CAS Paper 29

Water services and agriculture: key issues and strategic options

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INTRODUCTION

The whole agricultural industry is probably facing greater changes than has ever been the case before. The 1947 Act at the end of the Second World War was of course a watershed: the access to Europe was yet another of those occasions when farm thinking and planning had to change radically. But today with Common Agricultural Policy (CAP) reform now operational and a General Agreement on Tariffs and Trade (GATT) agreement very much on the horizon, coupled with the changes in biodiversity and biotechnology, the whole shape and style of our all-important sector is having to adapt to the circumstances which surround it.

Planning is ever more difficult, but still those critically important resources of land, water and sunshine remain at the centre of the production of a secure supply of the highest quality food - food which is probably of the highest quality in the world.

The National Farmers' Union (NFU) has set out its own water policies in two papers in 1992/93 which include the development of an overall strategy to encompass all water users. Within our policy papers, we envisage a direct role for the National Rivers Authority (NRA) in the development and management of water resources. Although I have no tangible evidence, I am becoming concerned at what I perceive to be a change in the NRA's approach to this important matter. Perhaps their proposals in the forthcoming paper on water for agriculture will allay some of my fears - but for the present I must remain concerned that the NRA appear to want to be less directly involved in this crucial role of developing and managing water resources.

PART 1 - WATER RESOURCES AND AGRICULTURE

In the debate about sustainable water resources, agriculture has two main considerations. Firstly, agriculture is a consumer of water, largely for irrigation purposes. Secondly agriculture is the principal land use in most of the water catchments in England and Wales. This first part of this paper provides an NFU perspective on the relationship between sustainable water resources and water for agriculture. In particular, the development of new resources, and demand management and water conservation measures are addressed.

DEMAND FOR WATER

Demand for water continues to rise year by year (mainly from increased personal consumption). Agricultural use of water forms part of this upward trend. Most of the water used in agriculture is used for irrigation, which accounts for about 1.5% of estimated water abstractions and about 5% of the country's total annual water consumption. The total irrigated area of outdoor crops in England and Wales was 164 460 hectares in 1990. Almost half of this was concentrated in the NRA Anglian region and a further 25% in the NRA Severn Trent region. The remaining irrigated area is dispersed throughout the country.

THE IMPORTANCE OF WATER

Today's marketplace demands a continuous, reliable supply of high quality produce. This can only be achieved by growing the crop without water stress and irrigation therefore plays a central role in the successful production of commodities such as potatoes, vegetables and fruit. Irrigation is important for two main reasons. The first is that it enables higher, more consistent and reliable yield levels to be achieved. The second, and often more important, is that it offers the potential for substantial quality benefits in terms of the condition, colour, shape, size and taste of produce.

Without a secure and adequate supply of water, farmers cannot meet the requirements of retailers and processors for their produce; contracts are lost and imports fill the gap. It is difficult to plan which crops to grow and impossible to target all the crop inputs - water, fertilisers etc - so as to produce a quality product.

THE NEED FOR AN OVERALL STRATEGY

In September 1992, the NFU published its proposals in relation to water resources. We highlighted the need for an overall strategy, which encompasses public water supply, industrial and agricultural requirements, and which addresses the environmental implications of

these requirements. We feel that Government, in conjunction with the water industry and water users, must play the key role in promoting the strategy; it is not solely the responsibility of the water undertakers nor of the NRA.

This strategy should be based on three key principles:

(i) where **there is a legitimate requirement for water, that requirement must be met.** The current and future prosperity of the agricultural sectors that depend on irrigation should not be constrained by lack of water and nor should any other legitimate use of water be constrained by a failure to make sufficient resources available;

(ii) the strategy should underline **the importance of water as a valuable resource which must in future be carefully managed;**

(iii) the strategy must provide **for the development of new resources as and when required,** unless it is shown that requirements can be met solely through better management of existing resources (and this, on the evidence available to us, is unlikely to be the case). However, the development of new resources must take place **in combination with better water management.**

NEW WATER RESOURCE SCHEMES

If forecast demands were to be met in their entirety, it would be necessary to develop new water resources. This is clearly shown in studies by the NRA which have compared forecast demand for public water supply with the yield that can be reliably expected to come from existing resources. The Authority's conclusions point to a significant shortfall in supplies in the south and east of the country over the next few years. These comparisons of demand and resources have considered public water supply only. They have not included the demands of industry or of agriculture and futhermore, they are based only on average demand. Since water for irrigation is needed in the dry summer months when public demand for water is at its peak, seasonal shortfalls are likely to be even more critical. Another point to note is that the possibility of climate change is not included in the NRA forecasts.

