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Welcome to Permaculture



I awake in the deep velvety dark of the night and write this editorial. Everything is changing. My psyche feels an unravelling, a flexing of the new. It was predicted years ago, not always in apocalyptic terms because change opens to the possibilities of undreamt opportunity. I won't catalogue the recent societal and global changes – I am sure you know – but I sense that we humans are becoming ever more aware of how interconnected we really are, to both the human and planetary systems. As we force the envelope of our current *modus operandi* on this earth, we are experiencing greater and greater feedback. This makes us feel vulnerable, as though we are part of an endgame we do not control. There is another narrative, however, that does not deny the reality of unfolding world events, yet it does challenge the assumption that we are powerless to effect positive change.

I recently visited a project that opened my eyes to how radically effective earth restoration projects can be. This was not a big UN or inter-governmental programme, but one run by a small ecovillage community with the help of a relentlessly confident and visionary man, Sepp Holzer. I had heard he was building lakes in the arid Iberian Peninsula in Portugal. I imagined that they would be reasonably impressive after the winter rains. I had even watched a webcam of the first lake filling up last year. I had no concept of the scale of the restoration work, however. Sepp and the Tamera community[†] have literally dammed a valley and stopped the rain and topsoil rushing down the valley and into the sea.

Ever decreasing yields in this depopulated, rural region have driven poor farmers to try and extract more from the land than it is capable of bearing. Sheep are stocked at such density that the pasture is destroyed. Nature responds to the overgrazing by growing a 'scab', the inedible rock rose, *Cistus* spp, often the first pioneer after wildfire. 90% of the remnant cork oak forests are dying due to soil compaction that destroys soil mycorrhiza. The rest are being felled as cork falls out of favour, replaced by eucalyptus, hungry exotics in a brittle landscape. With the oaks dies a unique, biodiverse habitat and the Iberian lynx and Bonelli's eagle are threatened with extinction.

Sepp and the Tamerans have reversed this process in their valley. They stopped the overgrazing and ploughing, focusing the community's food production on fruit and vegetables. There are raised beds everywhere full of annual and perennial veg. Fruit and nut trees line the banks of the lakes. The winterbourne stream is dammed and there is an interconnected system of lakes that flow into each other as the slope falls down the valley. It is almost unbelievable that in such an arid landscape, so much water can be collected. This is living water too, with rippling surfaces, filled with frogs and fish, to keep the balance between mosquitoes and humans healthy. Sepp cups his hands and tells us, "God gives us enough water. All we have to do is find a way of holding it in the landscape."

What has been achieved in just three years is astonishing. Early morning mists arise out of the lakes and leave their dew on the surrounding plants. Swallows swoop and drink. Otters have returned. New springs rise in the surrounding hillsides. The younger oaks are seeding and growing. Even a Bonelli's eagle has visited. Perhaps it will return this year with a mate. The whole landscape is being reaquired. My heart opens in the knowledge that we can restore the earth. This story must be a part of our new narrative.

Maddy

Maddy Harland and the *Permaculture* team

See Maddy's regular blog at www.permaculture.co.uk/writers/maddy-harland

[†] www.tamera.org

SOLUTIONS

Permaculture Magazine Readers' Solutions

SEPP HOLZER'S EDIBLE TOWER

Sepp Holzer, the Austrian permaculture farmer famous for extraordinary polycultures of fruit, vegetables, grains, herbs, fish and animals on his Alpine farm doesn't just enjoy the rural idyll.† He also works with the people in the slums of Columbia, showing the landless poor how to grow food using discarded materials. This is his edible tower recipe:

Take three scaffold poles and lash them together at the top like a tipi. Leave enough space at the top for a bucket. Use the poles as a form and wrap geotextiles or tarpulin around the poles working your way upwards. To hold the textile in place around the poles, place bamboo canes (or other wooden poles) vertically/diagonally (or in a lattice form) and secure them with rope weaved around and between them. This creates a conical container.

Add any kind of biodegradable



Centre: Sepp's edible growing tower is made from recycled materials and uses little ground space.

Above: A simple irrigation system in the top of the tower.

Right: Beetroot, broad beans and nitrogen fixing lupins growing in the tower.



materials you can lay your hands on: manure, textiles, straw, soil, cardboard, paper... Place an old bucket with holes resting on the scaffold crossover on top. This will be your watering reservoir enabling the tower to be watered from the top downwards in the height of the summer.

Once the compost has settled, and when the heap is not so hot that it will burn the roots of young plants, cut openings in the sides and plant seedlings.

