

**EVIDENCE TO THE CONSUMER COUNCIL FOR WATER (CCW) REVIEW OF
WATER POVERTY IN ENGLAND AND WALES**

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WATER POVERTY IN ENGLAND AND WALES¹

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Water poverty is conventionally defined as households spending more than 3% and 5% of their net income after housing costs on water. Water bills have risen faster than general prices and faster than earnings since privatisation. In 2018/19 21% of households paying for water in England and Wales were spending more than 3% of their income on water and sewerage and 10.0% were spending more than 5% of their income. If income is equalised the water poverty rates remain similar but the composition of water-poor households changes. The paper explores variation in water poverty and prospects for the future. If water bills rise 3% per year faster than household income, water poverty will increase to 34% by 2033 based on a 3% definition. Policy options are discussed.

Introduction

The affordability of water is a function of two factors – prices and incomes. It can be seen in Figure 1 that since privatisation in 1989 water prices have risen faster than overall prices, faster than fuel prices, and faster than household income - increasing more than fourfold by 2020 and more than doubling in real terms.

Everyone uses clean water and the number of households in England is projected to increase by 15% between 2020 to 2043⁴, increasing potential demand. At the same time the cost of maintaining a steady supply of clean water is likely to rise in the context of climate change and extreme weather events, an ageing infrastructure and habits of water use (Figure 2). Firms' costs may also increase as a result of investments in water and sewage treatment to comply with their regulatory framework. Higher costs are likely to mean even higher prices.

We already know (Figure 3) that lower income households currently spend proportionately more of their incomes on water so will be hit harder than better off households by rising prices. Median Real Income had only just begun to recover from the financial crisis and is now expected to fall again and further as a result of the Covid-19 pandemic and the post-Covid economic crisis.

¹ This is an update of an article Bradshaw, J. and Huby, M. (2013) Water poverty in England and Wales, *Journal of Poverty and Social Justice*, 21, 2, 137-148 and Bradshaw, J. and Main, G. (2014) Water Poverty in England and Wales: an update <http://spruyork.blogspot.co.uk/2014/09/water-poverty-in-england-and-wales.html> and NEA Discussion Paper (2019). Water Poverty: A Common Measurement. <https://www.nea.org.uk/wp-content/uploads/2020/10/Water-poverty-a-common-measurement-PRINT-VERSION.pdf>

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<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/dataset/householdprojectionsforengland>

