



Sustainable Water Resources for the Future: Values and Challenges

Consultation Document for the Environment Agency's Water Resources Strategies

October 1999



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Foreword by the Head of Water Resources

As we look towards the new millennium, reconciling the needs of the environment for water with the demands of society is becoming an increasingly difficult challenge. The environment is under stresses and strains from many different directions: housing, roads and increased population compete with our desire to improve our quality of life and to enhance wildlife, while we face the uncertainties of climate change. As the body responsible for managing and planning water resources in England and Wales, the Environment Agency is developing new water resources strategies. These will look some 25 years ahead, and will provide a framework for the sustainable management of water resources.

The Environment Agency's aim with regard to water resources is to protect the long-term future of the environment while encouraging sustainable social and economic development. The availability of adequate supplies of water is essential both for natural life and for human use. Water links different parts of the environment; an action in one location may have an effect far away. Although water is a renewable resource, it is not infinite. We have to face difficult decisions about how we should manage water. Some of these decisions will be based on scientific and technical factors, but others must reflect the values of society.

As the first stage in developing our strategies, we are consulting in this document on a series of issues. I would like to know your views on any or all of these, and any other issues that should inform and shape our strategies. This is an opportunity for you to tell us what you think, and to influence the principles that will shape water resources management over the next 25 years. I hope that we will be able to provide a focus for debate, and a suitable response to the issues that are raised.

Over the next year, we will develop and consult further on the details of our national and Regional strategies. If you would like to offer ideas now, or would like to make further contributions at a later date, please let me know. You will find the address for any correspondence on our strategies in Section 3 of this report.

Dr Giles Phillips
Head of Water Resources

October 1999

1. Introduction

The Government has asked the Environment Agency to develop new strategies for the sustainable management of water resources in England and Wales. Such strategies should contribute to sustainable development, protecting and where possible enhancing the aquatic environment, while facilitating economic growth and higher living standards. We propose that the strategies will look 25 years ahead, and will consider the many conflicting demands and uses for water. By the end of 2000, we will publish a national strategy and eight Regional strategies. The national strategy will deal with policy and national issues; the Regional strategies will provide a local focus and show options for reconciling the needs of the environment with those of abstractors and water users.

The development of these strategies is a major challenge for the Agency. We intend to follow a scenario approach, looking at the way that water resources may be needed and valued by society over the next 25 years, and the changing needs of the environment. While the Environment Agency has statutory responsibility for ensuring the proper use of water resources, there are many others with an interest in, or responsibility for, water resources management. For this reason, we are consulting on issues that we should consider when developing our strategies.

This consultation document initiates the formal development of our water resources strategies.

We have taken a new approach to our consultation. Rather than identifying alternative schemes and plans, we have taken a step back, and we are seeking views on some controversial issues. We believe that this approach should allow us to take into account the range of opinions that exist and should help us to produce strategies reflecting the needs and wishes of society.

We appreciate that many individuals and organisations have already expressed their views to us on some of these issues. We would like to ensure that we are aware of your current views and we would appreciate a response on any issue on which you would like to comment. We have invited contributions from national and local government, other statutory bodies, water companies, industrial and agricultural users of water, and environmental interest groups.

This document provides a broad outline of the basis for water resources strategies, before discussing the consultation issues on which we seek your views in some detail. We present first those issues that relate to how we protect the natural environment and land use, followed by those that look at the way that we all use water. The final group looks at potential solutions to any imbalance between supply and demand.

2. The basis for water resources strategies

There is a long history of planning and managing water resources in England and Wales but the context and society's expectations have changed over the years.

Legislation

The basis for integrated water resources management in England and Wales dates back to the Water Resources Act of 1963. This set out what have since become the Agency's present duties: to manage water resources by "conserving, redistributing, or otherwise augmenting water resources and securing proper use of water resources". It also established the duty to conserve aquatic ecosystems and amenity, balancing the needs of all water users.

Most abstractions require an abstraction licence.

The system of abstraction licensing is administered by the Environment Agency; potential abstractors apply to us, and we decide whether to allow the water to be taken, based on the reasonable need for water, the availability of water in the catchment, the likely environmental impact, and the effect on other abstractors. The Agency also has duties to pay particular regard to public water supply, and has responsibilities towards sustainable development, costs and benefits, and the needs of rural areas.

In total, there are about 50,000 abstraction licences in force in England and Wales. Almost three-quarters of these are agricultural, but these account for less than 2 per cent of the volume of non-tidal water taken. About half of the non-tidal abstraction is for public water supply; this amounts to about 17 million cubic metres per day. On average, about 36 million cubic metres of water are abstracted for all purposes each day. Water can also be taken for certain other uses without a licence; these include some navigation abstractions, trickle irrigation and gravel working de-watering activities, for example.

The abstraction licensing system, together with Operating Agreements with water companies and water resource management schemes with other abstractors, provides the current legislative framework for managing water resources in England and Wales. There is other legislation that has an impact on water resources management, including:

- the Water Industry Act (1999), which regulates the way water companies can charge customers, in particular by meter;
- the Competition Act (1998), which outlaws certain anti-competitive practices, and interpretation of which for the water supply industry could impact on sustainable use of water resources;
- the Water Regulations (1999), which seek to influence, through rules for household appliances and plumbing, the quantities of water we use in the home.

