

FOOD AND ENERGY
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BUSINESS AND ECONOMY

SUMMARY

- The relationships between food and energy are central to two current policy issues – energy consumption in the production and distribution of food, and energy production using agricultural products as bio-fuels. This bulletin explores the economics of these relationships by modelling the two types of ‘shock’ to the SW food sector: a rise in food distribution costs associated with higher energy prices; and an increase in export demand for agricultural products associated with greater use of bio-fuels.
- The food sector is a major consumer of energy. Changes in the food production and supply chain have been associated with greater energy intensity in food production and distribution (e.g. due to increasing ‘food miles’), generating increasing policy concerns over the sustainability of the food supply system.
- At the same time, there has been increasing interest in the role of agriculture and forestry as potential sources of energy supply.
- Food production contributes around 3.7 per cent of total gross value added from SW industries, and 5.2 per cent of total regional employment.
- Food production, both primary and manufacturing, is concentrated within the rural counties of the South West, although Plymouth and Bath & NE Somerset both contribute substantially to total output from food & drink manufacturing.
- Just over a half of all food products supplied to the South West come from other parts of the UK, with around a quarter being overseas imports and a quarter from producers within the region itself. SW producers contribute a slightly larger share of supplies of agricultural products than of manufactured food & drink products.
- The South West is a net exporter of food products to the rest of the UK, a (marginal) net importer from the rest of the world, and an overall net exporter.
- We would expect increased energy costs to influence both the composition and geography of food production, as producers and consumers switch to less energy intensive processes and products, and as production shifts to minimise (all else constant) on energy usage in food distribution.
- Our simulations consider a rise in food distribution costs – making imported food products more expensive within the South West (with greater increases for international imports than for imports from other UK regions), and making SW exports more expensive elsewhere (particularly in overseas markets). The net effect is to increase real agricultural output (GVA) and employment within the South West, as increasing shares of regional suppliers in SW and UK markets more than compensate for reduced international exports. The net increase in food production displaces production by other sectors, primarily through higher production costs and prices, and reduced exports. The net impact on SW GVA is broadly neutral.
- We also simulate the effects of increased export demand for SW agricultural products (associated, for example, with increased use of bio-fuels). A one off increase in export

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demand leads to a short term rise in agricultural product prices within the South West and a muted increase in output and employment from the sector, but a larger expansion over time as supply constraints are relaxed. Ongoing growth in agricultural export demand supports persistently higher product prices and growth of the sector.

INTRODUCTION

The relationships between food production and energy are central to two current policy debates – concerning energy consumption in the production and distribution of food, and energy production using agricultural products as bio-fuels.

Food production and distribution is a major consumer of energy, and increasing energy usage in this area has been highlighted in policy discussions over ‘food miles’ and local sourcing. The UK food production and supply chain has changed dramatically over recent decades so that food often travels much longer distances from farm to final consumer than was the case in the past. A number of factors underpin this shift - increasing international trade in food and of food supply chains has resulted in food being imported in increasing quantities from distant suppliers. At the same time, concentration of the food production and distribution systems into fewer and larger suppliers, together with changes in distribution systems (for example, towards the use of large regional or national distribution centres) and shopping habits have also contributed to increasing ‘food miles’. These developments have generated increasing policy concerns over the sustainability of the food supply and distribution system, as the rise in food miles has generated environmental, social and economic burdens associated with increased pressure on transport infrastructure. More recently, however, questions have been raised about the appropriateness of simple ‘food miles’ measures of sustainability as a guide for effective policy, as these may not account for either the total embedded energy in a particular food product (e.g. from use of energy intensive fertilizer/pesticide production or heating) or social and economic benefits that arise say from importing food products grown in the developing world. Rather, we need a more comprehensive approach to measuring the impact of food supply, which takes account of all of the energy and other resources devoted to food production and distribution.

At the same time there has been increasing interest in the role of agriculture and forestry as potential sources of energy supply. Globally, growth of the use of ‘bio-fuels’ has increased the demand for some agricultural and food products, contributing to rapidly escalating prices for some basic food commodities and consequent political unrest in some countries.

