



WHAT PRICE PROTECTION?

**An Economic Assessment of the Impact of Proposed Restrictions
on Crop Protection Substances**

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Executive Summary

Future generations looking back on 2007-08 are likely to view it as a turning point with respect to agricultural production. Between 2005 and 2008 the prices of agricultural commodities increased by more than 100 per cent. The result for the world's poorest nations has been hunger and food riots while the world's richer nations have awoken to the spectre of food inflation. This turn of events reflects more than one contributory factor, but it has brought into sharp focus the fact that global demand for food is now starting to outstrip supply.

High prices for agricultural commodities will bring forth a positive supply response. Across the world more land will be attracted into agricultural production, but the increase in the productive area will fall far short of what is needed. The only realist prospect of the world meeting its growing demand for food – and increasingly non food industrial crops – will be continued productivity growth ie, increasing output per hectare. The highly respected OECD and FAO organisations have jointly predicted that agricultural prices will be significantly higher over the next ten years than they have been over the passed decade. If future price increases are to be constrained science and technology must be employed. Put simply, modern farming techniques, founded on leading edge science will be needed to adequately feed the world's population in the coming years.

It is against this background that the European Council of Minister's recent political agreement to introduce new crop protection authorisation rules should be viewed. The full impact of the 'agreement's' restrictions is unclear – the European Commission has yet to publish a comprehensive assessment – but studies undertaken by highly reputable experts in the UK suggest that the result is likely to be a significant fall in the UK's – and by implication the Community's – total crop production: the product of lower yields and limited scope to increase the arable area.

All other factors remaining equal, the experts' assessed reduction in yields would make a large proportion of the Community's arable farms unviable, resulting in the loss of livelihood for many farmers and further job losses throughout the food chain. Of course other factors are unlikely to remain unchanged, most notably the prices of arable crops would rise and the increase would be likely to be significant. It is impossible to say by how much prices would rise as much would depend on the availability and prices of alternative supplies – not subject to the same restrictions – imported from outside the Community. However, it is possible to demonstrate that the price of cereals, potatoes and vegetable brassicas would need to rise by more than 100 per cent under the more severe proposed crop protection restrictions if arable farm margins are to be protected.

What would be the impact of a rise of 100 per cent in cereal prices on the prices of basic necessities? Cereal prices underpin the bulk of foodstuffs consumed in Europe and therefore the prices of all grain based products – from bread to milk products and meat – would rise to reflect the increased costs associated with cereals. If a 100 per cent increase in the price of cereals was passed on to consumers – without any mark-up along the chain – the price of a standard loaf would rise by around 9p (€0.11), a litre of milk would increase by 3p (€0.04) while a kilogram of pork would rise by 40p (€0.48). Attempting to provide an assessment of the increase in retail prices resulting from a 100 per cent rise in

the farm-gate price of potatoes and brassicas is difficult given the wide range of products but a reasonable average is £1(€1.2) per kilogram suggesting a doubling in the prices of these products.

The population of the EU has recent experience of the effects of a 100 per cent increase in cereal prices; namely, a 7.5 per cent rise in food prices over the past year and much larger increases for basic necessities such as bread, milk, dairy products and meat. Higher food prices are something that households whether rich or poor cannot avoid but studies reveal that the burden is proportionally greater the lower a household's income. Not only do lower income households spend a higher proportion of their incomes on food but also their purchases are heavily weighted towards the basic necessities whose prices are most responsive to increases in the prices of cereals. This variation in the share of household expenditure on food occurs not only within but also across Member States with recent members devoting significantly larger income shares to food. The lower a household's income the greater the pressure of higher food prices and individuals will be forced to cut back on their purchases. Some may react by buying smaller volumes, others by switching to lower quality products and the evidence shows that many will react by cutting out or reducing their consumption of vegetables and fruit with adverse consequences for their health and government campaigns to encourage healthy eating.

It might be assumed that one consequence of higher prices for crops would be the protection of farm incomes. This however would be a mistake. Firstly, it does not follow that the rise in the prices of arable crops would be sufficient to offset the substantial loss of margin resulting from lower yields. Secondly, the impact of significant increases in the prices of cereals would be devastating for livestock farmers. The associated higher feed costs would force many out of business and as prices for meat and dairy products rose in response to the reduced supply so the burden on household food bills would increase.

The overall effect would be higher food prices and a contraction in the size of the agricultural industry. Many farmers would lose their livelihoods and the fall in production would lead to job losses in the food processing and distribution industries. Higher prices would attract imports with the effect of not only causing a deterioration in the EU's food trade account but also causing prices to rise in the world's developing and poorer nations. At a time when the prospects for exports of UK and EU foodstuffs look very promising, exporters will be unable to take advantage of the world's growing demand, indeed many of those who have worked hard to create a food export business will find their efforts undone.

The recent rise in food prices has alerted politicians to the political dangers of the growing imbalance in global food markets. To date they can fairly claim that in large measure food inflation is something that has been caused by events beyond their control. Such claims will not be tenable if crop protection substances are markedly restricted by legislation. As the world enters a period of uncertainty regarding its ability to feed itself, politicians in the world's richest nations have a moral duty not only to keep the cost of food to their own populations as low as possible, but also to the world's poor and disadvantaged who will pay a much heavier price if the developed world's agricultural productivity is reduced.

Introduction

The formal start of the French Presidency on 1st July heralded a heavy workload for the French Farm Minister. One of the first issues demanding his attention is a memorandum from the Commission seeking financial support to provide school children with free fruit and vegetables. In its memorandum the Commission point to the importance of vegetables and fruit for the longer term health of the population, particularly those in lower income groups. In seeking financial support the Commission was explicitly acknowledging the importance of low prices in encouraging households across the EU to eat a healthy diet. Another issue thrust upon the new Presidency is the high prices of animal feeds and the damage they are doing to the competitiveness and supply of meat and livestock products. It is therefore ironic that shortly before the French assumed the Presidency, the Council of Ministers confirmed by a majority vote a political agreement on new crop protection authorisation rules to replace Directive 91/414. The full impact of this ‘agreement’ – subject to European Parliament amendments and confirmation by the Council early next year – remains unclear, but the available evidence points to a reduction in the EU’s production of arable crops and higher prices for crops, vegetables, feeds and livestock prices.

