

GSE MSc Architecture: Advanced Environmental and Energy Studies

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HOW MUCH ORGANIC FOOD COULD BE PRODUCED IN UK
GARDENS AND WHAT ENVIRONMENTAL BENEFITS WOULD
THAT BRING?

(The end of suburbia or the beginning of the good life.)

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For the attention of Melissa Taylor

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Introduction

This essay relates to the lecture 'Urbanisation and health in the UK'.

The food industry, including agriculture accounts for 19% of the UK's GHG¹ emissions including nitrous oxides and methane (Garnett, T 2008). According to the WWF² this figure could be 30% if effects of deforestation are included (2008). It is also a major source of chemical pollution. The industry employs the same linear process as most others, from extraction of raw materials to make fertilizers to disposal of waste food in landfill and human excrement the sewerage system.

The UK imports 40% of its food (DEFRA, 2010³), and over 90% of home-produced is reliant on fossil-fuel-supplied fertilizers and pesticides (DEFRA, 2009). The trend is towards more reliance on growing imports of cheap food (Murphy-Bokern D. 2008).

The UK contains 432,924 hectares of gardens (Davies, et al, 2009), most of which are dominated by unproductive lawns and flowerbeds. Meanwhile 61.4% of English adults and 27.3% of children are overweight or obese (DoH⁴, 2008) and many people have a disconnection with the natural world (Millen, K & Pagella, S, 2010).

This essay will explore what environmental benefits that could be gained by using our gardens to grow food.

¹ Greenhouse gas.

² Worldwide Fund for Nature

³ Department for Environment Food and Rural Affairs

⁴ Department of Health

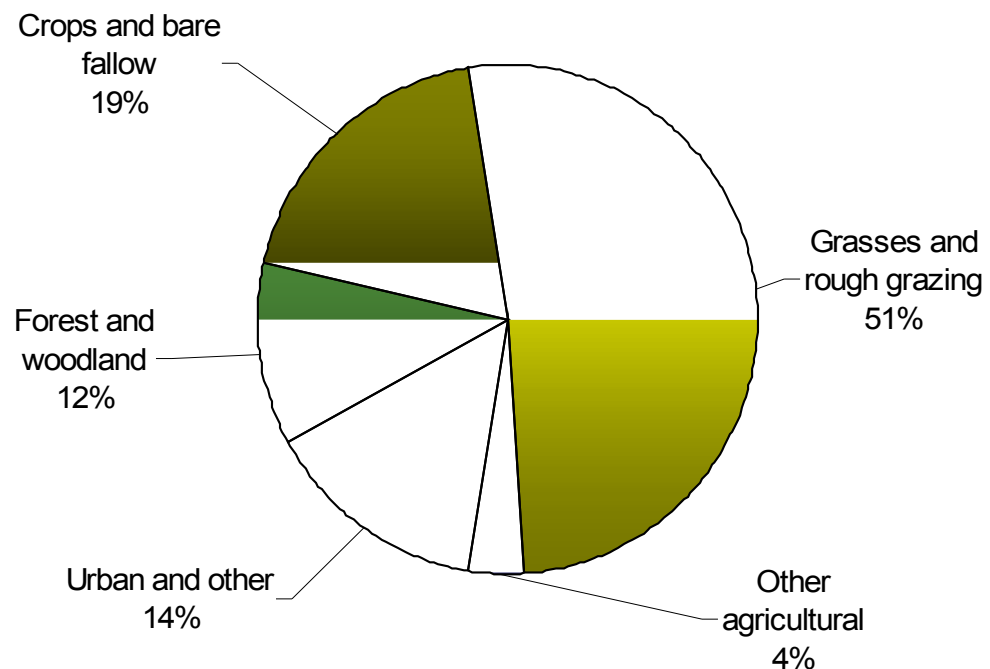
Critical Analysis

Land use

There is only 0.4 hectare of land available per person in the UK, but the average citizen has an ecological footprint attributable to food production alone of 2.6⁵gha⁶. (Best Foot Forward, 2002).

