

Temperate forest gardens

A preliminary assessment of productivity

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Forest gardens are based on the structure of young natural woodland but with a planting composition of useful and edible perennial species.¹ Originating in the tropics, they have been adapted for temperate climates in the last two decades.

Growing an 'edible campus'

Schumacher College is a residential college in Devon offering 'transformative learning for a more sustainable and equitable world' to an international audience. The college aspires to be an experimental 'edible campus' and in 2013 grew 25% of the vegetables consumed.

System design



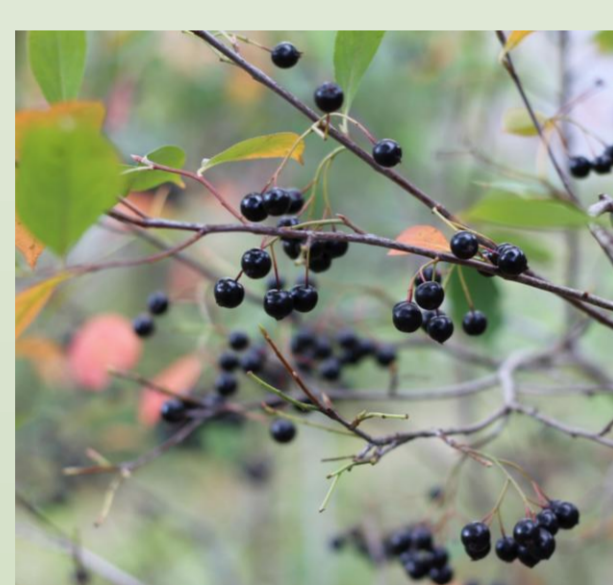
Forest garden plot, summer 2011

In 2007 former student Justin West established 3 forest garden plots at the College, total area 400 m². The project was inspired by Martin Crawford, whose famous forest garden is adjacent to the college².

Species composition



Apple (*Malus domestica*)



Chokeberry (*Aronia melanocarpa*)

The tree layer is predominantly pear, apple and plum, as well as species like lime (*Tilia cordata*), which produces edible leaves. The shrub layer includes traditional soft fruit and novel fruits like Japanese quince (*Chaenomeles* spp), chokeberry and autumn olive (*Eleagnus umbellata*).



Wild cabbage (*Brassica oleraceae*)

