Can Britain Farm Itself ?

As the need to repopulate the countryside with a new generation of small farmers becomes ever more pressing, Ed Hamer asks the big questions that will help to make this possible.

Back in 2007 *The Land* drafted a "back of an envelope job" calculating the ability of Britain to meet its food needs from our available agricultural land. In *Can Britain Feed Itself?* we evaluated six land use scenarios ranging from "chemical with livestock" to "vegan permaculture" and concluded that yes, Britain could indeed feed a population of 60.6 million people with varying degrees of flexibility – but only if we ate less meat.

Five years on and *Can Britain Feed Itself?* has been quoted by papers, pressure groups and commentators as the Food Security debate has moved from the fringe to the mainstream. What's remarkable about our original article is that it was the first attempt in nearly 30 years to address this question in print – and that since it was published neither Labour or the Coalition have felt inspired to follow it up with any kind of publicly funded evaluation.

More remarkable still is that since 2007 we've seen not only a global recession leading to the highest rate of UK unemployment for nearly two decades, but also the sharpest spike in food prices in living memory. Faced with a labour surplus and persistent doubts about national food security it might have been pertinent for someone to ask the question – could farming once again become a major employer in the UK? And could we even support a more resilient agriculture as a result?

Regrettably, the question doesn't seem to have been asked, at least not publicly, in the halls of power and so in the absence of anyone else stepping forward to take the initiative *The Land* has turned over the envelope and had another go.

Admittedly there are limitations to this kind of theoretical exercise, not least the variables involved in multiplying yields and labour demand from a sample population to regional and national levels. As with Simon Fairlie's original article the results of *Can Britain Farm Itself?* should be regarded only as a rustic guide to what could be achieved, given more time and attention than can be offered by a busy farmer in the throes of the growing season.

Lack of Interest?

For a country which devotes 80 percent of its land area to the business of producing food, the British public are remarkably casual about the details of how and what we farm. A 2011 survey by the National Trust found that consumers rated their knowledge of farming at 4.5 out of 10, with two out of every five adults in the UK unable to say what an arable farm was - and one in six who couldn't identify wheat as the main ingredient in flour[1].

This lack of awareness has traditionally been interpreted as a lack of interest by both the mainstream media and the government who have come to regard farming as an "industry" like any other, as opposed to the culture associated with growing our food. Details like farm yields, working pay and conditions - and whether it's been good season or not - tend to be relegated to the pages of the farming press. They are rarely discussed in the newspapers or even in the pub. As a result we know more about the salaries and livelihoods of our Premiership footballers than about the people putting food on our plates.

For those who make a living out of producing food, however, these details are acutely relevant. And for those who simply consume, they are perhaps more relevant than you might imagine. Whether or not you share the opinion of Ewen Cameron, the former Chair of Natural England, that "Britain is only nine meals away from anarchy", it is a simple fact that the details of how and what we farm deserve our attention – and this includes an evaluation of the labour, skills and knowledge needed to feed ourselves into the future.

Can Britain Farm Itself Today?

As a starting point it's worth considering the make up of our farming culture today. What we produce, how we produce it and how many pairs of hands it takes to do so. While this might sound like an ambitious task given the convoluted way we go about feeding 62.3 million people, we're fortunate that someone else also takes a particular interest in the finer details of farming.

Between 1955 and 2001 the UK government conducted an annual Farm Business Survey (FBS) as a compulsory census

Miriam McGregor

As the older generation of farmers dies off they are replaced by bigger and bigger machines. Feeding ourselves in the future depends upon bringing up a younger generation with the right skills.

Enterprise	2010 hectares/ headage (thousands)*	2010 Yields (tonnes/hectare/ head)	Gross UK production million tonnes/2010*	Defra SLR estimates. 1 SLR =*	Labour demand based on SLR's
Cereals for milling	1,534(ha)	6.95	10.6	95 ha	16,148
Cereals and grass for animal feed	1,473(ha)	6.95	10.2	95 ha	15,514
Oilseeds	697(ha)	1.25	0.8	125 ha	5,576
Potatoes	138(ha)	43.80	6.0	17.5ha	7,885
Sugar beet	92(ha)	7.0	0.6	60 ha	1,533
Vegetables & Fruit	169(ha)	13.89	2.3	19 ha	8,894
Milk	1,864(h)	7.4/cow	13.9	50 head	37,280
Beef	2,800(h)	0.32/cow	0.9	160 head	17,500
Sheep	14,000(h)	0.02/sheep	0.28	530 head	26,415
Pigs	9,900(h)	0.07/pig	0.77	3,545 head	2,792
Poultry	909,000(h)	1.5kg/bird	1.3	47,500 head	19,136
Totals			**47.65**		**158,673**

TABLE A

of every farm holding in the country. The survey was scaled back in 2001 to a subset of roughly 30,000 holdings a year with a full census now conducted every ten years. The FBS gives a running commentary on the state of British agriculture, on-farm land use, energy and labour stretching back nearly 60 years. Its results are published annually in the *Agriculture in the UK* report.