Figure 1: Movements in water prices overall CPI and fuel 1988=100

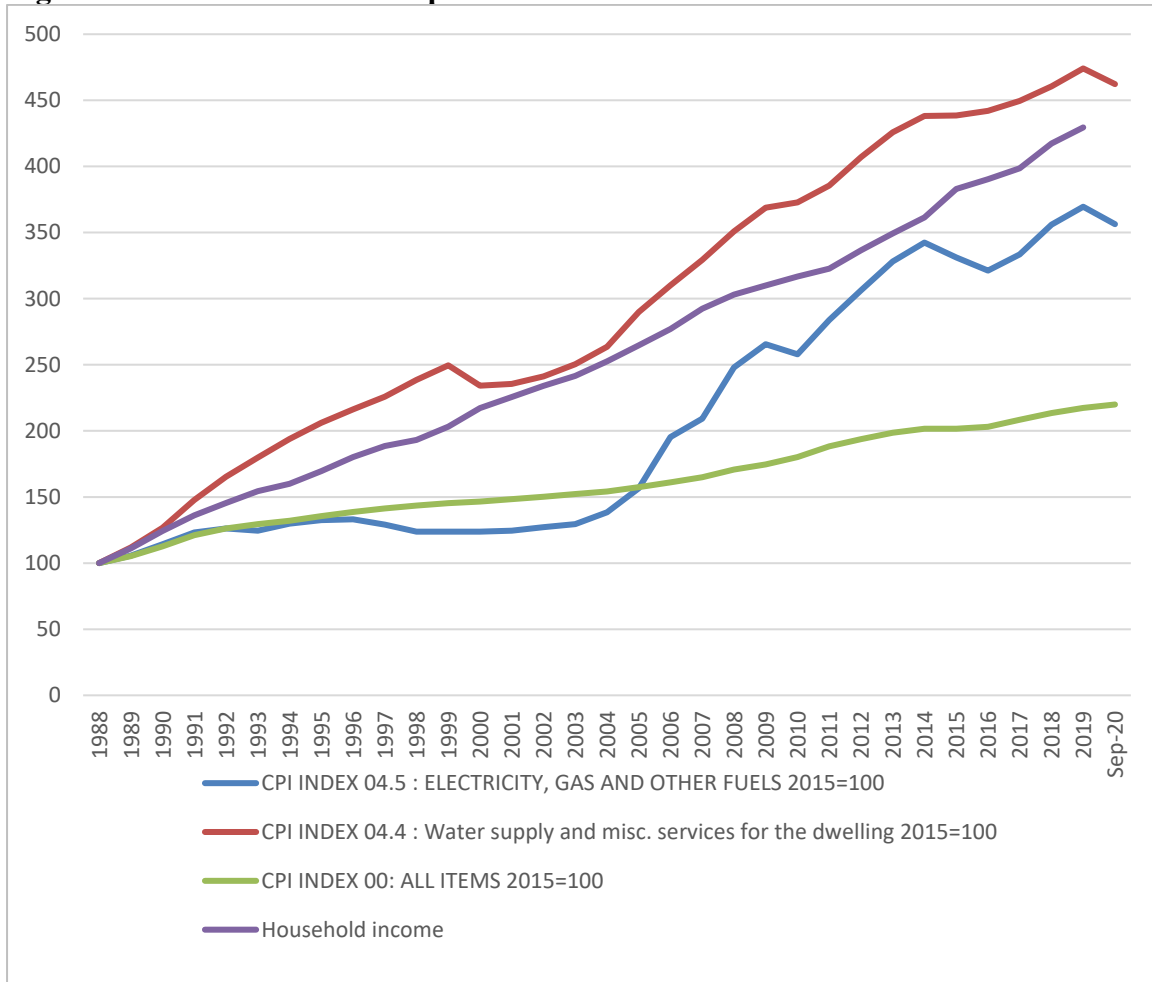


Figure 2: Factors increasing the costs of water treatment and supply

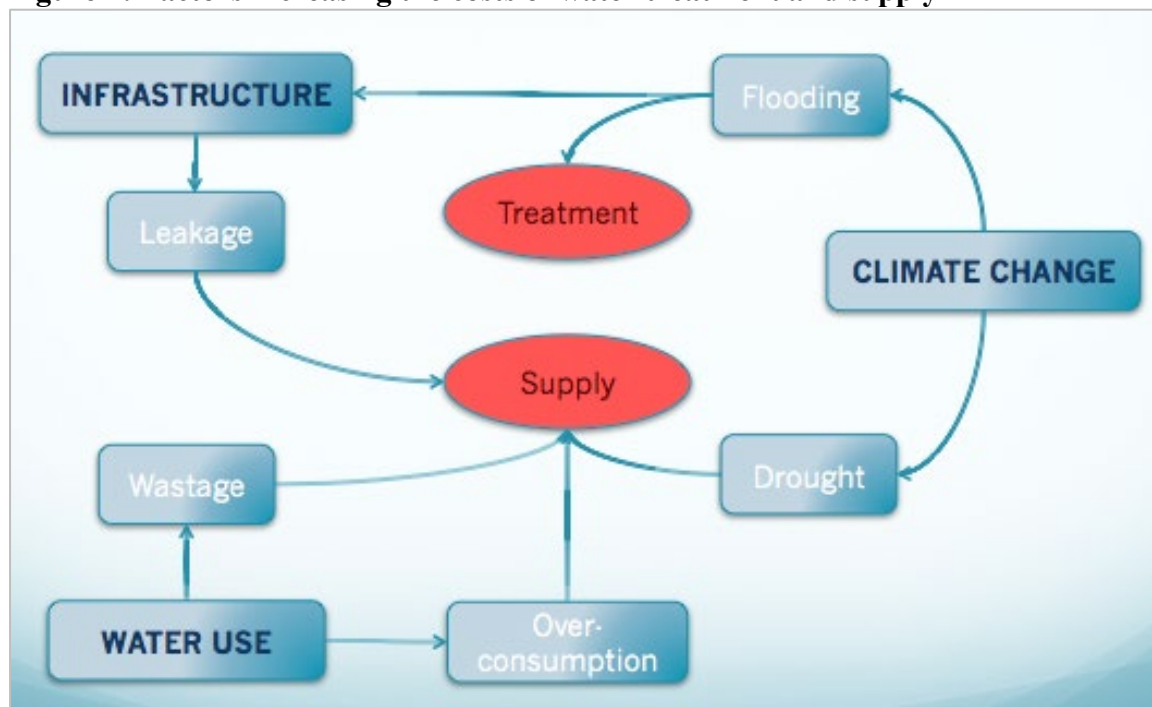
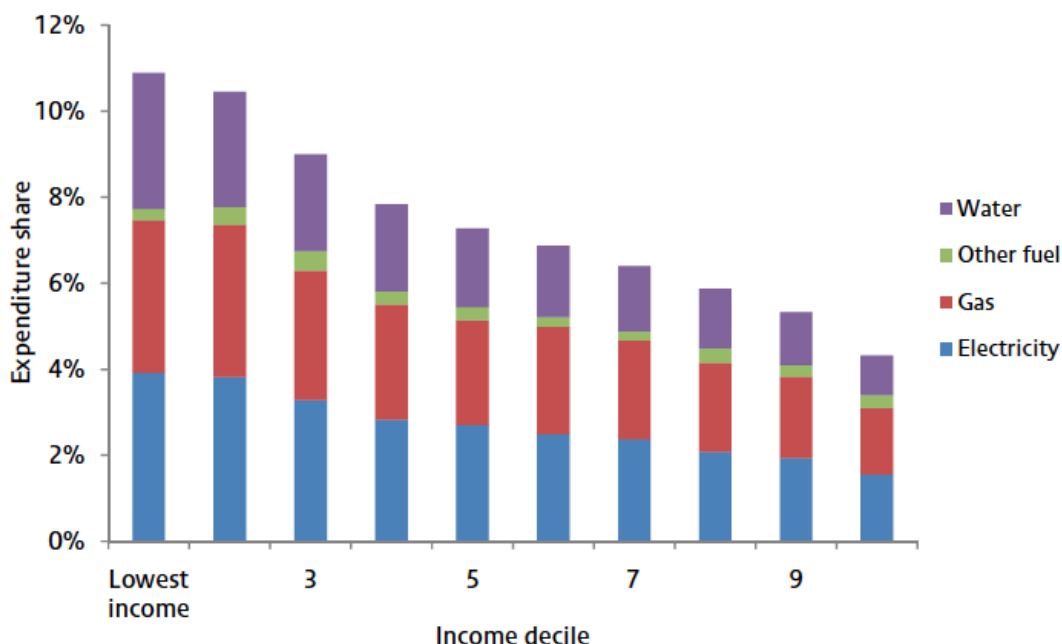


Figure 3: Shares of spending on fuel and water in 2009⁵ (Levell & Oldfield 2011)



(Based on ONS Living Costs and Food Survey)

This paper reviews the current state of and future prospects for water poverty in England and Wales, based on the secondary analysis of the Family Resources Survey (FRS) (2018/19), the latest available. The FRS is not the only source of data on water bills but as OFWAT⁶ argued “We assessed several sources of information for our indicator, and concluded that the FRS would be the most appropriate choice. The survey has a large sample size, and includes detailed information on benefits, water bills, metering, water debt, and household demographics. The survey runs every year, so we can also track changes over time. The advisory group agreed that this survey was the most appropriate choice, though they recommended examining other surveys in further work.”

There is no official definition of water poverty, or how it should be measured. By convention households have been defined as water poor if they spend more than three per cent of their income on water bills. OFWAT discusses the limitations of this definition but acknowledges its usefulness in identifying trends and patterns in water affordability. The Consumer Council for Water⁷ and OFWAT also use an additional measure - the percentage of households spending more than five per cent of their income on water bills. The numerator is the household water bill and the denominator is calculated as net household income after housing costs but before water payments.

Of course, the 3% and 5% thresholds are conventions without any particular scientific merit, though 3% was endorsed by the UN in 2013 and has some support from the Minimum

⁵ Levell, P. and Oldfield, Z. (2011) The Spending Patterns and Inflation Experience of Low-Income Households Over the Past Decade, Commentary 119, London: Institute for Fiscal Studies.