The Government has published a directly relevant policy document, following consultation during 1998, entitled *Taking Water Responsibly*. This sets out both the steps the Government wishes the Environment Agency to take within current legislation and also legislative changes the Government plans to make "as soon as Parliamentary time allows". The document includes changes to assist the Agency in managing water resources, to improve public availability of information, to increase flexibility and efficiency, and to introduce controls over some hitherto excluded abstractions.

The development of strategies will require us to identify the key players in taking actions forward, and we will want to consider how recent and planned changes will help to achieve the aims we identify. Certainly each item above has relevance to one or more of the issues brought out later in this document.

Planning

Much effort has been expended to ensure that public water supplies are clean and secure. The reservoirs, boreholes and extensive treatment and distribution networks owned by the water companies of England and Wales demonstrate the success of this. Until the latter part of the twentieth century, development of supplies was generally down to the initiative of local authorities or private water companies, and was very diverse in nature. Protection of other water users and their rights has been complex and variable, while protection of the environment was generally poor, at least partly through ignorance of water science.

Some large scale (that is, national) water resources planning was attempted for the first time by the Water Resources Board between 1963 and 1974. Much of its work was based on securing public water supplies into the future, with the clear aim of meeting all possible demand. This has become known as the "predict and provide" approach.

The National Rivers Authority (NRA) was formed in 1989, with responsibilities for water resources planning and abstraction licensing as well as other responsibilities for the water environment. The NRA had a statutory duty to secure the proper use of water resources. To pursue this, the NRA published a national water resources strategy in 1994. The document *Water: Nature's Precious Resource* set out some key policies and concepts essential to an environmentally sustainable water resources strategy. These included:

- sustainable development, implying no long-term deterioration in the water environment due to water resource development and water use;
- precautionary principle - where significant environmental damage may occur, but knowledge is incomplete, decisions made and measures implemented should err on the side of caution;
- demand management, managing the total quantity of water taken from sources of supply using measures to control waste and consumption.

A broad conclusion was that demand management measures might make significant new development of water resources unnecessary for demands up to 2021, but that preliminary studies to explore possible schemes would be a prudent parallel initiative. This has become known as the Twin Track approach to water resources management.

The Environment Agency was formed in 1996, taking over the NRA's water resources powers and duties, but with some explicit extra responsibilities for contributing to sustainable development. Much progress has been made over these three and a half years. Particular regard has been paid to the planning of public water supplies and the identification of sites damaged by current levels of abstraction, with the encouragement of Government and in co-operation with the water industry and the Office of Water Services (Ofwat). We have also had the opportunity to look back at some recent droughts, and to consider some of the issues and conflicts they raised. The time is right to take a fresh look at how we plan for the sustainable use and management of water resources.

Aims of the Agency's water resources strategies

Our strategies will cover, at national and regional level, issues such as:

- environmental needs for water, to protect wildlife and also to contribute to our enjoyment and quality of life;
- demands for water, for public water supplies and other sectors, while considering how flexible these demands may be and how valuable the various uses are;
- availability, both normally and in droughts, of water to meet demands;
- the steps needed to secure appropriate arrangements in the future, and the parties who should be taking those steps.

The response of society as a whole may include changes to legislation, changing practices and behaviours, and research into future needs.

Our aim is to offer a framework within which all interested parties can work in the coming years, to ensure that realistic demands for water are met and that those aspects of our environment which depend on water are protected. We intend to develop a risk-based approach, planning for future risk and identifying how to deal with it in the best way possible. There are, of course, different ways of dealing with different elements of risk. For example, society may choose a very high level of environmental protection to ensure that biodiversity and the natural environment is safe. Alternatively, society may choose to develop water supply to a level that will ensure security of supply with no risk of failure. Society and the physical environment interact in a complex way; many uncertainties need to be evaluated and the risks must be weighed up.

We shall seek to build on earlier NRA national and regional strategies, on recent water company water resources plans, and of course on a range of other available material. We will question our use of water and how it is valued. At this stage, it is not possible to set out how we will weigh different views; on many of them we need to be guided by Government and society. However, by consulting in this way, we hope that:

- we will receive new ideas;
- we will gain other perspectives on our own ideas;
- we will develop a sense of how strongly people or groups think about particular issues;

- we will promote increased external awareness of issues and of the Agency's role;
- we will increase the credibility and acceptance of strategies.

Our strategies have to allow for various uncertain elements in the future, and will therefore need to incorporate management of, or planning for, risks. We would welcome your views on particular aspects or information that we should be taking into account, or approaches that we might adopt.

3. The issues and how to respond

As well as the general question raised at the end of section 2, we have selected thirteen issues that we feel are fundamentally important and will influence the way we manage water resources into the next century. We invite your views on these important issues.

Each issue is presented in terms of background and questions on which we would like your views. Some of these issues are technical in nature. Where this is the case, we have attempted to provide adequate background and alternatives to assist you in forming an opinion.

Please feel free to respond to all the points raised, or to focus on a few issues of particular interest. The questions and points are for guidance only. Please do not feel restricted to comment on the specific questions asked but raise additional points if you wish. We would also be particularly interested in your views on the way that we manage water resources.