One of the key indicators recorded by the FBS is the mean labour demand of each enterprise on the farm – this is recorded as a Standard Labour Requirement (SLR). An SLR is calculated by averaging the number of full-time and part-time employees in each farm enterprise against productivity. These are then adjusted to account for the realities of farming, given that you are rarely occupied with a single enterprise.

In 2010 maincrop potatoes were given an SLR value of 20 hectares - meaning that 20 hectares of maincrop potatoes demanded, on average, 1,840 hours to be cultivated, planted, tilled and harvested - the equivalent of one full-time worker for 46 weeks of the year. For dairy cows an SLR headage of 50 was calculated - meaning that roughly 50 dairy cows should be enough occupy the average cowherd for a year[2].

SLRs are calculated exclusively for the labour required to take each individual enterprise through its production cycle from the field to the farm gate and no more. They do not account for processing nor for dependant demand. For example the labour required to cut and make silage for a dairy enterprise is listed under "Grassland" and not under "Dairy".

As with all statistics SLRs should be treated cautiously. But given Defra's liberal attitude to staffing, and enviable budget for data collection, it's unlikely we'll find a more considered set of figures elsewhere. There's also something quietly satisfying about making the most of Defra's hard work to raise a point that they seem disinclined to consider themselves.

According then to Defra's figures, in 2010 the UK had an agricultural labour force of 159,000 full time equivalents and an agricultural land area of 18.2 million hectares. Table A shows the land areas and headage figures recorded by the 2010 FBS for each farm enterprise, their respective SLR values calculated by Defra and an estimate of the distribution of labour demand.[3]

Of 2010's 47.65 million tonnes of gross agricultural produce Defra calculates that 86 percent was consumed here in the UK and 14 percent was sent for export. In the same year we also imported 8.61 million tones of "indigenous type" produce - produce which could have been grown in the UK[3]. This balance of imports and exports is assumed by many to be the foundation of the country's self sufficiency – our ability to feed our current population with what we produce. Defra refer to this figure as the "UK Food Production to Supply Ratio" and calculate it as a percentage from the value of food we produce ourselves divided by the value of all food consumed that could be grown here in the UK – including imports. A high value therefore indicates that we are producing the majority of the food we consume while a low value suggests relative food insecurity. The UK's indigenous Food Production Supply Ratio has decreased year-on-year since 1988 and reached an all time low of 71.7 percent in 2009. In 2010 it rose slightly to 74.4 percent[3].

The reason this measure of self sufficiency is relevant to agricultural employment is that it has an impact on both labour and land use that could otherwise be occupied with meeting domestic demand. Table B attempts to summarise this by calculating the SLR equivalents relative to both exports and imports of each enterprise. The far right hand column also calculates the net labour change that could be expected if we were to replace 2010's export production with the production of relative imports, based on UK labour figures.

The results indicate that we currently devote the equivalent full time labour of 16 percent of our agricultural workforce to the production of goods for export, while at the same time 2010 food imports equated to an estimated 91,893 full time agricultural jobs in the UK. Cutting exports and replacing imports with domestic production would result in a, not insignificant, increase of 66,315 full time equivalents in the farming sector.

TABLE B Source: *= Defra[3] ** = FAOSTAT[4]

Enterprise	Exports m/tonnes 2010**	Estimated 2010 SLR's	Imports m/tonnes 2010**	Estimated 2010 SLR's	Net labour change
Cereals for milling	2.33	3,528	0.49	742	-2,786
Cereals and grass for animal feed	1.09	1,650	1.04	1,575	-75
Oilseeds	0.00	-	0.02	128	128
Potatoes	0.25	326	0.28	365	39
Sugar beet	0.07	166	0.03	71	-95
Vegetables & Fruit	0.01	37	0.16	606	569
Milk	2.29	6,189	4.00	27,027	20,838
Beef	0.08	1,562	2.30	44,921	43,359
Sheep	0.09	8,490	0.11	10,377	1,887
Pigs	0.10	402	0.36	1,450	1,048
Poultry	0.23	3,228	0.33	4,631	1,403
Totals	**6.55**	**25,578**	**9.13**	**91,893**	**66,315**

