

A photograph of a brown roof with a gutter system. Water is being collected in the gutter and is shown as multiple vertical streams falling down. The background is a bright, overcast sky. The image is used as a background for a presentation slide.

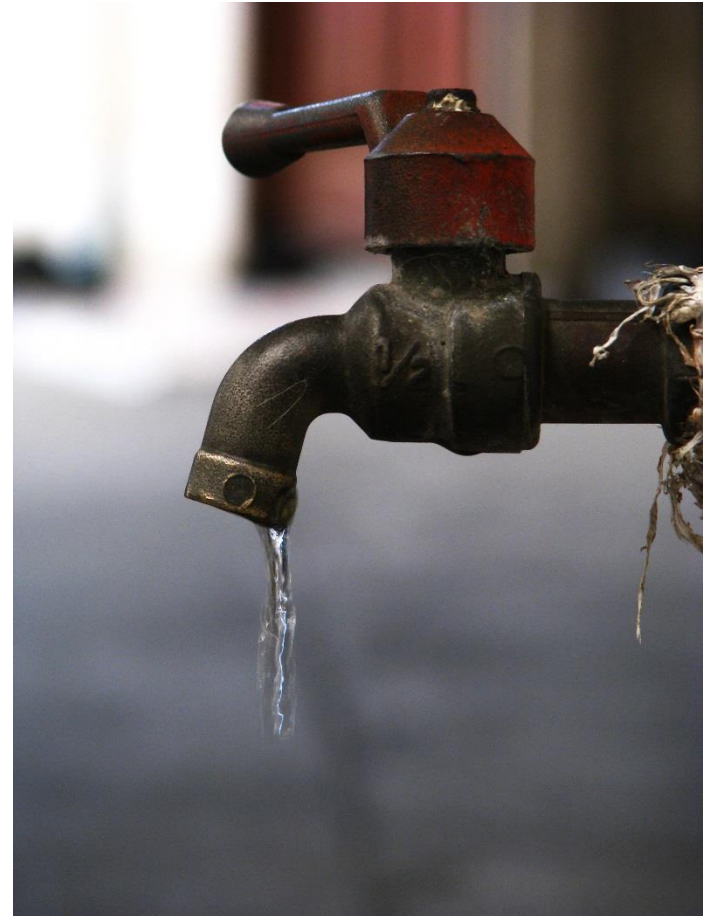
Water Harvesting for Allotments

Nick Jackson

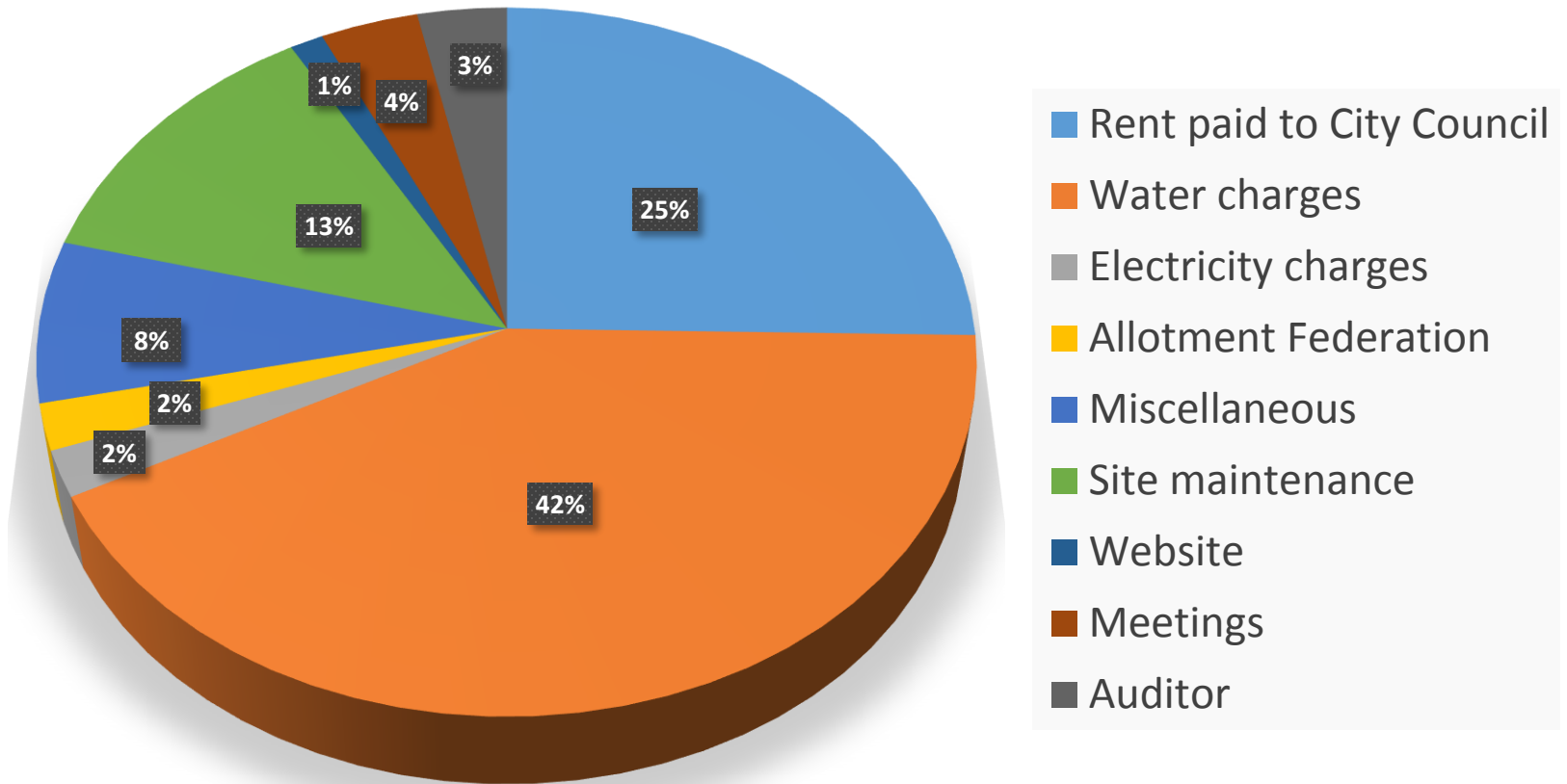
Osney, St John & New Botley Allotment Association