The UK Secretary of State responsible for agriculture, Hillary Benn, justified his abstaining in the vote on the grounds that there had not been a proper assessment of the potential impact of the proposals on EU agriculture or consumers (AgraFocus, 2008). His ministerial colleague, Phil Woolas replying to a Parliamentary question on the proposed new rules for crop protection said the Government ... *could not support measures that would have significant adverse impacts on crop protection and secure no significant health benefits for consumers.* An evaluation of the effects of the proposed reduction in the availability of crop protection substances for UK farmers by ADAS – a respected independent agricultural organisation with more than 50 years experience of agricultural production techniques – that was based on an earlier assessment by the Pesticides Safety Directorate (PSD), concluded that ... *even the lowest impact proposed ... reduces production by 25 per cent ... [and] the most severe impact ... [results in] all crops seeing reductions in production of at least 53 per cent* (ADAS, 2008).

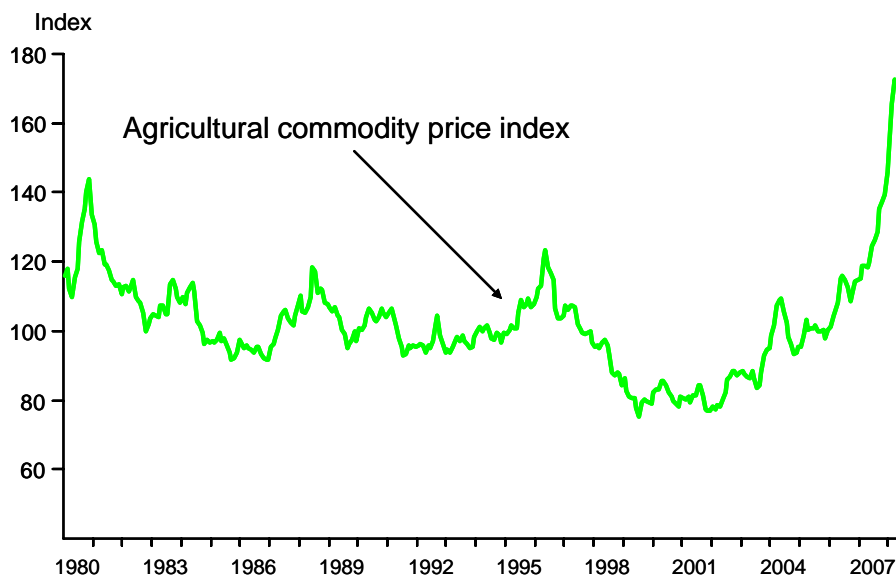
The purpose of this paper is to examine the likely implications of the proposed reduction in crop protection substances for the economic condition of the farming industry, the knock on effects for the UK food supply chain and the availability, quality and most importantly the price of food for consumers. What follows is separated into three sections. The first examines the changing balance of demand and supply for agricultural commodities at the global level and concludes that it is imperative that EU farmers are now encouraged to increase output and productivity if the world is to be able to feed itself at reasonable prices in the future. The second section analyses the economic consequences of the proposals for UK crop production – and by extension EU agricultural crop production – and concludes that the likely impact will be a significant reduction in the production of cereals, potatoes and vegetable brassicas accompanied by a significant increase in the prices of these commodities. The third and final section assesses the likely impact for the agricultural industry, the wider economy and the impact of higher food prices on household living standards, particularly those on lower incomes.

The Importance of Agricultural Productivity

In 2007 commentators and politicians across the world were forced to return to two phrases many believed had been consigned to history; namely, food inflation and food security. Between 2005 and 2007 the prices of agricultural commodities increased on average by more than 100 per cent – see Figure 1 – and in many cases they continued to rise into 2008. In developed countries, where productivity has substantially reduced the proportion of income that the average household needs to devote to food, the consequence of higher food prices is a slowdown in economic activity and reduced living standards. In the world's poorest nations the effect is under-nourishment and starvation.

The dramatic increase in the prices of agricultural commodities since 2005 is in part the result of adverse weather conditions that reduced crop yields in the world's major grain producing regions. However, the impact on world prices as shown in Figure 1 would have been less dramatic had global stocks of agricultural commodities not been dwindling over recent years – a trend that had largely gone unnoticed by commentators and politicians.

Figure 1: World Commodity Prices



Source: FAO

Over the past thirty years the supply of agricultural commodities has generally grown faster than demand. This resulted in the build up of agricultural surpluses, particularly in the European Union (EU) and the United States (US), and efforts by policy makers in these two regions to slow down the growth of production. But while the authorities in developed nations were focused on reducing the cost to the public purse of surpluses, economic growth in Asia – particularly in China and India – was gathering momentum. Asia accounts for more than half the world's population and China and India alone account for more than a third. The effect of this economic growth – in addition to a

growing world population – is not only to increase demand as diets broaden and deepen in response to rising affluence, but also to reduce the potential area of farm land as urbanisation spreads.

Per capita meat consumption in China has almost trebled since 1980 and, on average, each kilo of meat requires between five and seven kilos of grain. The rise in living standards that accompanies economic growth is the main reason why the UN Food and Agriculture Organisation (FAO) has forecasts that in developing countries the supply of cereals will not keep pace with demand and that an extra billion tonnes of cereals will be needed by 2030 (FAO, 2002). The FAO concludes that the developing nations will not be able to meet their own needs and exports from areas such as the EU will need to increase markedly resulting in feed grains accounting for an increasing proportion of global demand for cereals (OECD-FAO, 2008).

The need for increased production from a region such as the EU was an issue addressed by the UK government's new chief scientific adviser, Professor John Beddington. He predicted, in what was in effect his inaugural speech that the prices of staples such as wheat, maize and rice would remain high due in part to climate change and in part to rising demand. Referring to the rising demand, particularly in Asia he said ... *once you move to [an income of] between £1 and £5 a day you get an increase in demand for meat and dairy products ... and that generates demand for additional grain* (Beddington, 2008).

Had it not been for adverse weather and to some extent the encouragement of biofuels in the EU and US the tightening balance of global demand and supply for grains might have gone unnoticed for a few more years, but sooner or later the iron laws of economics were bound to kick in. One of the effects of high agricultural commodity prices is to encourage increased production. Across the world arable farmers have been responding and over the coming years the world is likely to witness a significant increase in the supply of arable crops: the product of an increase in the area devoted to production and higher yields in response to increased use of fertilizer and crop protection products. But the impact will not be sufficient to return prices to their pre-crisis levels.