Urban and other miscellaneous⁷ land comprises 14% of the UK (2010). This land is full of green spaces including private gardens.

Figure 1. UK Land Use.



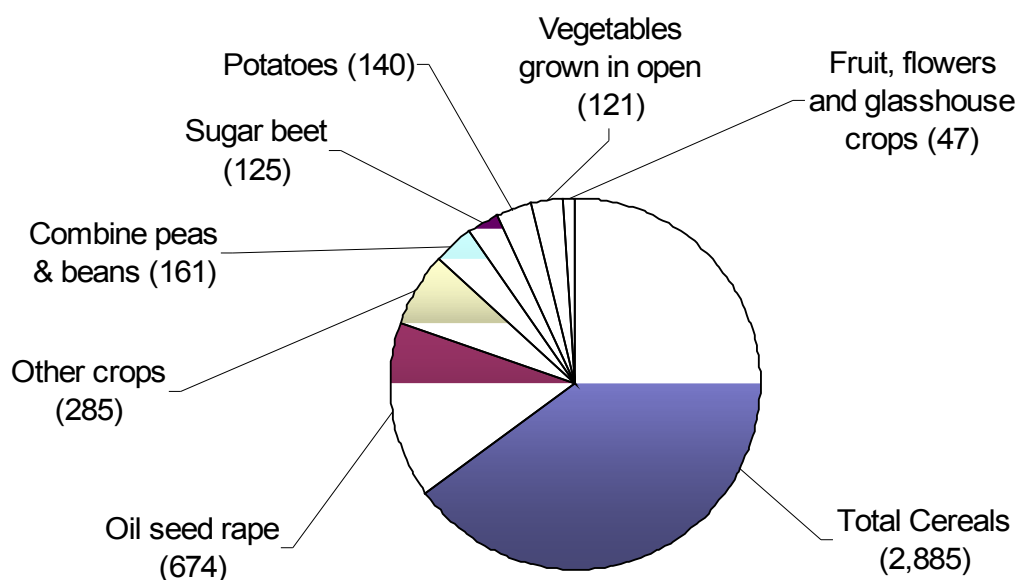
Source: Department for Environment Food and Rural Affairs. (2006). See Appendix 1 Cereals occupy most arable land, with relatively small areas used to produce fruit, and vegetables.

⁵ For residents of greater London.

⁶ Global hectare. A measure of earth's average biocapacity per hectare.

⁷ Figures include land used for urban and other purposes, e.g. transport and recreation, and non-agricultural, semi-natural environments, e.g. sand dunes, grouse moors and non-agricultural grasslands, and inland waters.

Figure 2 – '000s hectares covered by UK crops 2008



Source: Office for National Statistics (2009).

Self-sufficiency

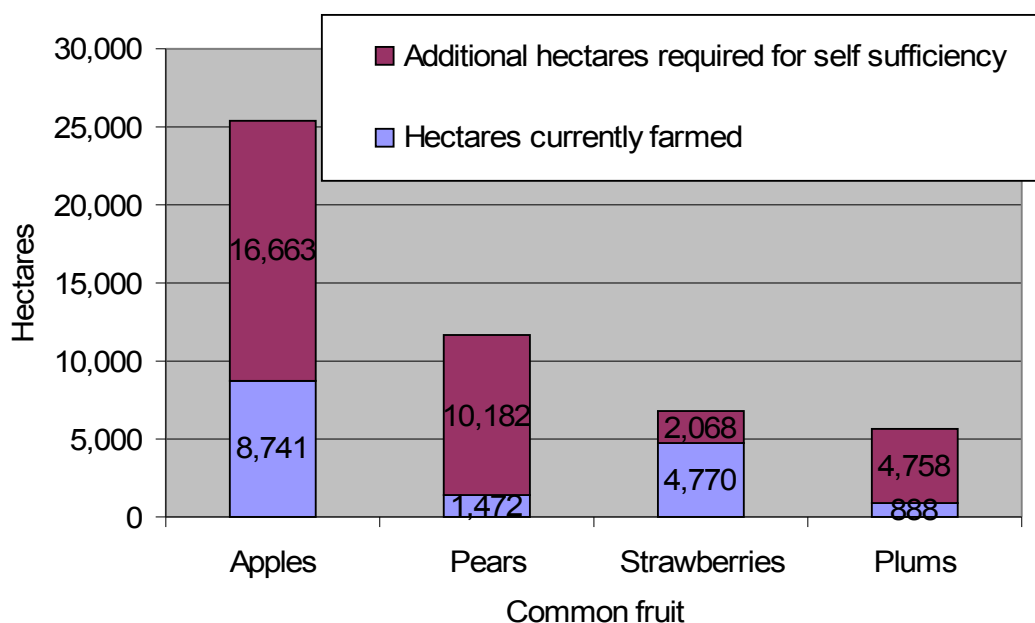
The UK is 74% self-sufficient in indigenous foods and 60% overall, figures the soil association regard as optimistic (2008). While self-sufficiency in cereals is high, it is not for fruit and vegetables.