Why collect water?

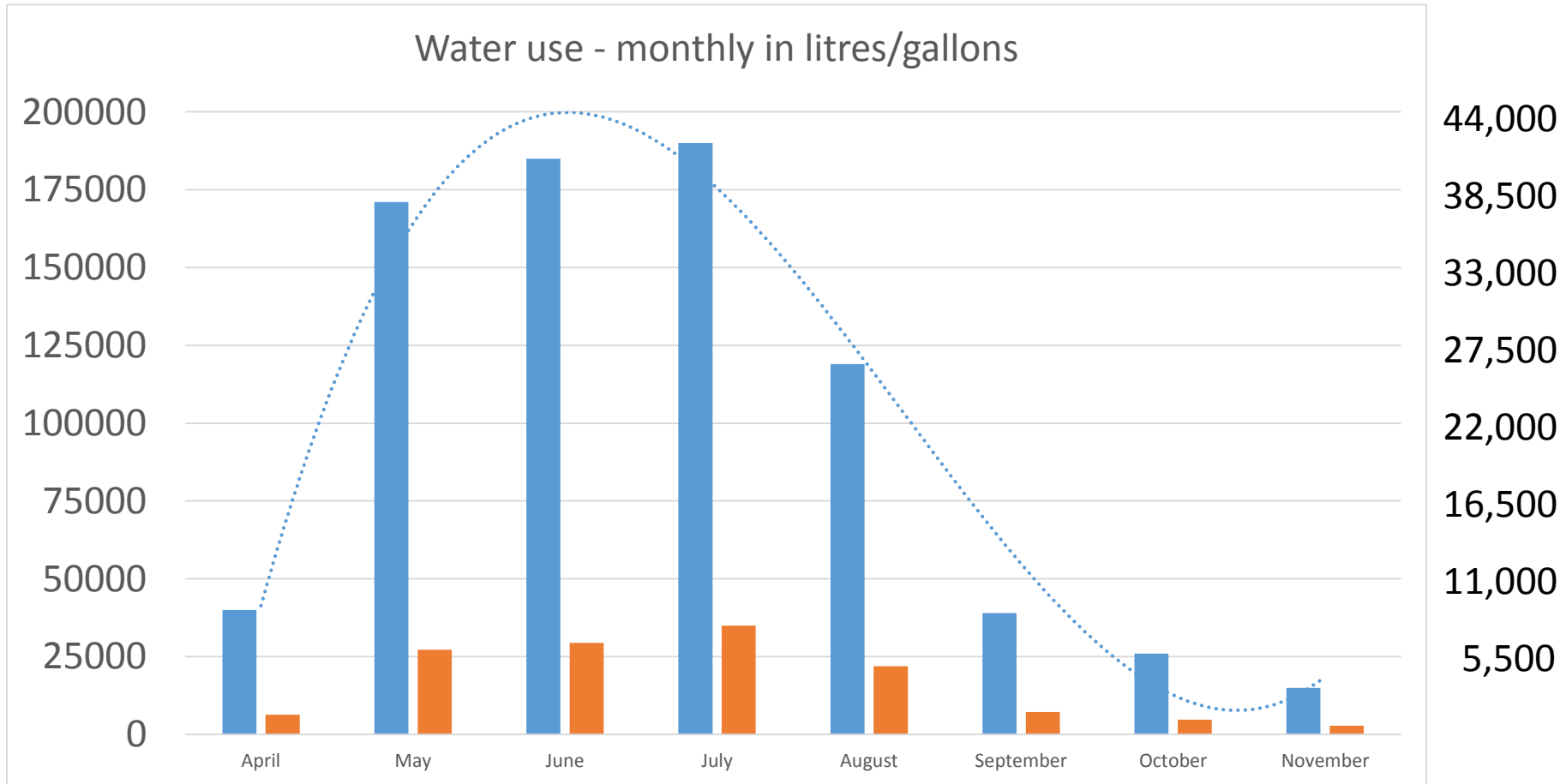
- Treated mains drinking water isn't all that great for the environment – or the allotment.
- It has to be extracted from somewhere.
- It has to be purified and then stored, before finally being pumped to where we need it.
- This requires (a) a lot of energy and (b) an inordinate volume of chemicals to treat the water.
- **AND IT COSTS A LOT!**



