

SP 0304  
BUE 408

Commercial In Confidence

Ministry of Agriculture, Fisheries and Food  
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Please complete in BLOCK  
LETTERS or TYPESCRIPT  
and return to the address  
given opposite by end  
MAY 1996

**Research and Development**

**Final Project Report**

**Date Project Completed [31/03/96]**

FOR COMPLETION BY CONTRACTOR

1. (a) MAFF Project Code: [SP0304]

(b) MAFF Project Title Cultivation practices on arable farms in England and Wales and their potential impact on the environment

2. Please summarise below in layman's terms the results of this project.

The project involved both a desk top study and a survey of cultivation practices on arable farms in England and Wales. The study attempted to predict, from a review of research papers, the likely effect of different tillage practices on the soil and its surrounding environment. Environmental indicators and the beneficial and/or detrimental effects of different tillage practices on these indicators were tabulated in the study. The main indicators of soil health were considered to be organic matter content, air filled porosity, oxygen diffusion rate and earthworm populations. It was concluded that microbial biomass was a more sensitive and more rapidly responding indicator of changes in soil organic matter. Soil respiration rate, as an indicator of biomass activity, was also considered to be the most sensitive measure of the effects of soil management changes and a parameter which could be measured in both the field and the laboratory.

Results of the survey showed that ploughing was carried out on about 90% of the area represented by the respondents. On heavier soils, there was evidence to suggest a slightly greater use of non-plough techniques. Although soil loosening to alleviate anaerobic and other detrimental conditions was found to be widely practised, there was little evidence that effective measures were being used to prevent soil compaction that would lead to recurrence of anaerobic problems in the soil. This situation and the widespread practice of ploughing and pre-plough cultivation is likely to have long term detrimental effects on the organic matter status in the soil.

There appears to be potential for reducing herbicide use based on improved management of both tillage methods and field margins.

3. (a) Were the scientific objectives as set out in ROAME B? YES

If NO, please give date when amended in agreement with MAFF Project Officer: [dd/mm/yy]

(b) Have the current scientific objectives been achieved in full? YES

If NO explain the reasons:

4. (a) Have the milestones been met: (i) in full? YES  
(ii) on time? YES

If NO, explain the reasons

5. For this project, what was: (a) the approved expenditure? £15,221

(b) the actual expenditure (to nearest £)? £16,485

(c) If the project is taking place under a Memorandum of Understanding does the variation in actual expenditure exceed delegated authorisations. NO

**N.B. Any such variation must be notified to MAFF by copying this form to Branch B, Research Policy Co-ordination Division, MAFF.**

If notification has already been made please give the date. [dd/mm/yy]

6. For this project, what was:

- (a) the approved staff input (man years of direct scientific effort)? 0.23  
(b) the actual staff input (man years of direct scientific effort)? 0.25

7. (a) Were there any outputs e.g. published papers, presentations? **YES**

If **YES** please list them on a separate sheet.

(b) Are there any further ways of communicating the results of this research to potential end users that you propose to pursue? **YES**

If **YES**, please elaborate

Further reports to be submitted to a refereed journal, and as an article in farming press, are planned.

8. (a) Have opportunities for exploiting any intellectual property arising out of this work been identified? **NO**

If **YES**, have they been communicated to the MAFF Intellectual Property Liaison Unit?  
**YES/NO** (delete as applicable)

9. Were the agreed scientific objectives the only developments emerging from this project?  
**YES**

If **NO** explain any unforeseen developments

10. Is this research now complete? **NO**

If **NO** please describe what further research might be needed, outlining its purpose and scientific objectives and whether it would be appropriate for Government, industry or LINK funding:

See separate sheet.

#### Declaration

I declare that the information I have given is, to the best of my knowledge and belief, correct.

Name in **BLOCK LETTERS**

PROFESSOR A.R. DEXTER

Position

Project Leader

Signature



Date

28/5/96

- 7(a)
1. Chamen, W.C.T. and Parkin, A.B., 1995 The impact of tillage practices on the soil and its linked environment, with particular regard to arable cropping in the United Kingdom. Contract Report CR/678/95/0209. Silsoe Research Institute, Bedford, UK
  2. Chamen, W.C.T., 1996 The impact of tillage practices on the soil and its linked environment, with particular regard to arable cropping in the United Kingdom. - Summary of Survey Results. Contract Report CR/---/96/0209. Silsoe Research Institute, Bedford, UK (in press)
10. The desk study highlighted the need for the development and use of indicators of soil health including organic matter content, air-filled porosity, oxygen diffusion rate and earthworm populations. Soil respiration rate was recommended as a sensitive measure of the effects of changes in land use or soil management.

The survey indicated that environmental benefits (and possibly also improvements on the competitiveness of the UK industry) might accrue from improved methods of mechanical weed control, and from the development and implementation of methods to reduce soil compaction. The replacement of sterile strips by well-managed conservation headlands was thought to have potential.

The results of the survey could be further analysed by ADAS and SRI to extract maximum information which is relevant to the sustainability and health of UK soils. The cost of doing this would be modest.