The authoritative OECD and FAO in their latest report argue that despite the expected increase in supply over the coming year, the growing global demand for food will ensure that over the medium term, at least, ie, the next ten years, agricultural commodity prices ... *will average substantially above the levels that prevailed in the past ten years (op cit, p11)*. In essence the OECD-FAO experts do not expect stock levels to be replenished and therefore not only will agricultural prices, and therefore food prices be higher in the foreseeable future, but also they will be more volatile. The OECD-FAO prediction is based on a 'business-as-usual' assumption; namely, it assumes that output from the world's agricultural industries will continue to grow. A significant reduction in the output of arable crops from a major agricultural region such as the EU would have the effect of raising agricultural commodity prices to even higher levels than envisaged by the OECD-FAO.

The OECD-FAO report was primarily concerned with explaining the recent tightening of agricultural markets, but there are other trends that also underpin concerns regarding the future balance of supply and demand for agricultural commodities. In his opening speech

to the United Nations Summit on World Food Security in Rome earlier this year, the UN Secretary-General, Ban Ki-moon urged the world's governments to support ... *promising research into optimal food crops and better annual production systems and adopting known technologies to existing food chains* (Ki-moon, 2008). Implicitly the Secretary-General was underlying the importance of efficiency and productivity, a point made all the more pertinent by the Summit's full title; namely, *The Challenges of Climate Change and Bioenergy*. In the coming years the extremes of weather and, in some parts of the world, shortages of water as well as the need to increasingly use land to grow industrial materials, will not only make the pursuit of higher productivity vital, but also according to climate experts, the world will have to rely to a greater extent on agricultural production in temperate zones such as Europe and North America to compensate for the climate induced difficulties for farmers in tropical regions (see for example, Von Witzke, 2008).

The importance of encouraging agricultural productivity is the central message of the preliminary results of a study by the influential Chatham House (2008) which pointed to increasing uncertainty regarding the ability of global food production to meet rising demand. The Chatham House authors point out that over the past 25 years global food production has doubled and this can largely be attributed ... *to higher productivity per hectare* (*op cit*, p5). The authors go on to observe that ... *the consensus seems to be that the area of land cultivated globally is not likely to increase substantially in the short term* (*op cit*, p7) which implies that productivity growth per hectare will need to be the main engine of supply. A similar conclusion was published in a Credit Suisse (2007) study that also noted that over recent years the growth rate for cereal yields had slowed, particularly in the EU in part reflecting the Common Agricultural Policy's (CAP) emphasis since the 1990s to discourage production growth eg, set aside.

The next section will demonstrate that the likely outcome of the proposed reduction in crop protection substances will be to lower productivity per hectare, reduce the output of arable crops and result in a significant rise in the price of agricultural commodities. This is an outcome tragically at odds with the world's rising demand for food and the UN Secretary General's urging of governments to do more to increase the efficient production of food. The final section of this report takes these results and analyses the adverse consequences for the UK – and by implication the EU - farming industry, the associated food chain and the population's living standards.

The Economic Impact at the Farm Level

In May this year the UK's Pesticides Safety Directorate (PSD) published an analysis of the potential impact of what it described as the Commission's 'cut-off criteria' and 'substitution' proposals for crop protection substances, as well as the likely impact of more restrictive amendments proposed by the European Parliament (PSD, 2008). The PSD study examined 286 active substances included in Annex 1 to the Directive 91/414, with the purpose of identifying those likely to be withdrawn under either the Commission's proposals or the Parliament's revisions. The PSD described its study as an *indicative assessment (op cit, p7)* as some of the impacts of the proposed revisions to the Directive are difficult to establish as the criteria are yet to be fully defined. According to the PSD expert study the Commission's proposals could remove up to 15 per cent of the substances it assessed, including some that are particularly important in the UK for the protection of cereal and key vegetable crops. The study also concluded that the Parliament's proposed revisions could result in the loss of 85 per cent of conventional crop protection substances and, according to the PSD experts, if realised, ... *conventional commercial agricultural in the UK (and much of the EC) as it is currently practised would not be achievable (op cit, p3)*.

What follows is based on the PSD's assessment of the reduction in active substances available to UK arable farmers augmented by an ADAS study (ADAS, 2008) that translated the PSD's results into the economic impact at the farm level. ADAS has been in existence for many years and with a staff of more than 700 agriculturists, scientists and rural experts it is the UK's foremost (and largest) independent, provider of research and consultancy to land-based industries. The PSD summarised the potential loss of active substances in terms of percentage reductions under four scenarios, named respectively as: Commission exclusion (CE); Commission substitution (CS); Parliament exclusion (PE); and Parliament substitution (PS). ADAS was commissioned by the European Crop Protection Association (ECPA) to undertake the independent evaluation of these four scenarios with respect to three crops: wheat, potatoes and brassicas. The three crops were selected for their importance to UK agriculture. Wheat accounts for some 63 per cent of the UK's cereal area. Over the past 25 years this proportion has steadily increased from 48 per cent – and according to the latest pesticide usage survey (Garthwaite *et al*, 2006) the crop accounts for 50 per cent of the pesticide use in the UK. Potatoes were selected as the crop which is not only important in its own right, but also it is particularly sensitive to blight. The third group vegetable brassicas represents more than half of the UK's vegetable area and also year round production. Table 1 shows the PSD's estimated losses in terms of the percentage of crop protection substances for these three key UK crops under its four scenarios. By any yardstick, the estimated reductions are large, and in the case of the fourth scenario – Parliament substitution – the impact is devastating.

For their assessment, the ADAS experts focused on the extent of the weed, disease and pest threats posed by the four scenarios and provided for each of the three crops a technical/agronomic and economic assessment of the likely impact arising from the estimated loss of active substances, including not only the immediate implications, but also the longer term consequences for crop production, resistance management and the industry's carbon footprint (*op cit*, 2008, p15).