Water cost as a percentage of our Association budget for 2016-17



Water use by the two sites in our Association

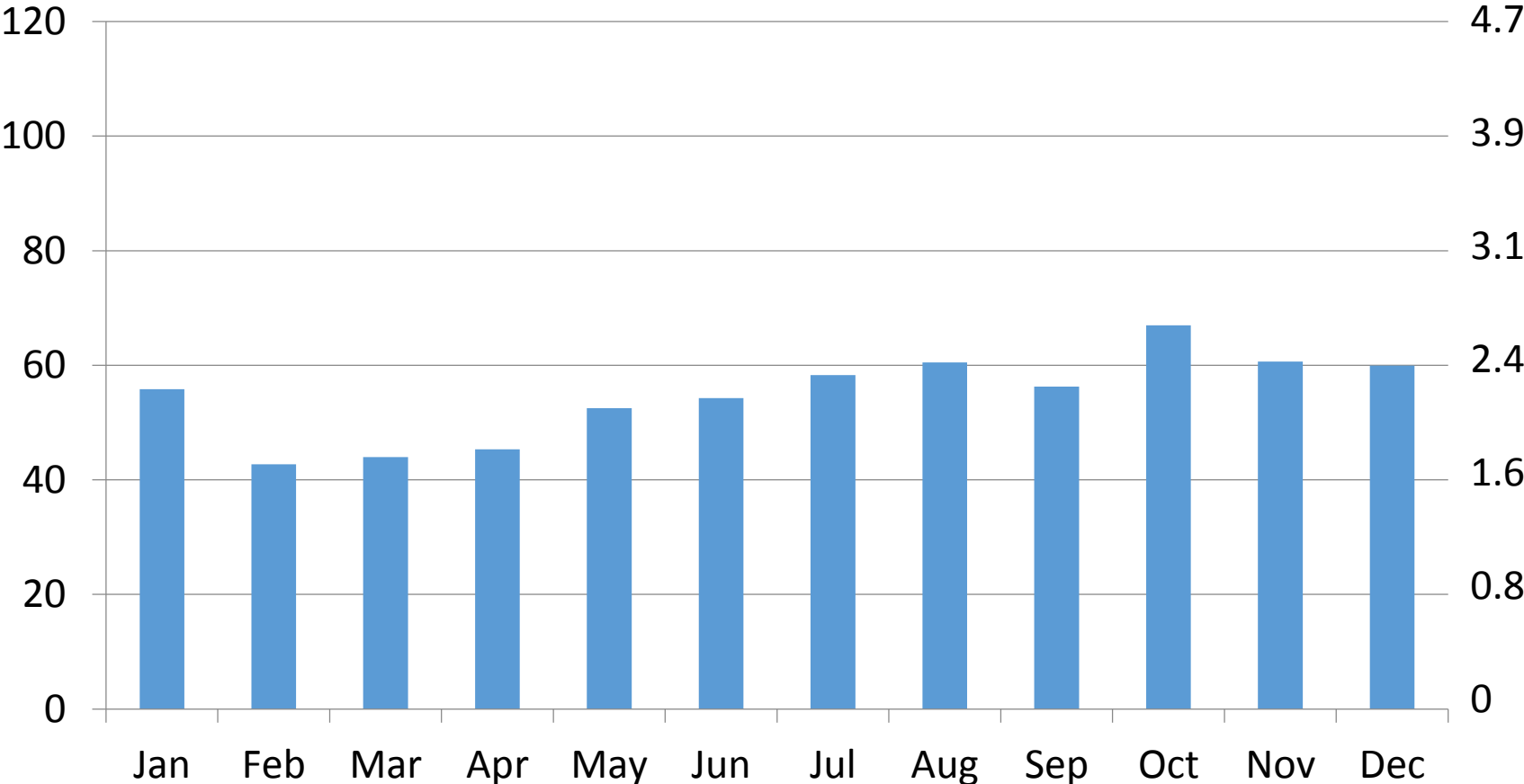


Rainfall or groundwater?

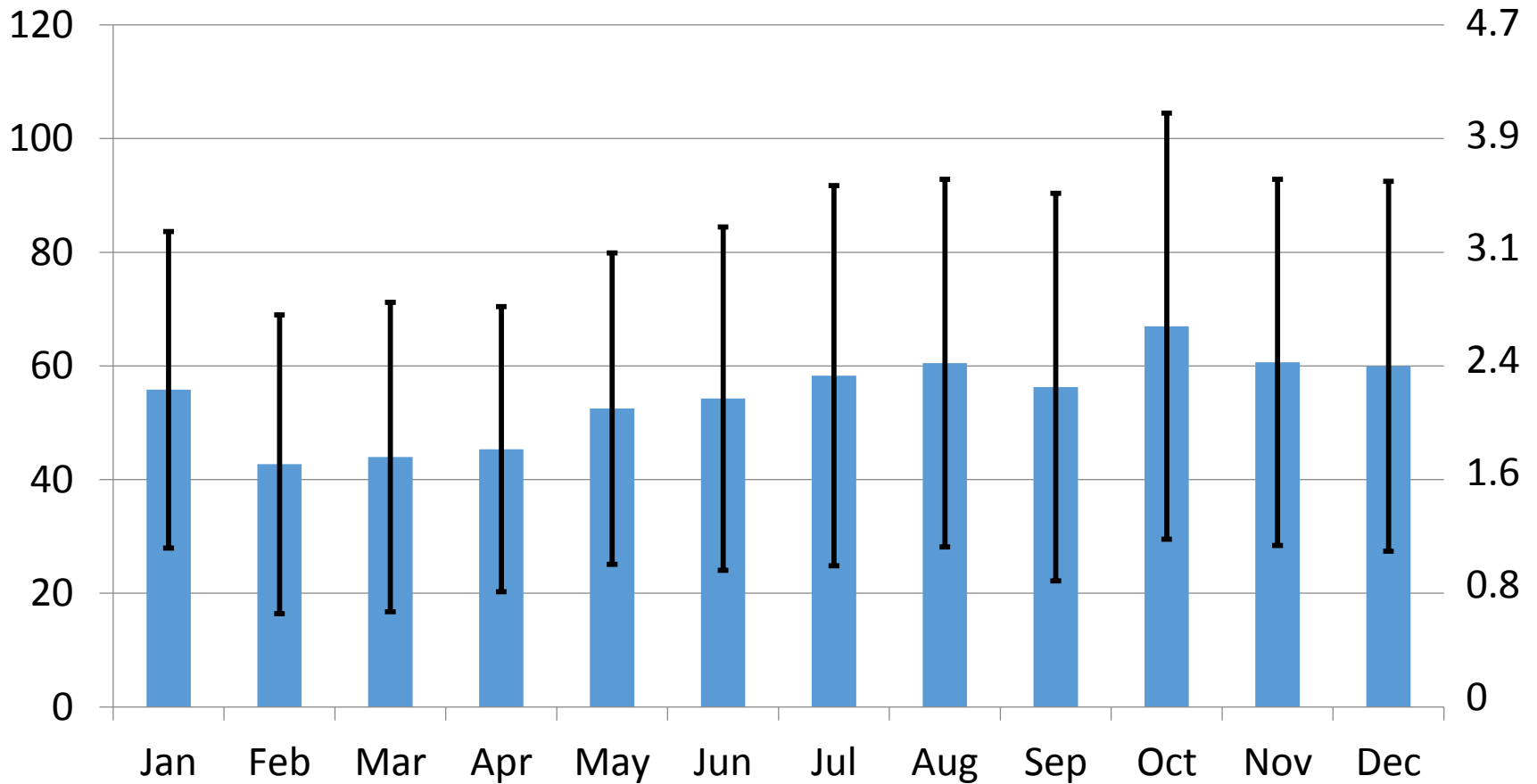
- **Rainfall:** simple to collect but can be unreliable from month to month – large storage volumes necessary to cope with drought
- **Rainfall:** few if any energy costs – usually relies on gravity
- **Groundwater or rivers:** more reliable sources for collection but start-up and maintenance costs are greater
- **Groundwater or rivers:** will require energy to pump water for storage



