

## Survey and Analysis of Labour on Organic Farms in the UK and Republic of Ireland

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A survey of 1144 organic farms in the UK and Republic of Ireland (IE) was used to assess whether organic agriculture provides more labour than conventional (non-organic) farming. The sampled farms comprised 23% of all organic farms. The jobs per farm and per area varied greatly with enterprise type and farm size, and between regions. Comparison of the survey with national statistics showed that organic farms employ 135% more FTE (full time equivalent jobs) per farm than conventional farms. The mean jobs per area was markedly lower for organic farms (1.35 compared to 2.43 FTE per 100 ha), because they are larger (216 ha compared to 51 ha). Even when corrected for the different size distribution, organic farms had more jobs per farm than the national averages (2.52 and 1.49 FTE for the UK and IE, compared to 1.28 and 1.16 FTE). The farm size weighted FTE per area for organic farms in the UK (4.33 FTE per 100 ha) was almost twice that for conventional farms. We predict there would be 19% and 6% more farming jobs in the UK and IE if 20% of the farms of both countries were to become organic (compared to the present 1–2%).

**Keywords:** farm labour, organic agriculture, employment, rural economy

### Introduction

In recent years there has been a growing recognition that measures designed to protect the environment can help to generate employment, enhance competitiveness and promote economic well-being (CEC, 1994, 1997), rather than threaten jobs. Policy makers have begun to see environmental degradation and unemployment as symptoms of inefficient resource use, effectively an under-use of labour and over-use of environmental resources, and to focus on the opportunities that the environment offers for job creation (Hawken *et al.*, 2000; OECD, 1997; Pretty, 1998, 2002; von Weizsacker *et al.*, 1997).

To date, however, most published literature on the linkages between a more sustainable environment and improved employment has focused on industrial and urban sectors, and less attention has been paid to opportunities and challenges in agriculture.

Various agri-environment schemes and organic farming support schemes have been implemented in Europe to promote more sustainable farming practices and enhance the farmed landscape. There is some evidence from such schemes and projects in the EU and the USA to suggest that measures to increase agricultural sustainability, whether in the form of habitat improvement, integrated methods of production, or whole farm changes can lead to increased demand for on-farm employment (e.g. ADAS, 1996a, 1996b; Dobbs & Cole, 1992; Dubgaard, 1994; Harrison-Mayfield *et al.*, 1998; Lampkin *et al.*, 1999; Mühlebach & Mühlebach, 1994; NAF, 1994; Padel & Zerger, 1994; Rayment & Dickie, 2001). In particular, it has been generally recognised that labour use per hectare is higher on organic farms in Europe, although the data are highly variable (Hird, 1997; Jansen, 2000; Latacz-Lohmann & Renwick, 2002; Offermann & Nieberg, 2000). More labour use arises because of more labour-intensive production activities including more complex rotation systems and mixed farming, a higher share of more labour-intensive crops (e.g. vegetables and fruit), less mechanisation, more on-farm processing and direct sales activities, and an increase in information requirements (Jansen, 2000). For example, Offermann and Nieberg (2000) reviewed 35 studies of organic agriculture in Europe and found that a 10–20% increase in FTEs (full time equivalents) per hectare occurred in 34% of cases, with a range from a 40% decrease to 60% increase. Labour per hectare was highest on arable and mixed farms,

while dairy farms required about the same or less than conventional equivalents. Horticultural farms were more labour-intensive, while for grazing livestock farms both higher and lower labour use than conventional farms were reported.

Recent years have, however, seen a decline in labour use in countries with well-established organic farm sectors, such as in Denmark, Germany and Switzerland, where there was a 35% fall in labour per hectare during the 1990s (Offermann & Nieberg, 2000). This appears to have been due to the development of labour saving technologies and increased mechanisation appropriate for organic farming, and increases in organic farm size. There is some evidence to suggest that small farms employ more people per unit area than large farms (Hird, 1997; Jansen, 2000; Lobley, 1995; Raven & Brownbridge, 1995). In the UK many of the farms that have converted to organic farming have been extensive grassland farms (because of the favourable economics and ease of conversion for such farms). Therefore, future increases in the proportion of organic farming may result in increases in jobs per area as the sector adjusts to reflect the distribution of sizes and types of farms in conventional agriculture. In this research, we investigated the amount of labour used by organic farming in the UK and Republic of Ireland (IE) by surveying organic farming enterprises. The objectives were (1) to examine variation in the characteristics of the organic farms across regions with contrasting agroecological and socioeconomic characteristics; (2) to assess the difference between the number of jobs supported by organic and conventional farms in the UK and IE, for comparison with previous studies in Europe; (3) explore the relationships between jobs and farm size and farm type; and (4) assess what job dividends might occur if there was expansion of organic farming.

## Definition of Organic Agriculture

Organic agriculture is a defined and certified system of agricultural production that seeks to promote and enhance ecosystem health whilst minimising adverse effects on natural resources. It is seen not just as a modification of existing conventional practices, but as a restructuring of whole farm systems (Caporali *et al.*, 2003; FiBL, 2000; Lampkin & Padel, 1994; Reganold, 2004; Sciallabba & Hattam, 2002). The FAO/WHO

Codex Alimentarius guidelines define organic agriculture as 'an holistic production management [whose] primary goal is to optimise the health and productivity of interdependent communities of soil, life, plants, animals and people' (FAO/WHO, 2001). Similarly, the International Federation of Organic Agricultural Movements, with 750 member organisations in 100 countries, defines it as 'a whole system approach based upon sustainable ecosystems, safe food, good nutrition, animal welfare and social justice. Organic production therefore is more than a system of production that includes or excludes certain inputs' (IFOAM, 2002).

Most industrialised countries now have regulations governing food labelled as organic, though some use the terms 'biological' and 'ecological' instead. In these countries, farms have to be inspected and certified before they can sell produce labelled as organic. In the EU, organic farming is controlled by Regulation EC 2092/91. There is thus a legal requirement for products sold as organic to be certified. In the UK, certification licenses are issued by the Department for the Environment, Food and Rural Affairs (Defra) on advice from the Advisory Committee on Organic Standards to various bodies to undertake farm inspections and certification. In the Republic of Ireland, the Organic Farming Unit in the Department of Agriculture and Food is the responsible body. International standards are published by IFOAM (2005) and guidelines by FAO/WHO (2001).

The past two decades have seen a substantial increase in the numbers of organic farms and amount of organic produce consumed. The annual organic food market estimated for 2002 in the EU was some \$7 billion and in the USA \$8 billion, and is estimated to have reached \$25 bn worldwide in 2003 (Yussefi, 2005). Globally, certified organic agriculture now occupies about 1% of agricultural land and 1–2% of agricultural sales by value. In Europe, the area has grown rapidly from 6000 ha in 1985 to 5.6 M ha for the end of 2003, and food sales have been increasing by about 25% per year during the 1990s and early 2000s (Willer & Yussefi, 2004). In the UK, the total area of organic and in-conversion land (at March 2003) was 741 k ha, which comprised 4.3% of total agricultural area (excluding common grazing). In the UK some 78% of consumers buy some organic food products, though 23% of these consumers account for 84% of the total £1 billion spent in 2002–2003 (Soil Association, 2003).

## Research Methodology

Organic farms in the UK and IE were surveyed with farmer-completed four-page questionnaires in 2003. The questionnaire used the same categories for farm enterprises and labour as those used by the UK agricultural ministry, Defra, for the annual June agricultural census forms. The questionnaire was sent to 90% (not all addresses were available) of the 5027 organic farms in the UK and IE registered with 10 certification bodies in 2003, and 1160 were completed by farmers and returned (25.5% response rate). Some farms were then contacted by telephone or e-mail to cross-check the reported data.

Only 13 questionnaires were rejected owing to incomplete data, two more were removed as they were large vegetable growing and processing enterprises with only 4% and 7% of organic area, and one non-commercial college was removed. The final sample size was 1144, of which 59% were from England (Table 1). The 1018 farms from the UK comprise 24.8% of all registered UK organic growers, and the 177,361 ha of organic and in-conversion land on those farms comprises 24% of the total organic farm area in the UK. This study, therefore, reports on about a quarter of all certified organic farms and farmland area in the UK, and 14% of organic farms and 16% of organic area in the IE. We recognise that government statistics for all farms already include organic farms, but as the area of all organic farms represents only 4% of the total farm area in the UK and <1% of the area in IE, we can assume that the organic data has little distorting effect on the national statistics.

The self-reporting by farmers could have been a potential source of error in the survey, as farmers may have under- or over-reported data in the various enterprise and labour categories on the questionnaire. Self-reporting is, however, the standard reporting mechanism for returns to government for the June agricultural census, the IACS forms for government subsidy support, for tax returns, and for other occasional surveys. Organic farms, unlike many conventional farms, are all also subject to on-farm certification visits, though this may not change the likelihood of accurate self-reporting.

