/03 Total MAFF Cost: £149191 Total Project Cost: £171691

Contractors University of Aberdeen

**Description** Late blight, (caused by *Phytophthora infestans*) is the most serious disease affecting organic potato crops throughout the UK. For crop protection, organic growers continue to rely heavily on copper fungicides, which are likely to be banned for use in organic production systems in the future. There are currently no satisfactory alternative control strategies for the disease in the UK.

The overall objective of this project is to evaluate and/or develop alternative strategies for the control of blight in organically grown crops. This will involve:

- 1) a review of currently available blight control strategies and their effectiveness,
- 2) evaluation of plant, seaweed and humic extract preparations for the control of late blight,
- 3) evaluation of compost extracts and microbially enriched compost extracts on late blight,
- 4) identification and evaluation of biological control agents with activity against late blight, and
- 5) the combination of novel strategies for blight control with existing agronomic and varietal disease avoidance techniques. This will involve multifactorial field trials with the aim of developing a systems approach to the control of late blight in organic potato crops.

Field trials facilities and agronomy support will be provided by organic farmers growing to Soil Association, the Scottish Organic Producers Association (SOPA) and Biodynamic standards. The Soil Association, SOPA, the British Potato Council, Hydro Agri UK Ltd. (Specialities Division), Stoller Chemical Ltd., Gordon and Innes Ltd. and Glenside Organics Ltd. will provide additional financial and/or 'in kind' support.

This project supports the expansion of UK organic production in line with current MAFF policy. Results from the study are intended to be used to provide novel late blight control strategies for organic potato production in the UK. The Potato Council, SOPA and the Soil Association will support the rapid dissemination of results through technical notes, their extension services and organised field trial visits.

**OF0168 Development of disease control strategies for organically grown field vegetables (DOVE)**

01/01/99 To 30/06/02 Total MAFF Cost: £149293 Total Project Cost: £149293

Contractors ADAS Consulting Ltd  
Henry Doubleday Research Association

**Description** This study will aim to provide up to date information and advice to organic vegetable growers which will lead to safe expansion of UK production with minimal disease problems. The 3 year study will be composed of 4 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Review of the significance of disease in organically grown field vegetables and the potential effectiveness of current control strategies under conditions of increased production. A search of UK and world literature will be conducted and information will be collated to produce a review and a list of major disease problems threatening organic producers. The review will be updated during the second and third years of the project with newly received findings; 2. Evaluation of novel techniques and strategies for control of diseases in organically grown field vegetables. Laboratory and field studies will be conducted to develop improved disease control strategies. In the laboratory, effects of different plant extracts on selected pathogens will be investigated, while field studies will involve the evaluation of paper and polyethylene mulches for pathogen control; 3. Monitoring of disease development in organic crops in relation to rotation and size of enterprise. Observations on disease progress and economic significance will be made on a range of vegetable crops grown in a standard rotational sequence; each phase will be represented each year of the study to allow observations on brassicas, alliums, legumes and potatoes each year at the same site

over 3 years. Visits will be made on at least 3 occasions to monitor diseases in vegetables on organic holdings. Sites will be stratified to give geographic spread and to compare and contrast disease levels and economic appraisal for eastern England with the Midlands and the west; and 4. Production and publication of advisory literature for disease control in field vegetables. It is planned to produce at least 2 popular press articles and a conference paper. Comprehensive results of the study will be published in the form of a booklet at the end of the project.