Please send your response in writing to:

Dr Giles Phillips
Head of Water Resources
Environment Agency
PO Box 217
Patchway
Bristol
BS32 4XB

(Please note that this PO Box address is for this consultation only)

Or by electronic mail to:

anna.c.bly@environment-agency.gov.uk

Consultees in Wales are asked to send their responses to Ian Barker, Water Resources Manager, Environment Agency Wales, Rivers House, St Mellons Business Park, St Mellons, Cardiff, CF3 0LT.

It would be helpful to us if your response could include where appropriate reference to the issue or question to which you are responding. The closing date for responses is 31 January 2000.

We will use the results of this consultation in formulating our national and Regional water resources strategies. Later in the process, we will consult further on the details of Regional strategies. If you would like to offer views on these, please feel free to do so now or to register an interest in receiving further information.

The Agency intends to produce a consultation response document. This will summarise the range of views that we receive on each of the issues. Responses may be included in our document but anonymity will be respected where requested.

A What environment should we protect?

In granting new abstraction licences, the Environment Agency sets conditions to protect the water environment and provide opportunities for navigation and active or quiet recreation. The licence conditions are based on what we know about ranges of river flow or water level in the area in question. Our knowledge of the natural water environment is based on historical information that we have collected over several decades. By protecting natural river and groundwater levels and flows, we believe we are providing conditions that will allow aquatic plants and animals to continue to thrive. There is still much to learn about how plant and animal species depend on river flow or water levels, although we do know that patterns of flow (known as flow regimes) are more important than just minimum flows. No single measurement of the state of the water environment provides a simple way to set conditions to protect river ecosystems. Research continues to seek a better understanding of the key interactions between water and aquatic plants and animals.

Many factors may cause change in the aquatic communities supported by a river or a wetland, including:

- changes in flow or water levels
- changes in water quality, including temperature
- changes in the river channel, such as sedimentation or dredging.

Some of these may have natural causes, while others are a result of human activities.

Factors that may affect river flow and water levels over the next 25 years include:

- changes in land-use
- changes in the volume of water abstracted
- changes in the volume of water discharged
- natural climate variations, but also climate change.

Society expects many changes to be made; new houses will be built, we expect agriculture to meet our changing needs for food, and economic development and its associated jobs are essential. The Government intends such changes to be made in the context of sustainable development: that is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

The Agency has a statutory duty to protect Habitats Directive sites and SSSIs from abstraction damage, and to further conservation of flora and fauna. We interpret this in terms of maintaining and improving the environment. As we plan the way that we manage the water environment for the future, we need to consider what sort of environment we want to protect, and how this can be achieved in the context of society's other needs.

Questions

- A1 Should we try to protect the water and water-related environment as it exists today?
- A2 Should we try to enhance the water and water-related environment of some locations, even at the expense of others?
- A3 How can we ensure that the water and water-related environment continues to provide for the needs of navigation and active or quiet recreation?
- A4 To what extent should we take a precautionary approach to water resources management?

B How should we respond to climate change?

Climate changes naturally. Natural causes for climate change include volcanic eruptions and solar variability, as well as oscillations within the climatic system, such as El Niño. In the longer term, changes in oceanic circulation and fluctuations in the earth's orbit are also known to have affected climate. The UK has experienced periods much colder and much warmer than the present climate.

There is now little doubt that the earth has been warming over recent decades, and that this trend is also apparent in England and Wales.

Scientists seem to agree that this warming is unlikely to be only the result of natural climate variability: it is generally accepted that man-induced global warming is occurring because of the release of greenhouse gases into the atmosphere.

The UK Climate Impact Programme (UKCIP) predicts warming rates from about 0.1°C per decade to 0.3°C per decade. By the 2080s, this gives a range of temperature increase between 1.1°C and 3.5°C.

Within these averages, there are seasonal and regional differences. Temperature predictions are considered to be more accurate than the predictions of other climate variables.

Patterns of precipitation change are difficult to predict. The scenarios suggest that annual and winter precipitation will increase by the 2080s. Summers are likely to be drier in the south and wetter in the north.

Some people are expressing concern that climate change has already affected extremes in climate, and that summer droughts and winter storms are more frequent than in the past. UKCIP work suggests that very dry summers, such as that of 1995, could occur once a decade by the 2080s, instead of once a century now. However, the probability of two successive dry years changes little, principally because of increased winter precipitation.

In the face of such uncertainty, how should we manage water resources to ensure that the environment is protected, while making proper use of water resources? The Agency will wish to contribute to a sound scientific and balanced approach to the uncertainties associated with possible climate change. For example, it could be expensive and environmentally damaging to develop a new reservoir simply to meet the most extreme forecasts of climate; however, failing to plan for the possibility of such extremes would also be unacceptable. In the short term, drought contingency planning is essential; we can never know whether the next drought will be the result of climate change or part of the natural variability in climate.

Questions

- B1 How should we plan strategically for the longer term in the face of uncertainty about climate change?
- B2 What monitoring do we need to put in place to ensure that we understand the effects of climate change on water resources?