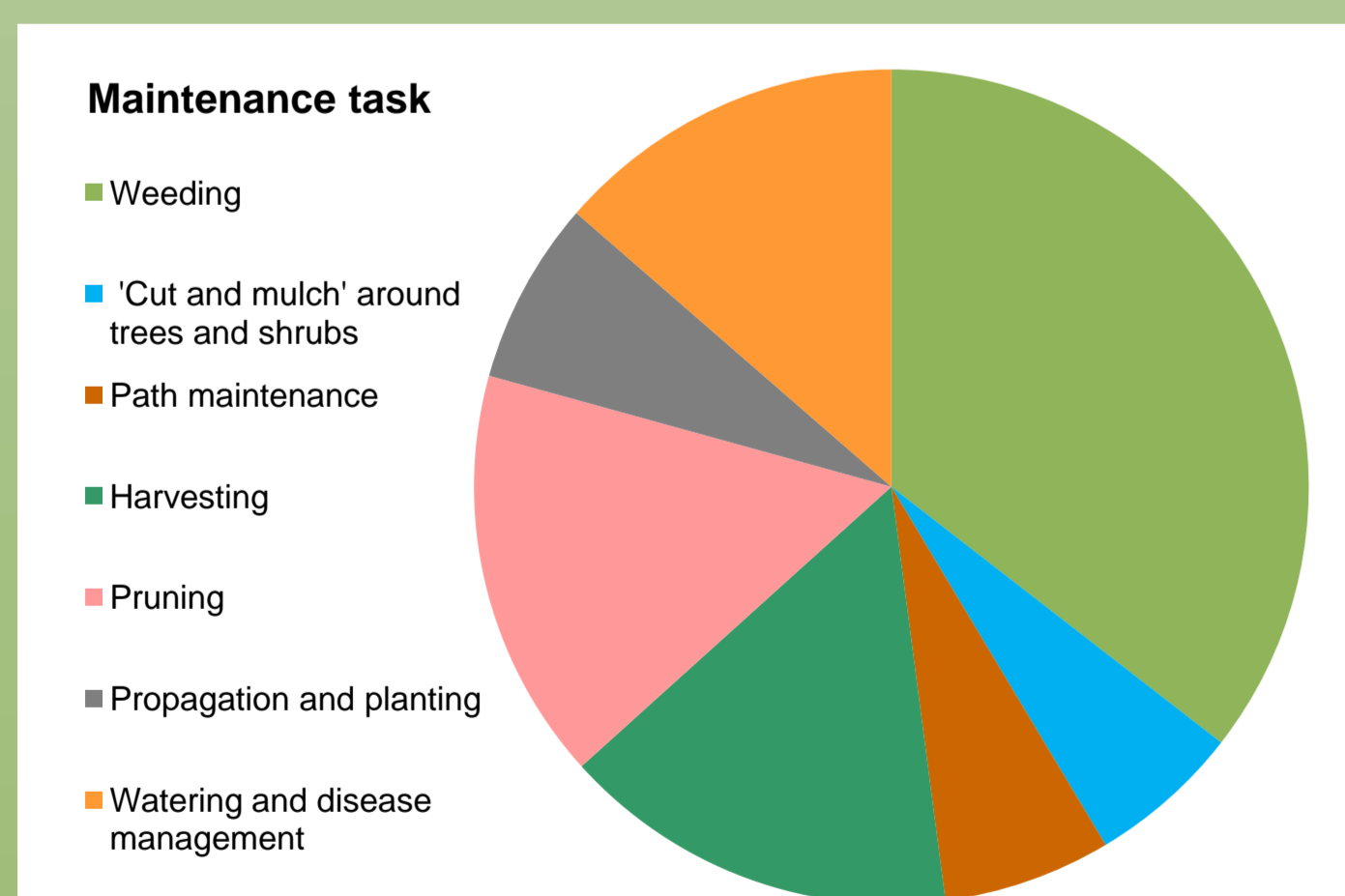


Good King Henry (*Chenopodium bonus-henricus*)

There are over 25 species in the herbaceous layer, mainly native or naturalised herbs from woodland and coastal habitats. Edible prostrate herbs, eg wild strawberry (*Fragaria vesca*) and pink purslane (*Claytonia sibirica*), provide ground cover.