**OF0169 Optimising production systems for organic pig production**

01/04/99 To 31/03/02 Total MAFF Cost: £300000 Total Project Cost: £330000

Contractors ADAS Consulting Ltd  
University of Aberdeen

**Description** This study will aim to generate the scientific and financial information required to facilitate increased organic pig production in a biological and economically efficient manner. The study will be composed of 10 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Establishment of trial, monitoring and management systems on 3 focus farms and at least 4 link farms. A steering group (including collaborating scientists, farmers, and representatives from the RSPCA, Tesco, PIC, MAFF Organic Unit and the British Pig Association) will be set up to ensure full consultation with the organic industry. On focus farms, 20 sows from each of 3 breed types (Saddleback, Saddleback F1 hybrid and Camborough 12) will be integrated into existing herds ready for experimental work; 2. Effects of breed type (conventional and traditional) on maternal characteristics (prolificacy, rearing ability and longevity) and growing pig characteristics (growth rate and carcass attributes). Sows from each breed type will be isolated in separate paddocks to other breed types and crossed with a standard Duroc sire; performance data for sows and growing pigs will be produced using an existing herd recording package; 3. Appraisal of the range and nutritional value of feeds available to the organic producer. Feeds available for use in organic production will be identified and existing data on nutritional value of these feeds reviewed (where this data is lacking, chemical analysis of feeds will be conducted); 4. Separate and interactive effects of maternal breed type, feed type (cereal based diet and 2 bulky fed diets) and housing (paddock and straw yards) on grower pig performance, carcass characteristics and meat yield; 5. Separate and interactive effects of breed type, feed type and housing on sensory properties of the resulting pig meat processed into pork, ham, bacon and sausages, as assessed by an evaluation panel based at Robert Gordon University, Aberdeen; 6. Assessment of ranging behaviour exhibited by different breed types under alternative systems of dry sow paddock management and the implications for sward utilisation, animal welfare, manure deposition and parasite levels. Two alternative systems for managing dry sow paddocks (rotational and set stocking) will be established on 1 focus farm, with 2 replications for each of the 3 breed types. Effects of breed type and paddock management on feeding patterns, use of space, dunging and urination will be monitored. Sward quality will be measured at regular intervals and parasite data collected from faeces; 7. Assessment of welfare parameters of organic pig production including the effect of breed type, feed type and housing system, through appraisal of pig health, physiology and behaviour of sows and growing pigs. Welfare parameters of organic production will be reviewed against the criteria of the Five Freedoms. Slaughtered sows and finished pigs from focus and link farms will be evaluated for parasite infestation and physiological condition. Production records will be appraised to identify issues regarding general health and body condition of sows, their rearing ability and piglet losses as affected by breed type; 8. Establishment of best practice for organic herd management, the range of systems which are acceptable and the suitability of different breed types, feed types and housing systems for organic production. Management policies on focus and link farms will be appraised and used to draft a guide to best practice; research work results will be used to modify this draft and identify the effects of breed type, feed type and housing system; 9. Economic implications of organic pig production. Set-up costs will be established and a detailed financial budget produced to appraise the profitability of current organic pig production. Financial implications of converting from non-organic production will be appraised, based on research results and other industry data. Implications of breed, feed and housing system on profitability will be established; and 10. Transfer of technology to the organic and non-organic sectors. This will be achieved with the assistance of the steering group members.

**OF0170 Organic dairy cows: milk yield & lactation characteristics & develop of herd simulation model for organic milk productn**

01/09/00 To 28/02/01 Total MAFF Cost: £34504 Total Project Cost: £34504

Contractors Reading University

**Description** Full title: Organic dairy cows: milk yield and lactation characteristics in thirteen established herds and development of a herd simulation model for organic milk production

Main objective:  
The main objective of the project is to gain better understanding of the production characteristics of dairy cows under organic management. This objective is achieved by sub-objectives that will produce information about lactation curves and milk yield characteristics of organic cows and about the effect of organic management on the production of cows with different genetic potential.

Research description:  
Using retrospective milk recording data from 13 organic dairy herds, the nature of lactation curves and associated herd parameters will be established. Based on the results, a herd simulation model will be developed to characterise production profiles in organic dairy herds.

Policy relevance:  
The research is relevant to MAFF policy in regard to support of the developing organic livestock production sector to provide information to producers to improve output and livestock performance, develop improved husbandry methods, maintain high standards of animal welfare and to meet the standards of organic production.

Intended use of results:  
- The findings of the lactation and herd performance parameters will enable the formulation of appropriate advice for organic and converting

farmers with regard to the design of feeding, feed production strategies and fertility management that meet the needs of their herds and optimises the yields of the cows.

- The herd simulation model will be useful for further research in organic dairy cow management.

- The project results will give overall guidance to further research in organic dairy cow feeding, breeding and management.