This bulletin explores some of the implications of these developments within the SW economy. It investigates the impacts of higher energy costs for food production and supply in the South West. It also considers the possible implications of increased global demand for agricultural products related to expanded use of bio-fuels. The analysis is based on information from the SW Regional Accounts and simulation exercises using models of the SW economy developed by the Business & Economy Module of the South West Regional Observatory.

The results suggest that food production within the South West may well benefit, albeit marginally, from an increase in energy prices that tends to raise food distribution costs and to encourage more ‘local’ supply. The agriculture sector in the region would also benefit to some degree from increased global demand for ‘bio-fuels’. The aggregate impact of such changes on the SW economy as a whole are, however, likely to be modest.

ENERGY & FOOD SUPPLY

Much attention has been given to the issue of ‘food miles’, as food is transported over increasingly long distances between the farm and the final consumer. In the UK, food transport involves a range of modes but is primarily related to goods vehicles (HGV and LGV), international sea and air freight (for imported foods), and car usage for shopping trips. Moving food around has significant and increasing impacts on the UK transport infrastructure. Research by the UK Department for Environment, Food & Rural Affairs estimated that the UK food supply system was responsible for transport movements of 30 billion vehicle kilometres

during 2002, with 83% of these within the UK.¹ Most of this involved transport of food by road, split between cars and goods vehicles. All of this makes a significant contribution to overall transport movements in the UK. Thus, for example, DEFRA estimate that food transport alone is responsible for around 25% of all HGV vehicle kilometres in the UK. This is associated with a range of environmental and safety burdens including associated CO₂ emissions, air pollution, congestion, accidents and noise. DEFRA estimate that food transport by road in the UK contributed around 19 million tonnes of CO₂ emissions in 2002, 1.8% of total emissions and 8.7% of emissions from the road transport sector. Although on a relatively small share in terms of transport movements, air freight of food also has significant environmental costs, contributing an estimated 11% of total food transport CO₂ emissions in the UK, and this has been rising over recent years.

All else remaining equal, a reduction in food transport will improve sustainability. However, modern food supply systems consume large amounts of energy during all stages of the production and distribution process, not just in transport. Changes in transport would require changes to other elements of the food supply system, some of which may adversely affect sustainability. For example, the current food distribution system within the UK often involves large HGVs travelling long distances between suppliers and shops via large centralised distribution centres. This system adds to vehicle kilometres, but also allows more efficient loading of vehicles, reducing the environmental impact per vehicle kilometre. A more localised supply system would reduce vehicle kilometres, but may also increase the impact per vehicle kilometre, so that the overall implications for sustainability are by no means clear cut. And even if it does result in reduced environmental impacts from food transport, local sourcing may require greater energy use in food production. Thus, although 'food miles' have an immediate appeal as an indicator of the environmental costs of food supply, a reduction in food miles need not imply an improvement in the sustainability of the total food supply system. As the authors of the DEFRA report argue:

Our analysis indicates that the wider environmental, social and economic effects associated with different food supply chains are complex and very system specific. Consideration of these effects does not lead to a clear case for a move to either higher or lower food miles systems.

DEFRA, 2005: vi

FOOD & THE SW ECONOMY

The following tables and figures present information on the production and supply of food products within the South West based on data from the SW Regional Accounts.

SUPPLY OF FOOD PRODUCTS

Total demand for agriculture, fish, and food products within the South West amounted to around £7.2 billion in 2003, or 4.5 per cent of all products supplied to users within the region (Table 1). Around 70 per cent of this total is manufactured food & drink products, with most of the remainder being agricultural products. Just over a half of all food products supplied to the South West come from other parts of the UK, with around a quarter being overseas imports and a quarter from producers within the region itself. SW producers make up a slightly larger share of supply for agriculture products than of manufactured food products.

¹ Watkiss, P. (2005) *The validity of food miles as an indicator of sustainable development: Final report*, DEFRA.