Plans are already underway to develop new water resources which would prevent such shortfalls. The NRA have put forward a range of proposals including new groundwater abstractions and schemes for transfer across the country using rivers and canals. Each proposal has the potential to make more water available to existing and future users; each also has implications for land occupiers, riparian owners and others. These proposals will each require detailed case-by-case evaluation and many local as well as more widespread interests will need to be considered. However, the environmental implications of developing

new water resources are a key concern for agriculture. The water that is naturally available underground sustains much of the production that takes place in England and Wales; its protection, conservation and proper allocation are essential to the long term future of the industry and to the maintenance of a thriving countryside. A particular concern to agriculture is the abstraction of groundwater in circumstances in which the natural replenishment of the aquifers cannot sustain the rate of abstraction. In recent years, some farmers have experienced problems associated with inappropriate abstractions. These and other considerations underline the need for extreme caution with respect to the nature and scale of new groundwater resource developments.

It is not the purpose of this paper to consider resource development proposals in detail. However at this stage, we would express substantial reservations about schemes which involve major abstraction from groundwater, unless it can be shown that they pose no risk to soil and water conditions in the surrounding countryside through their effect on the water table. Generally we believe that schemes which involve the transfer of water from areas where it is in surplus are likely to be more satisfactory. We also believe the Government should make the technical feasibility of transfer schemes the subject of extensive research in view of the significant technical uncertainties that are associated with such schemes, not least how water quality will be protected.

Costs of new water resources

A major consideration in the proposals for new water resource development is: who should meet the necessary cost? Development of new resources requires major investment. The allocation of costs of this investment merits detailed discussions between Government, the water industry, consumers, agriculture and other water users. The NFU sees a strong case for measures which alleviate the environmental problems caused by past practices towards abstraction to be funded by the community as a whole.

It is also essential that funding of any scheme ensures no financial or other disbenefit to those in areas which provide the source of water or those affected by the transfer of water to the user. Rather, costs will need to fall fairly and equitably on those likely to derive the most benefit from the investment. Beneficiaries may include agricultural businesses in so far as they have access to the additional or more secure supply of water that is provided.

The existing system of water abstraction charges is one means by which funds for investment in new schemes can be raised from whichever group or groups of water users will benefit from the additional resource. Another is private sector investment in schemes by those likely to benefit from the water made available. The latter

could include, for example, participation by a group or groups of farmers in the development of a local water transfer scheme. A combination of these two approaches may provide one way forward. The NRA has statutory duties relating to the redistribution and augmentation of water resources. The NFU attaches particular importance to the execution of those duties in so far as they affect water users (agriculture and others) who are not customers of the water companies.

These and many other considerations need thorough and urgent debate. The NFU enters this debate recognising that an abundant and reliable supply of water may, over time, come to represent a higher cost to the business that benefits from it than hitherto. However, costs must only fall where benefits are received. This will be a key criterion for further debate about investment in water resources.

DEMAND MANAGEMENT AND WATER CONSERVATION

Better use of existing water resources must form a significant component of the overall strategy to meet forecast demand. The NFU is strongly in favour of improved demand management and water conservation measures for all categories of water use, agricultural and other.

In September last year, the NFU produced a document entitled *'Better use of water'*. This outlines the steps which we believe should be taken to ensure that agriculture makes the best possible use of water resources already available to it, while continuing to prosper in the competitive business of producing quality fruit, vegetables and potatoes. These include the following:

Using 'surplus' winter water

One way in which farmers can make better use of water is by storing surplus water available in winter (a proposal covered in more detail below). The NFU also believes that more could be done to make use of the water that is 'surplus' following heavy rain in April or later in the summer. Conditions commonly attached to abstraction licences specify that any abstraction after April 1st will count as 'summer abstraction'. However, in areas of the country where irrigation is practised, heavy rains often occur after April 1st and create high river flows which, if not abstracted, are simply discharged to the sea. If the NRA defined 'summer abstraction' in terms of the height or flow or the river farmers would be able to use the 'surplus' water following heavy rain (eg to fill reservoirs) without detracting from their entitlement at times when flows are low. This might in turn reduce their requirements during low-flow periods.

