rainwater harvesting

what is it?

Harvesting of rainwater is simply the collection of water for domestic or commercial use that would otherwise go down the drain. Various techniques have been practised for thousands of years to collect and store water, especially in areas of low rainfall. Today, rainwater harvesting systems can be installed in both new and existing buildings and can range from a quick, cheap water butt to a more complex system. Rainwater can be used for the garden, washing the car, showering, flushing the toilet, the washing machine, and even drinking if treated with UV light.

water butt: the simplest collection method is a rainwater butt connected via a diverter such as a rainsava (see below) to a downpipe from the roof - water collected can be used on the garden, using a watering can.

rain harvesting system: in a typical rainwater system water is collected from the roof and taken via pipes to a storage tank. A filter removes leaves and other debris and a settlement tank allows small particles to sink to the bottom; floating debris is skimmed off the surface via an overflow pipe, and clean water extracted from just below the surface. Water can be pumped directly from the tank to appliances or to your loft header tank. A float switch in the tank will automatically top up with mains water if the level is too low

drinking water: rainwater can be used for drinking if you install a UV sterilisation unit; the unit is switched on permanently and uses c. 40 watts. This unit will need two filters before the water reaches it – 25 and 5 microns, otherwise micro-organisms can 'hide' behind particles.

rainsava: *can be insterted into your downpipe (round or square) to divert rainwater into a water butt; available online or from garden centres.*

UK region	average rainfall (mm)
N Scotland	1671
E Scotland	1135
W Scotland	1732
E & NE England	755
NW Eng & N Wales	1291
Midlands	785
East Anglia	606
SW Eng & S Wales	1247
S & SE England	776

annual rainfall: *above are the average annual rainfall figures for the last 30 years; use these figures in conjunction with the table on page 2 to find the volume of water you can expect to collect. source: Met Office*

what are the benefits?

- rainwater collection removes the need for the energy and chemicals used to produce pure drinking water - unnecessary if all we're going to do is clean the car with it or flush it down the toilet.
- it also reduces the need for the pumping of mains water, and the energy use, pollution and CO_2 emissions that go with it.
- it reduces demand on rivers and groundwater: the WWF recently reported that over-extraction by water companies is damaging Britain's wetlands and trout rivers. The problem is most acute in the south-east, where population is increasing and millions more houses will soon be built. 86% of an average household's water needs can be met by collecting rainwater, without further purification (33% for washing, 25% for toilet flushing, 22% for car washing and 6% for the garden).
- other benefits: rainwater is soft, and leaves no limescale; washing clothes in soft water

requires less detergent and so reduces water pollution from these compounds; plants love rainwater; it doesn't contain chlorine, which is thought to be carcinogenic; large-scale collection of rainwater can reduce run-off and therefore the risk of flooding.

what can I do?

First, cut your water use: average UK per capita domestic water use is around 55m³/year (160 litres / day). This can easily be cut to less than 30m³/year by installing low-flush toilets (or better still, compost loos), getting rid of the dishwasher, fixing dripping taps, washing the car less often, and having showers instead of baths (especially if you share with a friend). Then find the rainfall figures for your area (see table on p.1) and your roof area, and check the table below to see how much water (in m³) you can expect to collect per year. For an average property with average rainfall, you should be able to get around 100m³. Water is metered at between £1-2 per m³ (this will go up – prices have already risen 50% since privatisation). If you're not metered, your water supplier is obliged to install one for free (currently around 25% of UK households are metered).

Maybe rainwater harvesting is something you want to do regardless of length of payback time, but in certain circumstances, it could be quite a cost-effective thing to do. If you can house a 1.5m³ storage tank in a garage or cellar, you won't need a submersible pump, and you could buy your kit for around £1000. Then if you are handy with plumbing you could install yourself. Otherwise your tank will be underground and costs will be around £1500 for the system and £1000 for installation.

Some routine maintenance is required, such as cleaning the filters three times a year, keeping gutters clear, and checking everything once a year to see if it is working properly. Decide if you want the water from your tank to be pumped to your loft tank or direct to your appliances (cheaper) – seek advice from suppliers / installers (see below).

There are no UK regulations concerning rainwater use for toilets, washing machines and gardens, though the back-up from the mains must be in accord with standard regulations.

If you are far from mains water, or don't fancy chlorine or fluorine in your drinking water, a UV unit costs around £500, and you have to change the bulb each year (c. £40).

	roof area m²				
mm rain/yr	**50**	**75**	**100**	**125**	**150**
600	18	27	36	45	54
800	24	36	48	60	72
1000	30	45	60	75	90
1200	36	54	72	90	108
1400	42	63	84	105	126
1600	48	72	96	120	144

expected volumes of water collected *in cubic metres can be found by checking your average rainfall (see page 1) against your roof area.*
source: Environment Agency

resources

- books below available from LILI
- *Rainwater Harvesting: the collection of rainfall and runoff in rural areas*, Arnold Pacey & Adrian Cullis
- *the Texas Manual on Rainwater Harvesting* – free download
- Environment Agency - 01903 832073 – contact them for *Harvesting Rainwater Information Guide* and lists of suppliers
- Rainwater Harvesting Association - ukrha.org, trade association
- rainharvesting.co.uk 01452 772000 – suppliers / installers plus information on their website
- thetankexchange.com - 08704 670706 - recycled industrial fruit juice barrels
- LILI (see below) run a 'sustainable water & sewage' course including rainwater, greywater and compost toilets

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