Table 1: Percentage Loss of Active Substances under EU Proposals

	Pesticide type	Commission exclusion	Commission substitution	Parliament exclusion	Parliament substitution
		(1)	(2)	(3)	(4)
Wheat:	Herbicide	13	37	37	84
	Fungicide	49	65	62	97
	Insecticide	26	47	92	100
Potatoes:	Herbicide	29	36	36	79
	Fungicide	11	22	33	72
	Insecticide	0	38	77	100
Brassicas:	Herbicides	8	38	50	75
	Fungicide	44	50	55	83
	Insecticide	17	44	83	100

Source: ADAS (2008, page 16)

Wheat

In terms of economic value and land use the ADAS assessment of wheat is by far the most important of the three crops. ADAS adopted the approach of assessing separately, the loss of production at the industry level eg, lower yields, resulting from the PSD's estimated percentage reduction in the number of herbicides, fungicides and insecticides available to farmers under the four scenarios. In practice – as acknowledged by ADAS (*op cit*, p10) – the loss of production arising from the combined impact of the reduced availability of crop protection products would be less than the sum of its parts. Nevertheless, as indicated in Table 1, the combined impact of the four scenarios is at its lowest under CE and at its greatest under PS.

The main issue for wheat – and implicitly cereals in general – raised by the reduced choice of herbicides would be the problem of black grass and to a lesser extent Italian rye grass. Black grass is present on approximately 50 per cent of the wheat area in Great Britain and Italian rye grass on about 6 per cent. The loss of the main pre- and post emergent herbicides for controlling these weeds would only be partly offset by the use of permitted active substances as they *are less effective in controlling weeds* (*op cit*, p19) and farmers would have to engage in increased ploughing involving higher fuel and machinery costs (and thereby an increased carbon footprint), as well as incurring the additional burden of higher labour costs per hectare in order to mitigate the loss of effective control. This would be particularly the case under the PS scenario which would amount to requiring UK farmers to farm with very little resort to herbicides. The estimated loss of yields due to the reduced availability of herbicides as calculated by ADAS experts are set out in Table 2.

According to the ADAS study the loss of production would be greater under its assessment of the reduced availability of fungicides – see Table 2. ADAS observe that production losses due to disease are subject to seasonal variations and can result in severe reductions in yields and even the rejection of a crop where mycotoxin exceeds EU limits under certain conditions (*op cit*, p22). ADAS estimates of yield losses arising from the

reduced choice of fungicides range from 20 per cent under CE usage to 32 per cent under PS. The effect of the PS scenario would be to force fungicide-free production techniques on the industry effectively bringing to an end modern cereals farming in the UK and by implication in Europe.

Turning finally to pest control. The PSD's assessed reduction in the range of insecticides available to wheat farmers has a much more limited impact on the industry's wheat yields according to the ADAS experts. This follows because cereal crops are not particularly susceptible to pests, though the impact of the proposed reduction in protection from pests could be devastating for individual farms. For example, the reduction in yield for an individual crop attacked by, say, wheat bulb fly would be severe. This serves to make the point inherent in the ADAS approach, namely, a focus on the industry 'average' outcome ignores the minority of farms, in any year that under the proposed reduction in available plant protection substances would be vulnerable to a catastrophic loss of production and possibly, the loss of their livelihood. Once again the PS scenario would force pesticide-free production significantly increasing the risks associated with cereal farming.

Table 2: Implied reduction in Wheat Yields

%	Status	Scenarios				
		Quo (1)	CE (2)	CS (3)	PE (4)	PS (5)
Yield loss (%) due to:						
(i)	Weeds		7	20	22	39
(ii)	Disease		20	27	28	32
(iii)	Pests		<1	<1	<1	10
(iv)	Combined		26	41	44	62

Source: ADAS.

The estimates of the reductions in yields under the four scenarios set out in Table 2 form the basis for calculating the economic implications for cereal farms and total wheat production. The data used to assess the impact of these yield reductions on the operating margins for wheat – ie, revenue less variable and overhead costs – are drawn from the Agricultural Budgeting and Costing Book (ABC, 2007) and pre-date the substantial rise in the prices of cereals, seed, fertiliser and fuel that such farms are currently subject to. The margin relates to feed wheat and a farm in excess of 400 hectares. This is significantly larger than the average size of cereal farm in England, which Defra estimates at around 220 hectares (Defra (a), 2007). Generally larger cereal farms have lower unit costs (Lang and Allin, 2006, p30), so all other factors remaining equal they are likely to be more resilient than smaller scale farms. Finally, the Operating Margin is before rent and finance charges and before payment of the single farm payment.

As indicated above there is, in a real sense, no such thing as an average farm and therefore an average margin. At the farm level, yields and production costs are influenced by a host of given variables, ranging from soil type, rotations, weed and disease propensity, as well as the skills and knowledge of the farmer. In addition there

are the random effects of weather and disease, the risks of which are inversely related to the range of crop protection substances available to the farmer. Finally, unit costs are influenced by the size of farm and ownership of the land. Thus, the ‘average’ wheat margin set out in Table 2 should be treated as no more than indicative. Subject to the explanation below, the results set out in the table should be read as a guide to the expected change in the crop’s operation margin, resulting from the assessed impact to the four scenarios when compared to the *status quo* margin set out in the first column.

The starting point for assessing of the impact of the four scenarios on operating margins is to estimate the impact on operating costs. Crop protection products account for some 19 per cent of total operating costs and in some cases eg, scenario CE, farmers will have some scope to substitute crop protection products, albeit that as assessed by ADAS they will not be as effective. But as observed above, the reduction in the availability of active substances will generally result in higher fuel, machinery and labour costs, the impact of which – particularly as the industry is entering a period of higher fuel charges – will be to offset to a greater or lesser extent any savings from the reduced use of crop protection products. The balance for operating costs of reduced expenditure on crop protection substances and increased expenditure on fuel and labour are set out in Table 3.

Table 3: Implicit Price Increase to Restore Wheat Operating Margins

%	Status	Scenarios			
	Quo (1)	CE (2)	CS (3)	PE (4)	PS (5)
Yield (tonnes/ha)	8.85	6.65	5.22	4.96	3.36 ¹
Price (£/tonne)	<u>110</u>	<u>145</u>	<u>183</u>	<u>190</u>	<u>259</u>
Revenue (£/ha)	974	964	955	942	870
Operating Costs (£/ha) ²	<u>635</u>	<u>625</u>	<u>616</u>	<u>603</u>	<u>531</u>
Operating Margin (£/ha)	339	339	339	339	339
Percentage rise in price(%)³	-	32.2	66.2	73.0	135.0

¹This yield is lower than the average organic yield, as typically organic wheat is grown after grass, legumes or roots.