Temporary transfer of licences
NRA estimates show that a significant proportion of the water that has been allocated and licenced for use by the agricultural industry is not being used. There are many reasons why licence holders may not use their full entitlement each year. However, since other farm businesses are constrained by lack of water, the NFU sees this as unhelpful both to the industry and water management generally. We believe that holders of spray irrigation licences should be able to apply to the NRA (without need for advertising or other protracted procedures) to transfer the whole or part of a licence to a designated person, for use in the same catchment for a specified and temporary period. This is a matter for the NRA and the Department of the Environment (DOE) and we look to them to consider how this might be achieved.

Water efficiency
In agriculture, the lack of water has already promoted significant improvements in the efficiency of water use. For example, state-of-the-art spray irrigation equipment includes overhead boom and pivot systems, computer-based scheduling systems, apparatus which ensures that fields are covered without areas of overlap, and nozzles which ensure uniform rates of application to the soil. Sophisticated scheduling systems are being employed which use soil, weather and crop data to determine the optimum rate of application to match the crops' requirements. There is scope for greater levels of conservation and the NFU welcomes all measures which will further this process. It must be remembered however, that the adoption of such tools has implications for costs and competitiveness in the industry.

Water from the mains
Mains water is an expensive commodity that is of a quality suitable for drinking. It is used in some more specialised horticultural businesses but it is not generally appropriate to use mains water for irrigation on a large scale. Water companies can make supplies of water, perhaps of less high quality, available to individual industrial premises. It is clearly sensible to do this if it means making good use of water that is surplus to the requirements for mains supply and saving on costs of unnecessary treatment. It may be possible for more farmers to enter into agreements with their local water company to obtain a supply of water in this way. At best, this will only be feasible for a limited number of businesses because proximity to water treatment works or the distribution system will be essential. In order to encourage such arrangements, where they are feasible, two problems need to be overcome. The first is the uncertainty about the applicability of hosepipe bans to supplies of this nature. The second is the legislation which prevents water companies from applying differential prices to supplies made at particular times or

for particular purposes. We would welcome discussion on this with representatives of water companies, DOE and the Office of Water Services (OFWAT).

Use of the drainage network

A network of drains, ditches and dykes has been developed to protect much of the UK's prime land from flooding. Most of this is managed by Internal Drainage Boards (IDBs). This same drainage network can be used to retain water at or near the root zone during the summer. The chief constraints on this practice are statutory duties of IDBs and technical problems. However, these are not insurmountable problems and experience of this in some IDBs have shown that it is possible to achieve a significant shortening of the period when drought stress may occur. The NFU supports efforts by IDBs and the farmers they represent to make more use of the drainage system as a means of water conservation. We believe that MAFF should establish a working group, including representatives of IDBs, DOE, MAFF and NFU, to develop the concept further.

'Buffer zones' and water conservation

There is growing interest in the use of 'buffer zones' for water management in the UK. Definitions vary but a buffer zone would probably comprise an area of permanent or semi-permanent vegetation bordering a stream or river; it might be the width of a typical headland or considerably wider. Water conservation is a potential benefit of buffer zones and although unproven at this stage, the NFU believes this is worth more investigation. MAFF and NRA research into buffer zones should include their potential for water conservation, as well as other potential benefits and problems.

ON-FARM RESERVOIRS FOR WINTER WATER STORAGE

Irrigation takes place during periods of peak demand and in areas where the shortfall between water demand and available resources is, or is likely to become, the most significant. It therefore contributes to the summer pressure on water resources, a pressure which is also caused by the increase in demand for public water supplies and other water uses.

In recent years, the authorities have responded to seasonal pressure on water and to increased concern about the water environment by imposing more frequent and more extensive restrictions on irrigation. Such restrictions can be introduced with little or no notice, and with no compensation.