**OF0171 A review of current European research on organic farming**

01/10/98 To 30/06/99 Total MAFF Cost: £45207 Total Project Cost: £45207

Contractors ADAS Consulting Ltd

**Description** In support of it's policy to expand organic farming, MAFF sponsors a programme of research and extension (through OCIS) to provide information to producers on organic systems of production. A considerable body of information is also available from Europe, a significant proportion of which may be directly relevant to UK production systems. The purpose of this review is to provide a comprehensive framework which sets out clearly the content and key results of current European research programmes. The overall objective is to increase the body of knowledge and information available to UK producers and extension workers, and to help direct UK research effort. UK producers, processors, retailers, and ultimately the consumer will be the main beneficiaries. Key messages and findings will be disseminated through a variety of media, some for immediate incorporation into existing production systems. Increased knowledge will build confidence, encourage more efficient production, address specific technical problems, and improve the overall competitiveness of UK organic farming.

**OF0173 Clover:cereal bi-cropping for organic farms**

01/01/99 To 31/12/01 Total MAFF Cost: £251125 Total Project Cost: £251125

Contractors IGER, Inst. of Grasslands and Environmen

**Description** There is a substantial need, for economic as well as environmental reasons, to reduce inputs of fertilizer nitrogen and agrochemicals into arable cropping systems, especially cereals. IGER (North Wyke) and IACR (Long Ashton) have very successfully developed a clover:cereal bi-cropping system which enables crops of winter wheat to be grown with greatly reduced inputs of N fertilizer and markedly reduced levels of pesticides and energy (e.g. Clements & Donaldson, 1997). The clover:cereal bi-cropping system is now well developed for whole-crop silage production in conventionally managed farms. The approach has outstanding potential for organic farms in which the range of permissible fertilizers and agrochemicals is extremely limited. The proposal will evaluate the agronomic viability and sustainability of bi-cropping in organic farming systems as specified under UKROFS, for both silage and grain production. Experiments will be established on three UKROF approved sites with contrasting soil types and environmental conditions. Randomised block small-plot experiments will determine the most satisfactory ways of modifying the IGER/IACR system for organic farming.

The results will be used to enable the greater adoption of organic cereal growing and would be a very attractive option for growers and would be directly in line with MAFFs policy focus of encouraging conversion to organic production.

**OF0176 Integrated grain storage - technology transfer for organic farming**

01/04/99 To 31/03/01 Total MAFF Cost: £34453 Total Project Cost: £34453

Contractors Central Science Laboratory  
Henry Doubleday Research Association

**Description** This study will aim to highlight major post-harvest problems experienced by organic grain growers in the UK, as well as summarising the information currently available to organic growers for dealing with their grain storage problems; the study will also ensure smooth technology transfer from conventional to organic systems. The project will be composed of 3 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Highlighting of the main post-harvest problems experienced by UK organic grain growers. A steering group will be established, including CSL storage experts, an independent organic adviser, an organic farmer and HDRA. Representative organic farm stores will be visited, techniques currently employed will be assessed, and views on the principle problems of organic storage will be recorded; 2. Collation of available published information into a more convenient form that will enable growers to tackle storage problems more effectively and identification of areas requiring a minimum of modification to ensure smooth technology transfer from the conventional to the organic sector. The review will take into account conclusions of a desk study on the storage of organically produced crops completed previously by HDRA and findings of MAFF-funded research into storage of conventionally grown grain. The Integrated Grain Store Manager (IGSM) software will be adapted to include an organic module; this is likely to include necessary improvements to modelling of pest populations and trap interpretation to reflect the crucial importance of early detection in systems depending on physical control. Publication of technical information and a joint workshop with the Soil Association will support these activities; 3. Identification of areas where organic methods cannot adequately replace conventional pest control measures and suggestions for areas requiring further research and development. The feasibility of permissible alternatives to fabric treatments, including vacuuming, steam, pressure, hypochlorite, biological control and inert dusts could be examined with some form of preliminary experimental assessment. Results of the study will be made available as technical and popular articles and data will be incorporated into the IGSM software as an organic module. A workshop arising from the project will also be convened.