Table 1: Supply of Food Products to the South West (£m, 2003)

	South West Producers	Imports: Overseas	Imports: UK Regions	TOTAL
Agriculture	551	463	1062	2076
Fishing	0	19	66	85
Meat Processing	261	219	449	929
Fish & Fruit Processing	240	220	158	618
Oils & Fats	0	36	53	89
Dairy Products	43	121	416	580
Grain Milling and Starch	25	36	132	193
Animal Feed	133	29	168	330
Baking and Confectionary	383	233	787	1403
Beverages	136	354	364	854
Total Food and Drink Manufacturing	1221	1248	2527	4996
Total Food & Drink Industries	1772	1730	3655	7157
All Products	101698	20477	20477	142652

Source: South West Regional Accounts

FOOD PRODUCTION IN THE SOUTH WEST

Table 2 shows production of food products within the South West during 2003, based on data from the SW Regional Accounts. Total output of food products from the region was just over £7.5 billion in 2003, around 40 per cent of which was primary food production (agriculture and fishing) and 60 per cent food & drink manufacturing. This activity generated over £2.8 billion of income (gross value added). Taken together, food production contributed around 5 per cent of total gross output from SW industries and 3.7 per cent of SW GVA. Food production also accounted for around 5.2 per cent of total employment (measured as full-time equivalent jobs) in the South West during 2003. The majority of these jobs were in agriculture.

Table 2: Food Production in the South West

	Values (£m)		Shares (%)	
	Gross Output	GVA	Gross Output	GVA
Agriculture	2882	1326	1.9	1.7
Fishing	126	53	0.1	0.1
Meat Processing	1141	345	0.8	0.5
Fish & Fruit Processing	360	113	0.2	0.1
Oils & Fats	4	1	0.0	0.0
Dairy Products	1027	257	0.7	0.3
Grain Milling and Starch	74	22	0.0	0.0
Animal Feed	260	48	0.2	0.1
Baking and Confectionary	1161	553	0.8	0.7
Beverages	482	125	0.3	0.2
Total Food and Drink Manufacturing	4509	1464	3.0	1.9
Total Food & Drink Industries	7517	2843	5.0	3.7
All South West Industries	149858	75944	100.0	100.0

Source: South West Regional Accounts

Table 3: Employment in Food Production in the South West

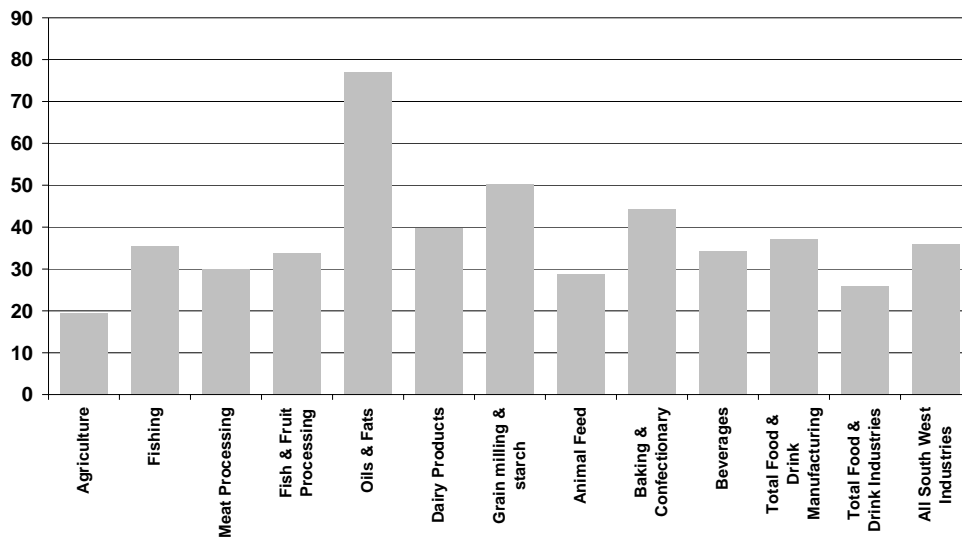
	Full-Time Equivalent Employment	% of total
Agriculture	68486	3.2
Fishing	1491	0.1
Meat Processing	11470	0.5
Fish & Fruit Processing	3347	0.2
Oils & Fats	13	0.0
Dairy Products	6456	0.3
Grain Milling and Starch	437	0.0
Animal Feed	1667	0.1
Baking and Confectionary	12498	0.6
Beverages	3640	0.2
Total Food and Drink Manufacturin	39528	1.9
Total Food & Drink Industries	109505	5.2
All South West Industries	2114849	100.0