Restrictions on irrigation, or even the prospect that restrictions may be introduced, have a very detrimental effect on the commercial

production of fruit, vegetables and potatoes. Each time a ban is imposed, there are major financial and other implications for the farm business and for those engaged in the related activities of packaging, transport and retailing. A regime in which irrigation restrictions occur frequently, or are often in prospect, constitutes neither good water management nor a satisfactory climate in which agriculture can operate.

The storage of surplus water available in winter is a means of ensuring a more secure supply whilst making better use of existing resources. In addition, reservoirs have considerable potential for habitat creation, and wildlife and landscape conservation. The NFU believes that Government should encourage this practice. The most effective means of doing this would be to offer a grant towards the construction of water storage facilities. An alternative approach would be to run a voluntary scheme under which farmers who currently abstract water in summer can elect to replace some or all of this abstraction with the abstraction of an equivalent amount during the winter and, in return, receive a grant for the facilities that would be needed to store winter water.

Current pressures on the water environment have been caused by the combined requirements of society's water needs. A grant scheme for on-farm storage would offer significant water conservation benefits and a means by which the agricultural industry could reduce these pressures on the water environment. The scheme would be entirely consistent with the principle that grants are available to encourage actions that will alleviate environmental problems. Such a scheme could be operated by MAFF, by the NRA or by both organisations jointly. The exact mechanism and the necessary legislation are matters for discussion, a discussion which we believe should be led by MAFF.

PART 2 - WATER QUALITY AND AGRICULTURE

In relation to the water issues, agricultural concerns are divided into two broad areas. The first is water resource issues. The second, and often more contentious is water quality issues. It is customary on water quality issues to see the farmer as a polluter to be reprimanded and/or punished. However, this second part of the paper provides an insight into the positive response that the industry has made in relation to agricultural pollution. The relationship between agriculture and nitrates in water is examined in the third part of this paper.

AGRICULTURAL POLLUTION - THE INDUSTRY'S RESPONSE

During the early- and mid-1980s the rising trend of farm pollution incidents was a major cause of concern to the farming industry. On

close examination it can be seen that this was part of a rapid increase in reported incidents of all kinds, and that the proportion comprised by agriculture did not rise over this period (Table 1). Some or all of the apparent increase would seem to be a result of improved reporting of a pre-existing level of pollution. However, it is clear that pollution at that time was at an unacceptable level for all types.

Table 1
Reported water pollution incidents 1981-92

Year	Total Incidents	Farm Incidents		% Farm	
		Type (A)	Type (B)	Type (A)	Type (B)
1981	12 600	2367		18.8	
1982	13 100	2428		18.5	
1983	15 400	2795		18.1	
1984	18 635	2828		15.2	
1985	19 994	3510		17.6	
1986	21 404	3427		16.0	
1987	23 257	3890		16.7	
1988	26 926	4141		15.4	
1989	26 421	2889		10.9	
1990	28 143	314		11.2	
1991	29 372		2954		10.1
1992	31 673		2770		8.7

Note: The figures for farm incidents since 1991 are for substantiated incidents only.
Source: NFU

The industry's response was to promote an NFU campaign to convince farmers of the unacceptable nature of organic pollution of rivers, and of the need to improve both management practices and containment facilities. An important complement to the campaign was lobbying Government to obtain improved grant-aid for farmers installing pollution control facilities and to maintain the availability of free pollution advice. The campaign was most intense in the south west, where it was carried out jointly with the then South West Water Authority and MAFF/ADAS under the slogan 'Together We Can Beat It'.

The effect of the campaign as a whole, combined with the efforts of those involved, is shown by the dramatic take-up of grant-aid under the Farm and Conservation Grant Scheme (FCGS). The amount of grant paid increased from about £2 million in 1986/87 to about £25 million in 1992. This has of course been matched by equivalent or greater investments from farmers' own contributions. A total of about £150 million has therefore been invested over the last eight years, illustrating the industry's response once the problem was understood.

The outcome of all this activity has been a continuing downward trend in agricultural pollution incidents, serious incidents in particular.