Enterprise	Target yield person/day grams	Annual demand m/tonnes	2010 yield tonnes/ha tonnes/h	Areas/ha Livestock/head required	New SLR demand	Net SLR change
Cereals & oilseeds	500	11.33	6.95	1,630,215	14,820	-6,904
Potatoes	453	10.27	43.8	234,474	13,399	5,514
Sugar beet	32	0.68	7.0	97,142	1,619	86
Vegetables & Fruit	500	11.33	13.89	815,694	42,931	34,037
Cereals and grass for animal feed		5.76	6.95	82,877	872	-14,642
Milk/dairy produce	568	12.89	7.4ton/cow	1,741,891(h)	34,837	-2,443
Beef	56	1.27	321kg/cow	3,956,386(h)	24,727	7,227
Sheep	14	0.31	20.1kg/sheep	15,500,000(h)	29,245	2,830
Total labour force (SLR equivalent)					**162,450**	**+3,777**

TABLE C

Although maybe not groundbreaking, this is, as far as we are aware, the first time that this exercise has been carried out, and it's a useful starting point. It is important to emphasise however that it doesn't account for the labour required to produce non-indigenous crops like soya and palm oil which can't be grown in the UK and it also assumes that exports and imports cancel each other out relative to demand – which they do not.

Much better would be to calculate the labour demanded by a standard diet which could be supplied entirely from domestic resources. Table C attempts this using Simon Fairlie's original "Chemical Livestock" diet taken from Can Britain Feed Itself? For this exercise pig and poultry enterprises along with their relative labour, have been removed to account for the drop in current levels of meat consumption that would be needed if Britain was to feed itself from its available land area [5].

The diet has been updated for a population of 62.3 million people and represents as closely as possible the balance of farming and land use in the UK today. The entire population is awarded the same diet on the understanding that the working population will make up for older generations and the youngsters in terms of appetite.

Table C suggests that, based on 2010's average per hectare yields, it is still possible to feed 62.3m people a standard but varied diet with very little change in the way we farm today. This could even lead to a modest two percent increase in the agricultural labour force – or nearly 4,000 jobs. And while this is certainly commendable it does raise the question – how many people *could* we employ if we radically changed the way we farm?

The Roots of Decline

That the intensification of farming would lead to fewer and fewer jobs was perhaps always inevitable. In the late 1930's, just before the war, 540,000 people were employed in farming in the UK[6]. At the time British consumers were spending an estimated 35 percent of their income on food, making the money in farming steady - and the labour cheap.

After the war however, things changed culturally as well as politically. Agriculture as an "industry" became less autonomous and ever more centralised. The 1947 Agriculture Act was a fundamental piece of legislation considered by many to be based on sound thinking. Drafted by Clement Atlee's Labour government to "promote a healthy and efficient agriculture capable of producing that part of the nation's food which is required from home sources with the provision of adequate remuneration and decent living conditions for farmers and workers"[7]. It was introduced in response to public concerns that food imports - mostly from the U.S - were replacing home grown produce.

Ironically however the goal of "adequate remuneration" can arguably be held responsible for the sharpest decline in the agricultural workforce for the best part of a century. The 1947 Agriculture Act was the first piece of legislation to introduce intervention prices - subsidies paid for by the taxpayer to support farmers regardless of their skill or attention to land husbandry. During the same post-war period manufacturing was also being subsidised to promote blue-collar jobs in northern factory towns - with farming clearly promoted as a market ripe for modernisation. The result was an emerging mechanised farming industry finding its swagger amongst a new generation of cash-flush farmers.

For farm labour, the 1947 Agriculture Act was arguably the biggest blow since Jethro Tull decided to tinker about with some horses and an 18th century plough. Between 1948 and 1989 the UK's labour force fell by 70 percent as the first tractors, then balers and finally combine harvesters arrived in rural parishes[8]. Increased efficiency and economies of scale encouraged farmers to expand their markets from regional to national, and beyond.

These new markets demanded high volume and uniform quality produce. The most efficient way to get those was through specialisation. Turning to their natural strengths, small farms in the damper hills of the west focussed on livestock while the flatter and drier east concentrated on growing cereals. Whereas smaller mixed farms had needed workers throughout the year, the larger specialist farms tended to only need labour at peak times with very little maintenance in between.