- B3 Should farmers and other abstractors expect a greater allocation of the available summer water, or should they adapt to the new climate?
- B4 How can we identify and manage the risks to water resources availability of climate change?
- B5 How should climate change impact on the way we use water?
- B6 If climate change reduces summer river flows, should we manage resources to protect the existing water environment, or accept that some sites can no longer be maintained?

C Should we prioritise access to water resources?

There are many demands and needs for water, including the environment, public water supply, agriculture, industry, recreation, navigation, hydropower, fisheries and forestry. Much of the existing pattern of abstraction is historical, reflecting the needs of users over the last 30 years. Under present abstraction licensing arrangements and legislation, further allocation of resources within a given catchment is made on a "first come, first served" basis. Legislation requires the Agency to have "particular regard" for the needs of public water supply. Any abstractor with a legitimate need for water can have an allocation, provided that there is water available in the catchment. The availability of water is determined by both the environmental needs of the catchment, and the legal requirement to protect the abstraction rights of other water users. If there is no water available, a potential new abstractor will be refused a licence, even if the need for water appears pressing. Is this the best way to allocate water resources, or should some uses be seen as more important than others?

The Agency is encouraged by Government decisions, published in *Taking Water Responsibly*, to review licensing practice and legislation in a number of radical ways which will make decisions more open and more flexible. We look forward to the legislation necessary to deliver some of these changes. We are actively preparing to implement these new arrangements but there will remain some open questions.

The Government's June 1998 consultation paper on changes to the water abstraction licensing system included a discussion of the possible use of economic instruments as a means of achieving the allocation of water resources in a way that better reflects their value to different users. A further consultation on more detailed proposals is expected early in 2000 in the light of research that is presently being concluded.

The Agency often places a time limit on new licences, so that they can be reviewed periodically. We have also carried out work seeking to establish best practice for water use in agriculture and industry; this helps us to identify the proper use of water resources and to make sure that we allocate an appropriate amount of water to each licence.

Questions

- C1 Does the current "first come, first served" principle provide an appropriate balance between different needs for water and protecting the environment?
- C2 Does the "first come, first served" principle provide sufficient encouragement for environmentally sustainable uses of water, such as hydropower?
- C3 Can a hierarchy of water allocation be identified? If so, how should water be allocated? Should this differ in different locations?
- C4 Should access to water be controlled by market forces? Is willingness or ability to pay for water a good way of allocating it?
- C5 Should water to maintain navigation have priority over some other uses?

D Should water resources and supplies be a consideration in the planning system?

Housing and other developments need water, and water companies have a duty to supply domestic customers within their appointed area. In theory, it is possible to supply water anywhere within England and Wales, although in some locations new supplies may be expensive or require the transport of water over long distances and have an environmental impact. In other places, making an adequate supply available may take time; for example, were a new reservoir to be necessary, it could take ten to twenty years before it started providing water. In such locations, development could place an unacceptable burden on the water environment or on existing water consumers. However, these could be the locations where other factors favour development; for example, there may be a need for economic development or there may be a need for additional housing because the area is thriving. In such areas, it could be possible to introduce innovation to make best use of the limited water that is available, for example by recycling water wherever possible.

We know that more new houses are needed; Government figures predicted 4.4 million new homes would be required between 1990 and 2016. Regional Development Agencies are promoting sustainable economic development; this could include new industry that makes use of large volumes of water. The Environment Agency is consulted by regional planning bodies and local authorities when they are preparing regional planning guidance and development. The Agency's current position is that it aims to ensure that practical limitations arising from water supply and treatment are fully considered, by providing planning authorities with advice and relevant information on development.

Questions

- D1 Should the availability of water resources be a constraint on development?
- D2 How should water resources issues affect the timing or phasing of new developments?
- D3 Can technological innovation, such as water recycling and water efficiency, deal with all the problems of water availability that we may face?
- D4 Should the water company duty to supply water to new domestic customers be reviewed?

E What are the main dependencies between rural land-use and water resources?

Much of the debate over water use in England and Wales is related to public water supply. However, there are many important issues that relate to rural land-use.

The way our countryside is managed has a direct impact on the way that rivers flow, as well as providing a demand for water. Rural land-use management is itself the result of many complex social and political policies and pressures.

Different land-uses and management techniques affect patterns of river flow. For example, land drainage makes run-off occur more rapidly, while broad-leaved forests may increase evaporation and therefore reduce river flow. Grazing pressures can alter vegetation patterns and therefore affect run-off.

The EU and the UK Government are committed to the diversification of the rural economy, encouraging farmers (and others) to develop alternative enterprises that add value to basic agricultural products. In some areas, grants are available for these activities. Water resources planning must take this into account.

Many rural areas of East Anglia, the Midlands and the South East are highly dependent on irrigated agriculture. This influences not only the economic viability of farms but also employment in many ancillary services, such as irrigation equipment suppliers, seed merchants, vegetable packers and hauliers. Therefore the unavailability of abstraction supply can potentially have a major impact on the wider rural economy. The Agency recognises the significant links between various rural land management practices and the water environment. Due to the complexities, there is no simple regulatory relationship, and the Agency will need to consider with others these links, and how they can be sustainably managed.