The question of what is a farm is important for this study. In many official statistics, it is farm holdings that are recorded. Following amalgamations over the years, some farms are now made up of more than one holding. The government agricultural census asks farmers to report on their 'holdings' which are defined as 'land farmed as a unit', and our questionnaire asked farmers to report on their 'farm holdings'. The land unit reported on should therefore have been comparable between our study and the national census. However, the national data includes large numbers of non-commercial or non-agricultural smallholdings, while our survey was of certified organic farms, and thus largely commercial farms. Therefore we also examined the distribution of farm sizes and the jobs per unit farm size (FTE per 100 ha) in order to offset potential bias.

We analysed 1144 organic farms in the UK and IE and compared data with existing published statistics derived from national farm surveys. We did not use any of the three most common techniques for comparing organic farms with

**Table 1** Comparison of total number of organic growers and area certified as organic with those sampled in this survey (survey in 2003; totals are for March 2003 for UK; December 2002 for Republic of Ireland)

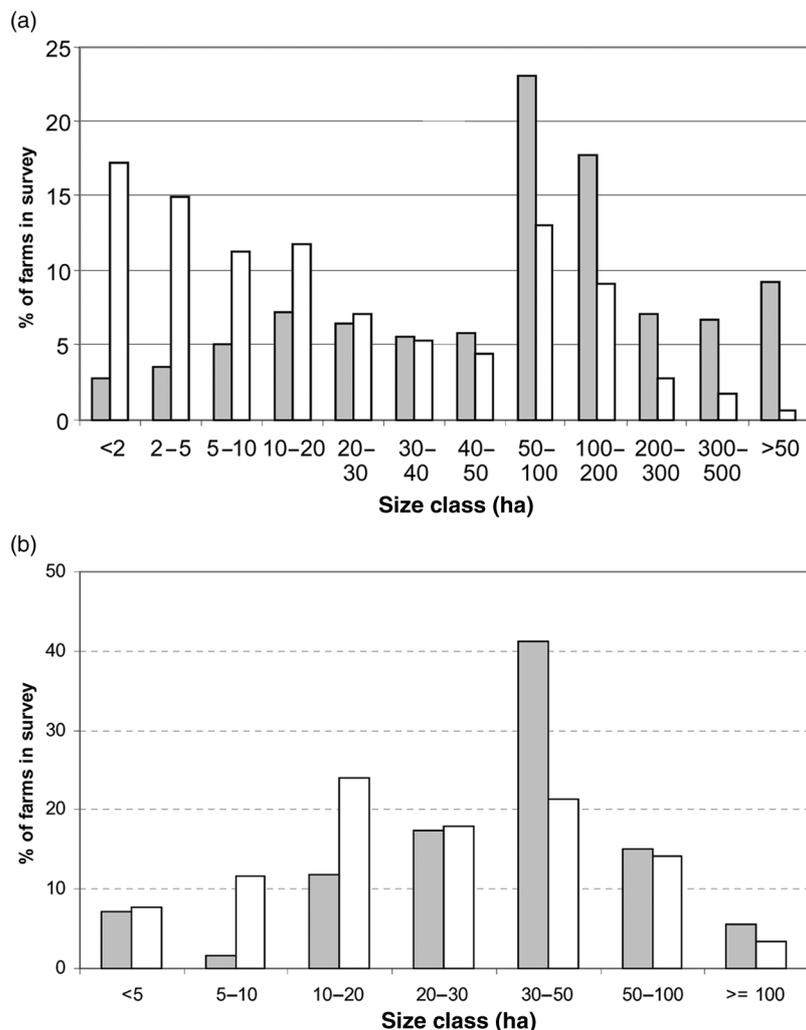
	<i>Total number of registered organic growers</i>	<i>Number of farms sampled</i>	<i>Proportion of total number in this survey</i>	<i>Total area under organic (including in conversion) (ha)</i>	<i>Proportion of total area in this survey</i>
England	2611	674	25.8%	251,836	28.1%
Scotland	725	163	22.5%	428,608	21.0%
Wales	618	160	25.9%	55,101	27.6%
Northern Ireland	139	21	15.1%	5629	21.1%
UK	4104	1018	24.8%	741,147	23.9%
Rep. Ireland	923	126	13.7%	29,850	16.1%
<b>Total</b>	<b>5027</b>	<b>1144</b>	<b>22.8</b>	<b>770,997</b>	<b>23.6%</b>

*Note:* Total numbers of organic growers does not include numbers of sole processors and/or importer of organic produce. *Sources:* DAF, 2003a; Defra, 2003; this survey.

conventional, namely sample groups, matched pairs and clustered groups (Fowler *et al.*, 2000; Lee & Fowler, 2002; Reganold, 1995). Studies using these methods tend to have a very small sample size (typically less than 20 farms), and it remains very problematic to compare like-with-like for conventional and organic farms, as each type of farming tends to have very different structure and range of enterprises (Jansen, 2000). The easiest comparisons are when paired farms have only one enterprise (e.g. top fruit or cereal), but these will misrepresent organic farming, as it encourages mixed farms with a variety of production enterprises.

### Regional Characteristics of Surveyed Farms

The size distribution of the 1144 surveyed organic farms in the UK and IE is shown in Figure 1. The overall mean farm size was 216 ha (of which 139 ha was certified organic), but because of the pronounced skewness of the data with a few very large farms, the median size was much lower than the mean, 63 ha. The log transformed areas were normally distributed with the geometric mean, 62 ha, close to the median. The most common farm size category was 50–100 ha (23% of survey). In comparison,



**Figure 1** Distribution of farms in size (area) classes in the survey of organic farms (solid bars) and in the country as a whole (open bars), for (a) the UK and (b) the Republic of Ireland (IE). Survey date 2003; 1018 farms in the UK and 126 farms in IE.

Sources: Defra (2003); DAF (2003b)

the UK and IE average holding size is 51.3 ha. For the UK alone the average size for all holdings is 58.5 ha, and 32% of all holdings are in the 0–5 ha size category (Figure 1), of which a high proportion are likely to be non-commercial or non-agricultural. If holdings <5 ha are excluded from the UK national data set, the mean size is 89.1 ha. The organic farm size survey showed only 6% of UK farms <5 ha, presumably reflecting the fact that these farms are certified, and thus most are commercial, and not smallholdings.

Table 2 shows the area of farms in this survey by region and country and the amount of land under organic management. The spread of respondents in England was such that all regions were well sampled and a regional analysis could be carried out. The number of farms in the IE was insufficient to allow subdivision. The total area of the 1144 farms was 247 k ha, of which 74% was organic and in-conversion. In total, 59% of the farms were completely organic, 65% of the farms had  $\geq 90\%$  of the area organic, and 81% had  $\geq 90\%$  of the area either organic or in conversion. At the farm level, the average percentage of the farm area that was organic was 78% and either organic or in conversion 89%. Not all respondents gave detailed breakdown of areas into different enterprise types (only 80% of all the area in the survey was enumerated). However, 81% of this area enumerated was under grass, pasture or rough grazing and 13% under crops, vegetables and fruit. The similar proportions for the UK only survey farms (79.6% and 12.3%) agree well with January 2004 Defra statistics (Defra, 2004a) for organic or in conversion areas with 86% under permanent or temporary pasture, and 9% under arable crops, bearing in mind only 74% the survey farm areas were organic. Therefore we believe the data collected are representative of organic farms. In contrast, some 26% of the total UK agricultural holding area is under crops, and 65% under grassland or rough grazing.

The surveyed organic farms had on average 10% of their land woodland or other non-farmed land (Table 2). The farms contained some 6000 ha of woodland and 7439 ha other non-farmed habitats, an average of 5.2 and 6.5 ha per farm, respectively. These woodland values appear substantially higher than mean values for all UK farms: 0.71 ha per holding in England, 4.7 ha in Scotland, 1.35 ha in Wales, and 0.3 ha in Northern Ireland (Defra, 2003).

The average farm size sampled in the UK was 238 ha, of which 153 ha was organic (the remaining 85 ha is a combination of land farmed non-organically and woodland and other non-farmed habitats). The average size for sampled IE farms was 39 ha, of which 38 was organic. These values are similar to the average of 181 ha of organic land on the 4104 organic farms in the UK and 35 ha for the 923 organic farms in the IE (DAF, 2003a; Defra, 2003).

Half of the organic area in this survey was on Scottish organic farms (although this accounted for only 14% of farms surveyed), followed by 16% in the South West and 10% in the South East. Scotland had the largest average area of organic land per farm in this survey (553 ha), followed by the North East (173 ha) and North West (139 ha). The smallest organic farm area were in the Republic of Ireland (38 ha) and Northern Ireland (57 ha).