NRA statistics show clearly that the number of serious farm pollution incidents has declined considerably since the early 1980s reaching record low levels in 1990,1991 and 1992 (Table 2). In 1992 for example, there were just 67 serious pollution incidents attributed to agricultural sources, a reduction of 32% compared with 1991.

Table 2
Serious water pollution incidents from farms, and prosecutions 1979-92

Year	Serious Incidents			Prosecutions
	Type (A)	Type (B)	Type (C)	
1979	584			38
1980	841			34
1981	1304			71
1982	1215			64
1983	1521			87
1984	1387			110
1985		572		159
1986		622		128
1987		990		225
1988		940		173
1989		522		163
1990		239		123
1991			99	159
1992			67	92

Note: The definition of a serious incident changed in 1985 and 1991.
Source: NFU

The continuing downward trend in serious pollution incidents since the mid 1980s demonstrates the positive attitude of the farming community in relation to waste management and pollution issues. The reductions are also seen as evidence of success of policies over recent years which have combined farm waste advice and grants for waste-handling facilities with a campaign to raise farmers' awareness of pollution.

The Control of Pollution (Silage, Slurry and Agriculture Fuel Oil) Regulations 1991

In 1991, new regulations governing the standard of construction of new containment facilities for silage, slurry and fuel oil on farms were introduced. In retrospect, it can now be seen that much of the problems these regulations were intended to tackle had already been brought into control by voluntary action. In consequence, the regulations - which set extremely rigorous construction standards - may be an excessive legislative burden on the industry. They may even be counter-productive since the excessive costs of new facilities will discourage farmers from giving up the use of existing works.

MAFF FARM WASTE MANAGEMENT PLANS

Earlier initiatives in relation to agricultural pollution have focused on fixed equipment. What is needed in addition, is more attention to the management of farm waste. The MAFF farm waste plan initiative seeks to raise farmers' awareness of waste management, and is seen as a positive step by the NFU. We have actively supported the campaign since it was launched in May 1992. This support flows from our belief that enouragement and incentive rather than regulation are the way forward. The MAFF farm waste plans are still at a development stage. We believe that further testing is required before the plans can be encouraged on a more widespread scale. However, the value of the plans is beginning to be recognised by the farming community.

THE SEPARATION OF CLEAN AND DIRTY WATER

The mixing of clean and dirty water is a major contributor to farm waste management problems. A reduction in the volume of slurry stored after heavy rain brings about a reduction in the risk of causing pollution incidents not only from inadequate storage capacity but also as a result of land run-off. It also allows for improved, cost-effective management, in particular a substantial reduction in the cost of providing waste storage capacity. The NFU is convinced that the separation of clean and dirty water is a useful means by which the number of pollution incidents from livestock farming can be reduced. Works that would enable separation are currently excluded from the FCGS which is a serious disadvantage to those intent on reducing pollution.

PART 3 - NITRATES

Health standards

The scale of the nitrate issue in the EC, and in the UK in particular, is largely attributable to the adoption of a 50mg/l 'maximum allowable concentration' (MAC) in the drinking water directive of 1980. The NFU regards the standard as rather arbitrary and ill-founded and believes that the £400 million cost of meeting it up to the year 2005 is money which could be much better spent. I will explain why the NFU takes this view.

Health risks

Methaemoglobinaemia

This is the only confirmed health risk linked to nitrate in drinking water and is commonly known as 'blue baby' syndrome. It can occur in a bottle-fed infant under the age of 6 months when combined with bacterial contamination. It is extremely rare in the UK. Only 13 cases

have ever been reported here, all before 1973. The World Health Organisation (WHO) has confirmed that the disease is not a problem in western Europe. The UK practice of supplying low-nitrate bottled water to mothers of bottle-fed infants prior to the introduction of the EC standard (after 1985) seems to have been 100% effective in ensuring that no cases occurred.

Stomach cancer

There is a hypothetical link between nitrate in the diet and stomach cancer. However, epidemiological studies have failed to confirm the existence of any relationship between areas where nitrate levels in water are high and an increased incidence of stomach cancer. Indeed, studies have shown the reverse. Nor is the evidence of fertiliser workers who are heavily exposed to nitrate supportive of this suggestion that cancer of any sort becomes more frequent. Although it is probably not possible to demonstrate conclusively that nitrate in drinking water is never linked to cancer, there is no evidence to justify expending scarce resources when substantial research effort has failed to confirm a relationship.