The plants we saw at Tamera ecovillage in Portugal in early spring



were kolrabi, broad beans, beetroot, tomatoes, cabbage and nitrogen fixing lupins but I suspect any plant that can survive in a hanging container will thrive here, and more besides.

The advantage to this design is that it is entirely made from scrap, takes vertical gardening to a new level using very little ground space and can be placed on wasteland where soil may be polluted. Sepp believes passionately in the opportunity for everyone to garden and grow food. *Maddy & Tim Harland, PM*

† For more details on Sepp's book, *Sepp Holzer's Permaculture*, newly translated into English, see p.23.

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how to make Hugelkultur RAISED BEDS

Sepp Holzer explains how burying branches, even whole trees, in raised beds allows the gardener or farmer to grow an incredible variety of food, even on the most unpromising upland or arid land

Before you start building a raised bed system, you should find out what direction the wind usually comes from and take note of it. The simplest way to do this is to tie a strip of material to a tree or pole and observe it regularly over a period of time. You should also check it at night. This way you can find out very quickly which direction the wind comes from and which areas are the windiest. If necessary, a windbreak can be put up around the system or the entire system of raised beds could be positioned against the wind and used as a windbreak itself. I find that

Raised beds are suited to growing all kinds of vegetables: peas, beans, salad, tomatoes, radishes, cucumbers, carrots, courgettes, pumpkins...

raised beds planted with fruit bushes and tall-growing plants like sunflowers, Jerusalem artichokes, or hemp make the best windbreaks.

I build these beds to a height of at least 1.5m (5ft). They are exactly like normal raised beds, except that I

make the sides a little steeper. This way the beds will not compact so quickly under the increased pressure. With raised beds that are higher than 3m (9ft), I put a narrow terrace on the top. This makes managing and harvesting the bed easier. The higher the bed is, the more space will be taken up and you will need to allow for this in your plans. Raised beds not only make good windbreaks, but also make excellent visual barriers and keep out noise and pollution. Frequently, it is enough just to have these windbreaks surrounding the system. I also angle the beds to give



them more sunlight. On steep slopes this is not so easy, because you also have to take into account where the surface water drains.

With raised beds on hills it is very important to pay attention to the flow of water within the system. The beds must not be parallel to the slope, otherwise those at the top of the hill will absorb all of the water when it rains, whilst the beds at the bottom will, in the worst case, begin to dry out. Water must be supplied evenly to all of the beds. The water must not be allowed to channel either or it could lead to landslides. The alignment of the beds in relation to the hill should be determined by the course rainwater takes down the slope.

A system of raised beds can be built by hand or with a mechanical digger, although only relatively small material can be incorporated into the beds when they are built without using machinery. As my experience has led me to favour bulky materials for constructing raised beds, diggers are indispensable for me. I use the digger to make a ditch 1-1.5m (3-5ft) deep and around 1.5-2m (5-6ft) wide. I carefully remove



I build these beds to a height of at least 1.5m (5ft). They are exactly like normal raised beds, except that I make the sides a little steeper.

Above: These steep raised beds are the perfect height for harvesting without having to stoop.