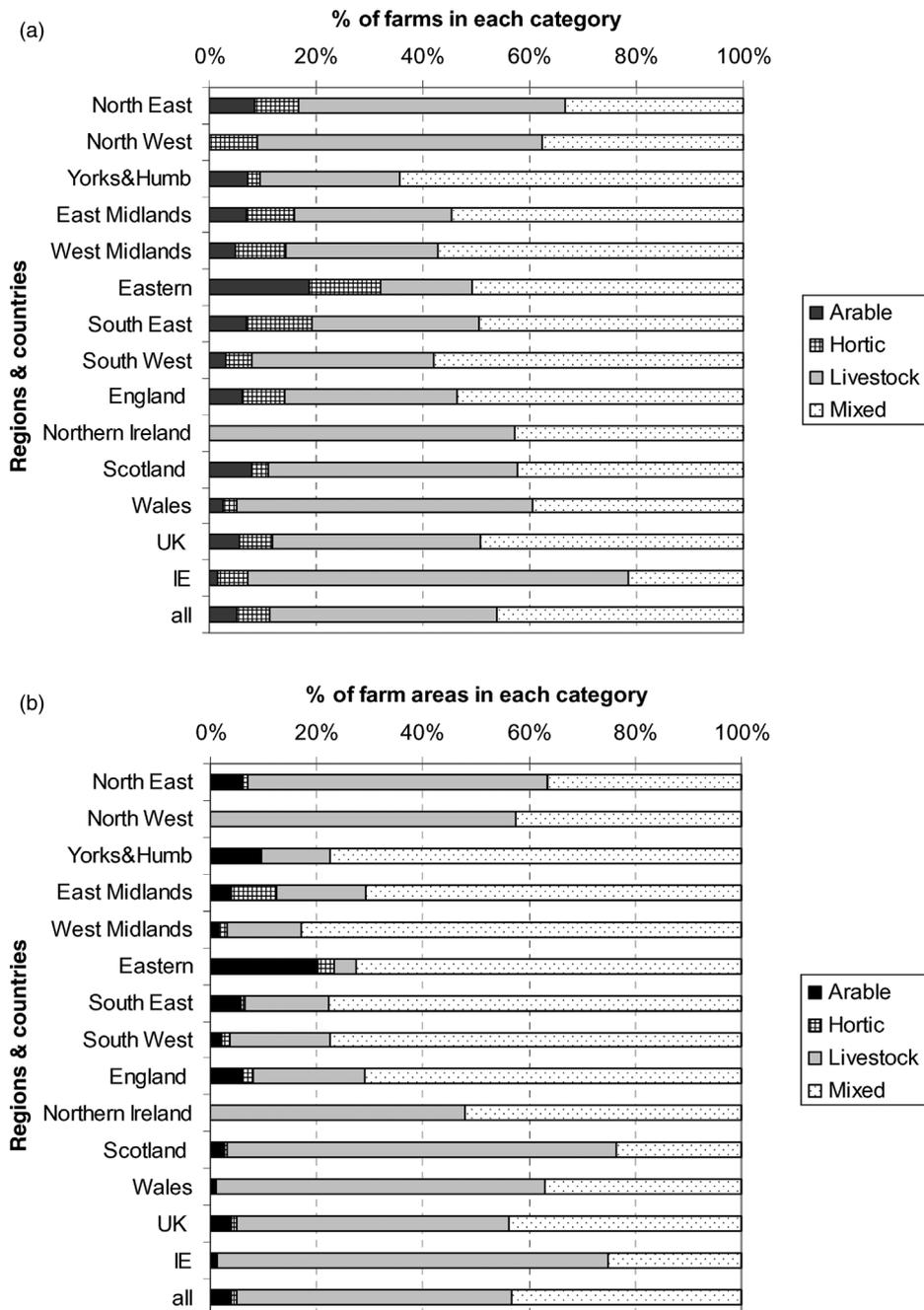
We assigned farms to four enterprise types: 'arable' (cereals, roots or field crops), 'horticultural' (salad, vegetable, soft-fruit or orchard), 'livestock' (cattle, sheep, pigs, poultry, or farmed deer etc.), and 'mixed' (comprising both substantial livestock and crops), based on their survey returns. In the UK, there were 5.7 and 6.3% of surveyed farms in the arable and horticultural categories, respectively. The majority of organic farms had livestock (85%), with 529 (46%) being mixed with both crop and livestock components in farm systems, and 42% being livestock only (Figure 2). This proportion of mixed farms is much higher than for conventional farming (e.g. in Wales, 2% of all holdings are mixed; in Northern Ireland 3.7%). Regions with the highest proportion of mixed organic farms are Yorkshire and the Humber (63%), South West (58%), West Midlands (57%) and East Midlands (56%). The countries or regions with the lowest are Republic of Ireland (22%) and North West and North East (both 36%). Overall, mixed farms are on average larger than arable only farms (202 ha compared with 156 ha), and livestock farms are the largest (264 ha). However, this is largely a result of the large upland Scottish farms, and average size for arable, livestock and mixed farms in England are 141, 93 and 191 ha, respectively. The majority of IE organic farms were livestock enterprises (71%), with very few arable and horticultural farms.

The majority of farms in the sample have been certified as organic in whole or part for less

**Table 2** Area of sampled organic farms and amount of certified organic land in the UK and the Republic of Ireland (IE) (survey date 2003)

	Number of farms sampled	Total area of farms (ha)	Area organic and in conversion (ha)	Area non-organic (ha)	Area of woodland and other non-farmed habitats (ha)	Mean farm size (ha)	Mean area organic and in conversion land per farm (ha)	Mean % area each farm organic and in conversion	Mean % area each farm cropped	Mean % area each farm grass or grazing	Mean % area each farm woodland or non-farmed
English Regions											
North East	24	5,738	4,156	1,304	406	239	173	80.5	22.0	68.7	8.3
North West	45	8,623	6,235	856	1,714	192	139	93.1	14.9	81.4	3.8
Yorkshire	42	4,288	3,503	785	356	102	83	90.9	28.5	62.1	8.7
East Midlands	44	7,137	3,391	3,706	324	162	77	76.3	33.5	61.6	4.6
West Midlands	63	5,415	5,221	214	277	86	83	96.5	23.5	62.6	7.3
Eastern	75	14,701	4,986	9,490	1,327	196	66	64.1	37.2	32.2	16.3
South East	115	17,827	13,381	3,739	1,453	155	116	84.9	22.8	58.4	10.8
South West	266	33,251	29,949	2,972	1,581	125	113	92.7	19.3	70.0	7.2
England	674	96,980	70,822	23,066	7,438	144	105	87.0	23.6	62.7	8.6
Scotland	163	127,057	90,147	36,431	4,735	780	553	86.8	14.5	75.1	10.3
Wales	160	16,466	15,204	1,211	924	103	95	95.7	9.8	76.5	12.0
N. Ireland	21	1,448	1,188	260	59	69	57	81.2	8.7	75.6	12.4
UK	1018	241,951	177,361	60,968	13,336	238	174	88.2	19.9	66.9	9.4
Rep. Ireland	126	4,928	4,812	45	283	39	38	97.8	10.3	76.5	12.7
<b>All surveyed farms</b>	<b>1144</b>	<b>246,879</b>	<b>182,173</b>	<b>61,013</b>	<b>13,439</b>	<b>216</b>	<b>159</b>	<b>89.2</b>	<b>19.0</b>	<b>67.8</b>	<b>9.7</b>

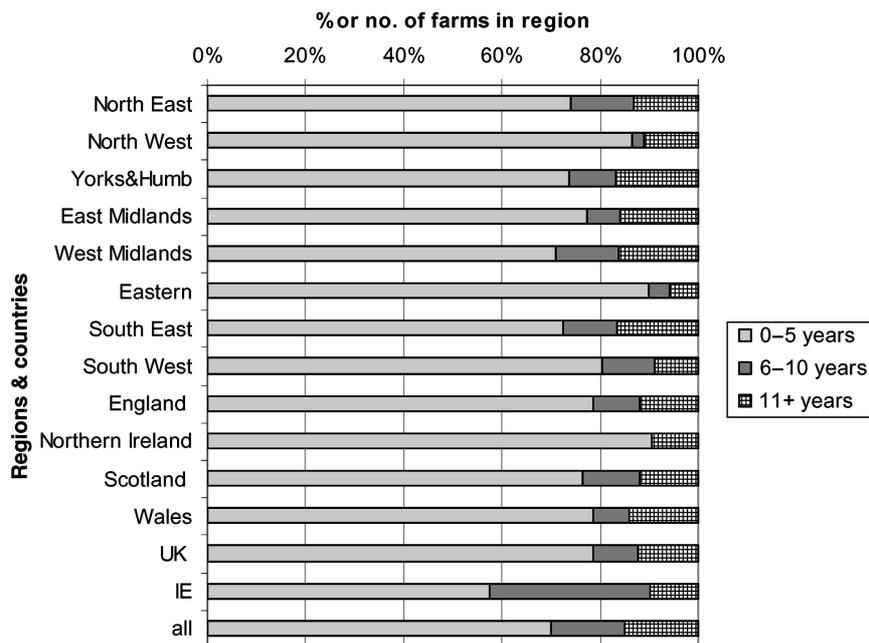
Notes: (1) The regions in England are the Defra regions: 'Yorkshire' indicates Yorkshire and the Humber, 'South East' includes Greater London, and South West includes the Channel Isles. (2) The totals for areas of organic, in-conversion and woodland/non-farmed habitats sum to more than the total area reported because some questionnaire returns appeared to double count land in both the area of non-organic and area of woodland categories. (3) Only 1006 of the 1144 farms gave breakdowns of their area into land use, and the totals did not always sum to the reported total area. The last four columns therefore use the total enumerated area for each farm to calculate proportions in categories.