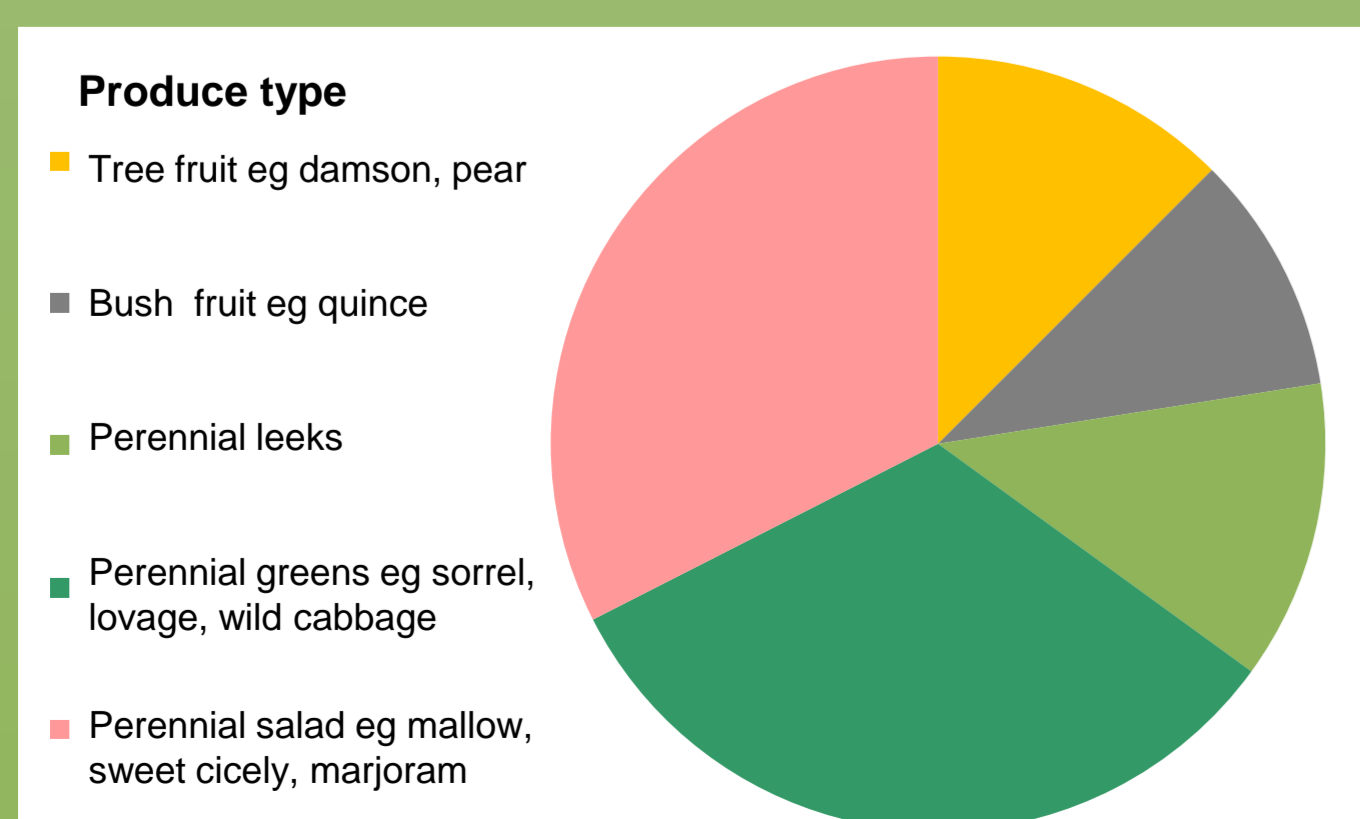
Maintenance

Horticulture students work in the forest gardens for course practicals. Maintenance and harvesting tasks form part of the daily work groups and volunteering that underpin the college's community living ethos.



