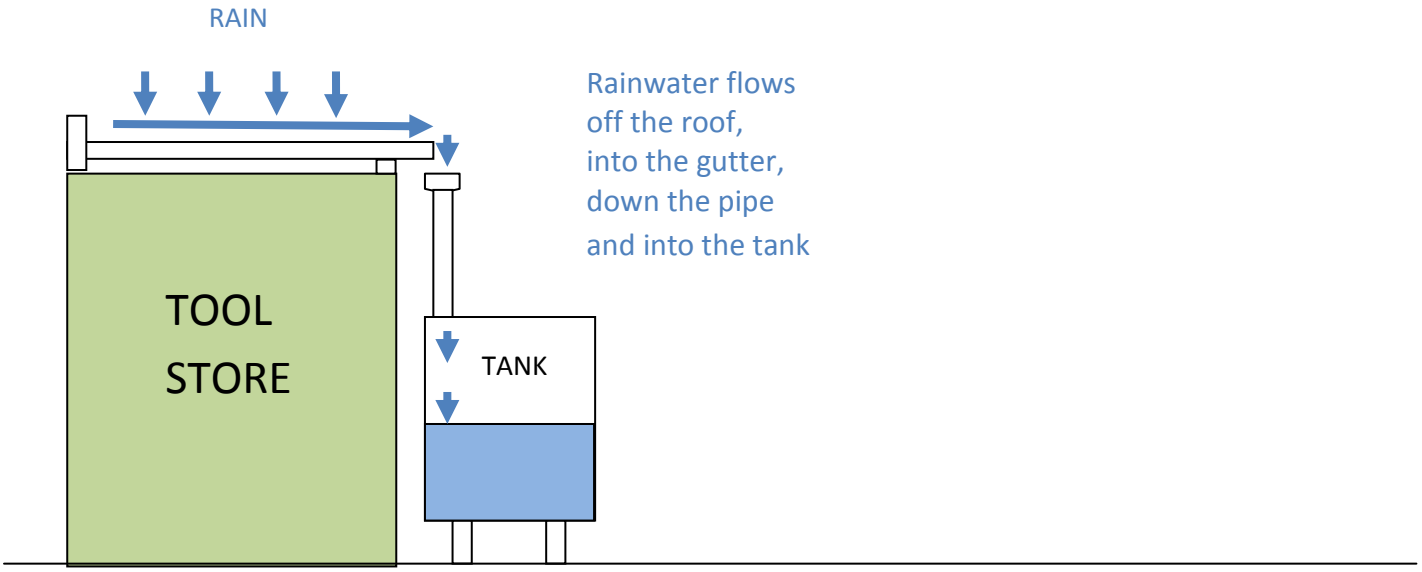
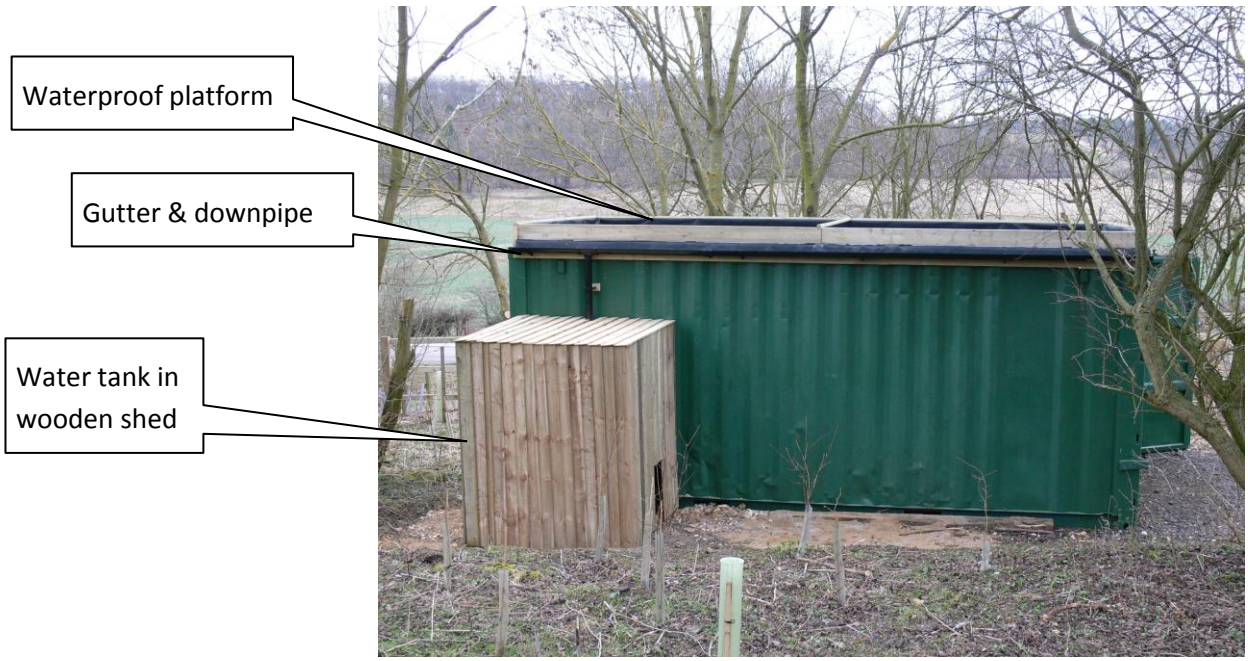
Living Roof and Rainwater Harvesting System