**Figure 2** Types of organic farm enterprises in each English region or in the UK countries and the Republic of Ireland (IE), 2003 survey,  $n = 1144$ . ‘Arable’ are farms with cereal, root or other field crops; ‘Hortic’ comprises farms with substantial vegetable, soft-fruit or orchard areas; ‘mixed’ comprises farms with both livestock and crop activities. (a) % of farms in each enterprise type. (b) % of farm areas in each enterprise type

than the past five years (76.2%). Some 11.7% have been organic for six to 10 years, and 12% have been organic for more than 11 years. Four regions have more than 15% of farms in the sample as organic for more than 11 years – Yorkshire, South East, West Midlands, and East Midlands. In

Ireland, somewhat more of the farms are in the six to 10 year category than elsewhere (32%, Figure 3). The Irish sample reflects closely the proportions for all 923 organic growers in the country (54% less than five years, 38% for six to 10 years, and 9% > 10 years, DAF, 2003a).



**Figure 3** Proportion of farms in each English region in the UK and in the Republic of Ireland that have been in part or wholly organic for different numbers of years. Survey in 2003,  $n = 1144$

Many organic farms in this survey are engaged in processing farm produce and in direct sales and marketing. We assessed these by type of activity (Table 3). Some 19% of all farms are involved in processing (from lows of 6% in IE, 10% in Northern Ireland and 12% in Wales, to a high of 29% in the South East), and 37% of all farms are engaged in direct sales and marketing (lows of 14% in Northern Ireland to 29% in IE and Yorkshire and a high of 46% in the South East). Some 16% of the farms do both direct sales and processing, so that 39% of farms do some processing or direct sales or both. Processing is spread across meat, dairy, cereal and fruit and vegetable sectors. Direct sales are most commonly through farm shops and customer collection, followed by farmers markets and local shops. A quarter of farms doing direct sales were involved in box delivery schemes, but pick-your-own schemes and/or mail order only accounted for 6% of the farms involved. It is important to note that many conventional farms also make use of these kinds of processing and direct sales opportunities.

### Labour on Organic Farms Compared with All Agriculture

Labour characteristics were assessed on the questionnaires as full and part time agricultural

labour on-farm, plus that engaged in on-farm processing and direct sales. Seasonal and contract labour was additionally reported, either as number of days per year or number of people employed. For this study, all labour was transformed into full time equivalents (FTEs). Both Defra statistics and our survey recorded part-time employment as any job involving less than 39 hours per week. As a recent survey suggests that part time workers in England and Wales work approximately half the weekly hours of full time workers (Defra, 2005), we assumed part-time to be 0.5 of a full time job for both Defra statistics and our survey. There are also uncertainties in assigning a FTE value to seasonal or casual workers. As there were 99 farms in our survey that reported both the number of casual workers and days worked we used this to calculate that on average any reported casual worker was employed 41.6 days per year. It was then assumed that 240 days casual work are equivalent to one FTE job (five days per week; four weeks holiday per year). However, the resulting FTE from reported casual labour figures only contributed 2.6% of the total FTE in the sample, so the uncertainties in this approach are not likely to be significant.

Table 4 shows the national level data on all people employed and FTEs on all UK and Irish farms. This includes 'all those engaged in

**Table 3** Types of processing and direct sales and marketing activities on organic farms in the UK and the Republic of Ireland (survey in 2003,  $n = 1144$ )

	No. of farms	% of farms engaged in processing or direct sales	% of all farms in survey
<b>Processing</b>			
Meat	97	45%	
Dairy	80	37%	
Fruit and/or vegetables	77	35%	
Other	30	14%	
Cereals	11	5%	
<b>No. of farms with some processing</b>	<b>217</b>		<b>19%</b>
<b>Direct Sales</b>			
Farm shop and customer collection	245	58%	
Farmers' markets and/or local shops	153	36%	
Box delivery	106	25%	
Box and/or mail order	21	5%	
Pick-your-own	5	1%	
Other	54	13%	
<b>No. of farms with some direct sales</b>	<b>421</b>		<b>37%</b>
<b>No. of farms with either processing or direct sales or both</b>	<b>449</b>		<b>39%</b>
<b>No. farms with both processing and direct sales</b>	<b>189</b>		<b>16%</b>

Note: Totals are <sum of individual categories as farms may have several types of activities.

**Table 4** Labour in all UK and Republic of Ireland (IE) agriculture as calculated from data provided by government agencies (2002, numbers in thousands)

	UK		England	Scotland	Wales	NI	IE
	No. people	FTEs	FTEs	FTEs	FTEs	FTEs	FTEs
Farmers, partners, directors and spouses							144.0
FT	163.8	163.8	103.4	16.1	22.5	21.8	
PT	192.7	96.4	60.8	14.8	11.3	9.5	
Salaried managers							
FT	12.6	12.6	12.2	–	0.4	–	–
Other workers							7.5
FT	76.8	76.2	58.6	12.6	3.0	2.7	
PT	40.3	20.1	14.4	3.0	1.4	1.4	
Seasonal, casual and gang	64.2	11.1	8.2	0.68	0.90	1.39	6.7
<b>Total</b>	<b>550.5</b>	<b>380.2</b>	<b>257.6</b>	<b>47.2</b>	<b>38.5</b>	<b>36.8</b>	<b>158.2</b>

Notes: (1) FTE is 'full time equivalent job'; FT means 'full-time', PT means 'part-time'. (2) IE data only reported as FTEs. (3) PT numbers of people were converted using 0.5 FTE. (4) Seasonal, casual and gang numbers were converted to FTE assuming each worker reported works 42 days out of a total of 240 days per year (see text). Sources: DAF (2003b); DARD (2003); Defra (2003); NAW (2003); SEERAD (2003).

agricultural or horticultural work including managerial, supervisory and office work, preparation and marketing of produce and maintenance' but 'excludes sales assistants in farm shops and garden centres' (Defra, 2004b). Therefore, our

direct sales category may include additional staff not included in Defra statistics, though this is likely to be a small discrepancy. In the UK, there were (in 2002) 550,500 people employed at a FTE of 380,100 (ratio of 1.45), of whom 371,800 are in

England at a FTE of 249,000 (ratio of 1.44). These ratios are similar across all the UK countries.

Table 5 contains the national data on jobs on all farms by country and region and reported per holding and per 100 ha. The average for all the UK is 1.28 FTEs per holding and 2.19 FTEs per 100 ha. Farms in the IE employ fewer FTEs per holding (1.16), but more per area (3.15 per 100 ha). There is considerable consistency across regions of England for FTEs per holding, with an average of 1.42, and varying from 1.61 in North West and Yorkshire to 2.07 in the South East. There is more variation on FTEs per 100 ha, with an average of 2.77 (low 1.43 in the North East, high 3.38 in the West Midlands).

These data are, however, averages for all farms, and could be misleading as only a small proportion of farms employ outside workers. In England, there are 164,200 FTE farmers, spouses and directors employed on all holdings (Table 4). But of these holdings in England, only 24,373 employ the additional 93,400 FTE workers. Thus some 156,710 farm holdings (87%) in England do not employ outside workers.

In the organic farm survey, labour was reported in the categories of farming only, processing and direct sales, and the total per farm (Table 6). The average FTE total per farm was substantially higher in our survey (Table 6) than for the national statistics per holding (Table 5), in all regions and countries. Thus the surveyed organic farms employ 2.91 FTE per farm in the UK and IE compared with 1.24 on conventional farms (an increase of 135%). Organic farms in England employ the most FTE per farm (3.4), with those in Scotland employing 3.1, in Wales 2.0, Northern Ireland 1.8 and in the Republic of Ireland 1.6.