**OF0177 Growth and competition model for organic weed control**

01/04/99 To 31/03/02 Total MAFF Cost: £58281 Total Project Cost: £58281

Contractors Horticulture Research International

**Description** Losses of organic vegetable crops due to annual weeds can be prevented by keeping the crop free of weeds for just a short critical period; the timing of this critical period depends upon the relative sizes and densities of the weed and crop plants and upon weather conditions. This study will aim to develop a MATLAB software program encoding the HRI growth and competition model for predicting optimal weeding times of major organically produced vegetable crops. The HRI model is able to give accurate predictions of the effects of weed density on the growth of carrots and cabbages and has been extended to the majority of parameters for onions. Parameter values for major vegetable crops obtained from conventional agriculture will be used. Other inputs will be the wide row spacing commonly used in organic production (allowing mechanical inter-row weeding), weed density and varying climatic conditions. Model validation will draw upon crop and weed growth data available from HRI and advisory input from the Henry Doubleday Research Association to relate the model inputs and simulation results to organic practice. Additional data for model validation will be provided from the CSA 2093 project (Mechanical weed control techniques for agriculture and horticulture). Initially, the growth and competition model will be fully calibrated for onions. The model will then be used to determine the optimal weeding times for cabbage, carrots and onions, given variations in weed density, crop density, daily light integral, soil mineral N and initial transplant size. Model performance will be validated using historical data and new experimental data (from work conducted on HRI's Wellesbourne organic site). Ability of the model to predict optimal weeding times for other crop types (leeks, cauliflower and broccoli) will also be tested. Outputs of the model will be compiled to identify weeding windows and critical weeding periods. Reports will be compiled for MAFF and findings will be published in scientific journals and other publications. Meetings will be organised (in collaboration with HDRA) to present results of simulations and recommendations to organic growers.

**OF0178 Improving N use and performance of arable crops on organic farms using an expert group approach**

01/01/99 To 31/12/01 Total MAFF Cost: £89509 Total Project Cost: £89509

Contractors ADAS Consulting Ltd

**Description** The overall aim of this study will be to improve the performance of arable organic cropping systems by identifying acceptable changes in farming practice which increase availability of N for crop uptake and decrease N losses to the environment. Between 5 and 10 appropriate arable organic farms will be selected for studies on estimated N availability and N losses for representative rotations in use on these farms. Data already available on these farms will be augmented by visiting each farm and determining, on a field by field basis, the following parameters: soil types; cropping histories; grass management; cultivation pattern and timings; manure inputs; estimated autumn crop cover; crop type; and crop performance. Farm by farm information on potential N sources, and attitudes and restrictions to changes will also be obtained. Relevant data from conventional systems will be collated to allow N balances to be estimated. Estimates will then be made for the most representative organic rotation on each farm of N availability through each cropping season, together with N lost as nitrate and ammonia from each rotation. Variation in assumptions used to make these estimates will be analysed in order to gauge their certainty. Aspects of rotations for which N use and crop performance could be improved will be identified in order to quantitatively estimate the degree of improvement in gross margins and N losses and to develop these changes into a form which is acceptable to the farmers concerned. Furthermore, alternative strategies for enhancing crop performance and/or restricting N losses from each case will be explored. Options for manipulation of N availability will take into account soils, climatic conditions, farm infrastructure and markets specific to each case studied, while implications of alternative strategies for N availability, crop performance and N losses will be estimated for each case. Findings will be communicated to a panel, formed from farmers from case study farms, and reactions will be sought. Principle acceptable changes to organic arable systems will be summarised into messages and relevant considerations will be itemised and illustrated so that they can be disseminated to, and considered by, organic producers. Advisory aids will be prepared, based on the assumptions used to formulate acceptable improvements; these will be combined into a leaflet and copies will be printed for distribution through EFRC channels. Appropriate opportunities will be taken to present findings to organic farmers, and a seminar will be arranged for consultants from EFRC, the Soil Association and other organisations at which findings from the project will be presented.

