

ECONOMIC EVALUATION OF MAFF'S NITRATE R&D PROGRAMME

EXECUTIVE SUMMARY

1. The aims of the project were to evaluate the efficiency and effectiveness of MAFF's Nitrate Research Programme over the past 10 years and draw conclusions from which to inform decisions on future research programmes. The main objective of the R&D Programme was to improve knowledge of the role of agriculture in nitrate pollution of water so as to enable appropriate measures to be taken to comply with EU legislation at minimum cost to the UK.

2. The **main results** of the evaluation are that the Programme has been:

(a) very **effective** in producing major outputs of high quality scientific information (paras 5.64 and 5.69) which has been effectively translated into policy outcomes (5.67); and

(b) an **efficient** use of public funds: a cost benefit analysis of the main policy outcome, using conservative assumptions, shows a net present value of benefits of just over £200m compared to Programme costs of just under £100m at 2000/1 prices (para 6.38 and the immediately preceding Table 4).

3. The first stage of the analysis examines the **rationale** for public expenditure by MAFF on a major R&D programme (Section 3). This part of the analysis concludes that the policy issue was of such importance and the possible economic gains on a large enough scale to justify the expenditure needed of roughly £50m over a period of 5 years; that the theoretical arguments relating to public versus private funding were finely balanced but that in practice there was no alternative to public funding; and that the appropriate public sector body to take on responsibility for the Programme including funding of it, was MAFF. The Report commends MAFF for its foresight in sponsoring the research.

4. Section 4 examines the **management of the programme**. There appeared to be some potential weakness in the arrangements for managing the Programme in the early years. These were not, however specific to the Nitrate Programme and we found no evidence that they caused serious practical problems or detracted from the outcomes. The Report commends the system of reviewing programmes triennially. It also suggests that reviews of major topics within a programme, as for mineralisation, could be undertaken more often. There are two recommendations relating to the ROAME system: that DEFRA should review the operation of the system in relation to R&D, and that all major programmes should be subject to economic appraisal before initiation or major changes of direction and in any case at regular intervals.

5. As noted above, the R&D carried out in the Programme was highly **effective** (Section 5) and **efficient** (Section 6). Two points to note are:

(a) first that there are some benefits additional to those captured by the cost benefit analysis. Two of the most important are, first, the much improved

base of scientific knowledge which leaves DEFRA in a better position to deal with future policy issues, and second, the substantial side effects (paras 7.20 and 7.21).

(b) The second point is that one significant failure of the Programme was that farmers do not appear to have made much use of information which would have enabled them to improve profits at the same time as reducing nitrate pollution. The main reasons are probably that farmers perceived, correctly, the benefits to them as being small and that the information was not presented in the most user friendly way. The Report recommends that in future greater efforts should be made to involve the industry in methods of presenting information to farmers (para 7.19). The significance of this point should not be overstated: farmers in NVZs will be required to adopt the practices concerned and outside NVZs there will probably continue to be increasing, if rather slow, uptake.

6. Other issues examined in the evaluation (Section 7) were:

(a) **Knowledge transfer (KT):** our assessment is that KT amongst scientists was very effective (para 7.4), as it was to those involved in policy development within government (para 7.4). R&D results were therefore effectively translated into policy outcomes. As indicated in para 5(b) above, KT to farmers was not very effective. A specific aspect of this was:

(b) **Models** A large number of farm decision support models were produced but not widely used by farmers, partly because they were not user friendly.

(c) **Side effects** The Programme produced some very substantial positive side effects. The progress in defining the processes of the nitrogen cycle has opened the way to a new integrated approach to soil science being carried forward by BBSRC and NERC, including in the Global Nitrogen Enrichment Programme (GANE). Developments in the use of stable isotope tracers were also highly significant.

7. Overall we conclude that the Programme was well managed and very successful in achieving its objectives. We are not aware of other economic evaluations of scientific research by MAFF. This one has demonstrated that it is possible to assess outcomes of some programmes in economic terms and we would recommend that DEFRA should commission other such evaluations.