⁶ OFWAT (2011) Affordability and Debt 2009/10 Current evidence http://www.ofwat.gov.uk/future/customers/metering/affordability/pap_tec201105affevid.pdf

⁷ Snell, C. and Bradshaw, J. (2009) Water Affordability in England and Wales: A report prepared for CCWater <http://www.ccwater.org.uk/server.php?show=nav.444>

Income Standard estimate for water.⁸ One obvious criticism of these thresholds is that they take no account of consumption. A household may not be spending more than 3% or 5% because they are trying to reduce their bills (if on a water meter) and may be risking their health and well-being as a result. Alternatively, a poor or non-poor household may be in water poverty unnecessarily because they are behaving wastefully. It might be possible to combine an estimate of consumption adequacy using both a share of total expenditure and an estimate of an amount needed to be spent for healthy living. This amount would of course need to vary by household size and type and, possibly, water region, to take account of price differences. Certainly, the introduction of a consumption level has been recommended for the definition of fuel poverty. The constraint in the case of water is that only half of households are metered.

Equivalisation

There is a debate about whether or not the income denominator should be equivalised to take account of household composition. The independent advisory committee to the OFWAT review concluded that it should not be. The Hills Review⁹ of fuel poverty, supported equivalisation of income if spend was also adjusted depending on household composition. It is an important issue because whether income is equivalised or not makes a difference to the characteristics of households defined as in water poverty, as we shall see below. One aspect of the argument is that if we are to equivalise the denominator – income, should we not also equivalise the numerator – spending on water? There are a number of arguments against equivalising the numerator. One is that we do not know what the equivalent needs for water of different sizes and compositions of household are. Another is that water rates already vary to some extent by house size/value, and therefore, at least to some extent, household size. This is not the case with fuel expenditure. In this analysis we compare the results using equivalised and non-equivalised household income. We used the standard modified OECD scale to equivalise.

The data have been adjusted to the average of 2018/19 and the sample responses are weighted to match the population.

Current state of water poverty

In 2018/19 21% of households paying for water in England and Wales were spending more than 3% of their income on water and sewerage and 10% were spending more than 5% of their income. We have also estimated an average *water poverty gap* – that is for those spending more than 3% and 5% on water how much their bills need to fall to be lifted out of water poverty. Our best estimate is that the mean gap at the 3% threshold is £5.43 per week (median £3.13) and at the 5% threshold it is a mean of £7.73 (median £3.90).

Table 1. shows that since 2008/9 the water poverty rates have fallen slightly but the water poverty gaps have increased. The latter is also the case for general poverty.

Equivalising income makes only very small differences to the overall water poverty rates and poverty gaps. However, as we shall see it makes much larger differences to the composition of those in water poverty.

⁸ NEA Discussion Paper (2019). Water Poverty: A Common Measurement.

⁹ Hills, J. (2011) Fuel poverty: the problem and its measurement, CASE Report 69.

Table 1: Comparison of water poverty rates and water poverty gaps 2008/9, 2017/18 and 2018/19

	Income not equivalised		Income equivalised	
	Water poverty at the >3% threshold	Water poverty at the >5% threshold	Water poverty at the >3% threshold	Water poverty at the >5% threshold
Rate in 2008/9	23.6%	11.5%		
Rate in 2017/18	21.9%	10.0%		
Rate in 2018/19 ¹⁰	21.1%	10.0%	20.3%	9.0%
Gap in 2008/9	£3.46	£3.62		
Gap in 2017/18	£4.75	£6.48		
Gap in 2018/19	£5.43	£7.73	£5.71	£8.79