²Variable costs per hectare are set at seed £40, fertiliser £114, crop protection £119 and overheads at labour £97, fuel and machinery £180 and other costs at £85.

³Increase needed to restore the operating margin.

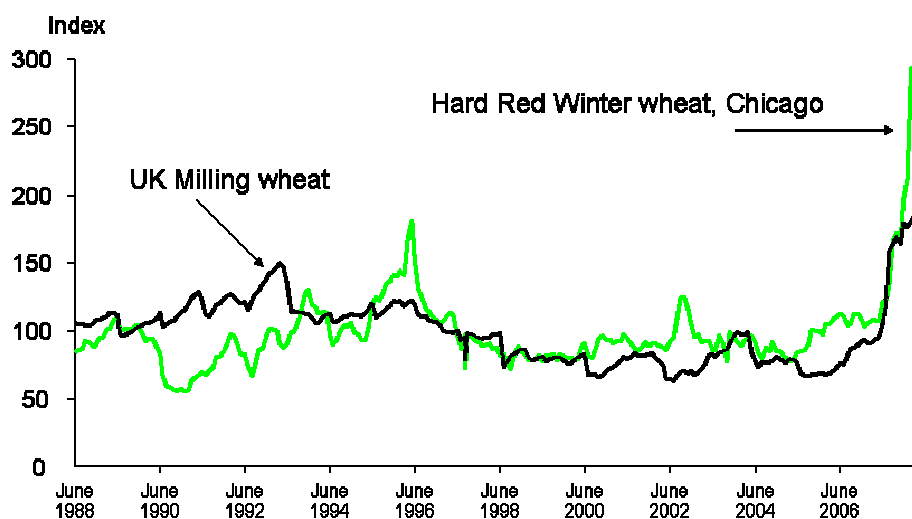
Source: ADAS, ABC and author

Armed with estimates of operating costs under each scenario the next stage is to estimate revenue. Using the ABC’s estimate of average wheat yields, Table 3 shows the reduced tonnes of wheat per hectare as estimated by the ADAS experts for each of the four scenarios. The impact of these lower yields on revenue depends on the price response. If the price remained unchanged at £110 per tonne revenue would fall to £732 per hectare under the CE scenario and progressively to £370 across the remaining three scenarios. Combining these falls with the operating costs displayed in Table 3 the operating margin

would drop 70 per cent to £104 under the CE scenario and a catastrophic 147 per cent to a loss of £160 per hectare under the PS scenario. Even though this is before the single farm payment – currently of £185 per hectare – these outcomes are untenable as the single farm payment is more than accounted for by labour costs – including an imputed payment for the farmer and farm family - plus rent and finance charges. Moreover, it would be extremely unwise to assume that the single farm payment will avoid further (and significant) reductions under future reforms of the CAP. But this implied dramatic fall in profits would not be realised.

The effect of the reduced yields set out in Table 3 would be a fall in total wheat production – and by implication cereals production – in the UK and across the EU. This would invoke a price response but the extent of the response would depend on the availability and price of imports. One of the intentions underlying the various reforms of the CAP since the early 1990s was to bring EU cereal producers into direct competition with cereal growers across the world. As indicated in Figure 2, there is now a closer correspondence between EU and global cereal prices: represented by the Chicago wheat price.

Figure 2: UK and Chicago Wheat Prices



Source: Author

The first section explained why the OECD-FAO believe growing demand will ensure global cereal prices are higher over the coming decade than they have been over the past decade but the OECD-FAO projection assumed EU cereals production would continue to rise. Cereal farms across the EU's 27 member states generally display lower yields than the average for UK cereal farms but after allowing for this difference the effect of the proposed reductions in crop protection substances would be a significant fall in the EU's total production of cereals. Even under the more modest CE scenario EU cereals production is likely to fall by 40 million tonnes below the level it might otherwise have been. Under the very restrictive PS scenario EU cereals production would be some 100 million tonnes below where it would otherwise be.

What would the effect of such falls be on EU and global cereal prices? According to the International Grains Council, world grain production fell by some 60 million tonnes between 2004/05 and 2006/07. The effect was a reduction of some 55 million tonnes in global grain stocks and – as explained in the first section – a sharp rise of more than 100 per cent in the price of grains (IGC, 2008). Put simply the result of the proposal to restrict farmers’ access to crop protection substances would be a fall in EU production and a rise in the prices of cereals: the extent of these changes being proportional to the severity of the restrictions. Because so many variables influence global cereal prices eg, demand, the weather and changes in the world’s area sown to cereals, it is not possible to provide an estimate of the likely response of EU cereal prices. Instead, set out in Table 3 is the increase in prices necessary to maintain the operating margins

As can be seen the estimates range from an increase of 32 per cent under the more modest CE scenario to a massive 135 per cent under the most restrictive PE scenario. If as a result of increases in the global cereals area – say in Russia and Latin America – the increase in the world price of cereals was not sufficient to support the rises shown in Table 3 the effect would be a reduction in cereal farm incomes and for a significant number of cereal farmers across the EU continued production would no longer be viable. The area sown to cereals would contract compounding the effect of lower yields on overall production. Between 1997 and 2007 – a period of significant income pressures for British farms – the area of cereals fell by 643,000 hectares (18 per cent). The wider implications of the results set out in Table 3 for the farming industry as a whole, the wider economy and consumers are examined in the next section.

Potatoes

Some 6,000 tonnes of potatoes are grown in the UK on an area of 140,000 hectares. This amounts to approximately 5 per cent of the cereals area but at an annual average of £600mn the value of the potato sector’s output amounts to about 37 per cent of the value of UK cereals output. As shown in Table 4, the ADAS experts’ analysis of the likely reduction in available crop protection substances would be increased disease (ADAS, 2008). Potato blight continues to exert a major impact on the economics of potato production and the loss of key substances for dealing with blight could result in yield reductions of up to 45 per cent. Moreover, according to ADAS a longer term implication of the reduction in fungicides would be a heightened risk of resistance in the blight population (*op cit*, p29) and the loss of yields could be compounded by a higher rate of rot in storage (*op cit*, p31). Again the PS scenario would, for all practical purposes, force the non-use of crop protection substances and it is worth noting that typical yields for organically produced potatoes are some 40 per cent lower than those of conventional production systems (Zarb *et al*, 2002).