Questions

- E1 Should irrigation water be seen as a special priority in agricultural areas?
- E2 How should the impact of rural land-use change on water resources be considered? For example, should afforestation be controlled if water resources are under stress?
- E3 To what extent should the impact of water resources developments on landscape be considered in our national and regional strategies?
- E4 Should the Agency take a lead role in the provision of storage for spray irrigation?

F Is water "undervalued"?

A plentiful supply of water is often taken for granted in England and Wales. However, because of our high population density, water availability per person is very low by international standards. Water is also a precious resource, essential for the well-being of the natural environment, as well as supporting navigation and all sorts of recreation. Balancing the needs of the environment with those of society is a complex task. To the user, direct costs for water are low. Those who abstract directly from rivers and groundwater pay for the Agency's costs of managing water resources; typically, this means an average metered charge of between 0.5 and 1 pence per cubic metre of water, depending both on location

and the use to which the water is put. Those who take water from public supplies pay more, because they must cover the costs of the supply company, which include the costs of treating and transporting the water. The average metered charge is 72 pence per cubic metre.

These prices poorly reflect the scarcity of water in some places or its value to the environment. Water is particularly scarce in certain locations and in some years or at certain times of year. It would be possible to treat water like other commodities, making it more expensive when it is scarce and cheaper when and where plenty is available. However, an individual's willingness to pay for water does not necessarily reflect the value that society places as a whole on keeping the same water in the environment. The Agency does not believe that its present abstraction charging scheme, based on cost recovery, has a significant influence in encouraging careful, wise or efficient holding or use of abstraction licences.

The Agency recognises the recent Government decisions on water charges and acknowledges the current social and political issues associated with the widespread use of charging by quantity used. Nevertheless in looking 25 years ahead, we need to form a considered view from the point of view of sustainable use of water resources, to continue to inform public debate about longer term options. There are many ways to promote the efficient use of water. Public education and awareness campaigns can be very effective, provided that messages are clear and targeted appropriately. An essential part of this is gaining the trust of water users.

Questions

- F1 Should the cost of water reflect its importance in sustaining life, the economy, and the environment?
- F2 Should more actions be taken to make users understand the link between their use of water and its impact on the environment?
- F3 Can education and awareness campaigns alone deliver efficient water use?
- F4 Might there be situations where an extension of charging by water metering becomes of critical importance in water resources management?

G Are customer restrictions an appropriate and effective way of saving water?

We all expect to be able to turn on our taps and find a plentiful supply of clean water. All water companies are planning to be able to supply water through a repeat of the worst drought on record.

During periods of drought, water companies must match their declining stocks of water with the demands of their customers. Demand for water increases during hot, dry weather, partly because people bathe and wash more frequently, but also because of increased garden watering. This increased demand may cause two problems. The company's supply network may be incapable of transporting the volume of water required; this problem is often caused by short peaks in demand due, for example, to garden watering. Of greater concern to those managing water resources is that this increased demand draws on stores of water that may not be replenished for weeks or months. All water companies are developing drought contingency plans that set out the measures they would take to manage water resources during a developing drought, and the Government has announced that legislation to make these Agency-agreed plans a statutory requirement will be introduced when Parliamentary time allows. The main problem in drought management is that it is not possible to predict how severe a drought will be or when it will end. It may be necessary to take steps to be more careful with water use early in a drought to make sure that there is not a major failure in supply later on.

One way of maintaining the balance between supply and demand during droughts is to reduce demand. There are many ways of doing this, ranging from publicity campaigns seeking wise water use, through hosepipe bans and bans on non-essential use of water, to standpipes and rota cuts in extreme circumstances. If demand reduction is not sufficient to ensure that there will be adequate supplies through the drought, a water company may need to seek extra emergency water supplies through a drought permit or drought order, allowing additional abstraction. At a time when the environment is also under stress because of a lack of water, this may be particularly damaging.

The Government, the Environment Agency and water companies all agree that rota cuts and standpipes should be seen as a measure of last resort, to be used only in a drought far worse than those seen over the last century. However, some water companies have taken the view that they will never apply any form of customer restrictions. The Agency's current view is that the use of hosepipe bans and other

restrictions can play a part in protecting vital supplies in the uncertainty of a severe drought, and they should therefore be included in water company drought management plans.

Planning to meet such unconstrained demand may have other impacts. A water company planning to meet large demands in a very dry summer will need access to large quantities of water. Developing such sources of water can be costly, both financially and in environmental terms. It may also mean, in turn that other abstractors may not be able to abstract, with potential impacts on agriculture and industry or local economic development.

Questions

- G1 Should water be available at all times for watering gardens and other uses such as car washing?
- G2 Are customer restrictions an appropriate drought management tool?
- G3 If hosepipe bans and other non-essential use bans are acceptable, how frequently, on average, should they be applied?
- G4 The Agency has powers to ban spray irrigation in drought conditions. Should their powers be extended to other uses of water?
- G5 Are there other ways of persuading customers to reduce water use in dry periods?
- G6 Should all significant abstractors and major users of water develop drought contingency plans?

H Is our individual use of water sustainable?

We all use water in our homes and at work. Figures from water companies suggest that in 1998, estimates of per capita consumption (pcc) range from 124 to 191 litres each day. In other words, in some parts of the country, customers will be using 65 per cent more water on average than in other areas. The range of peak demands is even greater. It is not easy to see why people in some areas should need so much more water than in others.