**OF0179 Desk study to apply knowledge developed for conventional horticulture to control of pests in organic vegetables**

01/04/99 To 31/03/02 Total MAFF Cost: £89179 Total Project Cost: £89179

Contractors Henry Doubleday Research Association  
Horticulture Research International

**Description** This study will aim to demonstrate how methods of pest control developed for conventional vegetable production can be adapted for use by organic growers. The study will concentrate on pests of umbelliferous and cruciferous crops and will be composed of 11 specific objectives outlined as follows, together with ways in which they might be achieved: 1. Adaptation of the existing carrot fly forecast to quantify how the date of crop drilling influences subsequent fly pressure. The carrot fly forecast produced at HRI Wellesbourne will be used to predict the proportion of the first generation of flies that will lay eggs on carrot crops drilled on different dates. The model will also be used to predict the timing of emergence of the subsequent fly generation within the crop. It will then be verified using data from experimental carrot plots located close to the source of the main carrot fly population at HRI; these data will be incorporated into the existing carrot fly forecast model; 2. Production of a model to quantify how crop damage can be reduced by altering the harvest date. A sub-model based on published and field data will be incorporated into the carrot fly forecast model, together with meteorological data; this model will be calibrated with experimental data collected from carrot plots at Wellesbourne; 3. Identification of times at which crops should be covered to reduce carrot fly damage. Output from the carrot fly model will be modified to identify the times at which crops should be covered and the dates after which it is safe to uncover crops for operations such as weeding; 4. Quantification of the contribution possible from host plants with various levels of resistance. Data collected at HRI Wellesbourne will be used in simple mathematical models to quantify how partial plant resistance can contribute to the reduction of carrot fly damage alone or in combination with other damage reduction techniques; 5. Verification of carrot fly control strategies. Information collected in objectives 1-4 will be used to produce a strategy for reducing carrot fly damage in organically grown umbelliferous crops;

this will be evaluated by HDRA in commercial carrot and parsnip crops where there are high and low levels of infestation. Objectives 6-11 will focus on pests of cruciferous crops; 6. Adaptation of the existing pest forecasts to quantify how the judicious choice of planting and harvesting dates can be used to reduce crop damage. Existing forecasting systems for pollen beetle, cabbage root fly, cabbage aphid, diamond-back moth, small white butterfly, cabbage moth and garden pebble moth will be used to identify the periods when cruciferous crops are at risk from each of these pest species. Forecasts will be verified by experimental data obtained from cabbage plots; 7. Identification of crop/pest situations where application of crop covers would be advantageous. A literature review will be conducted to identify crop/pest combinations where it would be advantageous to apply covers to exclude insect pests; results from relevant field experiments will also be included; 8. Evaluation of simple methods for inspecting crops to determine the presence or absence of any given pest species. A literature review will be conducted, including results from studies involving sampling aphid and caterpillar pests within cruciferous crops; 9. Identification of critical periods during which control measures should be applied. The literature will be reviewed to indicate the best time to apply the various control measures available to organic growers. Output from models of pest activity will be modified to indicate the most appropriate timings for application of each control measure; 10. Verification of the pest control strategy arising from work conducted in objectives 7-10. This strategy will be underpinned by the pest forecast models and will be presented as a MORPH decision support system. The strategy will be evaluated in an organic cropping system by growing crops of cauliflower and cabbage in locations with different levels of pest infestation; and 11. Production of a user-friendly format for disseminating the information produced in the study to organic growers. Information will be provided in the form of a decision support system in MORPH, articles in grower publications, through the advisory network and at annual meetings for organic growers.

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**OF0180 Influence of level of self-sufficiency on the nutrient budgets of an organic dairy farm**

01/10/98 To 30/09/02 Total MAFF Cost: £207771 Total Project Cost: £207771

Contractors IGER, Inst. of Grasslands and Environmen

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**Description** An initial application has been submitted to MAFF proposing that the organic dairy farm at Trawsgoed should be divided into two sub-units with different degrees of self-sufficiency in feed production. Imported feeds are an important source of N, P and K under the current management at Ty Gwyn and these changes will have a major impact on the nutrient budgets of the self-sufficient unit, affecting both its performance and sustainability. This second proposal will examine how the degree of self-sufficiency influences nutrient requirements and the potential for loss. Whole-farm budgets and internal flows of N, P and K will be determined. These determinations will be supported by field studies of changes in soil P and K status. The effect of slurry applications on N-fixation will be measured to improve the accuracy of estimates of N inputs used in the budget calculations. The work will provide policy makers with an improved understanding of the true nutrient requirements of organic dairy systems and of system requirements for minimising N surpluses and the risk of losses. The findings will contribute to the database of knowledge necessary for the development of more general models of organic farming systems. The information will assist organic farmers and advisors to optimise performance and increase the viability of organic farms and thus contributes to MAFF's policy objective of encouraging more farmers to convert to organic farming.