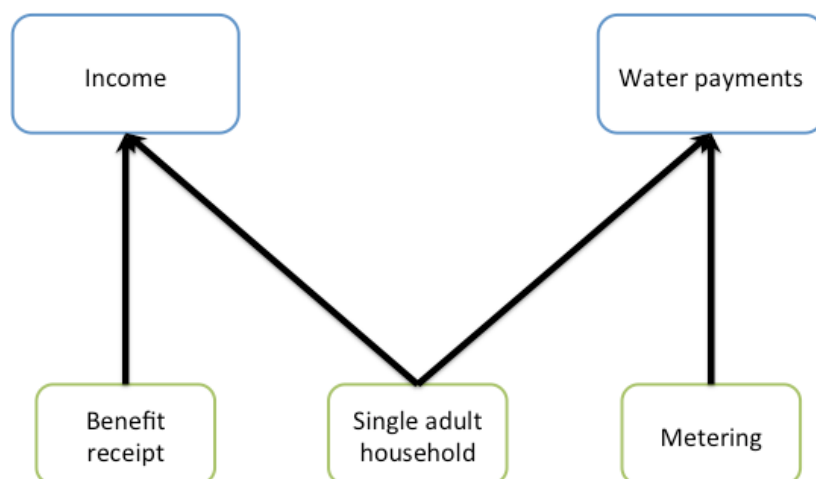
Source: Own analysis of the Family Resources Survey

We know from previous research¹¹ that water poverty rates vary with a number of household characteristics. Here we concentrate on three key factors that have significant impacts on water poverty rates on the grounds that they are important and potentially policy relevant:

- Household type
- Benefit status
- Water metering

Of course, these three factors interact (Figure 4). We should expect benefit receipt and household type would have an impact on the income denominator of water poverty, while household type and having a water meter will have an impact on the numerator water payment when these factors are associated with lower water use.

Figure 4: Interactions between components and determinants of water poverty causing lower water bills



¹⁰ This is for single unit households if we include multi-unit households the rates are: unequivalised @3%=18.9%; @5%=8.9%. Equivalised @3%=21.2%;@5%=9.1%.

¹¹ Huby, M. (1998) Social Policy and the Environment, Buckingham, Open University Press.

Huby, M. (1995) Water poverty and social policy: a review of the issues for research. Journal of Social Policy, 24, 219-236

Household type

Table 2 shows that both 3% and 5% water poverty rates vary by the type of household, with single and lone parent households having higher water poverty rates than couples and multi-unit households in England and Wales. The impact of equivalising income completely changes this picture. The income of singles increases and the income of couples remains the same while the income of singles and couples with children and multi-unit households falls. The result is that single parent families, couples with large families and multi-unit households are now most likely to live in water poverty. The probability of a lone parent with one child being in water poverty at the 3% threshold unequivalised income is 44.9% while that of a childless couple is only 13%.

Table 2: Water poverty rates by household type (England and Wales 2018-19)

Household type	Unequivalised income		Equivalised income		% of household type in population
	% spending over 3% income on water	% spending over 5% income on water	% spending over 3% income on water	% spending over 5% income on water	
One adult only	37.2	19.5	19.2	10.4	22.7
One adult with 1 child	44.9	20.6	36.5	13.9	1.9
One adult with 2 children	36.8	11.5	42.7	13.3	1.4
One adult with 3 or more children	27.2	7.0	50.2	16.2	0.8
One family couple with no children	13.0	5.5	13.1	5.6	23.3
One family couple with 1 child	13.7	5.5	17.9	8.1	5.6
One family couple with 2 children	12.6	6.4	23.8	10.3	6.3
One family couple with 3 or more children	12.7	5.0	41.8	15.3	2.6
Multi-family household	11.2	5.0	24.0	9.4	35.4
Total	18.9	8.9	21.2	9.1	100

The presence of only one adult in the household has the biggest effect on unequivalised water poverty so in Table 3 we distinguish between one adult (including lone parent households) and other households. A single adult household is more than three times more likely to be in unequivalised water poverty. Only 12.2% of households without a single adult are in water poverty at the 3% threshold.

Table 3: Water poverty rates by whether single adult household (England and Wales 2018/19)

Single adult household	Unequalised income		% of households in population
	% spending over 3% income on water	% spending over 5% income on water	
Yes	37.4	18.8	26.8
No	12.2	5.3	73.2
Total	18.9	8.9	100.0

In the case of equalized water poverty, Table 2 indicated that having dependent children was a risk factor. Table 4 shows that having children in the household nearly doubles the risk of being in equalized water poverty. Only 17.8% of those without children in the household are in water poverty at the 3% threshold.