Of course it is naïve to blame mechanisation entirely for this rural exodus. The popularity of further education, degrees and qualified training would have cost many rural communities a ready supply of able-bodied workers. Social housing almost certainly encouraged rural to urban migration among a generation who would have previously remained in the countryside. Meanwhile on the farm selective breeding, crop science and agrochemicals were making short work of manual labour.

The pattern continued throughout the second half of the 20th century, buoyed by our accession to the Common Agricultural Policy in 1963, and the subsequent scramble to compete with farmers on the other side of the channel. By the time we signed the General Agreement on Tariffs and Trade in 1994 we were pitching our farmers against U.S. cereal producers and Brazilian ranchers, and full-time labour was a luxury that could rarely be afforded.

The first decade of the 21st century was characterised by a new approach to farming which prided itself on the production of "global commodities" as opposed to national food supplies. In this environment it's difficult for farmers to justify anything other than the bare minimum labour costs for fear of being

Jack Marshall

Endangered species? Thanks to mechanisation, the land supports fewer famers each year. Given the political will it is entirely possible to reverse this trend and repopulate the countryside with a new breed of ***Agricola vulgaris*** - yeomen smallholders.

judged inefficient. Taking this to its logical conclusion, Farmers' Weekly reported in May 2012 on the unveiling of John Deere's first driverless tractor which can plough, seed and harvest a 1,000 acre field if you want it to - controlled entirely by a GPS computer[9].

Double Yield

How many people could we employ if we radically changed the way we farm today? As mentioned earlier, the only way this can really be modelled is by calculating the labour demand across a subset of farms and then multiplying this figure to give an idea of the impact on a national scale. In 1997 an attempt was made to do just this by Vicki Hird from the Sustainable Agriculture Food and Environment Alliance (SAFE – now Sustain). Her results were published in a report titled *Double Yield; Jobs and Sustainable Food Production*. Using case studies and reviews of several independent reports Hird argued that: "By switching support away from the richest farm sectors (such as arable) and providing support for sustainable agriculture it is possible to protect the environment, whilst facilitating job creation: a double yield"[10].

More recently in 2009 the Soil Association commissioned Reading University to conduct an evaluation comparing yields of indigenous foods that could be produced in England and Wales under organic production with the volumes currently produced under "conventional" (non-organic) production. The report used a subset of data from Organic certified farms collected by Defra's Farm Business Survey, and scaled up these results to give a picture of the variations in yield that could be expected from a nationwide conversion to Organic production. These results have been used to adjust 2010's yield figures in Table D.

This calculation also required a re-evaluation of Defra's SLR figures to account for the fact that Organic management, by its nature, is more labour dependent than conventional agriculture. These figures were adjusted in accordance with a report published by the Soil Association in 2006 called *Organic Works*. The report evaluated five separate investigations into the impact of organic management on farm labour demand over a ten-year period and concluded an average 31 percent increase in on-farm labour compared to non-organic production[11].

As may be expected, Table D demonstrates a dramatic increase in labour demand from a nationwide conversion to small-scale mixed farming of 157,000 full time equivalents, or 99 percent. It also suggests that 16.7 million hectares of croppable and permanent pasture would have to support 332,000 full time employees, an average of just over 50 hectares (120 acres) per person. So we now have a ballpark figure for the number of hands needed to feed our current population in a way that is, to all intents and purposes, "resilient". The next logical question would seem to be - could we do it?

Can We Do It?

In 2010 Defra estimated that British consumers spent £156 billion on food after imports[3]. If we set a modest target of meeting 90 percent of domestic demand from domestic supply then we can realistically assume we have a budget of £140 billion consumer spending to work with. Of this total, our current, centralised, retail model awards the producer eight percent - or £11.2 billion[13]. Applied to the 50 hectares of farmland allocated to each full time employee in Table D this equates to a gross margin averaging £33,000 per person per year.