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**OF0181 Companion cropping for organic field vegetables**

01/01/99 To 31/12/01 Total MAFF Cost: £220022 Total Project Cost: £270022

Contractors ADAS Consulting Ltd

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**Description** It has been proposed that growing certain companion crops sequentially to, or concurrently with, organic vegetable crops could provide vegetable crops with nutrients; companion crops may also suppress pest and disease incidence in organic production systems. This study will aim to determine the effects of fertility-building companion crops, grown in permanent strips on a bed system, on the nutrient accumulation and incidence of damage from pests and diseases in 3 major field-scale vegetable crops. The work will be managed by a steering group including staff from Elm Farm Research Centre (EFRC), ADAS Boxworth, Arthur Rickwood and Gleadthorpe Research Centres and representatives from East Anglian Food Link. A field experiment will be conducted in order to assess the economic viability of producing 2 major representative vegetable crops (onions and cabbage) within a 6 course rotation using permanent companion crop (white clover or subterranean clover) strips; this practice will be compared with a standard organic farming system using standard yield and costs. Another field experiment will evaluate the effectiveness of 2 leguminous overwintered cover crops (white clover and hairy vetch) and applied P and K (natural sources) at providing nutrients to vegetable crop (cabbage and lettuce) strips for additional nutrition over 2 seasons. A third experiment will utilise seed trays in a glasshouse to compare the competitiveness of 3 companion crops (subterranean clover, hairy vetch and lucerne) with 3 vegetable crops (cabbage, leeks and carrots) in order to determine optimal companion crop/vegetable crop associations. A large plot field experiment will also be conducted to determine the effects of a fertility-building companion crop (white clover or subterranean clover), grown on a permanent bed/strip system, on the nutrient accumulation and incidence of pest/disease damage in 3 vegetable crops (cabbage, carrots and leeks). A report will be prepared for MAFF at the end of each year of experimentation and the project steering group will hold 2 meetings each year, with additional meetings at the request of MAFF, lead scientists or the project coordinator; all meetings will be minuted and actions followed up. Results will be disseminated using the EFRC, Demonstration Farm Network, EFRC Arable and Horticulture Farmer groups and in briefings for the Organic Advisory Service advisors. The work will be published in the form of a refereed scientific paper.

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**OF0182 Energy use in organic farming systems**

01/09/99 To 31/03/00 Total MAFF Cost: £16556 Total Project Cost: £16556

Contractors ADAS Consulting Ltd

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**Description** To update an existing model of energy use in farming systems and expand to cover conventional and organic upland beef/sheep and field vegetables. The model will be tested with data from four MAFF organic conversion research projects. A final report will be produced by 31 March 2000. This will include a consideration of the extent to which, in an organic system, labour may be substituted for energy. It will also include a discussion on the relative energy inputs into food distribution from the farm to the consumer. The research will provide data for MAFF policy formulation, and an identification of areas for improvement by the organic farming industry.

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**OF0185 Control of internal parasites in organic livestock without the use of pharmaceutical anthelmintics (CTE 9904)**

01/01/00 To 31/12/03 Total MAFF Cost: £558935 Total Project Cost: £713934

Contractors ADAS Consulting Ltd

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**Description** Organic systems seek to reduce reliance on external inputs, and develop sustainable methods of production which balance output with high standards of animal welfare. Effective alternatives to the use of anthelmintics are a serious technical and ethical constraint for the developing organic sector. The purpose of this proposal is to develop effective methods for parasite control in ruminant organic livestock, without the use of pharmaceutical anthelmintics.