Table 4: Water poverty rates by whether dependent children in the household (England and Wales 2018/19)

Children in household	Equalised income		% of households in population
	% spending over 3% income on water	% spending over 5% income on water	
Yes	30.0	11.6	27.9
No	17.8	8.1	72.1
Total	21.2	9.1	100.0

Benefit status

Households dependent on income-tested benefits are defined here as receiving Income Support, Pension Credit, income-based Job Seeker's Allowance or income-related Employment Support Allowance (ESA), Child Tax Credit and Universal Credit. This gives us the water poverty rates shown in Table 5. There is a much higher rate of water poverty among benefit-dependent households.

Table 5: Water poverty rates by income deprivation (England and Wales 2018-19)

Benefit-dependent	Unequalised income		Equalised income		% of households in population
	% spending over 3% income on water	% spending over 5% income on water	% spending over 3% income on water	% spending over 5% income on water	
Yes	29.9	12.2	38.4	14.6	35.6
No	17.7	8.2	18.3	7.6	64.4
Total	22.0	9.6	25.4	10.1	100.0

Water meters

Our analysis of the Family Resources Survey 2018/19 found that 48.1 per cent of households in England and Wales were metered, (though 7.3% of households did not respond - perhaps indicating that they did not know whether they were metered or not.) This is a big increase on the 36 per cent found in 2008/9. Table 6 gives the water poverty rates for metered and unmetered households in 2018/19. The picture is quite complicated. Metered households have a slightly lower rate of water poverty despite the fact that their mean spending on water is slightly higher. This is partly because their bills are much more variable than unmetered customers (indicated by the standard deviation). The median bill of metered households is slightly lower than unmetered households. Having a water meter for existing customers is usually a matter of choice. Households who are likely to have lower bills with a meter than with rates-based charges are more likely to have opted for a meter. Second households with a meter may be more conscious of how they use water and may reduce their consumption to save costs. The Covid lock down is likely to have driven up the bills for water for metered but not unmetered customers who have spent more time at home.

Table 6: Water poverty rates by metering (England and Wales 2018-19)

Water bills	£ Mean (SD)	£ Median	Unequalised income		Equalised income	
			3% threshold	5% threshold	3% threshold	5% threshold
Metered	8.76 (18.07)	6.94	16.5	7.7	18.5	8.6
Unmetered	8.19 (4.00)	7.89	18.8	8.6	21.8	8.3

Modelling the probability of water poverty

The combined effects of household type, benefit dependency and metering are explored using a logistic regression model to predict the probability of households being in water poverty. The best fitting model parameters are shown in Table 7. Predictor variables are all coded (1=Yes; 0=No). Each predictor is significant.

The odds ratios show that, all else being equal, households with only one adult have odds of water poverty that are almost four times higher than the odds for larger households; those receiving benefits are one and a half more likely to be water-poor than non-benefit households; and metered households are only three-quarters as likely to be water-poor as households charged for water on the basis of rateable values.

Table 7: Logistic regression model to predict water poverty at the 3% threshold (England and Wales 2018/19). Income unequalized.

	B	S.E.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
One adult in household	1.368	.001	3.928	3.918	3.938
Income related benefit receipt	.520	.001	1.682	1.678	1.687
Metered water	-.335	.001	.715	.714	.717
Constant	-1.857	.001	.156		

Cox & Snell $R^2 = 0.083$; Nagelkerke $R^2 = 0.130$

The models can be used to estimate the probability of different household types being in water poverty in 2018/19. For example the model equation for is $P(\text{water poverty}) = 1/(1 + e^{-Z})$ where $Z = (-1.86 + 1.37 (\text{one adult}) + 0.52 (\text{benefit receipt}) - 0.335 (\text{metered}))$.

Table 8 presents the same results at the 5% threshold and Tables 9 and 10 present the same results but using equivalised income and households with dependent children instead of one adult households.

Table 8: Logistic regression model to predict water poverty at the 5% threshold (England and Wales 2018/19). Income unequivalized.

	B	S.E.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
One adult in household	1.413	0.002	4.108	4.094	4.122
Income related benefit receipt	0.240	0.002	1.272	1.267	1.276
Metered water	-0.359	0.002	0.698	0.696	0.701
Constant	-2.827	0.002	0.059		

Cox & Snell $R^2 = 0.041$; Nagelkerke $R^2 = 0.091$

Table 9: Logistic regression model to predict water poverty at the 3% threshold (England and Wales 2018/19). Income equivalized.