Fruit

In 2008 the UK produced only 11.2% of the fruit consumed: 402,900 tonnes on 28,500 hectares.

Not only are exotic fruit imported in large quantities, but indigenous ones too, such as two-thirds of our apples (DEFRA, 2010).

Figure 3 – Hectares of some common fruit farmed and estimates of the area required for self-sufficiency



Source: Department for Environment Food and Rural Affairs. (2009). Basic Horticultural Statistics - 2009.

If the UK produced all of the apples, pears, strawberries and plums it consumed it would raise the overall percentage of home consumed fruit from 11.2% to 31.0% and increase the land needed to grow it from 28,500 to 62,171 (DEFRA, 2009).

To replace exotic fruits with homegrown indigenous species would require 202,061⁸ hectares of fruit-producing land in total.

Vegetables and potatoes

In 2008 the UK produced 57.9% of the vegetables⁹ it consumed: 2,590,000 tonnes produced on 116,995 hectares and 83% of the potatoes: 5,999,000 on 144,000 hectares. Self-sufficiency in vegetables and potatoes conventionally farmed would require an additional 85,066 and 29,494 hectares respectively (DEFRA, 2009).

⁸ Estimated from average yield per hectare of indigenous fruits and quantities of exotics imported.

⁹ Not including potatoes

Table 1 – Yield and area in hectares of fruit and vegetables grown in the UK showing shortfall in area cultivated for self-sufficiency and estimating area necessary for self-sufficiency and replacing exotic crops.

Crop type	Yield (Tonnes per ha)	Area in hectares			
		Currently farmed	Shortfall for ISS ¹⁰	Required for ISS	Required ISS substituting exotic crops
Fruit indigenous	14.4	28,500	33,671	62,171	62,171
Fruit exotic	Unknown	0			138,380
Vegetables	22.1 Tonnes per ha	116,995	85,066	202,061	202,061
Potatoes	41.7	144,000	29,494	173,494	173,494
Total		289,495	148,231	437,726	576,106

Source: Department for Environment Food and Rural Affairs. (2009). Basic Horticultural Statistics - 2009..

UK Gardens

Most UK residents want houses with gardens (Platt, S. et. al, 2004). In 2009 there were 27.1 millions dwellings (CLG¹¹, 2010). Davies, et al, estimates that 87% of UK households have access to a garden, the average size is 190m² and the total coverage is 432,924 hectares (2009).

What could gardens produce?

Home gardeners should target high-value food where the UK lacks self-sufficiency: fruit and vegetables. Cereals involve more time and space than available to the average gardener (Rohrer, F 2008).

If 34.4%¹² of the area of UK gardens were put to work as convention farmland they could make up the shortfall in land area to grow indigenous fruit and vegetables. To

¹⁰ Indigenous self-sufficiency

¹¹ Communities and Local Government

¹² 289,495/432,924 * 100%

replace exotic fruits with imported would require an additional one-third¹³ of gardens. However these figures are based on chemical farming techniques, as very little food in the UK is organic.

