



# UK Water Security

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## Introduction

This Dods Political Intelligence report provides an overview of UK water security. It provides context on the issue, a summary of why water security is important to the UK and a breakdown of current relevant UK policy. The report concludes with an insight section which evaluates current UK policies and whether they are sufficient to meet the scale of the challenge.

## What is Water Security?

The United Nations' [working definition of water security](#) is:

*“The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.”*

Fresh water is a finite resource, making up around 3 percent of global water supplies. It is vital for humanity to have clean and reliable fresh water supplies for public health, economic development, and agriculture.

Globally, water security is being affected by climate change, which is altering weather patterns and particularly the hydrological cycle. Water security is also being impacted by increasing human competition for water stemming from population growth, increasing urbanisation, more intensive per capita use of water, and the modernisation of agriculture.

There is an interdependent relationship between water security and human activity, [as](#) “human activities both shape and are shaped by water systems.” Climate change and water demand pressures are largely driven by human activity, and the actions needed to address water security concerns require human action. These actions include addressing the root causes of climate change to limit its impact on water security; adapting infrastructure and the built environment to the expected impacts of climate change; guaranteeing fair access to water for all; and ensuring the sustainable use of water for consumers, industry and agriculture.

The reliable availability of clean water also impacts biodiversity and ecosystem resilience. Poor fresh water supplies or polluted waterways can force species to migrate or come into competition with others for water supplies. Species which cannot survive in polluted water or cannot successfully adapt to lower water availability will reduce in population, affecting the biodiversity in a given area and harming the resilience of the whole ecosystem. Water security is therefore important for the protection of nature. Not only does nature have intrinsic value, but functional ecosystems provide “ecosystem services” which are vital to society, including for removing carbon from the atmosphere and maintaining pollinator populations, which are crucial for agriculture.

## Water Security and the UK

Despite the perception of the UK as a temperate country with predictable weather and rainfall patterns, there are growing water security concerns because of both the changing climate and human action. These concerns relate to the expected impacts of extreme weather on the UK, consumer demand for water, and the knock-on effects of a changing climate, including for food security and water supplies.

### Extreme Weather

In terms of the direct impacts of extreme weather, the UK's [Third National Adaptation Programme](#) (NAP3) outlines that “a prominent climate risk is the increased chance of flooding due to more intense rainfall... [which] can cause millions of pounds worth of damage to peoples’ homes and businesses”, as well as to important infrastructure.

The National Infrastructure Commission (NIC) [estimates that](#) 325,000 homes are already at high risk from flooding, which could increase by as much as 135,000 by 2055. To contextualise the costs of flooding, the economic losses from flooding in England between November 2019 and March 2020 were estimated to be about £333m.

Extreme weather is also expected to directly impact landscapes, biodiversity, and water quality with “wetter winters and more frequent, heavier storms... leading to more flooding and more pollutants being washed off fields and urban areas” and into rivers.

NAP3 also identifies that “hot summers and heatwaves will become more intense and longer lasting” and “summer drought conditions will occur more.” High temperatures and drought will have major implications for water security, with the [Met Office estimating](#) that “under the current trajectory, the amount of water available in England could be reduced by 10-15 percent, with some rivers seeing up to an 80 percent decrease in water during the summer months.”

### Food Security

The UK's agriculture sector depends on secure water supplies to produce crops and for rearing livestock. The UK's domestic food production is therefore contingent on water security.

Agriculture primarily depends on two main water sources: rainfall and stored water, from surface water (rivers and lakes) and groundwater (shallow and deep aquifers) respectively. The UK's agricultural sector, which is primarily rain-dependent, faces challenges from changing weather patterns including droughts, floods, and extreme rainfall.

This was evident in 2020 when UK wheat yields dropped by 40 percent due to both heavy rainfall and drought in the growing season. The effects of climate change on agriculture, which are not restricted to the UK, still impact the UK through consumer

food prices. For example, the ECIU [has warned](#) that between the start of 2022 and the end of 2023, the average UK household food bill rose by £361 due to the impacts of climate change on global agricultural yields. Again, in April 2024, the [ECIU highlighted](#) the particularly wet winter of 2023/24 and the resulting poor wheat harvest as a factor which is expected to drive UK food prices even higher.

Looking to the future, [Met Office Research](#) shows that drought conditions are more likely in the UK's main crop growing season, between April and October. With droughts forecast to become more frequent as the climate changes, and a resilient water supply required to meet the shortfall in rainfall, water storage and other resilience measures will be crucial to maintain agricultural water security and the UK's food security.

Whilst water security is therefore a key component in food security, the relationship between the two is not one-directional. Soil and fertiliser runoff from agricultural land adversely impacts the quality of river water due to chemical contamination. This in turn degrades local ecosystems, reduces soil quality, and undermines pollinator populations which support agricultural yields. This further harms water security, food production and food security.