Source: South West Regional Accounts

Summary Input Output Accounts for the South West, 2003

	Demanding Group																Total Final Demand	TOTAL OUTPUT	
	Agric. etc.	Food, Drink & Tobacco	Extraction	Other Manuf.	Energy & Water	Construct.	Distrib. & Retail	Hotels & Catering	Transport & Commun.	Other Services	Total Intermediate	SW Households	Other SW Final Demand	Exports: EU	Exports: Non-EU	Exports UK Regions			Tourists
<i>Value of purchases/sales (£m)</i>																			
<i>Supplier</i>																			
Agriculture etc.	103	281	0	20	0	11	15	10	3	26	470	182	23	80	21	2254	21	2581	3050
Food & Drink Manufacturing	115	259	1	37	2	6	156	229	23	175	1002	331	3	183	126	3164	16	3822	4824
Extraction	1	1	2	10	0	8	4	1	2	10	40	13	31	172	87	620	3	924	964
Other Manufacturing	60	148	26	1607	27	509	362	60	322	1115	4236	530	374	4521	2953	11026	66	19470	23705
Energy & Water	37	41	17	204	302	25	86	17	35	241	1007	1112	16	0	1	844	25	1998	3005
Construction	38	18	16	101	49	2853	115	25	155	1600	4969	450	6749	7	5	741	28	7981	12950
Distribution & Retail	101	115	16	713	13	145	176	199	160	575	2214	11386	179	682	474	1969	599	15289	17503
Hotels & Catering	3	6	1	23	2	14	73	11	24	155	313	3398	3	3	4	103	1600	5110	5423
Transport & Communications	33	108	56	369	13	90	1028	110	1110	1735	4652	2089	70	135	131	3929	308	6662	11314
Other Services	261	347	86	1755	149	1168	2171	415	1425	11467	19243	14006	22792	720	1166	8710	482	47876	67119
Total Expenditure in South West	753	1323	222	4840	556	4828	4186	1077	3260	17099	38145	33497	30239	6502	4968	33359	3148	111713	149858
Imports: Overseas	123	374	103	3952	165	535	222	262	546	3150	9432	8245	2800	0	0	0	173	11218	20649
Imports: UK Regions	697	1499	196	5066	664	1598	2711	755	2241	7544	22971	11869	2277	0	0	0	291	14437	37408
Taxes etc.	70	-4	22	380	45	368	311	358	390	1426	3366	34312	746	0	0	1525	334	36916	40282
GVA (incl. FISIM)	1407	1632	421	9468	1575	5621	10073	2971	4877	37899	75944	0	0	0	0	0	0	0	75944
Total Output	3050	4824	964	23705	3005	12950	17503	5423	11314	67119	149858	87923	36061	6502	4968	34884	3946	174284	324141
FTE Employment	71900	40000	5500	246400	11500	177000	348400	117200	115800	981100	2114800								
Energy Consumption (Thousands of tonnes of oil equivalent)																			
Oil & Gas	100	320	110	1370	2570	200	350	90	1270	930	7290								
Coal & other	10	40	20	530	3570	30	40	0	0	30	4280								
Electricity (Net)	50	70	20	410	500	10	220	50	70	300	1690								
TOTAL	160	420	150	2310	6630	250	610	140	1340	1260	13260								

Source: Based on South West Regional Accounts, 2003

Figure 1: Productivity of SW Food Production, 2003 (GVA/FTE, £ thousands)

Source: South West Regional Accounts

The food & drink manufacturing sector as a whole broadly matches the overall productivity of SW industries, although lower productivity in agriculture means that overall food production is less productive (in terms of GVA per full-time equivalent job) than other activities (Figure 1).

GEOGRAPHY OF SW FOOD PRODUCTION

Food production, both primary and manufacturing, is concentrated in the rural counties, although Plymouth and Bath & NE Somerset also contribute substantially to output from food and drink manufacturing (Table 4).