In all cases, apart from the PS scenario, the loss of crop protection choices could be offset to some extent by using permitted, but less effective substances. It is pertinent that according to the PSD the main organic protection against blight – copper sulphate – would no longer be available to growers. Increased cultivations, involving higher fuel and labour costs, could not fully offset the adverse effects of the reduction in protective substances. The data displayed in the lower half of Table 4 relates to the gross margin for main crop ware potatoes and are again drawn from the Agricultural Budgeting and Costing Book (ABC, 2007).

Table 4: Implicit Price Increase to Restore Potato Gross Margins

%	Status	Scenarios				
		Quo (1)	CE (2)	CS (3)	PE (4)	PS (5)
Yield loss (%) due to:						
(i)	Weeds		6	6	6	15
(ii)	Disease		22	31	31	45
(iii)	Pests		1	6	6	15
(iv)	Combined		22	35	35	53
Yield (tonnes/ha)						
		47	37	31	31	22
Price (£/tonne) ¹						
		85	107	130	130	179
Revenue (£/ha)						
		3,995	3,957	4,030	4,030	3,938
Variable Costs (£/ha) ¹						
		<u>2,217</u>	<u>2,1814</u>	<u>2,252</u>	<u>2,252</u>	<u>2,160</u>
Gross Margin (£/ha)						
		1,778	1,778	1,778	1,778	1,778
Percentage rise in price (%)²						
		-	25.7	52.8	52.8	110.7

¹ See text for explanation,

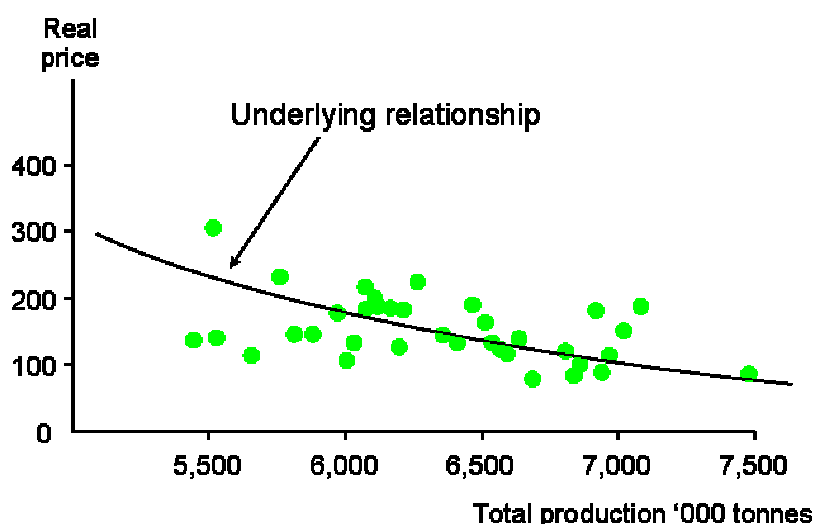
² Increase needed to restore the operating margin

Source: ADAS, ABC and author's estimates

The relatively minor changes in variable costs shown in Table 4 are based on the ADAS study and essentially reflect higher cultivation costs that offset reduced expenditure on crop protection substances. For example, a number of specialised technologies might be employed to reduce weeds, but as observed by the ADAS experts they are also expensive (*op cit*, p27). Cultivations to substitute for late blight control are still under investigation, but varieties favoured for ware production and processing are generally blight susceptible (*op cit*, p29). The effect of pests eg, wireworm, is treated by ADAS as a reduction in the average yield, but in practice the effect of pests is to lower the quality of the crop and again at the level of the individual farm pests can result in a crop being rejected by packers and retailers.

Turning to revenue the impact depends on the price response to the loss of production resulting from the decline in yields. As shown in Figure 3 – which records the underlying relationship between the real potato price (ie, after removing the effects of inflation) and supply – prices are responsive to falls in total production. Hence, again the issue of revenue has been approached by calculating the price increase necessary to maintain the gross margin. As can be seen under the more modest restrictions of the CE scenario it is estimated that the price would need to rise by some 26 per cent. As the severity of the restrictions in crop protection substances increases so the required price increase rises to 110 per cent under the most restrictive PS scenario. Whether in reality the price increases shown in Table 4 are realised would once again depend on the availability and price of imports.

Figure 3: The Relationship between Potato Production and Prices



Source: Potato Council and author

Annual EU production of potatoes averages around 60 million tonnes of which the UK contributes 6 million tonnes (10 per cent). On average EU potato yields are about two-thirds of those achieved by UK growers in part because of the more intensive techniques employed in the UK. Nevertheless, after taking differences in yields into account, the effect of the proposed restrictions on crop protection substances would be to reduce yields across the Community resulting in EU production falling by between 10 and 20 million tonnes. It is very unlikely that this shortfall could be made up by imports.

Until the 1990s the bulk of the world's potatoes were grown in Europe and North America but over recent years production in developing countries has increased so that they now account for more than half of global production: China and India alone account for almost one third of global supply. This production is needed to meet the growing demands of the developing world's population and in any event potatoes are a bulky commodity that are unlikely to be shipped from Asia unless EU prices were very high. Nearer to the EU Egypt is the main African producer of potatoes but with an annual production of 3 million tonnes it could only make up a small fraction of the likely fall in EU production. This leaves Eastern Europe, notably the Russian Federation, the Ukraine and Belarus who are major producers so it is likely that exports to the EU from these countries would increase. Again it is not possible to quantify the final outcome but the most likely scenario would be a marked reduction in the EU's production of potatoes, a significant rise in the price of potatoes and an increase in imports from Eastern Europe.

Vegetable Brassicas

There are approximately 29,000 hectares of vegetable brassicas grown in the UK, with an estimated current value of some £260mn (Defra (b), 2007) indicating a value per hectare that is approximately 1.5 times the value of a hectare of potatoes and more than six times

the value of a hectare of wheat. The data set out in Table 5 show that under the assessed effects of the PSD's four scenarios vegetable brassicas are extremely vulnerable to disease and also, under scenarios PE and PS, extremely vulnerable to pests.