Table 2. – Percentage area grown of selected organic crops

Crop	Organic area as % of total area
Vegetables	6.10%
Potatoes	2.30%
Fruit & nuts	5.70%

Source: DEFRA (2009) See appendix 2

Other studies

UK Allotments

A 1975 study by the RHS¹⁴ showed that UK allotments could produce 31.28 tonnes of vegetables a hectare, while a Which magazine study concluded 40 tonnes/ha. The studies contained 26 and 28 crop species respectively but were not entirely organic (Tomkins, M. 2006). Conventional agriculture yielded 22.1 and 41.7 tonne/ha of vegetables and potatoes respectively in 2008.

Cuba

The Soviet Union's collapse forced Cuba to develop an extensive system of organic farming. After five years of continual soil improvement, yields of vegetables reached 250 tonnes/ha in urban gardens. Yields on state farms were just 6.1 tonnes/ha. (Cruz, M.C. and Medina, R.S. 2003) indicating that more people working the land increase the yield/ha.

Marais System

This is further evidenced by the labour intensive Parisian Marais system that yielded 93.22 tonnes of vegetables per hectare 100 years ago (Tomkins, M. 2006).

Biointensive

Practical research into biointensive gardening by John Jeavons, has produced high yields. This system involves growing mainly high calorie crops such as grains, beans and potatoes in loose soil in raised beds. (Jeavons, J 2005).

¹³ 138,380/432,924 * 100%

¹⁴ Royal Horticultural Society

Table 3 – Average U.S. and U.K. farm yields compared to yields achieved by biointensive food production.

Crops	U.S. Average Yield (tonnes/ha)	U.K. Average Yield (tonnes/ha)	Possible Biointensive Yields tonnes/hectare		
			Beginner	Good	Excellent
Tomatoes	15.0		48.8	94.7	204.1
Lettuce, Leaf	23.7	20.9	65.9	98.6	263.7
Onions, Green		9.0	48.8	97.6	263.7
Corn, sweet (shelled weight)	7.5		8.3	16.6	33.2
Watermelon	11.9		24.4	48.8	156.2
Cucumbers	10.1		77.1	154.3	283.7
Snap Beans	4.0		14.6	35.2	52.7
Carrots	28.8	65.2	48.8	73.2	527.3
Cantaloupe	9.8		24.4	35.2	70.8
Calorie Crops					
Potatoes	25.7	41.7	48.8	97.6	380.8
Onions	33.5	40.7	48.8	97.6	263.7
Wheat Seed	1.8	8.3	2.0	4.9	12.7
Oats, Hull-less Seed		5.8	1.5	3.4	6.3
Dry beans	1.3	4.5	2.0	4.9	11.7

Source: Jeavons 2005

Jeavons claims that 18.6 m² will supply one person with vegetables all year.

If the mid-range yields for potatoes could be achieved in the UK (96.7

tonnes/hectare) the total UK supply of 6,957,000 tonnes could be organically grown

on 71,944 hectares which is equivalent to 16.6% of the area of private gardens. If

the yield of other vegetables could only reach half that of potatoes (48.35

tonnes/hectare) the entire crop could be grown on 92,359 hectares or 21.3% of

private gardens.

Permaculture

According to Mollison, '*Permaculture*¹⁵ is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability and resilience of natural ecosystems'. Its first ethic is Earth Care (1988).

¹⁵ Permanent Agriculture

Forest gardens

Forest gardening follows permaculture principles. It aims to mimic the layers, tree, shrub and ground, found in natural woodland to create an edible woodland ecosystem (Whitefield, P 2002). Forest gardens fit with vegetable gardening: the forest garden as woodland with the kitchen garden in the corresponding glade.

Table 4 – Yields, spacing and sizes of common food forest garden trees and shrubs

Yields	Mid range yield (kg)	Spacing (m)	Maximum height and spread (m)	First Fruit (years)	Number per hectare	Yield (tonnes per hectare)
Tree Layer						
Apple (M26)	41	4	4	3-4	625	25.6
Pear (Quince A)	30	5	7	3-6	400	12.0
Plum (St Julien A)	32.5	4.5	4.5	3-6	494	16.0
Cherry (Colt fan)	10	4	2.5 and 5.5		625	6.3
Shrub Layer						
Raspberries	2.5	1	2 * 1	3-4	10000	25.0
Blackcurrants	4	1.8	1.8	3-6	3086	12.3
Gooseberry	4	1.5	1.5	3-6	4444	17.8

Source: Whitefield 2002

Table 5 – Number of trees required in total and per garden for UK self-sufficiency in our favourite top-fruit.

