benefits of green roofs

All over the world developers, planners and architects are realising the benefits of green roofs which provide insulation and absorb rainfall. This lowers construction costs for insulation and rainwater goods which help to offset higher costs for strengthening the roof structure. They cut the cost of winter heating and summer cooling as well as CO_2 emissions, and lower urban temperatures generally.

In many towns and cities the landscape is becoming increasingly impermeable as brown field sites are developed and front gardens covered in block paving. This puts pressure on storm drains and can lead to flooding and damage to the infrastructure. Vegetation also improves air quality by absorbing pollution, creates precious recreational spaces and wildlife habitats.

Other countries actively promote green roofs. Sweden's Scandinavian Green Roof Institute has important research facilities, Germany provides government subsidies and Tokyo has introduced laws which stipulate that 20% of new buildings should have green roofs. Things may also be changing in the UK. The Greater London Authority is encouraging their use.

further information

RISC's garden website provides links to sources of information about forest gardens, green roofs and permaculture. Dave Richards and Steve Jones, RISC's present and former gardeners, have formed a small partnership, designing and constructing sustainable gardens: *www.sector39.co.uk*.

The dense ground cover of herbs and strawberries helps to suppress weeds and conserve moisture.

growing our futures

risc's edible roof garden

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sustainable features on the risc *roof garden*

An important purpose of the garden is to demonstrate a more sustainable lifestyle and how a garden can help reduce our environmental impact, rather than add to the problem. For example, gardens often contain large amounts of 'embedded' energy which contributes to CO2 emissions. Energy used to: heat greenhouses (your own or the nurseries which grow plants), manufacture artificial fertilizer or cement, transport plants and materials, purify and pump the precious drinking water we use to irrigate our gardens, or dispose of waste. By adopting the slogan: rethink, reduce, reuse, renew, recycle we can limit our environmental footprint. Here are some sustainable features of the RISC garden, most of which can easily be adapted in your own homes and gardens.

water harvesting & conservation

The average person in the UK uses about 104 litres of domestic water each day. About four litres is drunk, the rest is used to cook, wash, flush toilets and irrigate our gardens. Water is also used to manufacture everything we use – 11,000 litres to make a pair of jeans and 4000,000 to produce a car.

The hose-pipe bans of 2006 are a wake-up call for many gardeners, particularly in the SE of England where rainfall for the past two years has been 2/3 below normal. Most climate scientists agree that global climate change is a reality and is like to result in greater extremes of weather. Some predict that a drought will occur every three years on average. We need to face the prospect of making our gardens thrive with limited or uncertain supplies of mains water.

The RISC roof garden was designed to limit water consumption from the outset by collecting all suitable sources of water, watering economically, retaining moisture in the soil, and protecting soil and plants from the sun.

1. We collect rainwater from the Centre in a 2000 litre container. At night (to reduce evaporation) this is pumped through the drip feed irrigation system using our own renewable electricity. We are hoping to raise funds to build a 20,000 litre cistern in the car park. This will provide enough water to flush RISC's many toilets as well as keep the garden green during a drought.
2. Precious water is conserved by using a thick layer of woodchip mulch which is produced in great mountains by tree surgeons. We also keep the soil cooler with a permanent ground cover of useful plants such as disease resistant wild strawberries and culinary or medicinal herbs. These also help to suppress weeds.

For more details on methods to conserve water see our leaflet, *beating the drought*.

waste minimisation

Every year more than 400 million tonnes of waste are generated in the UK. About 25 million tonnes is household waste. Reading Borough Council, like all local authorities, faces expensive financial

penalties unless it meets tough recycling targets set by Central Government. By 2010 the target rises to 40% for recycling and composting. In addition, the cost of paying to bury rubbish in landfills is rising dramatically. In 2005-6 Reading produced 71,000 tonnes of rubbish. Nearly 55,000 tonnes ended up dumped in the ground at £51/ tonne – nearly £3 million of Council Tax revenue – and the space left to bury it is diminishing. The site at Smallmead is expected to shut during 2008.

So anything we can do to cut our own waste by reducing the stuff we buy and its packaging, recycling, repairing and reusing will make a difference. A high proportion of household waste is organic – newspaper, kitchen waste etc. Our gardens can help by turning this into compost which can feed our soil and grow fresh food which will save food miles.

3 We compost kitchen waste from the Global Café, paper towels from the toilets and shredded paper from the offices, in our compost bins. Look out for the Green Cones, suitable for a small household's kitchen waste but not garden waste (£49 special price from *www.recyclenow.com t:* 0845 077 0757). These have a solar heated double skin, which speeds up the decomposition, and a basket dug into the ground so that the compost is diffused into the soil by worms. A very effective no-hassle system. However, we found that the basket is not rodent proof, so you need to exclude cooked food and meat which attract local rats.

reused materials

It is preferable to reuse materials rather than recycle them which usually requires more energy in re-processing. We've re-used plastic containers in our irrigation system. One water butt was once used to import lemon juice concentrate and other smaller containers have been transformed into a simple gravity-fed watering system.

4 The hard landscaping includes a wall made from Oxfordshire limestone blocks which we found during renovations in 1996. These came from Reading Abbey, probably in the 17th century, when it was used as a quarry. The carved capitals were probably part of a window construction.

5 One of the compost bins is made from old wooden pallets discarded from a building site and otherwise destined for the bonfire.

renewable energy & materials

6 Water harvested from the roof is pumped through the irrigation system using electricity generated by a wind turbine attached to a chimney and solar array above the greenhouse. Our equipment was inherited from Caversham Court Environment Centre is now very old and inefficient compared with modern technology. Wind power generation is not very suitable for an urban area in a valley bottom because air flow is turbulent and limited. However, we generate enough renewable energy to power our pump. Remember that the most efficient use of solar and wind power is the humble washing line!

We're hoping to install a solar water heating system which will serve the whole Centre and further cut our carbon footprint.

7 The hurdles along the north side of the garden are made from locally coppiced hazel. Just a few generations ago, managed woodlands provided fuel, building materials, food such as nuts, that were an essential part of the rural economy and helped create our landscape.

8 The raised beds at either end of the garden were originally also made from coppiced hazel, but are being replaced by willow harvested from King's Meadow.

recycled materials

9 Three compost bins and the water butt fed by the green house and are made from recycled plastic. While this is preferable to using new plastic made from petroleum, it needs additional energy to reconstitute it.

10 The porous pipe used to irrigate the two oval beds close to the green house is made from recycled tyres.

11 The paving slabs are made from re-constituted building waste. These are an alternative to the stone imported from China or India which is available from most garden centres. The energy used in the cement is less than that used to transport the slabs from a quarry the other side of the world.