Oxford rainfall (mm/inches) – monthly averages 1853-2015



Oxford rainfall (mm/inches) – monthly averages 1853-2015



Collecting rainfall

- It's surprising just how much water it is possible to collect from a shed roof
- Working out this potential requires a simple calculation
- Multiply the area of your shed roof in square metres* by the average annual rainfall in millimetres
- Multiply this by 0.75 to account for evaporation and rain bouncing off the roof and you have the number of litres per year you could be collecting



Adjusted average shed roof volumes in litres:

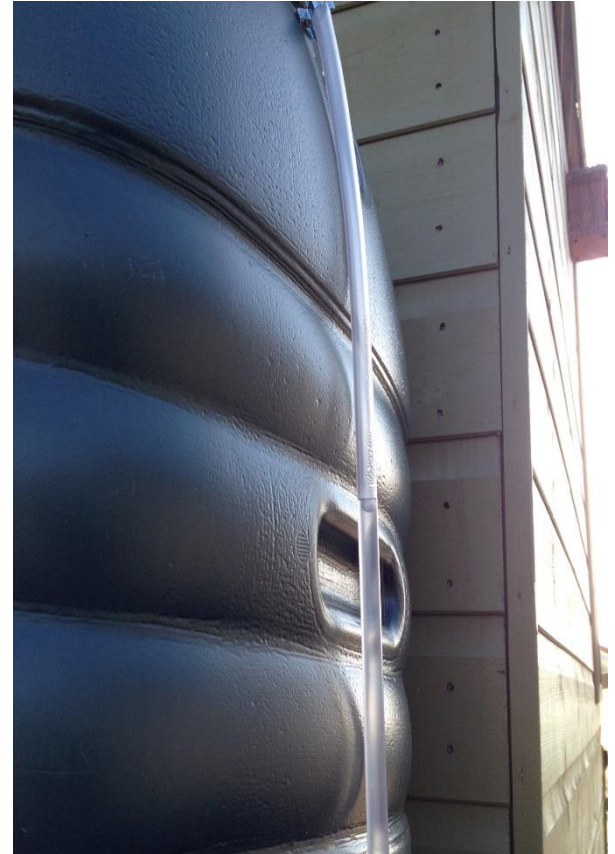
(6.5 m²)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Volume	276	211	218	225	260	269	289	299	279	332	300	297

* For imperial units, multiply your roof area in square feet by the annual rainfall total in inches. Now divide by 12 to convert to cubic feet and, as above, multiply by 0.75 to account for water loss. To convert cubic feet to gallons multiply by 6.2.