	B	S.E.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
Dependent children in household	0.501	0.001	1.650	1.646	1.654
Income related benefit receipt	0.917	0.001	2.502	2.496	2.508
Metered water	-0.218	0.001	0.804	0.802	0.806
Constant	-1.580	0.001	0.206		

Cox & Snell $R^2 = 0.059$; Nagelkerke $R^2 = 0.087$

Table 10: Logistic regression model to predict water poverty at the 5% threshold (England and Wales 2018/19). Income equivalized.

	B	S.E.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
Dependent children in household	0.422	0.002	1.525	1.520	1.531
Income related benefit receipt	0.634	0.002	1.886	1.880	1.892
Metered water	0.052	0.002	1.053	1.050	1.057
Constant	-2.718	0.002	0.066		

Cox & Snell $R^2 = 0.014$; Nagelkerke $R^2 = 0.030$

Table 11 shows that unmetered, one-adult households in receipt of benefits have the highest probability of being in water poverty (0.51). Larger households not on benefits and paying for water on a metered basis have the lowest probability of being water poor (0.10).

Table 11: Probability of different types of household being in water poverty in England and Wales in 2018/19. 3% threshold unequivalised income

Metered water bills	Benefit receipt	One adult in household	% of total households	Probability of water poverty
0	0	0	25.1	0.13
0	0	1	6.4	0.38
0	1	0	14.0	0.21
0	1	1	6.8	0.51
1	0	0	24.7	0.10
1	0	1	10.4	0.30
1	1	0	7.5	0.16
1	1	1	5.1	0.42

Predicting future water poverty in England and Wales

Low income working-age households (with a high risk of water poverty) depend on cash benefits which were frozen for four years from 2016. We do not know yet whether the £20 per week Covid uplift in Universal Credit will continue beyond April 2021. Pensioners have been protected by the triple lock. But for other households it is highly likely that real incomes will fall, especially with rising unemployment.

Turning to focus on water, we have already seen in Figure 1 that prices since privatisation have increased at a faster rate than overall prices and earnings. If this continues, even if the CPI uprating of benefits continues, water charges are going to place an increased burden on low income households. Also, maybe bills will increase for metered customers as a result of increased water use at home during lock-down.

The rate of water poverty is a function of the size of the water bill and the income of the household. So, in order to predict what is going to happen to water poverty in the future we need to predict what is going to happen to the level of water bills and to household incomes over the next 20 or so years. In almost any period in the last 60 years it would have been difficult to do this successfully, but at this time it is particularly challenging. Clearly the relationship between water charges and incomes can be very complex and may well differ for consumers with different sources of income.

We decided to model a range of simple scenarios of the possible relationship between bills and income between 2018-19 and 2033. They are:

1. Water bills will fall by 1% per year faster than average household income
2. Water bills will rise by 0% per year faster than average household income
3. Water bills will rise by 1% per year faster than average household income
4. Water bills will rise by 2% per year faster than average household income
5. Water bills will rise by 3% per year faster than average household income

The results for water poverty in 2033 are shown in Table 7. If there were no increase in water bills from 2018/19 levels, then the water poverty rate would remain at 19.3% using the 3% water poverty threshold and unequivalised income and 9.1% using the 5% threshold. If water bills increased by 3 per cent per year more than income, then by 2033 the water poverty rate would affect more than a third of all households (34.2%) at the 3% threshold and nearly 17% at the 5% threshold. **This is holding all other factors constant.**

Table 7: Water poverty rates in 2033 given various year on year changes in bills relative to income from 2018/19. Percentage of households spending more than the threshold of income on water bills: England and Wales

Water poverty threshold (% of income spent on water)	Water bills rise faster than average income by:				
	-1% pa	0% pa	1% pa	2% pa	3% pa
Unequalised income					
3% threshold	15.6	19.3	23.7	28.8	34.2
5% threshold	7.5	9.1	11.0	13.7	16.6
Equalised income					
3% threshold	16.7	21.6	27.0	32.9	39.8
5% threshold	7.2	9.2	11.3	14.3	18.1

Future changes in household structure and metering

Table 2 has shown that an important factor associated with water poverty is household structure. The Office for National Statistics publishes Household Projections for England to 2043¹². The percentage of single adult households in England is projected to rise fastest but the number of households with children will also increase. These changes in household size will increase the water poverty rate, given single person households have a higher rate of water poverty, at least using unequalised income. However, this will interact with changes in water metering.