However, because the mean farm size of the surveyed organic farms is larger than that of conventional farms, the overall average FTE per 100 ha, calculated from the aggregated survey data, is 44% lower for organic farms (1.35 compared to 2.43 FTE per 100 ha, Table 6 *cf.* Table 5). The average aggregate FTE per 100 ha is misleading because of the influence of the large area of the survey in large farms in Scotland. In particular, there is a marked contrast between

**Table 5** Total labour, area, FTEs per holding and per 100 ha for all agricultural holdings in the UK and Republic of Ireland (2002 data)

	<i>Holdings</i>	<i>Area (000 ha)</i>	<i>Total labour (000s)</i>	<i>Total labour as FTEs (000s)</i>	<i>FTEs per holding</i>	<i>FTEs per 100 ha</i>
English Regions						
North East	5,138	582	12.3	8.3	1.62	1.43
North West	16,823	884	40.3	27.1	1.61	3.07
Yorkshire	16,834	1,093	40.4	27.1	1.61	2.48
East Midlands	15,944	1,220	42.0	28.2	1.77	2.31
West Midlands	19,277	928	46.8	31.4	1.63	3.38
Eastern	17,832	1,471	52.7	35.4	1.99	2.41
South East	18,619	1,155	57.5	38.6	2.07	3.34
South West	35,800	1,766	79.7	53.5	1.49	3.03
England	181,083	9,287	371.8	257.6	1.42	2.77
Scotland	50,189	5,535	68.0	47.2	0.94	0.85
Wales	36,473	1,452	56.3	38.5	1.06	2.65
N. Ireland	28,513	1,067	54.0	36.8	1.29	3.45
UK	296,258	17,342	550.5	380.1	1.28	2.19
Rep. Ireland	136,300	5,016	na	158.2	1.16	3.15
<b>All farms in UK and IE</b>	<b>432,558</b>	<b>22,170</b>	<b>na</b>	<b>538.3</b>	<b>1.24</b>	<b>2.43</b>

*Notes:* (1) Data on labour and FTEs for England and its regions in Tables 4 and 5 do not exactly equate owing to the aggregation methods used by Defra. (2) Data from English regions do not sum to national total, owing to different reporting procedures. (3) Area excludes common land. (4) IE data is per farm not per holding. *Sources:* DAF, (2003b); DARD, (2003); Defra (2003); NAW, (2003); SEERAD, (2003).

**Table 6** Labour as FTEs per farm and per 100 ha on surveyed organic farms in the UK and the Republic of Ireland (IE) (Survey date 2003)

Region	No. of farms sampled	Total area of farms (ha)	Total labour as FTE	Mean farming FTE per farm	Mean processing and direct sales FTE per farm	Mean total FTE per farm	Mean farming FTE per farm (mixed farms only) <sup>3</sup>	Mean farming FTE per farm (livestock farms only) <sup>3</sup>	Mean aggregate <sup>1</sup> total FTE/100 ha	Mean total FTEs/100 ha per farm <sup>2</sup>	Mean farming FTEs/100 ha per farm <sup>2</sup>
English Regions											
North East	24	5,738	82	2.24	1.19	3.43 (0.75)	2.37	1.78	1.43	11.7 (7.11)	7.29
North West	45	8,623	132	2.72	0.21	2.94 (0.29)	3.18	2.29	1.53	35.9 (20.8)	27.1
Yorkshire	42	4,288	131	2.53	0.60	3.13 (0.46)	2.67	1.65	3.06	10.6 (3.9)	7.45
East Midlands	44	7,137	149	2.50	0.88	3.38 (0.52)	2.44	1.82	2.09	32.7 (28.4)	32.0
West Midlands	63	5,415	188	2.34	0.64	2.98 (0.27)	2.85	1.53	3.47	65.4 (34.9)	41.5
Eastern	75	14,701	330	4.01	0.40	4.41 (0.98)	5.37	1.60	2.24	14.6 (3.44)	11.9
South East	115	17,827	449	3.03	0.87	3.90 (0.45)	3.45	2.01	2.52	23.8 (5.80)	18.4
South West	266	33,251	811	2.43	0.59	3.05 (0.24)	2.74	1.70	2.44	18.8 (5.9)	14.6
England	674	96,980	2273	2.72	0.64	3.37 (0.18)	3.13	1.80	2.34	24.8 (4.75)	18.7
Scotland	163	127,057	506	2.42	0.69	3.11 (0.36)	2.62	1.75	0.40	12.3 (4.5)	7.29
Wales	160	16,466	318	1.76	0.23	1.99 (0.10)	1.89	1.68	1.93	8.2 (1.5)	5.44
N. Ireland	21	1,448	37	1.52	0.25	1.77 (0.23)	2.11	1.09	2.56	6.1 (2.1)	5.80
UK	1018	241,951	3135	2.50	0.57	3.08 (0.13)	2.88	1.74	1.30	19.8 (3.25)	14.5
Rep. Ireland	126	4,928	198	1.38	0.20	1.57 (0.11)	2.04	1.13	4.02	24.7 (9.8)	19.0
<b>All surveyed farms</b>	<b>1144</b>	<b>246,879</b>	<b>3333</b>	<b>2.37</b>	<b>0.53</b>	<b>2.91 (0.12)</b>	<b>2.84</b>	<b>1.63</b>	<b>1.35</b>	<b>20.3 (3.08)</b>	<b>15.0</b>

(Values in brackets are the standard error of the adjacent mean). Notes: (1) Calculated from mean FTE per farm divided by mean farm area. (2) Calculated from FTE per farm/farm area for each farm, then averaged. (3) 'Mixed' farms had substantial crops as well as livestock, 'livestock' were predominantly livestock with grazing or fodder crops.

Scotland, with large farm sizes (0.4 FTE per 100 ha) and the Republic of Ireland (4.0 FTE per 100 ha) with predominantly small farms. For many of the English regions the aggregate FTE per 100 ha are similar between organic and conventional farms, and for England, Wales and Northern Ireland the average values are 15 to 25% lower for the organic farms.

When FTE per 100 ha values are calculated for individual farms and averaged, they are much higher, due to the many small farms, with a mean 20.3 FTE per 100 ha. While this is arguably a useful metric, as it reflects both the effect of farm size and enterprise type on the number of jobs, there are no comparable national statistics for conventional farms. The mean individual farm FTE per 100 ha shows surprisingly similar values for England and IE (25 FTE per 100 ha), because of the smaller, predominantly livestock farms in IE, with fewer jobs per farm. There are other differences between regions in this metric, but in many cases the variation is large because of the mix of farm sizes and enterprise types, and in some the sample size is small (e.g. Northern Ireland).

These national and regional differences in FTEs per farm and area reflect the different mixes of enterprises (see Figure 2), and farm sizes (Table 2). When 'farming' FTEs (not including processing and direct sales) for mixed farms alone are considered, there is still a large range across the regions and countries (1.9–5.4, Table 6), but with livestock only the range is small (1.1–2.3). It is also clear that in most regions, mixed farms employ about 50–100% more people than livestock only. The only exception is Wales where mixed farms employ only 16% more FTE than livestock farms. The numbers of arable or horticultural farms in some regions are too small to compare these enterprises reliably but the mean FTEs per farm for the arable and horticulture enterprises across the survey are 3.61 and 5.23, respectively, and livestock is lowest (Table 7). This difference between types of farms agrees with previous work (Offermann & Nieberg, 2000). The labour requirements in the broad categories of enterprises were compared between two contrasting English regions, the South West and the Eastern which had large numbers of farms in each category (Table 7). For 'mixed' and 'arable' farm types, the South West farms had substantially lower FTE per farm than Eastern farms, but for 'horticulture' farms, particularly, the South West

supported nearly three times more FTE. It is clear that the very different farm sizes in the different regions has an influence on the FTE per farm, as the mean aggregate FTE per 100 ha is similar on mixed farms in both regions, and for livestock farms the FTE per 100 ha are lower in the South West than the Eastern region. However, part of the differences between these regions is that the enterprise types we have used are broad, and that there are still substantial differences in activity between regions within one general category, for example between dairy, beef and sheep livestock operations.

Although most of the employment on the organic farms surveyed were in the actual farming (2.37 FTE per farm out of the total of 2.91 FTE), Table 6 also shows the number of rural jobs created by on-farm processing and direct sales activities, amounting to 0.5 FTE per farm for all organic farms in the UK and IE (18% of jobs on organic farms). This indicates the importance to the organic and rural sectors of adding on-farm processing and direct sales activities to cultivation of crops and raising of livestock.