	Number of trees required	Trees required per garden to meet UK demand for produce.	Maximum planting area of one tree (m ²) (based on spread squared not πr^2)	%age area of average garden
Apple (M26)	17,225,158	0.76	16	8.4

Pear (Quince A)	5,215,406	0.23	49	25.8
Plum (St. Julien A)	2,221,716	0.1%	20.25	10.7
Cherry (Colt fan)			13.75	7.2

Source: Whitefield 2002 and DEFRA 2009

In the forest garden there is more than one yield/ha. The top-fruit tree layer is under-planted with the soft-fruit shrub layer, which in turn is under-planted with a perennial vegetables layer (the yields of which have not been quantified).

An average-sized garden could accommodate an apple, and a plum with a cherry fan against a wall or fence, under-planted with soft fruit. This would take up 50 m² of garden at maturity and would produce an average of 83.5 kilograms of top-fruit a year. Under-planting equal quantities of raspberry, gooseberry and blackcurrant would produce 175 kilograms of soft fruit on the same area. Nationally this it would produce 5,814,441 tonnes of fruit a year compared with total fruit purchases of 3.593,800 tonnes.

Glasshouse crops

In 2008 the UK produced 249,915 tonnes of glasshouse vegetables on 608 hectares and had an additional 180 hectares of glasshouse devoted to fruit (DEFRA, 2009). In 2004 the UK imported 80% of glasshouse vegetables (Garnett T, 2006) and about half its glasshouse fruit (DEFRA, 2009). To home produce all purchased glasshouse grown vegetables would require 3,400¹⁶ hectares of glasshouse.

A standard 2.97m² lean-to glasshouse would take up 0.016% of the garden area¹⁷ of an average house. Nationally these would cover 6,767 hectares. The glasshouse would have to be attached to the house for warmth but would not be heated.

¹⁶ 608*5 + 180*2

¹⁷ Greenhouse size: 1.2m * 2.4m. Average garden size 190 m². Number of gardens 22,493,000

Behavioural changes

Mass home gardening, in itself would require behavioural change. This occurred during the dig-for-victory campaign in the Second World War. To benefit fully from home production we would need to also change are eating habits and stop wasting food.

Avoiding products

The most GHG intensive produce is:

- Air freighted.
- Unseasonal grown in heated greenhouses.
- Pre-prepared and packaged.
- Easily perishable. (Garnett, T 2006).

These should be avoided and replaced with in-season indigenous homegrown produce.

Reducing waste

WRAP¹⁸ estimates that of the 21.7 million tonnes of food purchased nearly a quarter of food produced that can be eaten is thrown away. Most goes to landfill where it creates methane gas (2008). Growing our own food should make people more aware of waste prevention and hence one quarter less land would be needed to grow food.

Sharing land

Gardens are not evenly distributed per head of population. To encourage home production Hugh Fernley-Whittingstall created the landshare scheme whereby growers without land co-operate with landowners with spare land sharing the proceeds. The scheme has over 46,000 registered users (Channel 4, 2010). People would need to cooperate.

¹⁸ Waste Resources Action Programme

Adding it together.

Table 6 – Area and percentage of an average garden that would be taken up by incorporating biointensive and food-forest growing methods and the percentage food that could be produced if adopted nationally.