### Water Industry and Consumers

In terms of the resilience of consumer supplies, the UK's water system faces multiple and interrelated pressures, including from extreme weather as a consequence of climate change, high and growing per capita water consumption, and ageing water infrastructure.

For example, higher temperatures can lead to drought, which increases the rate at which stored water is used and reduces the rate at which water supplies are replenished. The effects of drought are then exacerbated by inadequate infrastructure such as insufficient reservoir storage and leaking pipes. In a drought situation, water supplies are inefficiently distributed through leaky pipes, which consumes water reserves faster than necessary and reduces resilience to drought in the whole water system.

These pressures from climate impacts are exacerbated by increasing per capita water consumption, with the Department for Environment, Food and Rural Affairs (DEFRA) estimating that UK water use is "144 litres of water per person per day", which results in "about 14 billion litres of water per day" for the UK. This [compares with](#) an average of "124 litres per inhabitant per day" in Europe. In the second [National Infrastructure Assessment](#), the NIC forecast that daily UK demand is forecast to increase by 4 billion litres by 2050.

These pressures are cumulative. In the absence of sufficient investment in infrastructure, the growing demand for water makes existing reservoir storage ever less resilient. Ageing or inadequate infrastructure is also increasingly vulnerable to the impacts of extreme weather, which can lead to further pressures on the whole system.

For example, NAP3 recognises that “important assets in the water industry are vulnerable to impacts from river, surface water and flooding events, including both clean water sites and sewage treatment works.”

These vulnerabilities in the consumer water system also have negative implications for the natural environment. This is because during heavy rainfall - which is increasingly frequent due to climate change - the inadequate sewerage system uses storm overflows to dispense excess untreated water into rivers and the sea. This pollution negatively impacts biodiversity and the health of the wider ecosystem. DEFRA specifically [identifies](#) the “growing population, an increase in hard surfaces, water bodies disconnected from their floodplains, and more frequent and heavier storms because of climate change” as factors putting the sewer system under pressure.

## Current Policy

### Policy Landscape

DEFRA holds overall responsibility for water policy in England. Devolved administrations hold responsibility for water policy in Wales, Scotland and Northern Ireland. A variety of legislation and other organisations influence the development and implementation of this policy.

At the highest level, the 'Climate Change Act' requires the UK Government to prepare for a changing climate and to publicly report on the impacts of climate change and how the UK will adapt to these risks, including for water security. Every five years, the Government therefore produces a [Climate Change Risk Assessment](#) (CCRA), which considers water security, among other risks. The Government then reports on the policies through which the UK will adapt via a National Adaptation Programme (NAP). The most recent NAP - [NAP3](#) - sets out that "adaptation is essential to help us prepare for impacts like drought and water scarcity which are predicted to become more frequent and severe."

The policies outlined in the NAP are delivered through several organisations. This includes the Environment Agency (EA), which is responsible for taking a strategic overview of the management of all sources of flooding. As part of this, the EA has a 5-year aim for rivers, lakes, groundwater and coasts to have improved water quality. Local authorities and internal drainage boards also have a role to play in dealing with local flood risk planning and responses.

Additionally, the independent Water Services Regulation Authority (Ofwat) has responsibility for elements of water security policy through the regulation of the water sector. The Government sets out its priorities for the water industry in a [strategic policy statement](#), which provides Ofwat with guidance on the use of its regulatory powers.

While also regulating the routine activity of water companies in line with these strategic priorities, Ofwat has the additional lever of the 5-year price review (PR) cycle. Through this, Ofwat sets expectations for the levels of investment companies should put into water infrastructure. The methodology for PR24, the upcoming price review cycle, includes that companies must have consideration of the impacts of climate change.

Water companies are also required to make plans to improve water security through five-yearly "Water Resource Management Plans", which set out how they will invest in infrastructure to adapt to climate change.

### Government Policy

#### Extreme Weather

NAP3 identifies that due to the impacts of climate change there are a range of water-related risks to British infrastructure and both the built and natural environment “including [from] flooding, heavy rainfall, water scarcity, high and low temperatures, and extreme weather events.”

To address this, the Environment Agency produced a [Flood and Coastal Erosion Strategy](#), setting out a roadmap to 2026 to make England more resilient to flooding. The strategy aims to ensure that “when flooding and coastal change happens, it causes much less harm to people, does much less damage, and ensures life can get back to normal much quicker.”