Now, realistically, in today's market £33,000 gross revenue is not going to make ends meet on a 120 acre mixed holding. In order to support this level of agricultural employment

Enterprise	Target person/day grams	Annual production required m/tonnes	2010 organic yields tonnes/ha tonnes/h*	Area required ha/ (thousands)	Organic SLR figures**	Total Labour required	Net SLR change
Cereals & oilseeds	500	11.33	4.72	2,400,423	76 ha	31,578	-85
Potatoes	453	10.27	33.6	305,654	12 ha	25,416	+19,840
Sugar beet	32	0.68	7.6	89,473	41 ha	2,170	-5,715
Vegetables & Fruit	500	11.33	11.0	1,030,000	13 ha	79,230	+74,697
Green Manure				1,743,000			
Cereals and grass for animal feed		4.72	4	1,180,000	76 ha	15,526	-12
Milk/dairy produce	568	12.89	4.8ton/head (2,685,416 h)	1,951,000	34 head	78,970	+70,076
Beef	56	1.27	227kg/head (5,594,713 h)	4,214,800	110 head	50,854	+13,574
sheep	14	0.31	17.5kg/head (17,714,290 h)	3,793,000	365 head	48,531	-14,826
Total land				**16,707,350**			
Total labour						**332,275**	**+157,549**

TABLE D

* = From Jones & Crane (2009) calculations of organic vs. conventional yields[12]
** = Derived from Soil Association (2006) average increase of 31% labour demand.

we would need to dramatically increase the share of the food pound received by our producers. If we were able to reorientate supply towards local markets where producers could secure a higher proportion of retail spending things very quickly begin to look different. Based on 2010's retail figures, for every additional one percent of the retail pound that can be secured by the producer, their gross margin increases by £83 per hectare. Spread over 50 hectares this soon starts to make a difference.

If we could work towards the 58 pence of the pound secured by Farmers' Markets, or 21 pence from local retailers[14], we start to see an achieveable picture emerge. If a single farmer was to run his 50 hectare holding with a combination of vegetables, cereals and beef, of which he sold a quarter through a Farmers' Market, a quarter through local retailers, and still gave half of it away to Tescos, based on 2010 figures - he could expect an estimated gross income of £98,562 across his holding.

Even accounting for the fact that we're on statistical territory, this particular farmer has the potential, after tax and overheads, to secure a healthy return for all of his hard work. He may even have money left over to support an additional full-time or part-time employee– leaving space for the arable boys in East Anglia to soak up a few extra hectares and still make the most of their competitive advantage for growing cereals.

Yes We Can!

It's undeniable that the model described above is idealistic and in many areas of the UK would be difficult to implement. However it's only through an exercise like this that we can re-start the debate over the ability of our home-grown farming sector to provide a double yield of both employment growth and healthy food.

It goes without saying that such a proposal demands robust research, modeling and testing. Any comprehensive evaluation must take into account associated job losses from dependent industries such as agrochemical and agricultural factors, as well as the likely role that poorly-paid and over-worked migrant labour would play in any increase in demand for employment from within the farming sector.

It's also acknowledged that the narrative laid out above is not universally endorsed. A year after the publication of *Double Yield* the journal *Farm Management* published an article which argued that an 11 percent decline in the agricultural labour force between 1984 and 1994 was simply the "levelling out to a minimum required to operate farms efficiently and maintain a viable countryside"[15].

Those opposed to a renaissance in farm labour for idealistic or commercial reasons will inevitably cite a "lack of interest" from younger generations in pursuing a career on the farm. But recent evidence from Ireland suggests a buck in the trend. Following the Eurozone economic crash in 2007 when unemployment rocketed to 60 percent across the Republic, attendance at agricultural colleges has increased by 44 percent as the next generation seek a way to remain employed in the country[16].

Here in the UK the Higher Education Statistics Agency reported in January 2012 that "Agriculture courses had seen the biggest increase in UK university enrolments over the last two years. Agriculture and related subjects saw an 11 per cent surge in undergraduate students and two per cent rise in postgraduate students between 2008/10 and 2010/11"[17]. Readers of *The Land* will also be aware of a growing interest among a younger generation to return to the land – typified by the growing Reclaim the Fields movement across Europe.

As Vicki Hird says in her report "That the UK could be entirely self sufficient in all products is not being suggested. Yet when it is not even self sufficient in produce suitable to its climate and soil, and when considerable social and environmental problems arise from the current production and importation, there should be a significant shift in policy towards promoting production and consumption of home grown produce."

As we head into the century of "sustainable intensification" it is essential that those of us concerned with the realities of producing food continue to provoke debate and demand answers to the most basic of questions relating to our food supply – perhaps starting with the simple maths of food insecurity vs. rising unemployment. Because if the alternative is one man, one computer and the thousand acre field we may very soon find 150,000 more allies calling for a resilient farming that supports good soil, healthy people and a hearty culture.

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