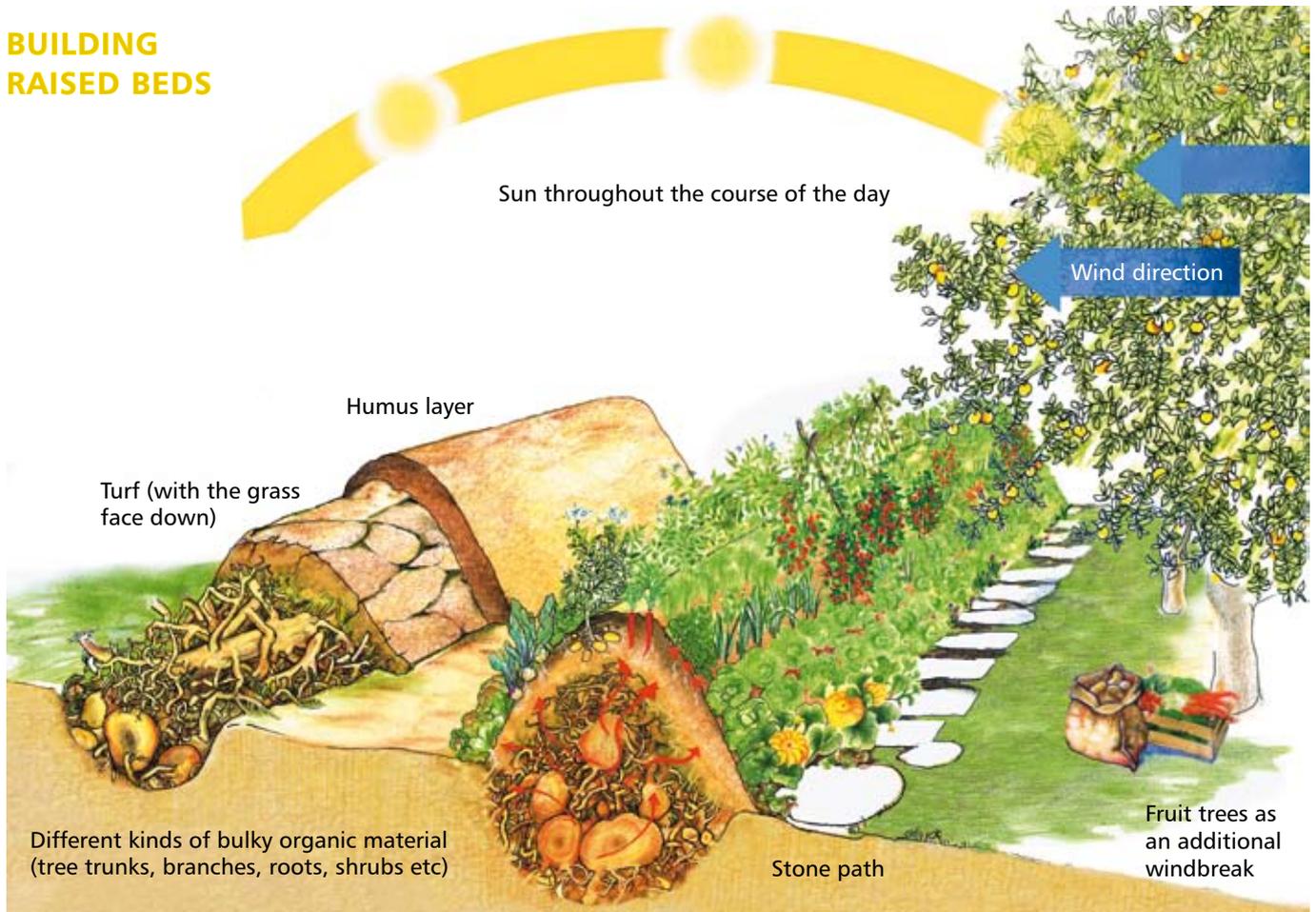
Below: Construction diagram of Sepp's Hugelkultur raised beds.

the humus layer and separate it. Then I place shrubs and trees along with their roots into the ditch. On top of that I loosely heap a mixture of earth, fine organic material and turf. Finally, I take the humus that was removed and place it over the bed.

If there are no trees or shrubs to use for the bed, I have to make do with turf. Having additional organic material brought in from elsewhere would waste far too much time and energy.

The sides of the raised beds should, depending on the material, be at an angle of at least 45 degrees. I have had good results with even steeper

BUILDING RAISED BEDS





beds of 60 to 70 degrees on heavy loam. Even with a bed made entirely of earth, a steeper angle makes sense. With some materials it is necessary to heap the earth as steeply as possible, as high as it can be and still hold together. When I am visiting other farms or giving advice, I see far too many raised beds that are much too flat. They ask me why the bed is not growing as well as they had hoped. The answer is simple: the angle of the sides is too shallow, so the beds become compacted. The supply of oxygen is decreased, the process of decomposition is interrupted and, if not dealt with, a foul-smelling anaerobic sludge can build up, which has a negative effect on the plants. In addition, the plants will not be able to establish their roots properly, because the ground is too compacted and they will begin to wilt. People continue to make raised beds that are too flat, which makes it all the more important for me to emphasise this point right now.

With wet, heavy soils it is a good idea to put in a drainage system to prevent water from building up. A French drain can be used to do this. With dry and sandy soils, on the other hand, it is important to keep water within the raised bed for as long as possible. This will happen automatically without any additional water being diverted, as it will collect naturally in the hollow between two beds and in the centre of the bed as the bulky material rots down. Covering the surface of the bed with mulch will also stop plants from drying out when they are taking root and are vulnerable.

Above: An outer raised bed used as a windbreak. The bed is stabilised by deep-rooted flowering shrubs and fruit bushes. The beds in the middle of the system are in a herb spiral type design and are positioned to catch as much sunlight as possible.

When the seeds have been sown and the plants are developing, keeping the soil covered will stop them from drying out too much. Crops that are not harvested and other self-set or wild plants can be left on the bed as mulch, which will develop slowly into a rich layer of humus. Having deep, coarse humus and keeping the soil covered are the best ways to retain moisture.