There are at least ten commercial varieties of vegetable brassicas grown in the UK and Defra collect statistics on six varieties. According to Defra (*op cit*) the most value crop ie, revenue per hectare multiplied by the number of hectares, is Calabrese, and the least valuable is spring cabbage. The Agricultural Budgeting and Costing Book provides details of gross margins for five varieties of brassica showing revenue, variable costs and gross margins per hectare in 2007 ranging from £3,850 to £6,650, £2,214 to £4,836 and £1,362 to £4,000 respectively. The ADAS study approached brassicas as a single group and Table 5 reports the experts' estimates of the percentage reductions for the brassica 'sector's average' gross margin according to the impact of the loss of protection for weeds, disease and pests.

Table 5: ADAS Estimates for Brassica Yields and Margins

%	Scenarios			
	CE (1)	CS (2)	PE (3)	PS (4)
Yield loss (%) due to:	<1	3	3	8
(i) Weeds	25	26	26	53
(ii) Disease	<1	<1	25	50
(iii) Pests	25	26	45	77
(iv) Combined				
Associated reduction (%) in gross margin due to:	<1	8	8	21
(i) Weeds	66	68	69	114
(ii) Disease	<1	<1	58	114
(iii) Pests				

Source: ADAS

The ADAS estimate of the reduction in gross margins does not appear to make any allowance for a price response to the fall in the production of brassicas. Again, much depends on the availability and price of imports as well as the response of consumers' to higher prices and, given an inevitable deterioration in the appearance of these vegetables, a reduction in demand. Without a price response the results set out in Table 5 imply that under these scenarios the commercial production of vegetable brassicas in the UK would cease. Table 6 is an attempt to indicate the price response necessary to maintain the gross margin. The example chosen is calabrese as the value of its sales in the UK – some £54mn – are greater than any other brassica. As can be seen the price response ranges from 21 per cent under the more modest CE scenario to a swinging 236 per cent under the PS scenario's severe restrictions.

Table 6: Implicit Impact on Calabrese

%	Status	Scenarios			
	Quo (1)	CE (2)	CS (3)	PE (4)	PS (5)
Yield (tonnes/ha)	9.0	6.8	6.7	4.9	2.0
Price (£/tonne)¹	<u>700</u>	<u>845</u>	<u>862</u>	<u>1,093</u>	<u>2,391</u>
Revenue (£/ha)	6,300	5,745	5,775	5,355	4,782
Variable Costs (£/ha) ¹	<u>3,938</u>	<u>3,383</u>	<u>3,413</u>	<u>2,993</u>	<u>2,420</u>
Gross Margin (£/ha)	2,362	2,362	2,362	2,362	2,362
Percentage increase in price (%)²	-	21.2	23.6	55.0	236.2

¹See text for explanation

²Increase needed to restore the operating margin

Source: ADAS, ABC and author's estimates

The Wider Implications of the Restrictions

The previous section has demonstrated that the PSD's assessed reduction in crop protection substances would, under all four scenarios, force far reaching changes on the production systems for wheat, potatoes and vegetable brassicas. Indeed, under the more extreme scenarios it would no longer be possible to use modern, productive farming systems and consequently a much reduced volume would be produced at significantly higher prices. The position is succinctly summed up in the ADAS report which observed for the worse case scenarios *...the impact ... would be so severe, with the loss of the majority of effective insecticides, fungicides and herbicides, that the resultant impact would not be handled by changes in individual crop management, but would be met by wide scale changes to farm structures, farming systems and crop rotations. It would require a different attitude to some aspects of crop quality from consumers and retailers and could even result in changes to diet due to certain commodities no longer being available in sufficient quantity.* (ADAS, 2008, p11).

The purpose of this section is to consider how the economic effects of the four scenarios outlined in the previous section at the level of individual enterprises are likely to impact more widely. Specifically on the economic status of the agricultural industry, the employment and trade effects for the UK economy, and the consequences for consumers, their diets and living standards.

The Agricultural Industry

It is very clear from the three crops analysed in the previous section that the ADAS conclusion is realistic, measured and applies generally to the production of crops. To carry out similarly detailed evaluations for the full range of arable crops grown in the UK would be a massive undertaking and unnecessary as it is reasonable to extrapolate from the results outlined in the previous section. The approach adopted; namely, estimating the increase in prices necessary to maintain crop margins does not guarantee that this would be the outcome and if price increases were not sufficient to fully offset the yield induced decline in gross margins the result would be a reduction in farm incomes.

The conclusion that the prices of arable crops are likely to rise significantly is almost certain to lead to a loss of income for livestock farmers and a decline in both their number and the output from the livestock sectors. The price of cereals is a major influence on the economics of livestock production. Feed costs for poultry and pigs average around 90 per cent of variable costs and almost 60 percent for dairying and intensive beef finishing systems (ABC, 2007). Of course persistently higher feed costs will eventually be reflected in the prices for meat, dairy products and eggs. But, as is currently being demonstrated in the case of pigs and poultry across Europe, it is only as the rise in feed costs drive farmers from the industry that supply contracts leading to a rise in prices.

The conclusion that agricultural commodity prices are likely to be higher in the future as a result of restrictions on the availability of crop protection substances fails to capture the longer term risks for the industry's survival. It is only as a result of the development of modern farming techniques that the UK's – and by implication the EU's – agricultural

industry's is in a position to compete with farmers in other parts of the world and withstand reduced levels of support under the CAP. Modern techniques have not only enabled UK agriculture to survive but also to develop and increase its output of crops at an underlying rate of more than one per cent a year. These techniques have yielded many benefits of which the following three particularly important benefits would now appear to be threatened. Modern crop production techniques have:

- allowed farming to increase its output while reducing its most expensive input, labour;
- delivered increasing productivity enabling a steady decline in the real prices of agricultural commodities; and
- they have not only generated a substantial rise in the quantity and quality of domestically produced food, but also the population has been able to adequately feed itself while reducing the proportion of its income spent on food.