One reason for the variation is the way that average per capita consumption figures are estimated. Even when measured per capita consumption figures are considered, the range is considerable. Of course, different households use water in

different ways; such variation between households is reasonable and to be expected.

Our individual use of water is clearly one of the most important demands, and hence is a critical driver for water resources planning. Further understanding of our individual use of water is essential. Household size, appliance ownership, and garden size are all important. However, attitudes to water use are also vital. Understanding these factors must be the key to identifying which aspects of water use can be controlled and should allow us all to ensure that we make the best use of the water with which we are provided. The Agency would like to see more efficient use of water by private consumers, with a change in public attitude to water usage.

Questions

- H1 Is it reasonable to expect individuals to manage their use of water? Or should they have an expectation that they can buy and use as much water as they like and can afford?
- H2 What role should the Environment Agency seek in influencing the use of water by individuals?

I Water efficiency - should the Agency set targets for all users?

All water users are encouraged to make efficient use of the water available to them. Most water companies have published water efficiency plans; these are generally plans of action and do not set targets for water efficiency. Beyond public water supply, the Agency has been working with agriculture and industry to identify, encourage and stimulate "best practice" in water use.

The Agency currently has no powers to set or enforce water efficiency targets, although when granting a new abstraction licence, we ensure that the applicant's needs are reasonable. The Agency is committed to promoting efficient water use by industry, commerce, agriculture and in the home. The Government's Taking Water Responsibly proposes enforceable legislation to require water companies to conserve water, and to require all other abstractors to use water in an efficient and effective manner. The Agency will be considering, with others, how best to enforce these future requirements.

Would it be possible to set quantitative water efficiency targets for public water supply, agriculture and industry? There are many factors that affect water use, and taking these into account could be challenging. However, water efficiency targets could provide an objective measure to allow performance to be evaluated and could provide a useful incentive for water saving.

Water companies are already under a statutory duty to promote the efficient use of water by their customers. Enforcement of this duty is a matter for the Director General of Water Services, who has published his expectations of the measures that companies should be taking to comply with this duty. Adding quantitative measures of water saved to the assessment of compliance with this duty would require an agreed way of attributing water savings specifically to those measures rather than to other influences such as weather or economic circumstances.

For industry and general agriculture, targets can be developed to reflect different manufacturing and agricultural sectors. For irrigation, efficiency targets would have to take into account the type of equipment used and irrigation and land management practices in place at the farm level. Some supermarkets and food processing firms recommend particular irrigation regimes, which could mean that efficiency targets would have to be aimed at these groups.

Work undertaken by the Environment Agency and others shows that there is considerable scope to save water and money through waste minimisation.

Questions

- 11 How proactive should the Agency be in promoting water efficiency?
- 12 Should quantitative water efficiency targets be set?
- 13 Who should be responsible for setting such targets?
- 14 What incentives are there, and could there be, for saving water?

J How might competition in the water industry affect sustainable water resources management?

The water industry has long been seen as a natural monopoly, with most water users obtaining a treated water supply from their local water company. The regulatory system is configured to ensure that this system is fair for customers,

with the Director General of the Office of Water Services (Ofwat) using comparative competition and price setting to ensure that water companies cannot abuse their position in the market. Limited competition to supply large water users is allowed under the present regime, but there are very few examples of these "inset appointments".

On 1 March 2000, the Competition Act comes into force. Ofwat and Office of Fair Trading are considering how the Competition Act should be applied to the water industry. Options include inset appointments, common carriage, and the surrender of abstraction licences to other or new water suppliers.

- Inset appointments allow a new supplier to supply a customer previously serviced by a water company. These apply only to large users of water.
- Common carriage involves the sharing of pipelines and distribution networks between several suppliers, the customer being allowed to choose the one they prefer. A similar position exists in gas and electricity supply.
- The surrender of abstraction licences potentially could be forced on a water company to allow another company to compete with it.

The Agency's role in this area is to secure the proper use of water resources while protecting the water environment. In considering proposed new abstractions or the transfer of existing licences, we shall continue to need to know how and where water will be used and returned after use, so we can be sure there is a genuine need for the water and that it will be returned to the environment in a suitable location. Through the full use of our licensing powers, we intend to ensure that the introduction of competition does not undermine the proper use of water resources.

Questions

- J1 What are the gains and risks arising from competition in the water industry for water resource management and the natural environment?
- J2 How should new entrants demonstrate a genuine need for water resources?
- J3 Might the introduction of competition in public water supply restrict the availability of water to other potential users?

K How far should leakage control be pursued?

All water companies' supply systems leak to some extent. In 1997-98 (the last year for which figures are available) some 25 per cent of the water abstracted by water companies was lost through leakage without reaching customers. Much of this leakage occurs from water company mains at joints and fittings, from breaks and corrosion holes. Some leakage occurs from pipes owned by water customers, for which they have responsibility. The pressure in the system and the state of the pipes and valves (the infrastructure) are important factors. Freezing and thawing in cold winters also places stress on the system. Some water company mains are up to 100 years old; it is not surprising that some of these fail on occasion.