Collecting rainfall (continued)

- Water butts can be fitted to intercept a downpipe coming off the shed roof
- If you have space link several together so as one fills up the water begins to fill the next
- Covering water butts with lids will reduce contamination, stop insects from breeding and prevent it becoming clogged with algae. Covered barrels are essential for safety if younger children visit
- Try and elevate or locate water butts uphill from the growing area so that gravity will distribute the water
- Make sure the base is level and supportive as the butt will get very heavy when full



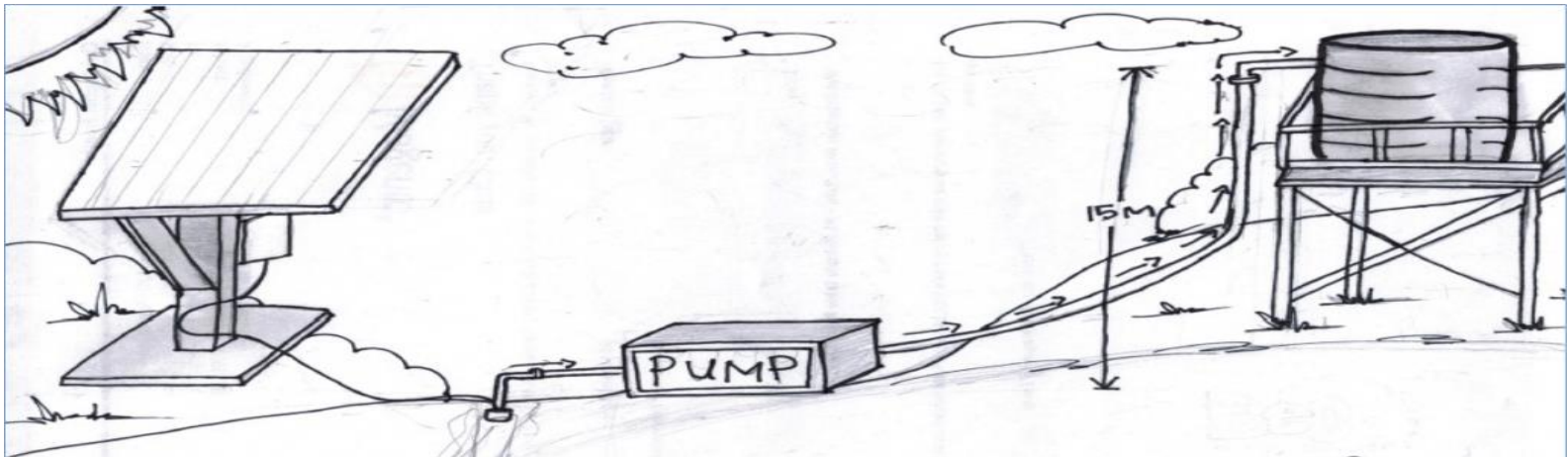
Taking water from a borehole, well or river

- So long as you get permission from the Environment Agency you will be allowed to abstract up to 20,000 litres (4,400 gal) a day
- Many 'off the shelf' solar pump systems are now available
- Solar is ideal as it will pump water during daylight hours – which matches supply to demand. If there is a cloudy or rainy spell then there is likely to be less demand for watering
- Many allotment sites in Oxford have rivers or streams nearby.
- Oxford has a shallow water table – 1m to 2m (3 to 6ft) below the surface – wells or boreholes do not need to be deep and cost is more affordable



Solar water supply – a recent example

- Totnes Allotment Society needed 4,000 (880 gal) litres of water a day pumped from a stream at the bottom of their site to header tanks at the top. A grid connection was prohibitively expensive
- Solar power was ideal – a local company designed and installed a system using a solar panel to drive an electric pump. Flow rate was measured at more than 500 litres (110 gal) per hour with the pump running for more than 12 hours per day (June) if required.



Making best use of water you collect ...

- If you have an elevated water butt or water source then you could consider using irrigation systems to increase your 'water use efficiency'
- For an initial outlay these systems last years and can cut the water you use by more than half ...
- Adding a timer allows you to water your crops just before dawn, losing little if any water to evaporation
- Last year we found using 'seeper hose' along rows more than doubled our yield of potatoes



Planned and existing water harvesting by Oxford Allotment Associations

- Cow Mead allotments have installed boreholes with hand pumps to provide water in addition to their mains supplied troughs
- Cripsey Meadow allotments harvest some rainwater from the roofs of nearby buildings and have also installed large water tanks filled from the nearby river using trash (dirty water) pumps
- Osney, St John & New Botley allotments have plans for solar powered water pumps to supply large water tanks on each of our sites and disconnect from the mains-fed network



Plot-level water harvesting – an example

- Shed built on a platform as the site is prone to deep (~1m/3ft) flooding in winter
- Raised water butts increases the water pressure
- We buried a pipe along the path with raised taps we use to fill watering cans, attach a hose or run a timer-controlled irrigation system



All groundworks by
Navy O Ceallaigh