	Area (m ²)	Percentage of average garden ¹⁹	Yield as a percentage currently nationally consumed ²⁰
Biointensive kitchen garden. Grown in 1.5m and 10m raised beds			
Potatoes (2 beds)	24	12.6%	101.3%
Other vegetables (3 beds)	36	18.9%	118.4%
Food forest fruit (3 vertical layers grown in same horizontal space)	50	26.3%	218.5%
Top fruit			
Soft fruit			
Perennial vegetables			Unknown
Glasshouse fruit and vegetables	3	1.6%	268.1%
Fertility patch	47	24.6%	
Total	160	84.0%	

Table 6 shows that the biointensive system produces enough potatoes and vegetables for the nation. Fruit from the forest garden would be produced in some excess, although some would be eaten by wildlife. There would be sufficient glasshouse room to produce the nation's glasshouse fruits and vegetables although some space would be taken raising pre-planting vegetables.

Environmental benefits

Wildlife

The pre-human landscape of the UK was one of woodlands and glades. Wildlife gardening that mimics the woodland glade provides a home to many UK animal

¹⁹ Based on an average garden size of 190m²

²⁰ Based on 22,785,474 UK gardens.

species (Baines, C 2000). Forest gardens are similar to wildlife gardens but also provide food for human consumption. As well as providing wildlife habitat they shelter buildings, absorb CO₂ (both through tree growth and soil building) and stabilise soils thus avoiding floods and droughts (Whitefield, 2002). Widespread adoption would result in tens of millions of trees being planted.

Producing all the fruit and vegetables we consume in gardens would enable 145,494 hectares of farmland to be used for other purposes. Overseas environmental benefits are difficult to quantify as they are dependent on the growing systems currently practiced.

Pesticides and fertilizers

Table 7: Pesticide and fertilizer use represented in tonnes and as a percentage of the tonnes applied annually for all agricultural uses in the UK.

Crop	Tonnes applied / %age of all agricultural use.			
	Pesticide	Fertilizer		
		Nitrogen (N)	Phosphorus (P)	Potassium (K)
Vegetables	1,215.255 / 4.0%	7,618 / 0.7%	5,152 / 2.4%	9,230 / 2.8%
Potatoes	12,081.589 / 39.42%	22,108 / 2.1%	19,196 / 8.9%	33,517 / 10.3%
Fruit & nuts	580.823 / 1.9%	980 / 0.1%	446 / 0.2%	1,548 / 0.5%
Total	13,877.667 / 45.32%	30,706 / 3.0%	24,794 / 11.5%	44,295 / 13.6%

Source: FERA²¹ Pesticide Usage Survey (2009) - See Appendix 3 and DEFRA

(2008) The British Survey of Fertiliser Usage – See Appendix 4.

Table 7 shows that changing to garden-produced organic fruit and vegetables would

mean nearly 14 million Kilograms less pesticide was released into the environment

annually and 30,706, 24,794 and 44,295 less tonnes of N, P and K respectively.

These figures do not include the pesticide and fertilizers savings on imported food.

Greenhouse Gas Emissions

Approximately 2.5% of the UK's entire GHGs emissions are caused by consumption

of fruit and vegetables, with the most emission intensive stage being transport

(0.55%) and refrigeration (0.65%). This compares to the 19% for the food industry as

a whole. Half of all transport GHGs are emitted by the 1.5% of fruits and vegetables

that are air-freighted.

NO₂ emissions due to horticulture cause 0.195% of UK GHG emissions. The energy

used to grow fruit and vegetables in heated structures accounts for a third of all

agricultures CO₂ emissions: 158,485 tonnes of carbon (Garnett, T 2006).

²¹ Food and environment research agency

Organic garden production could eliminate GHG emissions due to NO₂ emissions.

Reductions in CO₂ is be harder to quantify, but with better consumer choices could be reduced to those caused by cooking alone.

Conclusion

Summary of the case made

Widespread adoption of biointensive kitchen gardening techniques coupled with the extensive planting of food forests in private gardens could substantially improve the UK's self sufficiency in food production whilst reducing fertilizer, pesticide usage and GHG emissions. All fruit, vegetables and potatoes could be garden produced.

Wildlife would benefit through increased habitat availability throughout urban areas and potentially more habitat available in the countryside.

To maximise benefits however people would need to change their behaviour and begin enjoying indigenous in-season produce rather than pre-packaged air-freighted produce. They would also need to actively participate in land-share schemes to match gardeners with land.