Produce

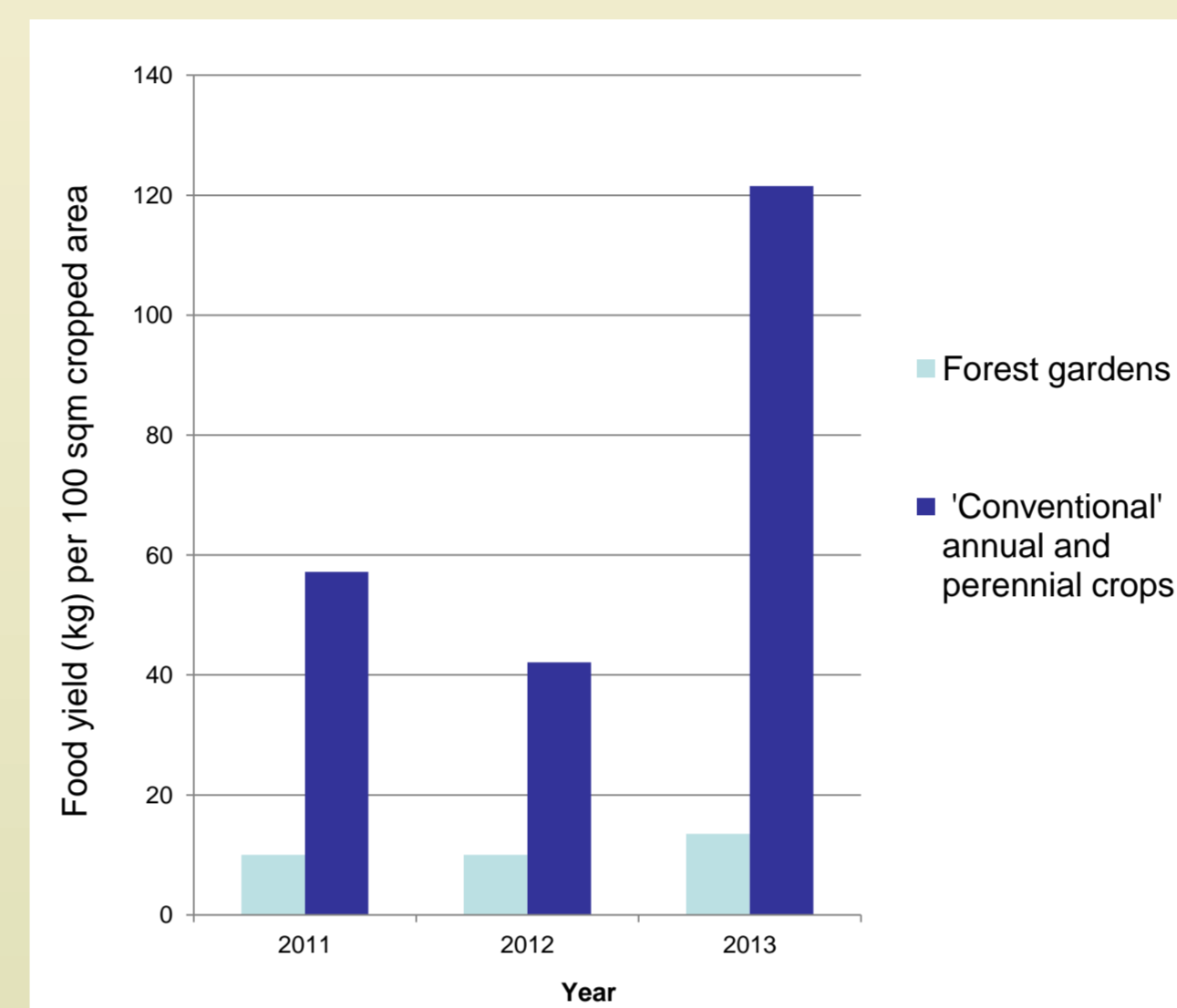
Produce is used by catering staff in college meals. Perennial salad is mixed with a lettuce base. Leaf greens are used in quiches and soups, unusual fruits become jams or chutneys.