All water companies have been increasing water metering. The Environment Agency claimed that water metering had reached 50% in 2017 with substantial variations in that proportion between water Companies¹³ and that is roughly what we found. OFWAT claims “You may save money if you switch to a water meter. The amount you may save depends on: how much you pay now, the number of people living in the property and how much water you use”.¹⁴ Even if metered households reduced their consumption, the extent to which their bills would decrease depends on the charging tariffs in place and how these compare to local charges based on rateable values. In general, households with low usage and high rateable values would have lower water bills if they paid on a metered basis. Larger families with higher usage would seem to be less likely to benefit from a switch. But although we know how much unmetered households pay now in rates-based water bills we do not know how much those same households would pay if their bills were metered.

Part of the variation in the bills of metered and unmetered consumers is due to differences in their characteristics and behaviour. One-adult households in England and Wales in 2018-19 were more likely to have a water meter (56.2%) than say multi-unit households (38.7%). OFWAT¹⁵ reports that customers living on their own were more likely to have asked for a water meter, suggesting those who opted to switch to meters did so to save money. Households receiving income related benefits are less likely to be metered (26.4%) than those not receiving income related benefits (39.9%).

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<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/dataset/householdprojectionsforengland>

¹³ <https://questions-statements.parliament.uk/written-questions/detail/2017-12-21/121058>

¹⁴ <https://www.ofwat.gov.uk/households/your-water-bill/metering/>

¹⁵ Ofwat (2011) Exploring the costs and benefits of faster, more systematic water metering in England and Wales. Birmingham, Office of Water Services.

Implications for policy

What could be done to mitigate water poverty and the expected increase in water poverty? Water poverty can be mitigated by increasing income or reducing bills. There is really nothing that the water industry can do about increasing income. We have to look to employment, earnings and benefits to do that and for all three the immediate outlook is pretty bleak. So, reducing prices and bills looks to be the best hope. There is one extant example of government action to reduce bills in the tax funded reduction in bills to water consumers in the South West Region. The only other methods are control of prices by regulation (or state subsidy) or measures by the industry such as WaterSure or social tariffs. WaterSure is already quite well targeted if you have a meter, in that it restricts bills to the average for the region for people on income tested benefits or who have three or more children or a medical condition. Social tariffs vary by water company and it would be worth assessing the extent to which they are well targeted. These are inevitably constrained by the fact that they involve cross subsidy between consumers. Also, to benefit from WaterSure consumers need to possess a water meter.

Metering: extending metering can be expected to reduce bills. The majority of unmetered households are single adult households or childless couples, who might be expected to use less water than their rateable value-based bills has them paying for. Also, there is evidence that households reduce their consumption after having a meter installed. Single adult households are also at higher risk of water poverty (using unequivalised income). An offsetting factor however is that those already metered are more likely to be those who would save as a result of having a meter and the consumers still to be metered are likely to be larger consumers with higher bills. However, they are also less likely to be at risk of water poverty. Of course, extending metering will cost the water companies— from lost revenue of reduced charges/consumption and the costs of installing and reading meters. But they could also save by identifying leaks.

Tariffs: If more consumers had meters it would be possible to reform water tariffs further. At present water tariffs are regressive due to the standing charge. Small consumers pay more per unit. Standing charges are justified by arguments about fixed costs and the need for charges to reflect marginal economic costs. We are not convinced by these arguments. Social and environmental arguments would support the abolition of standing charges.¹⁶ Indeed, it might mitigate water poverty if there were lower charges for the first x% of water consumed each quarter. In an ideal world we would provide a tranche of clean water free of charge, the next tranche would be charged at a basic rate and then we would charge a really high tariff for water use above a certain level, penalising those who use drinking water to clean cars or water their gardens. The problem of course is how to establish the cut-off points. The tranches would need to vary by household size and ideally also by household resources. Water companies don't know the household size or resources of their customers. Not indeed do they know how much non metered customers, about half, consume.

¹⁶ Hills, B., Huby, M. and Kenway, P. (1997) *Fair and Sustainable: Paying for Water*. London, New Policy Institute.