Existing Orthodoxy

Western farming is promoted as highly efficient. But it is measured in terms of yield produced per farmer and not yield produced per kilojoule of fossil-fuel energy input. Home food production is far more kilojoule efficient than farming.

Many environmentalists promote compact living in cities as the desired model for the most environmentally benign human settlements, as opposed to suburban developments. However most people reject high-rise living, and desire the suburban ideal. Properly managed, suburbia could be self-sufficient in fruit and vegetables, provide vital wildlife habitats and enable people to reconnect with the land.

Limitations of the essay

Data supplied by DEFRA can be considered robust, but that relating to biointensive farming and food forests needs substantiated with UK trials. It was not possible to exactly quantify the quantity of GHGs emitted by the fruit and vegetable industry in the UK and estimates as a proportion of the whole food industry were made.

The environmental cost of current garden maintenance, such as running lawnmowers was not considered. Neither were the effects of land use change due to conversion of lawns to other uses.

The total area of UK gardens was taken as a single mass and an average garden size was used. Gardens vary in size.

Not everyone would wish to participate in food production or land share schemes, and those who did may require training.

Gardens are not currently wholly lawn and flowerbeds: many contain trees, some fruit trees.

Further research

Several long-term practical studies should be conducted around the UK to evaluate the productivity of biointensive gardens and food forests. Other studies could include:

- The use and yield animals in the garden.
- The recycling of nutrients including N,P,K through composted human excrement.
- The use of grey water and rainwater management.

The food production potential of urban green spaces other than private gardens could be evaluated.

Only environmental benefits were examined. Other studies could measure the effects on:

- Physical health
- Mental health
- Social cohesion
- Ecopsychological effects. How gardening may enable one to reconnect with nature.

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12 March 2010.

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Appendices

Appendix 1. Land by agricultural and other uses

	Agricultural land			Forest and woodland %	Urban land and land not otherwise specified %	Total Land in 1,000s hectares
	Crops and bare fallow %	Grasses and rough grazing %	Other %			
England	30.1%	37.1%	5.1%	8.6%	19.2%	13,028
Wales	3.2%	72.3%	1.0%	13.8%	9.8%	2,073
Scotland	7.1%	66.4%	1.9%	17.1%	7.5%	7,792
Great Britain	19.8%	50.3%	3.7%	12.0%	14.3%	22,893
Northern Ireland	3.8%	72.9%	0.7%	6.3%	16.4%	1,358
United Kingdom	18.9%	51.5%	3.5%	11.7%	14.4%	24,251

Source: DEFRA (2009)

Appendix 2 Detailed organic land type 2008

	In conversion	Fully organic	Total	Total crop area at June 2008	Organic area as % of total crop type
Total cereals	9,923	47,316	57,239	3,272,075	1.70%
Wheat	4,512	17,812	22,324	2,080,463	1.10%
Barley	3,135	12,410	15,545	1,031,960	1.50%
Oats	1,092	11,525	12,617	134,664	9.40%
Other cereals	1,184	5,569	6,753	24,989	27.00%
Other crops	2,486	8,675	11,161	991,894	1.10%
Sugar beet	35	152	188	119,654	0.20%
Fodder, silage and other crops	1,810	6,174	7,984	73,183	10.90%
Other crops	641	2,349	2,990	799,058	0.40%
Fresh vegetables	1,835	14,651	16,486	271,566	6.10%
Potatoes	205	3,065	3,270	143,317	2.30%
Fruit & nuts	374	1,510	1,884	32,912	5.70%
Herbaceous & ornamentals (a)	586	4,922	5,508	12,866	42.80%
Temporary pasture	31,048	98,808	129,855	2,058,362	6.30%
Permanent pasture (inc. rough grazing) (c)	96,022	398,294	494,316	8,897,334	5.60%
Woodland	2,709	3,176	5,885	716,163	0.80%
Other	3,916	13,995	17,911	n/a	n/a
Total organic land area	149,103	594,413	743,516		

(a) The large increase in the area of 'herbaceous & ornamental' plants in 2008 is due to

improvements in the data recording systems.

