Self-suffiency on a vegan diet: the land needed

In order to become completely self-sufficient in food how much land would a man and woman need?

The food needs of a moderately active man of 35 to 65 years of 65 kg weight and a woman of 55 kg combined, according to Dept. of Health & Social Security figures, are taken as a basis. In addition to the minerals quoted others such as potassium, magnesium, iodine and fluorine are needed in small quantities, but are present in most foods so that a deficiency is unlikely to occur.

Inputs are assumed to be organic. Yields of wheat, oats and potatoes are estimated at only half of modern commercial yields which is almost certainly an underestimate. Yields of other crops are what experienced growers commonly achieve.

In Table 1 the consumption of wheat and potatoes are average for the U.K., and are the basis of the diet. The diet is a healthy and adequate one, but boring. It is, however, more appetising than that eaten by many people in the poor countries of the world. A herb plot is is included to increase the palatability of the food. Yields could be increased by catch cropping and intercropping.

Table 1 Land required

	Estimated yields		Daily ration for 2	Land required
Wheat	2000	lb/acre	14oz	720 yd^2
Potatoes	12000		15	160
Oats	2000		4	240
Peas	3	lb/yd^2	4	30
Broad beans	3		8	60
Carrots	13		8	14
Onions	10		4	10
Lettuce	8		4(May-Oct)	6
Cabbage	6		4(Nov-Apr)	8
Beetroot	10		4	10
Parsnip	10		4	10
Herb plot				8
Compost heap				12
				1288

Table 2 Food values provided by Table 1 rations

	Protein gm	kilocalories
Wheat	37.8	952
Potatoes	9.0	1364
Oats	13.6	452
Peas	5.6	56

cont.

	Protein(gm)	Kilocalories
Broad beans	16.0	152
Carrots	1.6	56
Onions	1.2	28
Lettuce	1.2	12
Cabbage	1.6	32
Beet	2.0	48
Parsnip	2.0	56
	89.0	3208
Requirements for man & woman	128	5100

The diet, then, is inadequate by western standards. A remedy would be to double the wheat and potato crop. The protein would then amount to 135.8 gm and the Calories 5524. The total land required would be 2168 sq.yd.

How about vitamins, minerals and protein quality?

Table 3 Vitamins

	Thiamine mg	Riboflavine mg	Nicotinic acid mg	Vit.C mg	Vit.A µg	Vit.D µg
Wheat	3.36	0.84	36.4	0	0	0
Oats	2.00	0.12	4.0	0	0	0
Peas	0.12	0.12	2.8	16	56	0
Broad beans	0.16	0.08	11.2	72	48	0
Carrots (old)	0.16	0.08	1.6	16	4536	0
Potatoes	0.60	0.30	3.9	30-120	0	0
Total	6.40	1.54	59.9	134-224	4640	0
Recommended needs of man+woman	2.1	3.0	33	60	1500	5.0

Parsnips, onions, beetroot, lettuce and cabbage contain very little riboflavine, and it is evident that the diet is more than adequate in all vitamins except riboflavine, B_{12} and D, but the latter is synthesised following exposure of the skin to sunlight so is unlikely to be a problem. To supply riboflavine and B_{12} would require a yeast extract food supplement to this vegan diet.

Table 4 Minerals and Amino Acids

	Calcium mg	Iron mg	Isoleucine g	Leucine g	Lysine g	Methionine g	Phenyl alanine g	Threonine g	Tryptophan g	Valine g
Needs per day	1000	22	1.4	2.2	1.6	2.0	2.2	1.0	0.50	1.6
Wheat	392	42	3.1	5.0	2.0	1.25	3.6	2.2	1.0	3.2
Oats	220					0.23				
Peas	16					0.07				
Broad beans	72					0.05				
Potatoes	64					0.1				
Carrots	112					0.02				
Parsnips	64					0.01				
Beetroot	36					0.01				
Cabbage	72					0.03				
	1048					1.77				

From this table it is apparent that only methionine is lacking in adequate amounts. This could be supplied by doubling the area of oats, but the addition of half a pint of milk per person per day would supply this more effectively: 1 pint of milk would provide 0.45 grams methionine and also 18 grams protein and 360 kcal.

If the diet were to be kept purely vegan the total land required would be 2408 sq.yd. or just under half acre.

Conclusion

It is theoretically possible to supply the food needs of one average adult on a singularly uninspiring diet from a quarter of an acre of average land using only organic inputs.