MANAGING RAISED BEDS

It is best to sow and plant raised beds as soon as they are created. As the soil has only just been piled up it is still very loose and has not yet begun to settle. Plants find it easier to establish themselves and take root in loose soil. Seeds fall through the loose soil and are not blown away by the wind so easily. The rain will not wash them away, but instead wash them further into the bed. So as not to hinder this effect, the beds should not be smoothed over. If you are planning to successively crop vegetables and fruit bushes, you should, if possible, plant the bushes on top of the raised bed. The vegetables below can then be reached quite easily. Organising the crops in this way is a particularly good idea in warm, sunny climates, on dry soils and when cultivating plants that

need partial shade. Selecting which fruit bushes to use and the intervals at which they are planted allows you to regulate the amount of shade. It is also possible to combine them with fruit trees if you want the whole system to be in shade. Fruit trees and bushes can also be planted between the beds.

The distance between the individual beds can be altered to suit what is being grown. When you are designing a raised bed you should always take into account how you are planning to manage the bed and what equipment you will be using to do this. Otherwise there may be some unpleasant surprises later on. For example, if I want to use a tractor to harvest the



Above: Vegetables on a raised bed. Weeds are controlled by a combination of mulching and hand pulling.



fruit, I have to allow enough space for a path between the beds for the tractor to travel along. This path could, for example, be planted with different varieties of clover for plant cover.

Raised beds are suited to growing all kinds of vegetables: peas, beans, salad, tomatoes, radishes, cucumbers, carrots, courgettes, pumpkins, potatoes and many others. The material breaking down in the centre of the bed provides the plants with plenty of nutrients and the plant growth will be lush. The amount of time the nutrients last or how quickly they are used up depends on what the centre of the bed is made of. If a raised bed is made of chipped wood, which breaks down quickly, a large amount of nutrients will be released in the first year. To make the most of this I select plants that demand a very high nutrient content: pumpkins, courgettes, cucumbers, cabbages, tomatoes, sweetcorn, celery and potatoes to name a few. In beds like these it is better to cultivate less demanding plants like beans, peas and strawberries after three years. If they are planted any earlier they

might become overfertilised. Overfertilised plants do not develop a good flavour. With some plants, e.g. spinach, nitrates can also build up in the leaves of the plant, which can be dangerous to one's health if eaten.

Raised beds constructed with bulky material such as whole tree trunks do not develop a particularly high nutrient content in the first year. The bulky material rots down very slowly. However, the supply of nutrients will be steady for many years and there is hardly any danger of overfertilising within the first year. To use a raised bed in the most effective way, you should take into account the nutritional needs of the plants.

I deal with any unwanted plants as I wander around the farm. I simply pull them up and leave them there with their roots facing up. If the weather is very dry and it is around midday, then this is even more effective, because the plants dry out and do not take root again. Mulching, in other words spreading straw, hay, leaves or similar organic matter, is a good way to keep these unwanted plants in check; it also keeps the soil covered and retains moisture.

From the second year, pigs can be allowed on the raised beds for a little time to graze after the harvest. As they search for food, they will till the beds and leave manure. The best fruit and vegetables should be harvested, but enough should be left for the pigs. They should have something to motivate them and make them happy. If too are allowed to graze in a small area, they can do a great deal of damage. The number of pigs and the amount of time they are allowed to graze must be determined by the available space. When they have worked the soil, it is in the perfect condition for sowing.

Depending on the weather and how they are used, the raised beds flatten gradually over the years. They are then either rebuilt or replaced 

Sepp's amazing story is told in detail in his book, newly translated into English, *Sepp Holzer's Permaculture – A Practical Guide for Farmers, Smallholders and Gardeners*, full of practical information and illustrations, price £18.95 available from Green Shopping at www.green-shopping.co.uk or call us on 01730 823 311.

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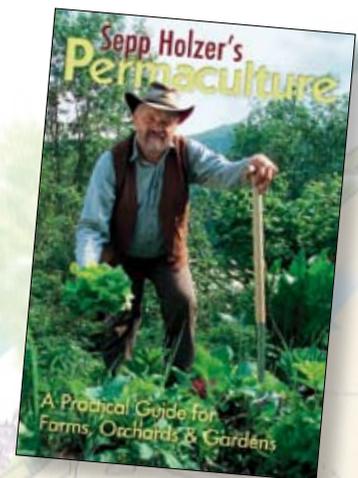
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