The research will establish the extent to which internal parasites can be controlled solely through management alone, and the constraints which apply in commercial practice, with a view to developing integrated, preventative control strategies. Detailed epidemiological data will be collected on selected 'focus' farms representing a range of organic farm types. Replicated experiments will be undertaken, to quantify the effect of dietary manipulation, novel crops, and drenching with tannins, on the development of parasitic gastro-enteritis (PGE). The collaborating research team has a strong reputation across scientific, extension, producer and educational communities, and brings together a range of specialisms, in a multidisciplinary approach. The use of commercial organic focus farms will provide an excellent platform for technology transfer.

The output of this project will be highly applicable in commercial practice, and will immediately benefit organic (and conventional) producers. The work will lead to a reduction in anthelmintic input on organic farms, and ensure that consumer expectations of reduced chemotherapy and high standards of animal welfare are retained. MAFF funded research is appropriate in order to maintain a competitive industry, safeguard animal welfare, and provide practical information for producers, which will enable them to better comply with current standards for organic production.

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**OF0187 Efficient use of animal manures within an upland organic system**

01/04/99 To 31/03/01 Total MAFF Cost: £39270 Total Project Cost: £39270

Contractors ADAS Consulting Ltd

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**Description** It is government policy to support the development of organic farming in the UK. Scientific information is required on the development, performance and limitations of organic systems, to facilitate informed decision making and to aid policy formulation. Efficient use of plant nutrients, recycled in the form of livestock manures, is critically important to the performance and sustainability of organic grassland systems. Within project OF0147 (Organic Sheep and Beef Production in the Uplands) at ADAS Redesdale, a replicated plot experiment investigating the agronomic performance of various forms of livestock manures, completed its original period of assessment in March 1999. The objective of this proposal is to extend the work for a further three years to allow sufficient time for cumulative effects on nutrient (N, P and K) dynamics to establish and be assessed. Comparison will be made of composted and uncomposted FYM; aerated and unaerated cattle slurry; ammonium nitrate and zero nitrogen controls. Combining data for the amount of applied nutrient, nutrient offtake in herbage, and soil fertility parameters, will provide a good insight into nutrient dynamics and subsequent effects on grassland productivity. Results from the project will be communicated through appropriate media to current and prospective organic farmers, research and extension workers and to MAFF to aid policy formulation on organic farming.

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**OF0188 Studies on exploiting semiochemicals for pest management in organic farming systems**

01/11/99 To 31/01/00 Total MAFF Cost: £20000 Total Project Cost: £20000

Contractors IACR, Institute of Arable Crops Research

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**Description** Semiochemicals, as naturally-occurring signals that regulate the behaviour or development of pests and disease, have potential for exploitation in organic farming systems where intervention against pests is required. This study will investigate the extent to which exploitation of semiochemicals for pest control will be acceptable in organic farming, i.e. whether release of semiochemicals from companion or trap plants can be extended to deployment of semiochemical formulations as natural extracts or even as nature-identical products. The main objective will be to identify specific aspects of organic farming where exploitation of semiochemicals could advance and widen use of organic farming practices by providing new pest management strategies acceptable in such systems.

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**OF0190 Economics of organic farming (extension to OF0125)**

01/07/99 To 30/06/00 Total MAFF Cost: £27324 Total Project Cost: £27324

Contractors University Wales, Aberystwyth

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**Description** The aim of this research is to extend the current contract (OF0125) to collect and collate data on the financial performance of organic farms, differentiated by farm type. The particular aims are to gather conventional farm data for the 1997/98 year to compare and contrast with data previously produced for organic farms for that year, and to produce a three year report, and to produce an annual report for organic farms for 1998/99 financial year.

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**OF0192 Workshop and desk study to appraise technical difficulties associated with organic pullet rearing**

01/04/00 To 30/11/00 Total MAFF Cost: £29678 Total Project Cost: £29678

Contractors ADAS Consulting Ltd

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**Description** The objectives are; 1) to identify potential technical problems that may arise when rearing laying hen pullets in an organic system; 2) to assess the extent to which technical problems can be overcome by applying information available from conventional pullet rearing, and; 3) to identify technical issues which cannot be solved using conventional information and so to identify further research needs.