Water that leaks either returns to the environment or evaporates. While some leaked water may have limited environmental benefits, these are uncontrolled and unlikely to make optimal use of the water. In treating and transporting this water, energy and chemicals have been wasted. Reducing leakage can be difficult and expensive. Small leaks are very difficult to trace and repairing mains in built-up areas can be disruptive. Maintaining a service to repair burst pipes rapidly can also be expensive. For these reasons, the water industry has developed the concept of the "economic level of leakage". Broadly defined, this is the level of leakage where further leakage control effort is more expensive to the company than providing the same volume of water in a different way. Some of the draft Ofwat leakage targets for 2000/01 have been based on companies' own assessments of their economic levels of leakage; these suggest that companies believe they have almost reached their economic levels of leakage.

Economic levels of leakage present some problems. It is hard to calculate the cost of extra leakage control, or to give convincing evidence of costs. It is difficult to take into account the environmental costs of the extra water needed to make up for leakage, and to consider the lost opportunities for other abstractors. Economic levels also provide little incentive for technical innovation; there is little benefit to a water company in making its leakage control cheaper because if it does this, it will simply have to do more.

One option would be to develop models of best practice in leakage control. These may not be economic in the strict sense of the word but would provide a long-term basis for managing leakage into the future. Alternatively, it may be possible to make a single major investment in leakage control

that drives leakage down significantly, delaying the need for resource development and moving leakage to an acceptable baseline. The Agency expects water companies and others to strive to achieve and maintain better control of leakage, and will expect reductions before it will consider cases for the development of new reservoirs.

Questions

- K1 How could best practice in leakage control be defined?
- K2 How could incentives for further leakage control be developed?
- K3 What expectations of further leakage reductions should the Agency have when formulating its regional and national water resources strategies?

L Should water resources be developed locally?

Water is not always readily available where or when it is required. Abstraction from some locations is potentially more damaging than from others. For example, all other factors being equal, the abstraction of a small volume of water in the headwaters of a river would have a more significant impact than the abstraction of the same volume of water further down the catchment.

Public water supply companies have networks of pipes that allow them to move water around, often over long distances and between river catchments. Regional water grids are already a reality in many areas. However, water is heavy and pumping uses significant amounts of energy, with the potential for further environmental impact, as well as costs for users. This is a major constraint in the development of a truly national water grid.

Other users of water do not have such well-developed networks. Farms and industry can either take water from the mains, or abstract directly from rivers or groundwater. Mains water is treated to a standard that makes it fit to drink: this treatment uses natural resources and energy, and may not be necessary for most agricultural or industrial purposes.

Striking the balance between local development and larger-scale water use is difficult. Local development generally has the advantages of relatively low direct energy use and gives users a clear link between their use of water and their local environment, thus providing local accountability. On the other hand, larger schemes such as regional reservoirs and their

associated pipeline networks are likely to use their energy efficiently, and can be sited to minimise their negative impact on the environment.

Questions

- L1 Should the Agency produce general rules about the relative benefits of local resource development, or should we treat each case on its own merits?
- L2 Would further development towards a fully national water grid be compatible with principles of sustainable development and local accountability?
- L3 Does local accountability affect the extent to which efficient use of water should be expected?
- L4 How can water users be made aware of the impact they have on the water environment, both locally and further away?
- L5 Should wet areas with adequate water resources look to profit from selling water to areas with limited resources?

M How should we work out which water resource options are most acceptable?

In order to maintain supplies of water, the future demand must be balanced against the available resource. When the gap between the two becomes uncomfortably narrow, some action must be taken. The "twin track approach" involves seeking the efficient use of water while bringing forward timely proposals for resource development where appropriate.

The traditional approach to water resources management was to predict the future demand and to provide sufficient resource, often in the shape of a new reservoir, to meet it. Our approach now is to attempt to balance all of the possible sustainable options to determine which is the most cost-effective. In detail, the approach taken assigns a monetary value to the costs and benefits associated with each option. The costs might be the investment and operational expenditure associated with the scheme, together with detrimental environmental impacts. The benefits would typically be the value of water to the user, any additional recreational opportunities, and perhaps any environmental enhancements.

Many options can be considered. Typically these would include:

- small-scale resource development or enhancement (for example, local boreholes);
- large-scale resource development (for example, reservoirs or major groundwater schemes);
- supply side savings (for example, leakage control);
- customer side savings (for example, demand management);
- other options, such as grey water recycling, effluent re-use, desalination, aquifer storage and recovery.

The Agency is committed to ensuring that environmental and other costs and benefits are fully taken into account when water resources decisions are taken, but recognises the methodological and information challenges inherent in that approach. The Agency will take a precautionary approach where there is a serious risk of environmental damage occurring due to incomplete knowledge of the matter. We need processes which have the confidence and support of the community, while allowing effective decision making.

Questions

- M1 Is it feasible to give a monetary figure to the environmental and social impacts of a scheme?
- M2 Do such approaches afford adequate long term protection for the environment and encourage sustainable development?
- M3 How can we place a value on good stewardship of infrastructure?
- M4 How should we determine whether to try to reduce demand or increase the available resource?

Glossary

Abstraction

The removal of water from any source.

Abstraction licence

The authorisation granted by the Environment Agency to allow the removal of water from a source.