Table 4: Food Production in SW Sub-regions, 2003 (GVA, £ million)

	Agriculture & Fishing	Food & Drink Manufacturing	Total Food & Drink
Bath & NE Somerset	24	86	109
Bournemouth	1	1	1
Bristol	4	41	46
Cornwall & Isles of Scilly	242	152	394
Devon	331	150	481
Dorset	190	86	276
Gloucestershire	155	239	393
North Somerset	16	39	55
Plymouth	3	122	125
Poole	2	30	32
Somerset	210	260	490
South Gloucestershire	25	43	68
Swindon	8	1	9
Torbay	7	20	27
Wiltshire	161	195	356

Source: South West Regional Accounts

TRADE IN FOOD PRODUCTS

Table 4 shows net trade in food products between the South West, other UK regions and the rest of the world. The region is a net exporter of food products to the rest of the UK, a (marginal) net importer from the rest of the world, and an overall net exporter².

Table 5: Trade in Food Products, South West 2003 (£ million)

	Agriculture etc.	Food, Drink & Tobacco
UK Regions		
Exports	2254	3164
Imports	697	1499
Net Trade	1556	1664
Overseas		
Exports	101	309
Imports	123	374
Net Trade	-22	-66
TOTAL TRADE		
Exports	2354	3472
Imports	820	1874
Net Trade	1534	1599

Source: South West Regional Accounts

FOOD & ENERGY: IMPLICATIONS OF HIGHER ENERGY COSTS

We would expect increased energy costs to affect the geography of food production both nationally and internationally. All else remaining equal, we would expect food production to relocate, at the margins, to areas with lower overall energy costs for food *production and distribution*. These will have different implications for primary food production (agricultural and fishing) compared to food & drink manufacturing.

On the supply side:

- Primary food production – Energy requirements (and associated costs) vary between areas for reasons of physical geography (climate, topography, soil quality, etc.) and production technology (e.g. high energy intensive mechanised farming vs. low energy-intensive and labour-intensive farming). Higher energy costs will, all else remaining equal, lead to an increased concentration of primary food production in areas with low total energy costs of production.
- Food & drink Manufacturing – Production energy requirements vary between areas largely due to differences in available technology. For simplicity, we assume that basic energy costs are broadly similar in all locations. The other main element of energy-related costs in food & drink manufacturing are the costs of transporting primary food commodities for processing. To a first approximation, these will increase in line with the distance from primary food production centres. Increases in energy costs (relative to other input costs) will, all else remaining equal, tend to concentrate food manufacturing closer to primary food production. Higher energy costs may also lead to changes in the primary food ‘ingredients’ in manufactured food ‘recipes’ – e.g. replacing imported ingredients with locally grown substitutes where possible.

² This table is based on the summary input-output accounts for the South West presented on page 3 above. Those accounts only approximate to the food & drink sectors presented in the other tables, since they include Forestry with Agriculture & Fishing and Tobacco within food & drink manufacturing (and products).

- Food distribution – Energy costs are primarily related to transport and to storage (e.g. refrigeration for perishable products). Higher energy prices will lead to concentration of production closer to population centres to reduce distribution and storage costs. This will influence the location of both primary food production and food & drink manufacturing. The latter will face a trade-off between minimising energy costs for transport of raw materials, and costs of transporting manufactured food products.

On the demand side:

- Higher energy costs will be reflected in higher food prices to final consumers. We would expect households to respond by altering patterns of food consumption, all else remaining equal shifting demand towards food products with lower total energy content. This would lead to an increased preference for locally-sourced foods of any given type, and a move towards foods with lower energy content – e.g. substituting away from energy-intensive manufactured food products towards primary ('unprocessed') food commodities with lower embodied energy. However, the total energy costs to the household of unprocessed foods need to take account of energy required for cooking in the home – which may actually be higher per unit than for manufactured food products due to technical economies of scale in food preparation.

Our simulations consider a rise in food distribution costs – making imported food products more expensive in the South West, but also making SW exports more expensive elsewhere. Our simulations assume that rising energy costs have a greater impact on the costs of food traded internationally (i.e. of rest of world imports to the South West and exports from the South West to the rest of the world) than on those traded within the UK (i.e. rest of the UK imports and exports). Our simulation model is a regional model that does not contain sub-regional detail. We cannot, therefore, consider changes in the sub-regional geography of food production within the South West.