There is increasing pressure both within the UK and EC for organic egg producers to use organically reared pullets. Although EC legislation allows a transitional period whereby pullets up to 18 weeks of age may be brought in from conventional sources, this expires on 31 December 2003 (EC 1804/1999). Information will be required before this date if UK organic egg producers are to be able to respond proactively. The successful completion of this project will provide information to MAFF about the key technical problems associated with the rearing of laying hen pullets organically, possible solutions to these problems and, if scientific information is missing, research priorities will be identified. The project will be undertaken in collaboration with major poultry industry companies including those involved in breed supply, nutrition and veterinary health, representatives of organic sector bodies and of MAFF, and organic egg producers, so that the results are relevant and applicable to the growing organic sector. There will be three stages in the project:

Stage 1 will comprise a technical workshop involving industry representatives, representatives of organic sector bodies and of MAFF, to consider technical problems that may occur when rearing pullets organically, and to identify possible solutions.

Stage 2 will address some of the perceived technical problems by reviewing the literature on conventional pullet rearing and assessing the extent to which published results can be applied to organic systems. Published and on-going European organic research will be taken into consideration and information arising from MAFF-funded project OF0171 (A review of European organic research) will be used wherever possible. Stage 3 will involve re-convening the technical workshop to discuss findings from the literature reviews, to discuss research priorities to fill any gaps and to consider mechanisms for technology transfer.

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**OF0195 Establishment of, and running, a comprehensive organic seed information database and communication network**

01/09/00 To 31/08/03 Total MAFF Cost: £69044 Total Project Cost: £69044

Contractors National Inst of Agricultural Botany

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**Description** The research will collate information from seed companies and organic seed producers on the availability of organic seed with cereals, field vegetables and potatoes. This will produce an up-to-date list of organic seed availability of varieties of field vegetable, cereals and potatoes within the EU. Where possible the list will provide an indication of seed quantity as well as variety availability.

A communication system linking the seed industry, organic growers, UKROFS and certification bodies will disseminate the information, which will be regularly updated to reflect seed availability. Results dissemination will be via a computer based database, publications and the organic, agricultural and horticultural press. Where possible there will be an indication of the suitability of the varieties listed for UK growing and marketing. Where UK tests have not been carried out a comparison with known controls will be made if possible.

The proposed research is relevant for the introduction and development of organic seed production and the utilisation of organic seed by UK producers. EU Regulation 2092/91 stipulates that organic growers are required to use organic seed and other propagating material if it is available within the EU. There is currently a lack of availability of organic seed across the EU and a derogation is in place allowing organic producers to use conventional seed if organic material is not available in sufficient quantity or quality. Results of the research will encourage the use of organic seed by growers and the production of organic seed by seed companies and seed growers.

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**OF0197 Modelling manure NPK flows in organic farming systems to minimise nitrate leaching, NH3 volatilization and NO2 emissions**

01/09/00 To 31/08/01 Total MAFF Cost: £64297 Total Project Cost: £64297

Contractors ADAS Consulting Ltd

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**Description** Environmentally damaging emissions of N arise from agriculture: ammonia, nitrous oxide and nitrate. Losses can be altered by changed management practices; such practices also affect the interaction between the three loss pathways. There is a need to make farmers aware of the size of the N losses and the effects of management practices. This is particularly pertinent to organic farmers, where N is often limiting crop production. Consequently a tool to identify the fate of N (and PK) from manure could assist in developing more environmentally friendly practices that also increase crop productivity and soil fertility. Phosphorus loss from agriculture is another environmental issue that needs addressing.

The main objective of this project is therefore to produce a tool for quantifying for, and demonstrating to, (organic) farmers the main N (and P and K) loss pathways from manure, the size of the losses and the influence of management practices on these losses. The final product will be a

computer model that quantifies NPK flows around the farm from excretion by the animal through housing and manure storage, and after land application. The model could be used either in workshops (as an aid to discussing the issues of NPK management) or used by advisors and/or farmers, or policy makers.

The project is in line with MAFF's policy objectives of (a) improving scientific support to organic farmers and (b) minimising harmful emissions from agriculture.

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