Catchment

The land that drains, whether naturally or artificially, to any point in a stream or river.

Consumption

Water delivered billed less underground supply pipe losses.

Demand management

The implementation of policies or measures that serve to control or influence the consumption or waste of water. (This definition can be applied at any point along the chain of supply.)

Distribution losses

The total water loss from the water company distribution system.

Economic level of leakage

The level of leakage where the marginal cost of active leakage control equals the marginal cost of leaking water. In determining this it is important to consider environmental and social costs as well as direct costs.

Per capita consumption

Consumption divided by head of population.

Precautionary principle

Where significant environmental damage may occur but knowledge on the matter is incomplete, decisions made and measures implemented should err on the side of caution.

Sustainable development

Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

Total leakage

The sum of losses on the trunk mains, communication pipes and losses between the point of delivery and the point of consumption.

Underground supply pipe losses

Losses between the point of delivery and the point of consumption.

Inset appointment

Allows a new supplier to supply a customer previously supplied by a water company. These only apply to large users of water.

Operating agreement

Agreement between the Agency and a water company to ensure the proper management of water resources operated by the company.

Water resource management agreement

Agreement between the Agency and an abstractor for water resources purposes.

Bibliography

Department of Environment and Welsh Office (1996) *Water Resources and Supply: Agenda for Action (The Stationery Office)*

DETR and Welsh Office (1998) *Water charging in England & Wales - Government Decisions Following Consultation (Department of Environment, Transport and Regions and Welsh Office)*

DETR and Welsh Office (1999) *Climate Change Impact in the UK - The agenda for assessment and action (Department of Environment, Transport and Regions and Welsh Office)*

DETR and Welsh Office (1999) *Maintaining Public Water Supplies - Ministerial guidance to the Director General of Water Services on issues arising in the preparation of water resources plans by the water companies of England and Wales (Department of Environment, Transport and Regions and Welsh Office)*

DETR and Welsh Office (1999) *Taking Water Responsibly - Government decisions following consultation on changes to the water abstraction licensing system in England and Wales (Department of Environment, Transport and Regions and Welsh Office)*

Environment Agency (1997) *An Environmental Strategy for the Millennium and Beyond (The Environment Agency)*

Environment Agency (1997) *Saving Water: Taking Action: The responses to the consultation report on water conservation and demand management (National Water Demand Management Centre)*

Environment Agency (1998) *On the right track - A summary of current water conservation initiatives in the UK (The National Water Demand Management Centre)*

Environment Agency (1998) *Optimum use of water for industry and agriculture dependent on direct abstraction (Environment Agency)*

Environment Agency (1998) *Progress in Water Supply Planning - The Environment Agency's review of water company water resources plans (Environment Agency)*

Environment Agency (1998) *The Review of the Water Abstraction Licensing System in England and Wales - The Environment Agency's response (Environment Agency)*

Environment Agency (1999) *On the right track 2 - A summary of current water conservation initiatives in the UK (The National Water Demand Management Centre)*

Environment Agency (1999) *Planning public water supplies - The Environment Agency's report on water company water resources plans to the Secretary of State for the Environment, Transport and Regions and the Secretary of State for Wales (Environment Agency)*

Garrod G and Willis K (1999) *Economic Valuation of the Environment (Edward Elgar, Cheltenham)*

Herrington, P (1996) *Climate change and the demand for water (HMSO)*

House of Commons Environment Committee (1996) *Inquiry into Water Conservation and Supply*

Hulme, M. and Jenkins, G.J. (1998) *Climate change scenarios for the UK: scientific report (UKCIP Technical Report No. 1, Climatic Research Unit, Norwich)*

National Rivers Authority (1992) *Water Resources Development Strategy - A discussion document (NRA)*

National Rivers Authority (1994) *Water: Nature's Precious Resource - An environmentally sustainable water resources development strategy for England and Wales (HMSO, London)*

National Rivers Authority (1995) *Saving Water: A consultation report on the NRA's approach to water conservation and demand management (National Water Demand Management Centre)*

National Rivers Authority (1995) *Saving Water: The NRA's approach to water conservation and demand management (National Water Demand Management Centre)*

Office of Science and Technology (1999) *Environmental Futures Foresight (Department of Trade and Industry)*

Ofwat (1998) *1997-98 Report on leakage and water efficiency (Office of Water Services)*

Royal Society for the Protection of Birds (1997) *Practical Implications of Introducing Tradable Permits for Water Abstraction: Report to the Royal Society for the Protection of Birds by Cranfield University and Middlesex University.*

Royal Society for the Protection of Birds (1997) *RSPB Good practice guide for prospective development - General principles (Royal Society for the Protection of Birds)*

Turner R K, Pearce D and Bateman I (1994) *Trading Environmental Permits in Environmental Economics: An elementary introduction (Hertfordshire, Harvester Wheatsheaf)*

UKWIR/Environment Agency (1997) *Effects of climate change on river flows and ground water recharge: guidelines for resource assessment (UKWIR/Environment Agency - Report ref. no. 97/CL/04/1)*

UKWIR (1998) *Towards an environmentally effective and socially acceptable strategy for water metering in the UK - main report (UKWIR report ref. no. 98/RG/02/2)*



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