Measures in the strategy include the £200m [Flood and Coastal Resilience Innovation Fund](#) which supports the implementation of resilience actions and the development of long-term investment plans for managing flooding and coastal change, particularly in flood and erosion-vulnerable areas. The strategy also includes provision for the creation of “adaptive pathways” for major estuaries such as the Humber; a doubling of the number of natural flood management projects through the Flood and Coastal Erosion Risk Management Investment Programme; and a commitment to plan for the improved resilience of major infrastructure such as railways. In addition, the strategy also outlines how the Government has made provision for training, tools and support for organisations to prepare and adapt to growing flood risks.

The Government’s integrated [Plan for Water](#) also sets out how, through a “catchment-based approach”, the protection and restoration of naturally functioning catchments will “improve water quality, reduce drought, support wildlife, and increase flood resilience.”

One important means of protecting and restoring catchments are nature-based solutions (NbS), [which](#) “address societal problems in ways that benefit both people and nature.” NbS work by creating, protecting and utilising functional ecosystems to draw down emissions, protect biodiversity, and provide public benefits. In this way, they are often described as an important and sustainable means of tackling the linked climate and nature crises, without sacrificing the interests of communities. For example, a restored woodland will draw down carbon dioxide from the atmosphere, provide a habitat for woodland species, reduce the localised flooding impacts from heavy rainfall, and provide cleaner air and well-being benefits to the local population. NbS delivered to date in the UK have included wetland restoration, which can reduce instances of localised flooding, improve water quality, absorb greenhouse gas emissions, and provide habitat for a variety of species.

## Food Security

To address concerns about the supply of water in the agricultural sector, the Government has committed to improving on-farm water storage and developing more efficient methods of using water on land. The Government aims to increase the amount of water stored by the agricultural and horticultural sectors by 66 percent by 2050. To



meet this target, the Government have allocated £10m in grants to help with the costs of building on-farm water reservoirs and irrigation equipment through [the Water Management Grant](#).

The Government are also currently developing Environmental Land Management Schemes, which are designed to replace the Common Agricultural Policy (CAP) for the UK post-Brexit. These schemes aim to provide financial incentives for landowners to procure environmental goods and services alongside food production. The slogan for these schemes is “public money for public goods”, and water health is one such public good. Consequently, these schemes are designed with an awareness of the value of water health and the risks that agricultural processes present to it. For example, each of the three Environmental Land Management Schemes: sustainable farming incentive, countryside stewardship, and landscape recovery, have goals that pertain to protecting and enhancing water quality.

The Government’s integrated “[Plan for Water](#)” affirms the Government's commitment to minimise the risks and impacts on water from chemicals and pesticides used in agriculture.

### **Water Industry Consumers**

The Plan for Water also sets out industry and consumer-focussed policies which relate to water efficiency, water quality, and water infrastructure improvements, in light of the risks posed by climate change.

The plan targets achieving a 50 percent reduction in leakage rates by 2050 against a 2017/18 baseline; and, reducing the use of the public water supply in England per head by 20 percent by 2037/38 against a 2019/20 baseline.

In addition, the plan cites an aim to reduce nutrient pollution from wastewater. This is to improve water quality and protect biodiversity. In order to do this, the Government introduced a target under the Environment Act 2021 to reduce phosphorus from treated wastewater by 80 percent by 2038 against a 2020 baseline.

To achieve these targets, the Government has aimed to influence consumer behaviour and incentivise industry to invest in infrastructure.

The industry-focused policies aim to incentivise water companies to reduce leakages and quickly resolve supply interruptions. This includes making sustainable drainage systems mandatory in new developments and provisioning a £100m Ofwat fund to develop water efficiency projects. Water companies will also be required to invest £2.5bn to reduce nutrient pollution from wastewater treatment works between 2020 and 2025, including by upgrading 160 wastewater treatment works to the highest standards for phosphorus removal by 2028.

From the consumer side, the Plan for Water introduced mandatory water efficiency labelling and encourages local authorities to set tighter water efficiency standards.

Ofwat also plays a key role in delivering the Government's policies relating to water security in the context of industry and consumers. This is because Ofwat's regulatory priorities are determined by the Government in the [strategic priority statement for Ofwat](#). The last strategic priority statement, published in 2022, stated that Ofwat should "deliver a resilient water sector" capable of meeting long-term water requirements. It also states that when developing new infrastructure, water companies should increase their use of NbS where possible in order to deliver for both consumers and nature.

The statement says that Ofwat should take action, including by ensuring the water companies "plan, invest in, and operate [their] water and wastewater services to secure the needs of current and future customers." The Government expects Ofwat to take an "integrated water management" approach where possible – taking actions that deliver for consumers, the environment and long-term resilience together. For example, Ofwat requires water companies to produce 5-yearly Water Resources Management Plans setting out how they will invest in infrastructure and technology to adapt to the risks posed by climate change.

As a headline water security goal, the Government expect Ofwat to ensure England is resilient to a one in 500-year drought by 2040.