However, a direct comparison of the survey data (Table 6) with national statistics (Table 5) is difficult for two main reasons. Firstly, the size distribution of the surveyed farms is very different from the national values (Figure 1). Secondly, the mix of enterprise types is different. Therefore, we investigated the relationships between labour and enterprise type, and farm size.

Table 8 shows the changes that occur to the FTE per farm and per 100 ha when particular categories of farms are removed from the sample. Removing the smallholder farms (<1 ha, <2 ha and <5 ha) from the dataset has very little effect on either the number of FTE per farm or the aggregate FTE/100 ha. However, these sampling restrictions do reduce mean individual farm FTE per 100 ha substantially. For example, the 1069 farms larger than 5 ha employ 5.5 FTE per 100 ha (individual farm calculation), much less than the estimate for all farms surveyed (20.3). Similarly, the survey contains many small farms which are horticultural enterprises, and if these are excluded this reduces the mean individual farm FTE per 100 ha to 7.94. Excluding the largest farms (>500 ha and >1000 ha) has little effect on the FTE per farm, but a large effect on the aggregate FTE/100 ha, increasing it up to the values comparable with the overall UK and

**Table 7** Contrasting labour use between farms of different types in two English regions on organic farms surveyed in the UK and the Republic of Ireland in 2003

Types of enterprise <sup>1</sup>	No. of farms			Total FTE per farm <sup>2</sup>			Farming FTE per farm <sup>2</sup>			Aggregate total FTE per 100 ha <sup>2,3</sup>		
	All survey	Eastern	South West	All survey	Eastern	South West	All survey	Eastern	South West	All survey	Eastern	South West
Arable	60	14	8	3.61	4.11	2.23	2.74	4.11	1.93	2.31	1.95	2.56
Horticulture	70	10	13	5.23	2.42	6.59	3.69	1.82	4.11	14.4	5.22	15.5
Livestock	485	13	91	1.90	1.78	2.08	1.63	1.60	1.70	0.72	3.84	3.04
Mixed	529	38	154	3.45	5.94	3.37	2.84	5.37	2.74	1.70	2.11	2.01
<b>All types</b>	1144	75	266	2.91	4.41	3.05	2.37	4.01	2.43	1.35	2.25	2.44

Notes: (1) 'Arable' type comprised farms with substantial cereals, roots or field crops; 'horticultural' with salad, vegetable, soft-fruit or orchard; 'livestock' with cattle, sheep, pigs, poultry, or farmed deer etc., and 'mixed' had both livestock and crops. (2) All values are means of all farms in that type and region. (3) Calculated for each enterprise type and region from mean FTE per farm divided by mean farm area.

**Table 8** Sensitivity of mean FTE per farm and per 100 ha to varying farm sizes included for organic farms surveyed in the UK and the Republic of Ireland in 2003

<i>Data included</i>	<i>Number of farms</i>	<i>Total farm area<sup>1</sup></i>	<i>Total FTE per farm<sup>1</sup></i>	<i>Farming FTE per farm<sup>1</sup></i>	<i>Aggregate<sup>1,2</sup> total FTE/100 ha</i>	<i>Total<sup>1,3</sup> FTEs/100 ha per farm</i>
<i>All farms</i>	1144	216	2.91	2.37	1.35	20.3
<i>Farms:</i>						
>1 ha	1122	220.0	2.92	2.38	1.33	10.56
>2 ha	1103	223.8	2.92	2.39	1.30	7.74
>5 ha	1069	230.8	2.93	2.41	1.27	5.47
<5 ha	73	2.2	2.73	1.87	123.9	237.5
<500 ha	1050	92.3	2.75	2.21	2.98	22.10
<1000 ha	1101	119.0	2.88	2.34	2.42	21.12
>1000 ha	40	2821.6	3.72	3.23	0.13	0.22
No. horticultural farms	1074	228	2.76	2.29	1.21	7.94
<100 FTEs/ha	1102	224.0	2.89	2.37	1.29	6.79
<50 FTEs/ha	1073	229.9	2.85	2.38	1.24	5.22
<25 FTEs/ha	1031	238.6	2.75	2.33	1.15	4.03

Notes: (1) Values are means of all farms in that cell. (2) Calculated from mean FTE per farm divided by mean farm area. (3) Calculated from FTE per farm for each farm, then averaged.

IE average. The 40 farms larger than 1000 ha have an average size of 2822 ha, and employ 3.7 FTE per farm but only 0.22 FTE per 100 ha.

If those farms employing more than 100 FTE per 100 ha ( $n = 42$ ) and more than 50 FTEs per 100 ha ( $n = 71$ ) are removed from the dataset, then FTE per farm are only slightly smaller, whilst aggregate and individual FTE per 100 ha show more substantial falls. Excluding farms with >25 FTE per 100 ha omits about 10% of the sample ( $n = 113$ ) and has a large effect on all FTE metrics.

Therefore, we conclude that organic farms employ 2.9 FTE per farm, compared with 1.2 FTE per conventional holding, even if farms <2 ha or <5 ha are omitted. The aggregate FTE per 100 ha for organic farms is 1.35, but it is important to note that this is strongly affected by the 40 very large farms (<1000 ha) in the survey. If these farms are excluded, the aggregate FTE per 100 ha for the survey and for conventional farms is the same (2.4 FTE per 100 ha).

## Labour and Farm Size

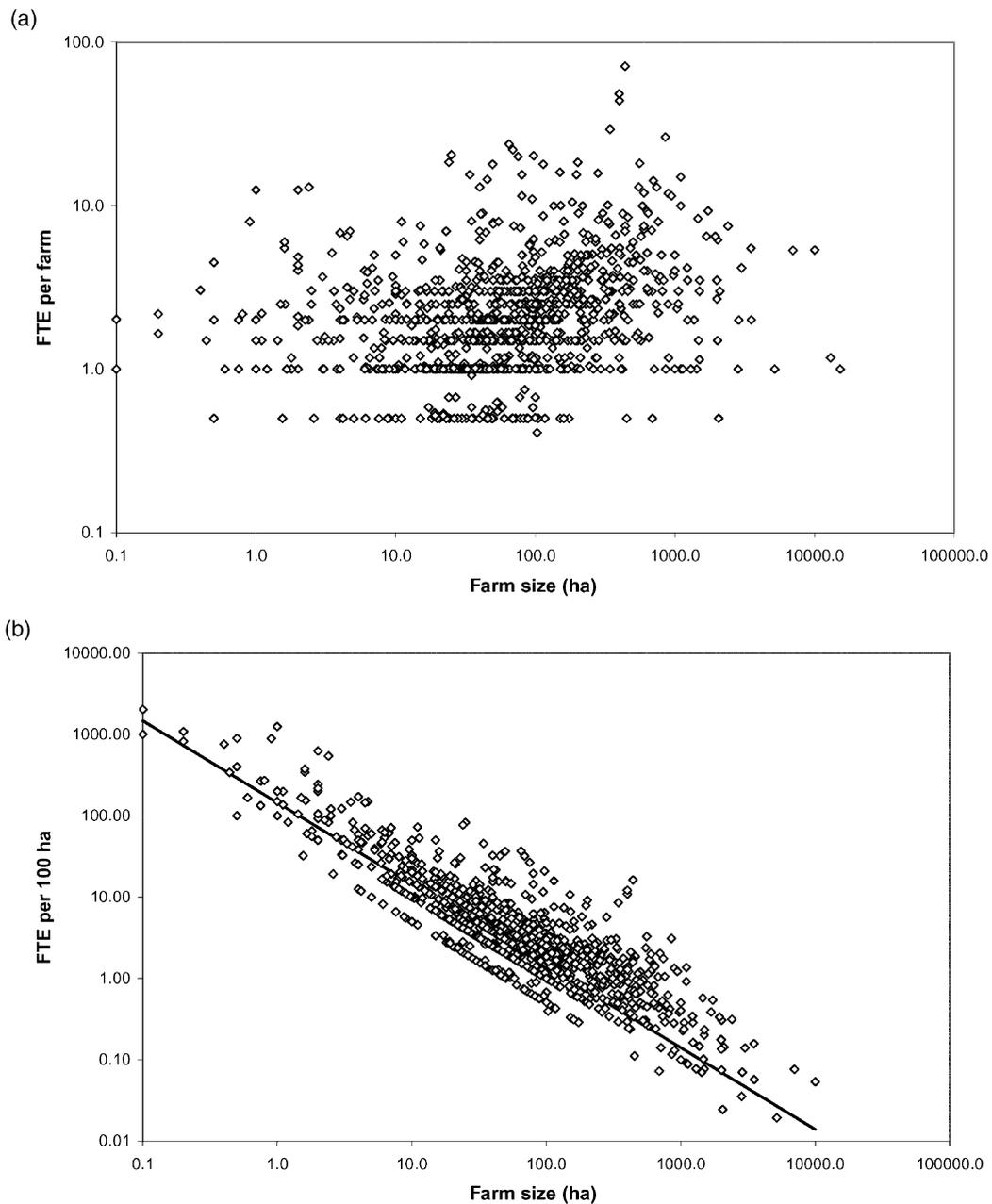
We found only a weak relationship between farm size and number of FTE per farm (Figure 4a). Numbers of FTE jobs do indeed increase with increasing farm size, but there is

large variation in farm size (across several orders of magnitude) in the sample where number of jobs per farm does not change substantially. There are, for example, 231 farms (20.1%) with sizes varying from less than 1 to more than 1000 ha each employing 0.9–1.1 jobs.