ENVIRONMENTAL RISKS

It has also been suggested that nitrate can contribute to over enrichment of natural waters (eutrophication), resulting in excessive algal blooms and consequent damage to natural ecosystems. We have examined the evidence carefully, and have concluded that under UK conditions at least, phosphate rather than nitrate is the critical nutrient for eutrophication of fresh waters. However, in seawater the roles are reversed. In UK marine waters, which are relatively deep and rapidly mixed by tidal and other movements, nitrate-limited eutrophication has been identified in four limited areas. This contrasts with the continental situation where relatively shallow poorly mixed coastal waters suffer extensive nitrate-limited eutrophication problems. The UK is a signatory to the North Sea Conference under which the countries contributing to these problems have an obligation to reduce nutrient input by 50%. We believe that even the most environmentally dedicated nations are finding themselves over-committed in achieving these ambitious targets.

COST BENEFIT

It is difficult for the President of the NFU to be seen to be objective on an issue such as this. However, I genuinely believe that the considerable evidence regarding risks to human health from nitrate fails to justify that MAC of 50mg/l. The recent report of the Parliamentary Office for Science and Technology (May 1993) concluded that on a rational view,

over 5300 cases of methaemoglobinaemia would need to be avoided to justify the expenditure committed by the UK water industry up to 1995. Since it appears that the problem was eliminated by the previous UK policy involving an MAC of 100mg/l, then there is no further benefit from the move to a 50 mg/l standard. It therefore appears that while the cost of meeting the 50mg/l standard will be of the order of £400 million in the UK up until 2005, there are no perceptable benefits.

CHANGING THE STANDARD

The NFU has made considerable efforts to highlight the weakness of the case supporting the EC standard. It is sometime said that the standard has been aligned with the WHO guidelines. However this is less than the truth. While the WHO guideline figure is about 45mg/l, this is intended to be measured as an average, and not as an MAC as is the case with the EC standard. Moreover the WHO value was a guideline, and was not intended to be adopted as a rigid standard. Taking these factors into account, it can be seen that the WHO view is a great deal less stringent than the EC directive. Even the UK medical authorities - part of Government - have expressed the view that an averaging approach could be entirely acceptable.

The NFU has advocated the case for a review of the EC standard over many years. Not only is the standard ill-judged scientifically, but it now becomes increasingly obvious that it is determining the expenditure of large sums of money as OFWAT has highlighted. The fact that little, if any, benefit is received for this expenditure calls into question the logic of maintaining the current standard. However, the mechanics of EC legislation make it extremely difficult to revise existing directives. When considered with the dogmatic reluctance of EC officials to contemplate the relaxation of any standard, however ill-founded, we are faced with a very tall hurdle to surmount which is as daunting to Governments as to representative organisations such as ourselves.

As part of the Prime Minister's deregulation initiative, the NFU has vigorously pursued the question of reviewing nitrate (and pesticide) standards in the drinking water directive. It is gratifying that discussions with Government officials indicate that the UK is now willing to lend some weight - how much I am unsure - to the realignment of standards more in keeping with the best scientific advice.

There are also some limited signs of new thinking in Brussels. In September, the Commission held a conference to discuss possible amendments to drinking water standards. The reports we have received from our representative are not overly encouraging. However, I take some comfort from the fact that we have won some support from the Government for re-evaluating the standard and moving

towards an averaging approach. In Brussels, perhaps the indication that the Commission is prepared to talk - however reluctantly - about reappraising standards in general is also a first step on a long road. However, I would not count on any changes being achieved in the short term.

SCHEMES TO LIMIT LOSS FROM AGRICULTURE

It is often assumed that agriculture is the only source of nitrate in water. This is far from the case with significant contributions made by sewage effluent discharges to rivers, sewage spread on land, leaking sewers and septic tanks, de-icers applied to roads and runways and atmospheric deposition. At the end of the day, farming does make a major contribution and we accept that we should take reasonable and proportional steps to minimise unnecessary nitrate loss. Nitrate is, after all, an important nutrient for crop growth and less loss may well reduce the need for fertiliser input. However, in the NFU's view, farmers should not be asked to go beyond good agricultural practice to help achieve the EC standard unless compensation is available. Agricultural loss is an unavoidable side effect of sound farming practice, and its concentration in water is determined more by rainfall than by other factors.