It is also worth noting that, in reality, rises in energy cost are not the only factor that will influence food production in future. A general increase in global demand for food and food commodities, for example, will tend to increase food prices and so the profitability of food production and manufacturing in all areas – separate from any effects from higher energy costs. Our simulations focus on the implications of higher energy costs holding everything else constant.

The central simulation considers a rise in food distribution costs leading to increases in the point-of-sale price of both agricultural and food & drink manufacturing products that traded either regionally or nationally (for simplicity, the price of food products produced and sold within the South West is held constant). The simulation is intended to illustrate the types of effect that might occur from this 'shock' to the SW economy, and the possible magnitude of the changes involved.

The results are shown in Table 6. The results incorporate a range of 'feedback' effects from the initial rise in distribution costs – as changes in demand and supply lead to changes in relative product prices, and consumers and producers respond to these price changes by altering patterns of consumption, production and trade.

Table 6: Impact of Rising Food Distribution Costs on SW Economy

% change relative to baseline projection

	Year					
	1	2	3	5	10	20
GVA - Total	0.0	0.0	0.0	0.0	0.0	0.0
GVA - Agriculture	0.4	0.7	0.9	1.3	1.9	2.4
GVA - Food & Drink	0.0	0.1	0.1	0.1	0.1	0.1
GVA - Other	0.0	0.0	0.0	-0.1	-0.1	-0.1
Employment - Total	0.0	0.0	0.0	0.0	0.0	0.0
Employment - Agriculture	1.0	1.2	1.4	1.7	2.1	2.5
Employment - Food & Drink	0.1	0.1	0.1	0.1	0.1	0.1
Employment - Other	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
RUK Exports - Total	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
RUK Exports - Agriculture	0.1	0.4	0.7	1.1	1.7	2.3
RUK Exports - Food & Drink	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
RUK Exports - Other	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2
ROW Exports - Total	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3
ROW Exports - Agriculture	-3.6	-3.3	-3.0	-2.6	-1.9	-1.3
ROW Exports - Food & Drink	-1.3	-1.2	-1.2	-1.2	-1.2	-1.2
ROW Exports - Other	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2
RUK Imports - Total	0.0	0.0	0.0	0.0	0.0	0.0
RUK Imports - Agriculture	-0.8	-0.7	-0.6	-0.5	-0.3	-0.2
RUK Imports - Food & Drink	-0.9	-0.9	-0.9	-0.9	-0.9	-0.8
RUK Imports - Other	0.1	0.1	0.1	0.1	0.1	0.1
ROW Imports - Total	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
ROW Imports - Agriculture	-4.9	-4.8	-4.8	-4.7	-4.5	-4.4
ROW Imports - Food & Drink	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
ROW Imports - Other	0.0	0.0	0.0	0.0	0.0	0.0
Price - Agriculture	2.5	2.3	2.0	1.6	1.0	0.4
Price - Food & Drink	0.5	0.3	0.4	0.4	0.2	0.2

Source: SW BEM

The net effect is to increase real agricultural output (GVA) and employment within the South West relative to the baseline, with a marginal increase in output and employment in food & drink manufacturing. Rising output is supported by reduced imports of food products from the rest of the world (ROW), with imports from the rest of the UK (RUK) also declining slightly. Overseas exports of food products from the South West decline as a result of higher distribution costs, but agriculture exports to the rest of the UK rise, as the entire UK market becomes more 'self sufficient' in agricultural products at the expense of imports from overseas, and the South West benefits as a major agricultural region. Higher distribution costs result in an immediate rise in food prices, although this dissipates over time as producers substitute towards less costly inputs and production methods, and as domestic production displaces now more expensive imports.

Changes in the food sector have implications for other parts of the SW economy. The net increase in food production displaces production by other sectors, primarily through higher production costs and prices, and reduced exports. The net impact on SW GVA and employment is broadly neutral.

FOOD & ENERGY: IMPLICATIONS OF INCREASED DEMAND FOR BIO-FUELS

The increased use of bio-fuels is one factor underlying a rapid rise in global demand for agricultural products. The effects of such a shift in demand on agriculture and food production in the South West are much more straightforward than are those of higher distribution costs. To illustrate, the following table shows the impacts of a 5 per cent increase in export demand for SW agricultural products.