### **International**

As a signatory to the Paris Agreement, the UK is also a party to the "[global goal on adaptation](#)", which aims to globally "enhance adaptative capacity, strengthen resilience and reduce vulnerability to climate change."

The goal was [further quantified](#) at COP28 in 2023, where parties agreed to work towards the achievement of a set of broad adaptation-related targets. The first target was to work towards:

*"significantly reducing climate-induced water scarcity and enhancing climate resilience to water-related hazards towards a climate-resilient water supply, climate-resilient sanitation and towards access to safe and affordable potable water for all."*

## Conclusion and Insight

Water security is a major and growing concern for the UK, with implications for infrastructure, housing, food security, the environment, and people's access to clean water.

It is therefore worrying that the resilience of existing water infrastructure and the plans to ensure the UK's water security are insufficient. The Climate Change Committee [found that](#) "NAP3 lacks the pace and ambition to address growing climate risks", and they recommended the Government take a different approach to improving the UK's climate resilience. The NIC [also found](#) that "all infrastructure systems should be more resilient" in the face of increasing exposure to shocks from climate change.

With global efforts to tackle climate change currently falling short of the commitments made in the Paris Agreement, it is unlikely that climate change impacts will reduce in the medium term. In this context, with insufficient adaptation policies in place and in the face of growing climate risks, taking action to improve the UK's water security will be necessary, and will require significant investment.

The NIC estimates that investments in environmental infrastructure resilience would need to "total £1 to £1.5 billion per year from the public sector and £8 to £12 billion per year from the private sector over the next 30 years." The NIC found that while expensive, investment now will "avoid costly impacts over the longer term" and that future generations "may pay increased costs due to inaction."

In this context, with the need for high and sustained levels of investment, adaptation action and water security should be prioritised by the Government as a matter of urgency. Given the cross-cutting nature of water security, this will require greater policy coordination from Government, and a focus on the efficient use of funding.

Some new bespoke infrastructure will be unavoidable, including an improved and expanded sewage network, and water storage facilities such as reservoirs. However, with funding a major consideration, NbS will be key to holistically and economically addressing the multiple and interlinked challenges associated with water security. In addition to jointly benefiting the climate, nature, people and the built environment, the [Dasgupta Review](#) found that in many cases, NbS "were more cost-effective than hard infrastructure options", and "compared favourably with engineered solutions."

In terms of coordination, implementing successful NbS in the right locations will require collaboration between different Government departments. To achieve this, the CCC has suggested establishing a joint unit in Government on adaptation, or even the creation of a cross-cutting "adaptation minister." Further to this, the Institute for Government (IfG) [has suggested](#) Government must improve its scrutiny of adaptation policy to ensure progress is being made in a joined-up way.

While it is therefore welcome that the Government has shown a commitment to introduce NbS as part of the catchment-based approach to water system restoration, and that the Government has empowered Ofwat to encourage water companies to use NbS, they could go further. The political and financial prioritisation of adaptation policy, along with the development of proper mechanisms to coordinate the most impactful policy interventions, could go a long way towards addressing the cross-cutting water security challenges facing the UK.

In addition to coordinated policy development and funding, there are practical considerations around implementing NbS – primarily around how to incentivise landowners to accept NbS on their land. Environmental land management schemes are only at their trial stage now; but despite their youth, there has already been a [watering down](#) of their long-term nature goals. As the schemes move beyond their trial stage, it is essential for both food and water security that they continue to incentivise landowners to protect and enhance water quality.

In addition to well-funded, well-coordinated, and implementable adaptation policy; water security will be greatly improved by consumer behaviour change. UK per capita water usage is high and must come down to improve the resilience of the water system, particularly while the population is forecast to grow. Marginal changes such as increasing the rollout of smart water meters and introducing mandatory water efficiency labelling are welcome. However, the Government has identified where it should focus to reduce household water consumption: retrofitting water-efficient products in households, businesses, and the public sector. With the Government acknowledging that “80 percent of the homes that will exist in 2050 have already been built” and that “most buildings would benefit from simple cost-effective retrofits to improve water efficiency”, it is clear that comprehensive investment in these measures will have both immediate and cumulative positive long-term effects on the UK’s water security.

Overall, while policy related to water security is complex and cross-cutting, potentially expensive, and faces implementation challenges, it is better to act now. Failure to prioritise water security risks affecting the population’s ability to access clean water; the destruction of housing and infrastructure due to extreme weather; a reduction in agricultural yields which would impact both farmers and consumers; and the degradation of the natural environment. It is positive that options to address the interrelated risks in a mutually beneficial manner exist in the form of NbS, but this should not take away from the need for spending on bespoke solutions and infrastructure, particularly for water storage, sewage treatment, and water efficiency measures.

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