The lack of strong relationship between farm area and jobs per farm holds if all-organic farms (no land managed conventionally) are analysed, holds across each of the countries and regions, holds for different types of farms (arable only, horticultural, livestock only, mixed), holds for on-farm jobs only, and holds if the farms with more than 20 jobs per farm are omitted from the analysis.

We found a clear inverse relationship between individual farm FTEs per 100 ha and area of farm across five orders of magnitude (Figure 4b, power regression statistically significant,  $p < 0.001$ ). Small farms have proportionally more labour per 100 ha than large farms. In Figure 4 many data appear clustered on similar values. This is because FTEs are commonly reported as discrete units representing whole people, rather than varying continuously.

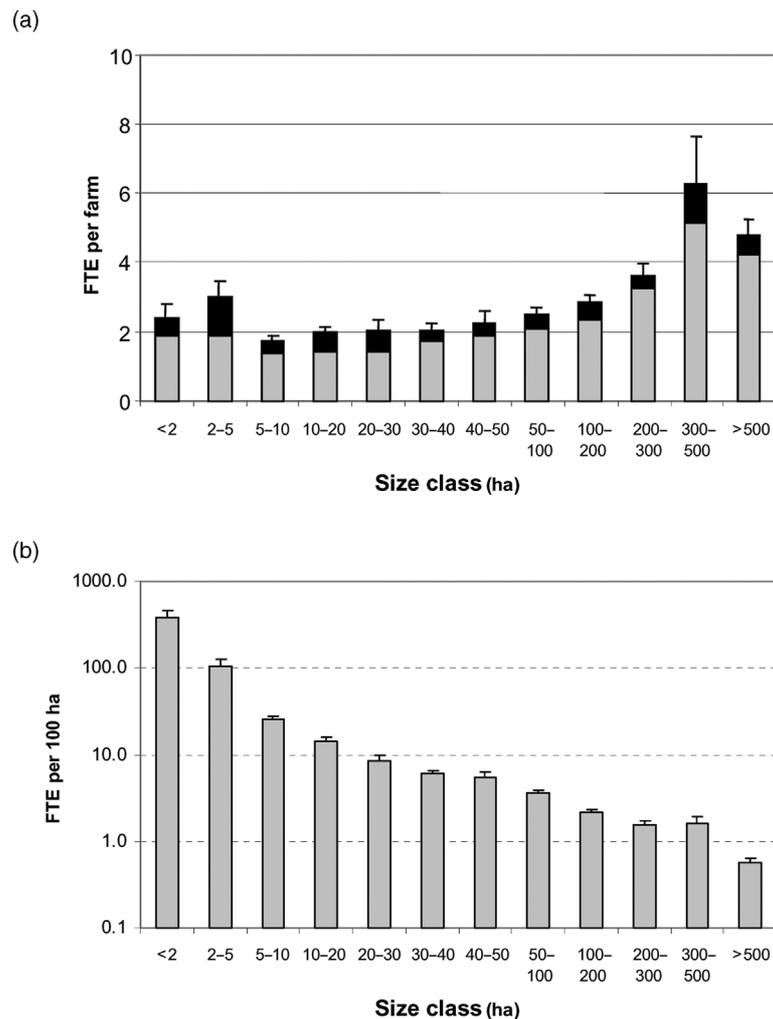
When FTE per farm data are grouped into the size classes used by Defra, these show increasing FTE per farm for farms >5 ha (Figure 5a), and steeply diminishing FTEs per 100 ha (calculated per farm) with increasing farm size (Figure 5b, note log scales).



**Figure 4** Relationship between jobs per farm, expressed as full-time equivalents (FTE) and farm size (total area) for surveyed organic farms in the UK and the Republic of Ireland, 2003 survey,  $n = 1144$ . (a) Total FTE per farm. (b) Total FTE per 100 ha (calculated for each farm). Line is fitted power regression, with reciprocal weighted values:  $\text{FTE per 100 ha} = 145 \times (\text{farm area})^{-1.005}$ ,  $r^2 = 0.633$ ,  $p < 0.001$

The relationships in Figure 5 and the national statistics for farm size class (Figure 1) provide a method for comparison of the organic survey FTEs with the national figures that overcomes the bias in the organic survey data set caused by the large number of larger, extensive grassland farms that have already converted (Table 9). The

survey mean FTE per farm values for each size class were multiplied by the national number of holdings in that class, and the total calculated FTE divided by the total no. of holdings (Table 9). This effectively weighted the mean FTE per farm by the national farm size distribution, showing the FTE that would result if



**Figure 5** Jobs, expressed as full-time equivalents (FTE) for surveyed organic farms in different size classes in the UK and the Republic of Ireland (IE), 2003 survey,  $n = 1144$ . Error bars are standard errors of the mean. (a) Mean FTE per farm either just on the farm (grey bars) or additional jobs in processing or direct sales (black portion). (b) Mean total FTEs per 100 ha (calculated for each farm), logarithmic scale

farms of all sizes converted evenly to organic. The UK data are shown separately from IE because of the very different size distributions in the survey (see Figure 1), the different size classes used in national statistics, and because the IE farms are dominated by livestock enterprises. When all FTE per farm (including processing and direct sales) are weighted in this way the organic value is 2.52 and 1.49 for the UK and IE, respectively (Table 9), 97% and 28% higher than the mean national values (conventional farms) in Table 5. We also calculated the mean individual farm FTE per 100 ha for organic farms in each size class (Figure 5b) which were multiplied by the total areas in each size class to estimate the total FTE. This

resulted in a very similar total FTE for the UK (755,500) to that calculated from FTE per farm (746,200), validating the size class weighting approach. Using both of these total estimated FTE figures and the UK farm area total (Table 5) produced aggregate values for jobs per area of 4.36 and 4.30 FTE per 100 ha, respectively, both about twice the UK conventional farm value shown in Table 5.

It is possible that the organic farms in our survey have more processing and direct sales activities than conventional farms. However, if on-farm only FTE per farm are used, these are still 48% and 10% higher values for the organic farms than the mean national values for UK and IE, respectively.

**Table 9** Calculating national mean FTEs per organic in the UK and the Republic of Ireland (data for 2003)

	No. of farms in survey		Total FTE per farm in survey		Farming FTE per farm in survey		Total nos. of holdings (000s)		Calculated total FTE if all farms were organic (000s)		Calculated farming FTE if all farms were organic (000s)	
	UK	IE	UK	IE	UK	IE	UK	IE	UK	IE <sup>†</sup>	UK	IE <sup>†</sup>
Size category (ha)												
<2 ha	28	6	2.34	2.67	1.82	}	49.2	}	115.0	}	89.6	}
2 ≤ 5	36	3	3.17	1.20	1.93	1.81	42.8	10.4	135.8	22.7	82.5	18.8
5 ≤ 10	51	2	1.81	0.75	1.41	0.63	32.4	15.8	58.7	11.9	45.5	9.9
10 ≤ 20	74	15	2.06	1.65	1.47	1.26	33.7	32.8	69.4	54.1	49.5	41.5
20 ≤ 30	66	22	2.27	1.27	1.50	1.11	20.4	24.4	46.4	31.0	30.7	27.0
30 ≤ 40	56	28	2.26	1.65	1.82	}	15.3	}	34.5	}	27.8	}
40 ≤ 50	59	24	2.82	1.33	2.18	1.32	12.6	29.1	35.4	43.7	27.4	38.4
50 ≤ 100	234	19	2.61	1.48	2.15	1.44	37.4	19.3	97.7	28.6	80.3	27.8
100 ≤ 200	180	6	2.88	2.84	2.36	2.42	26.0	4.6	74.9	11.9	61.3	11.1
200 ≤ 300	72	1	3.67	1.00	3.31	}	7.9	}	28.9	}	26.1	}
300 ≤ 500	68		6.24		5.14	}	5.1	}	31.8	}	26.1	}
≥500 ha	94		4.78		4.23	}	3.7	}	17.7	}	15.7	}
Total	1018	126					296.3	136.5	746.2	203.	562.5	174.5
<b>Mean FTE per farm or holding</b>									<b>2.52</b>	<b>1.49</b>	<b>1.90</b>	<b>1.28</b>
<b>FTE increase* (%)</b>									<b>96%</b>	<b>17%</b>	<b>48%</b>	<b>10%</b>
<i>Average of all farms</i>			<i>3.08</i>	<i>1.57</i>	<i>2.50</i>	<i>1.38</i>			<i>912.6<sup>+</sup></i>	<i>214.3<sup>+</sup></i>	<i>715.4</i>	<i>188.4</i>

Notes: (1) \*From the total FTEs per holding values for UK and IE in Table 5. (2) <sup>+</sup>Calculated using the survey mean values from all farms, and national total holdings values. (3) Total no. of holdings data for 2003 for UK, 2002 for IE. (4) <sup>†</sup>The published farm size categories for IE combine all <5 ha, 30 ≤ 50 ha, and ≥100 ha.