At The Spinney we have no mains water supply, so we decided to start collecting rainwater from the roof of our tool store.

Our **Rainwater Harvesting System** is made up of a waterproof platform built on top of the tool store, a gutter and downpipe at one side and a big collector tank to hold all the rainwater.





The water collected is not suitable for drinking but we use it for cleaning our spades and other tools and for watering plants.

On top of the waterproof platform we have installed a **Living Roof**.

This is a mixture of flowering plants grown in a special substrate. It was supplied in rolls which we had to hoist up onto the roof then cut to size and lay out like a carpet.

The plants are mainly members of the **sedum plant** family. These were chosen because they flourish in the British climate and have an amazing ability to survive where other plants would struggle in thin soils, even when the weather is very hot and dry. They are also easy to manage as they don't need mowing or deadheading, so we can just leave them alone.

Benefits of our Living Roof

- **Attracts wildlife and improves biodiversity by providing:-**
  - food for butterflies, bees and many other insects.
  - a safe place for mini-beasts to live and to overwinter
  - insects and seed heads for birds to eat.
  - dead stalks and flower stems for birds to use as nesting material

- **Absorbs Carbon Dioxide**
  Helps reduce global warming
  Improves air quality by releasing oxygen

- **Filters dust and pollutants from the air**

Technical information about sedum plants: how do they survive in a drought?

Sedum plants and their cousins from the Crassulacea family are very good at resisting drought because they have developed a survival mechanism known to scientists as **Crassulacean Acidic Metabolism** or **CAM.**

In simple terms, **CAM** is the plant's way of making sure that as little water as possible can escape through the pores on its leafs and stems, and it does that by effectively "holding its breath" all through the heat of the day and only opening its pores at night when the air is cooler and the water stored within the body of the plant is less likely to evaporate away.

All green plants use a process called photosynthesis to make energy food from carbon dioxide gas, water and sunlight. The by-product of this process is oxygen, which is why, without plants to do this, our planet would be uninhabitable - but that's another story!

Photosynthesis can only happen during the day, as the chemical reaction inside the leaf cannot happen without sunlight. The other ingredients for the reaction are water and carbon dioxide. Carbon dioxide is all around us as one of the gases in air. The plant absorbs this gas through pores in the leaf surface which are known as stomata (stoma is the Greek word for "mouth" or "opening"). The trouble is that when the stomata are open to let carbon dioxide in, they also let water vapour escape. When the soil is dry, the plant can't replace this water and it will wilt and die... but not if it is a **CAM** plant!

CAM plants keep their stomata closed during daylight hours so that water vapour doesn't escape in the heat of the day. Instead, they open their stomata at night, take in the carbon dioxide and store it in the form of malic acid. In daylight, they turn the malic acid back into carbon dioxide and use it for photosynthesis. That's how they survive for so long in arid conditions and it's also why (as noticed by Roman apothecaries) sedum plants taste bitter first thing in the morning and not quite so nasty by the afternoon.