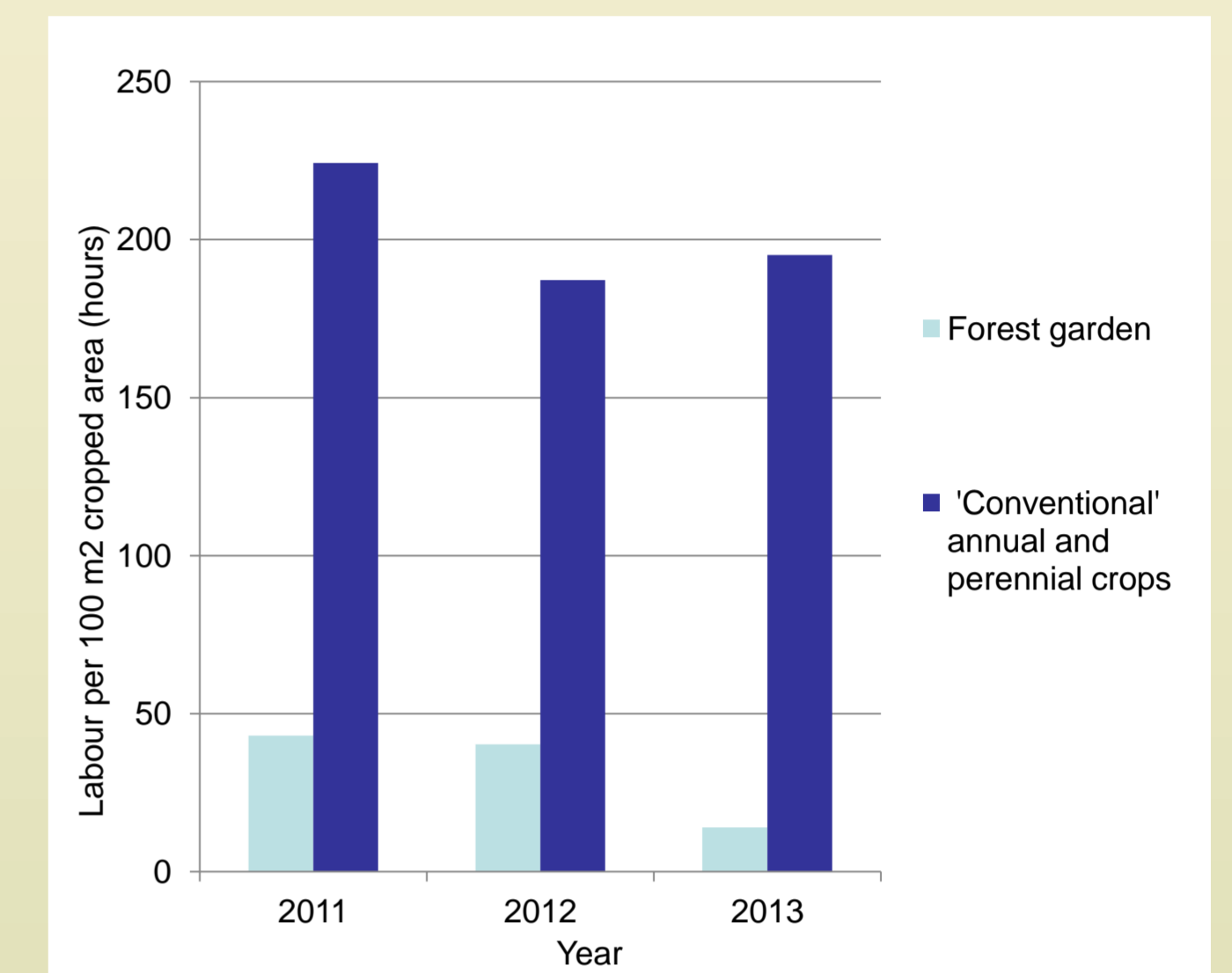
Forest garden salad

Forest gardens versus 'conventional'

In 2013 the college had 1,500m² of food production areas (3/4 fruit and kitchen gardens, 1/4 forest garden). All food growing was based on organic, low input and 'no dig' practices. Over a 3-year period, forest gardens used 10% of garden labour and produced 11% of total food yield. Productivity was 2.3kg per 100m² over 3 years, compared to 13kg for annual vegetables. Forest gardens use less labour once established; yield should increase as fruit trees mature



Yield comparison



Labour comparison

Perennial leaf crops

Challenges

Less than half of the usable leaf crops are harvested for the following reasons:

- **Producing attractive food** for conventional palates from perennial greens is possible but requires sustained innovation and motivation from catering staff
- **Optimal harvesting times** are up to 3 months in spring and 2 months in autumn. Most species are unpalatable to conventional palates for the rest of the year (fibrous and/or bitter)
- **Harvesting is time consuming** due to small leaf size, crop diversity and spatial separation between plants

Opportunities

- **Yield stability** – In 2012 annual vegetable yield dropped by 36% from previous year due to poor weather; forest garden yield stayed the same. High species diversity should increase niche complementarity, and thus productivity, over time³
- **'Hungry gap' harvest** – Peak harvesting times fall within early spring and early autumn, which are 'hungry gaps' for annual salad production
- **Resource extensive** – require no irrigation, apart from following planting if soil is dry. No organic matter inputs required in 2013, compared to 10 m³ compost in kitchen gardens. Woodland herbs are productive in low light intensities
- **Nutritional benefits** – wild and naturalised greens are proven to be higher in dietary fibre, macro- and micronutrients than domesticated leaf crops⁴

Forest gardens - future food?

Productivity is low compared to annual systems, although will improve with maturity. Forest gardens have low maintenance and input requirements, valuable for community-led horticulture and 'edible landscaping', where plants with food uses are incorporated into public spaces. Their high ecological complexity could contribute to yield stability and productivity over time, as well as providing benefits for biodiversity and nutrition.



References

1. Wiersum, K.F. 2004. Forest gardens as an 'intermediate' land-use system in the nature-culture continuum. *Agroforestry Systems* . 61: 123–134.
2. Crawford, M. 2010. Creating a Forest Garden. *Green Books*
3. Picasso, V.D. et al. 2011. Diverse perennial crop mixtures sustain higher productivity over time based on ecological complementarity. *Renew. Agric. & Food Systems*. 26 (4).
4. Grivetti, L.E., Ogle, B.M. 2000. Value of traditional foods in meeting macro- and micro nutrient needs: the wild plant connection. *Nutr. Res. Rev.* 13(1).