## Predicted Job Dividends

We use these farm size weighted estimates of mean FTE per farm to predict the potential jobs dividend in UK and IE farming if 20% of the farmland of both countries were to become organic (Table 10). The FTE increase would be 73,200 in the UK and 9200 in IE, increases representing 19% and 6% of the present agricultural FTE in those countries.

These job increases could be underestimates, as we use labour data for whole organic farms, even though farms on average have 10% of the area on these farms not organic, and these areas will be contributing fewer jobs per farm and per 100 ha. Conversely, they could be overestimates, as the majority of the farms (76%) have only become organic in the last five years (Figure 3), and conversion may require more labour input than established farms.

The largest source of uncertainty for this estimate for a job dividend is that it assumes

similar proportions of farm enterprises in each size category are replicated at the national level as those found in this survey, and that such proportions would remain the same over time; this is unlikely to be the case. It is notable that the percentage increase in FTE is much smaller for IE than the UK, reflecting the predominance of livestock farms, (Figure 2) and the small numbers of jobs in livestock farming (Table 7), compared to those on mixed farms, which form the other major farm type in the survey. Overall, a smaller proportion of arable and horticultural farm types have converted, so if these convert there may be higher job increases, as these farm types employ more people (Table 7). However, as noted above, these farm types are very broad, and a more detailed breakdown of FTE per farm for different activities would be useful in providing better estimates. In addition, whether a substantial switch of farm enterprise type would be possible obviously depends on agroecological and socioeconomic constraints

**Table 10** The predicted job dividend in the UK and IE if 20% of holdings became organic. All FTE data in thousands

	UK	IE
Current FTE all agriculture*	380.1	158.2
20% of all current FTE	76.0	31.6
Scenario using all FTEs per farm		
20% of holdings or farms organic <sup>+</sup>	149.2	40.8
FTE increase	73.2	9.2
As % of all current FTE	19.2%	5.8%
Scenario using farming FTEs per farm		
20% of holdings or farms organic <sup>+</sup>	112.5	34.9
FTE increase	36.5	3.3
As % of all current FTE	9.6%	2.1%

Notes: (1) \*From the total FTEs per holding values for UK and IE in Table 5. (2) <sup>+</sup>From calculations in Table 9.

that will differ between regions, as suggested by Table 7. It is also unlikely that in an expanded organic sector so many farms could be engaged in processing and direct sales given the current structure of the food retailing system, though this may change a little with increased institutional sourcing by hospitals and schools. We include in Table 10 an estimate based on using the survey 'farm-only' FTE values, excluding those involved in processing and direct sales. The percentage increase in FTE is considerably smaller, only 10% and 2% for the UK and IE, respectively. However, this is arguably a conservative calculation, given that the national farm job statistics do include processing and direct sales. Finally, an expansion of organic farming would result in the loss of jobs in some upstream and downstream sectors, such as arising from a reduction in demand for pesticides, fertilisers and animal feed concentrates. Nevertheless, this shows the substantial scale of the potential jobs dividend from organic farming.

## Summary and Concluding Comments

This study of 23% of organic farms in the UK and IE suggests that organic farms employ more people per farm and per 100 ha than conventional farms. Using the size-weighted comparison, organic farms in the UK employ 2.52 FTE per farm compared with 1.24 FTE per conventional farm (97% increase). For the Republic of Ireland, the figures are 1.49 compared to

1.16 FTE per farm (28% increase). Per unit area, organic farms in the UK employed 4.33 FTE compared to 2.19 FTE per 100 ha for conventional farms (size weighted data, 98% increase).

When calculated for individual farms, organic farms larger than 5 ha in size employ 5.5 FTE per 100 ha. As very small organic farms employ considerably more people per unit area than larger farms, including these small farms (6.3% of the sample) increases jobs per area to 20.3 FTE per 100 ha (individual farm basis), across the whole survey.

The smallest farms are those with vegetable, soft fruit or orchard activities (average 36 ha) but they employ the most (5.23 FTE per farm). On average, organic arable and field crop enterprises are smaller farms (156 ha) than livestock or mixed farms (264 and 202 ha, respectively), and employ 3.6 FTE per farm and 2.31 FTE per 100 ha (calculated from aggregate data). Mixed farm enterprises employ 3.4 FTE per farm and 1.7 per 100 ha, and livestock only enterprises only employ 1.9 FTE per farm and 0.7 FTE per 100 ha. Organic farms with processing and for direct sales operations supply more jobs (3.82 FTE per farm) than those farms that do not (2.33 FTE per farm). Over the whole survey, processing and direct sales operations supplied 0.53 FTE per farm of the mean 2.91 total FTE per organic farm.

These figures agree generally with previous estimates of higher labour requirements in organic farming (see Introduction). Overall, the approximately two-fold increase in the mean value per farm and per hectare for the UK was larger than that concluded in the study by Offermann and Nieberg (2000). This is probably a reflection of the mix of farm types that have converted to organic compared with the national mix of enterprise types, and shows the importance of considering the types of farms. The small increase in the IE farms agreed with the previous finding of no or only small increase in livestock and dairy farms.

The farm size weighted FTEs per farm and per 100 ha data from the survey predicted a potential jobs dividend in UK and IE farming of 73.2 k and 9.2 k FTE if 20% of both countries were to become organic. This is an increase of 19% and 6%, respectively over the current employment levels in UK and IE farming.

This study raises important policy implications. Should agricultural systems be seen as important contributors to rural economies, or should labour use in agriculture be seen as a factor of production

that requires reducing to increase economic efficiency? Conventional economic statistics indicate that agriculture is now a small contributor to economic performance in the UK and IE as measured by GDP. But a multifunctional agricultural sector, producing food, fibre, oils and other agricultural products, as well as contributing to both environmental goods and services and rural economies, makes many contributions to a range of economic sectors (Dobbs & Pretty, 2004). This study shows that organic farming already contributes to rural economies by supplying about twice as many jobs as conventional farming. An increase in organic farming area and number of farms would further contribute to the economic success of rural communities, through greater agricultural employment. In addition organic farming could also capture a larger proportion of consumer expenditure on food through added value and direct marketing and sales activities, as shown by the large number of jobs found in these activities in this survey. Such public good outcomes may justify further use of public money to support the expansion of organic farming.

This may lead, however, to new difficulties where there are shortages of labour both in the local rural labour force and within families, which in turn may slow down the expansion of organic farming. However, the mixed nature of most organic farm enterprises, combined with the larger number of processing and direct sales jobs, means that some jobs may be more attractive than those on some conventional farms. Research into whether different farming types result in different forms of labour, different remuneration and labour satisfaction is fraught with difficulties, and is currently under-researched (Jansen, 2000). However, we note that the large number of part-time jobs identified in this survey also means that they are well-suited to parents who need to combine child care with work. A further important factor may be the increased degree of human contact on any farm that employs one or more people. Many sole farmers and sole employees feel more isolated than in the past, and so increased employment can bring important social benefits. Such economic and human benefits justify further government support and enabling policies to help the transition towards organic farming for conventional farmers.

In conclusion, it is clear from this study that organic farming can play a role in rural economic growth across all regions of the UK and in the Republic of Ireland. Such benefits justify further

government support and enabling policies to help the transition towards organic farming for conventional farmers.

### Acknowledgements

This study was funded by the Soil Association (with whom 2305 of the UK's 4104 organic farms were registered in 2003). The funding body advised in the design of the project, but all data handling and analysis was conducted independently of the donors. We are very grateful to all the farmers who kindly completed farm questionnaires for this study. We are also grateful to Julie Rumsey of Defra for help with UK data. We thank Jilly Hall, Peter Melchett, Patrick Holden and Gundula Azeez for many useful comments and suggestions on manuscript drafts, and the reviewers for their critical advice.

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