Two main initiatives have been taken to reduce nitrate losses from agriculture in the UK. The first is the EC nitrate directive, adopted in 1991, and the second is the Government Nitrate Sensitive Areas (NSA) schemes. I intend to describe the main features of each, together with a flavour of the NFU's view of them.

Nitrate directive

This imposes the following main requirements on Member States:

(i) to designate as vulnerable zones by December 1993 the catchments of all drinking water sources which exceed (or are likely to exceed) 50mg/l;

(ii) to draw up by December 1995 action plans to take effect within vulnerable zones;

(iii) to bring these action plans into effect in vulnerable zones by December 1999.

The designation criteria are likely to lead to very large areas of land becoming 'nitrate vulnerable zones'. We expect that these will affect many thousands of farmers who will be extremely concerned about both controls on their operations and the value of their land (which often provides collateral for loans). Action plans must contain certain minimum measures, including compliance with a code of good agricultural practice, minimum storage requirements for animal manure and maximum land application rates for manure disposal.

Additional measures can be added if required by national governments. No compensation will payable. These requirements are very much less stringent than the original proposal from the EC Commission, which have been significantly modified in the light of substantial lobbying from the NFU and others. But even so our members are very apprehensive about them. In particular, livestock farmers are concerned about the effect of the manure application restrictions and storage requirements. There is also concern about the interpretation of 'good agricultural practice', which tends to be all things to all men. We have been reassured that the Government does not intend to take up any of the optional measures and that it will not implement the controls in the UK more rapidly than in other EC countries.

Nitrate Sensitive Areas (NSAs)

The NSA scheme differs from nitrate vulnerable zones in that participation is voluntary and payment is offered for substantial restrictions. It is also only applied in carefully selected catchments where the measures are likely to be of particular benefit. The first ten pilot areas, totalling about 10 000 hectares, have now been in operation for 10 years. A further 30 areas, totalling a further 40 000 hectares, are planned for introduction in 1994. The pilot scheme has achieved 80% uptake by farmers. Over the winter 1992/93, 6 of the 10 pilot sites achieved compliance with the directive standards or came within 10%. It is worth noting that the other 4 sites are in drier parts of the country. In the first two winters of the scheme, the unusually low rainfall meant that nitrate concentrations were very much higher.

STRATEGIES FOR NITRATE CONTROL

The 50mg/l standard must be observed at the consumer's tap. As the distribution network is under the control of the water companies, it is on them that the duty to comply with the standard falls. Water abstracted from rivers or aquifers which exceeds 50mg/l must be treated or blended at water treatment works prior to distribution. Management of nitrate levels at this point is capable of guaranteeing compliance with the standard.

Agriculture cannot provide this level of control of nitrate levels. Scientific aspects of soil nitrogen cycles are still not completely understood. However, the most crucial factor which is beyond human control is weather conditions, and in particular rainfall. Low rainfall can and does have a drastic effect on nitrate concentrations. It is therefore virtually impossible for any particular nitrate level to be achieved on a reliable basis by agricultural measures alone. In areas prone to high nitrate levels, water companies will inevitably need to have in place nitrate removal equipment or other contingency

arrangements to deal with periods of high nitrate levels. However, if the present MAC were to be converted to an average, there would be scope for very significant cost savings.

THE FUTURE

Both agriculture and the water industry are faced with unwarranted costs and controls to combat a health risk which is of much greater significance than the EC standard of 50mg/l suggests. I am encouraged to see that the Secretary of State has stated publicly his concern about the rate at which additional expenditure is being incurred to achieve higher water standards, and I hope he will review the merits of the various standards. The NFU has striven for many years to persuade others that it is in the public interest to align the standard more closely with that necessary to protect human health. We hope that it will be increasingly recognised that limited resources would be better devoted to health issues of more genuine concern.