(b) Source: Defra June Survey of Agriculture

(c) The majority of the omitted land (39,000) appears in permanent pasture

Source: DEFRA Organic Statistics, 2009

Appendix 3. Pesticide use by crop.

Crop Group	Total Area Treated (ha)	Total Weight Applied (kg)	% age Applied by weight
Cereals	45,977,322	12,808,263	41.79%
Oilseeds	5,210,293	1,280,709	4.18%
Peas & beans	2,431,778	1,011,875	3.30%
Potatoes	3,500,070	12,081,589	39.42%
Set aside	891,183	452,980	1.48%
Beet crops	2,310,461	592,837	1.93%
Other arable crops	425,841	182,102	0.59%
Vegetable brassicas	324,632	158,129	0.52%
Lettuce & other leafy salads	65,067	38,926	0.13%
Onions & leeks	343,341	226,922	0.74%
Carrots & parsnips	232,040	101,287	0.33%
Other root vegetables	20,926	13,288	0.04%
Other outdoor vegetables	46,399	83,866	0.27%
Maize & sweetcorn	542,278	264,046	0.86%
Other fodder crops	249,383	88,322	0.29%
Grassland	1,172,216	681,362	2.22%
Top fruit & hops	571,017	340,148	1.11%
Strawberries	53,117	145,500	0.47%
Other soft fruit	70,397	95,675	0.31%

Source: Food and environment research agency (2009) Pesticide Usage Survey.

Appendix 4. Fertilizer use by crop.

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Spring wheat	84	24	47	58	85	46	42	72	11	20	40
Winter wheat	98	45	47	17	181	61	76	178	27	36	1971
Spring barley	95	71	76	33	99	48	62	94	34	47	735
Winter barley	98	62	69	19	138	56	74	134	35	51	611
Oats	80	51	52	14	103	50	73	83	26	38	193
Rye/triticale/D urum wheat	51	10	25	37	140	56	79	71	6	20	47
Potatoes (seed or earlies)	100	100	100	10	150	158	216	150	158	216	13
Potatoes (maincrop)	99	88	94	29	156	147	249	154	130	235	98
Sugar beet	93	54	80	31	92	58	112	86	31	90	135
Spring oilseed rape	99	72	84	12	115	67	75	114	48	63	18
Winter oilseed rape	99	48	50	11	194	61	70	193	29	35	564
Linseed	96	13	35	29	60	42	53	58	6	18	27
Forage maize	70	60	39	91	59	52	79	41	32	30	199
Rootcrops for stock feed	80	65	67	63	68	85	72	54	55	48	53
Leafy forage crops	72	66	66	48	75	41	41	54	27	27	43
Arable silage/other fodder crops	39	29	30	57	89	36	45	35	11	14	79
Peas human consumption	2	36	41	2	24	67	72	0	24	30	36

	Crop area receiving dressing (%)				Average field rate (kg/ha)			Overall application rate (kg/ha)			Fields in sample
	N	P ₂ O ₅	K ₂ O	FYM	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	
Peas animal consumption	1	35	44	3	37	64	79	1	22	35	40
Beans animal consumption	6	38	38	8	15	59	66	1	22	25	163
Vegetables (brassicae)	100	100	100	30	120	69	115	120	69	115	30
Vegetables (other)	80	62	86	25	97	66	102	78	41	87	67
Soft Fruit	95	89	92	0	32	19	66	30	17	61	11
Top Fruit	63	25	43	5	71	54	106	44	14	45	34
Other tillage	48	41	41	8	84	77	157	40	32	64	73
All tillage	91	52	55	22	155	59	79	140	31	43	5280
Grass under 5 years old	80	57	58	46	122	31	46	97	18	26	933
Grass 5 years and over	53	39	39	32	87	22	27	46	9	11	2332
All grass	58	42	42	34	95	24	32	55	10	13	3265
All crops and grass	73	47	48	28	130	42	57	95	20	27	8545

Source: DEFRA (2008) The British Survey of Fertiliser Usage.