Table 7: Impact Of Rising Export Demand For Agricultural Products on SW Economy

	Year					
	1	2	3	5	10	20
GVA - Total	0.0	0.0	0.0	0.0	0.1	0.1
GVA - Agriculture	0.6	1.0	1.4	2.0	2.9	3.7
GVA - Food & Drink	0.0	0.0	0.0	0.0	0.0	0.1
GVA - Other	0.0	0.0	0.0	0.0	0.0	0.0
Employment - Total	0.0	0.1	0.1	0.1	0.1	0.2
Employment - Agriculture	1.6	1.9	2.1	2.5	3.2	3.8
Employment - Food & Drink	0.0	0.0	0.0	0.0	0.0	0.1
Employment - Other	0.0	0.0	0.0	0.0	0.0	0.0
RUK Exports - Total	0.1	0.1	0.1	0.1	0.2	0.3
RUK Exports - Agriculture	1.4	1.8	2.2	2.8	3.8	4.6
RUK Exports - Food & Drink	0.0	0.0	0.0	0.0	-0.1	0.0
RUK Exports - Other	0.0	0.0	0.0	-0.1	-0.1	-0.1
ROW Exports - Total	0.0	0.0	0.0	0.0	0.0	0.0
ROW Exports - Agriculture	1.4	1.8	2.2	2.8	3.8	4.6
ROW Exports - Food & Drink	0.0	0.0	0.0	0.0	-0.1	0.0
ROW Exports - Other	0.0	0.0	0.0	0.0	-0.1	0.0
RUK Imports - Total	0.1	0.1	0.1	0.2	0.2	0.2
RUK Imports - Agriculture	3.1	3.2	3.3	3.4	3.7	3.9
RUK Imports - Food & Drink	0.0	0.0	0.0	0.0	0.1	0.1
RUK Imports - Other	0.0	0.0	0.0	0.0	0.1	0.1
ROW Imports - Total	0.1	0.1	0.1	0.1	0.1	0.1
ROW Imports - Agriculture	3.1	3.2	3.3	3.4	3.7	3.9
ROW Imports - Food & Drink	0.0	0.0	0.0	0.0	0.1	0.1
ROW Imports - Other	0.0	0.0	0.0	0.0	0.0	0.1
Price - Agriculture	3.0	2.5	2.5	2.0	1.0	0.5
Price - Food & Drink	0.0	0.0	0.0	0.0	0.0	0.0

Source: SW BEM

In the short term, the impact of increased export demand on actual exports and output of agricultural products is muted, as capacity constraints bind, resulting in production costs and output prices for those products produced within the South West. (Manufactured food & drink prices also rise in response to higher input costs, although this effect is too small to register in Table 7). As a result, agricultural output and employment rise by only 0.6 per cent and 1.6 per cent, respectively. As additional capacity is built over time, costs and prices fall back and exports rise. In the long term, exports of agricultural products to the rest of the world increase by almost 5%, although imports also rise. Employment and GVA within SW agriculture rise by around 4%.

CONCLUSIONS

We would expect increased energy costs to influence both the composition and geography of food production, as producers and consumers switch to less energy intensive processes and products, and as production shifts to minimise (all else constant) on energy usage in food distribution.

Our simulations consider a rise in food distribution costs – making imported food products more expensive within the South West (with greater increases for international imports than for imports from other UK regions), and making SW exports more expensive elsewhere (particularly in overseas markets). The net effect is to increase real agricultural output (GVA) and employment within the South West, as increasing shares of regional suppliers in SW and UK markets more than compensate for reduced international exports. The net increase in food production displaces production by other sectors, primarily through higher production costs and prices, and reduced exports. The net impact on SW GVA is broadly neutral.

We also simulate the effects of increased export demand for SW agricultural products (associated, for example, with increased use of bio-fuels). A one off increase in export demand leads to a short term rise in agricultural product prices within the South West and a muted increase in output and employment from the sector, but a larger expansion over time as supply constraints are relaxed. Ongoing growth in agricultural export demand supports persistently higher product prices and growth of the sector.

Overall, the simulations suggest that, while these developments in the relationship between food and energy will have implications for food production sectors within the South West, the overall impact on the regional economy are likely to be small.

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SW BEM

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