To a lesser or greater extent, the effect of the PSD's assessed reductions in the available crop protection substances would be to reverse to a significant degree these benefits of modern farming techniques and push the industry towards organic production. This follows because most of the more effective pesticides would no longer be available and in the absence of suitable crop protection substances the use of inorganic fertilizers to boost yields would be less viable. Two undisputed facts about organic production systems is that they deliver lower levels of output per hectare, that is the system's productivity is lower than conventional farming; and they involve higher levels of (expensive) labour per unit of output. The combination of lower productivity and more intensive use of labour results in higher production costs necessitating a price premium of up to 30 per cent at the retail level (Fearne, 2008). The first section of this report explained the imperative of increasing – not merely maintaining – the industry's output and productivity in order to meet the growing challenges of population growth and rising living standards at the global level. And these demands will be augmented in the future as the need to source industrial materials from the land increases. But, leaving this imperative aside, it would be a serious error to believe that the UK's – and implicitly the EU's – agricultural industry could move decisively in the direction of less productive production without a substantial increase in the prices of agricultural commodities.

Less than 4 per cent of the UK's agricultural land is currently fully organic or in conversion. Most of this area is accounted for by pasture and rough grazing – less than 0.5 per cent of this land – 75,000 hectares – is sown to crops (Defra (c), 2007, p10). In the UK the area of tillage amounts to some 4.5mn hectares and the implied replacement of crop protection substances with increased use of labour on a large area is not feasible. Over the past 25 years the UK agricultural labour force has fallen by more than 140,000 and where it has proved uneconomic to replace labour with capital assets, labour intensive agricultural operations have become increasingly dependent on immigrant labour eg, fruit picking. The reality is that very few of the UK's workforce are prepared to take up the physically demanding work involved in agriculture. All the evidence suggests that even a significant rise in rates of pay would be unlikely to attract sufficient labour to offset the effects of reduced crop protection substances.

The ADAS approach, when assessing the impact of the four scenarios on yields, was to indicate the increases in the production areas necessary to compensate. The problem with this approach is that not only would there be a shortage of labour, but also there would not be sufficient land. ADAS estimated that the area of wheat (implicitly cereals) and potatoes would need to increase by at least a third under the least restrictive scenario ie, CE and by more than 100 per cent under the most restrictive scenario ie, PS. ADAS estimated that the area of vegetable brassicas would need to increase by 25 and 77 per cent respectively under these two scenarios. Where would this land come from assuming the labour could be recruited to work it? Set aside has now been reduced to a zero percentage in the EU, so in theory the productive arable area has increased by 10 per cent, but in practice some of the land is committed to environmental schemes and a proportion of the land set aside in recent years is relatively unproductive.

The idea that vast areas of grassland could be ploughed up is fanciful. Of the UK's 18.6mn hectares of agricultural land temporary and permanent grasses account for some 7.5mn hectares and rough grazing and woodland for the remaining 6.6mn hectares. Rough grazing is not appropriate for crop production and its low productivity greatly increases the cost of cattle and dairy production. Ploughing up temporary and permanent grasses would not only be environmentally damaging, but also cattle and dairy farmers would, if anything, need an increased area of grass to counter the projected rise in feed prices. In short, there is very limited scope to increase the area of land devoted to crops. As previously pointed out to some extent cattle and dairy farmers might offset – albeit at the cost of lower levels of productivity – the effects of higher feed prices by substituting grass, but no such alternative would be available to pig and poultry producers. The economic impact for these sectors of restrictions on crop protection substances would be devastating and the only beneficiaries would be producers in other parts of the world eg, Brazil.

The downsizing of the UK agricultural industry would have implications wider than purely economic. The agricultural industry retains a symbolic importance in the nation's psyche. The presence of farming influences the local landscape, it shapes a region's identity and it enriches the rural culture and identity. These contributions are not subject to objective quantifiable analysis, but their social value and contribution remain very real. The outcome of the four scenarios analysed in the previous section could rapidly and markedly change the scale, nature and economic standing of agriculture. Change is a feature of all development and farming is not, and should not be immune. But over the past decades change in agriculture has been consistent with rising living standards, more pleasant working conditions and rising food security. What is proposed would seriously compromise these three pillars of post war agricultural policy in this country.

The Wider Economy

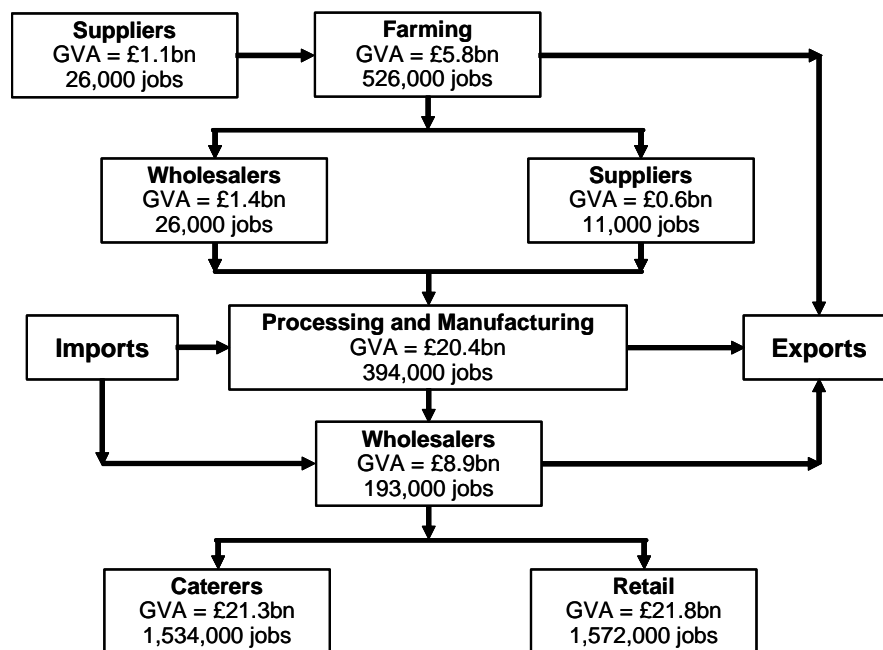
The first section of this report has outlined why it is unlikely that the rest of the world would be in a position to provide the EU with cheap agricultural commodities, but this is not to imply that world prices would be sufficiently high to allow domestic farm prices to offset the decline in their margins implied by the proposed restriction and in any event the outcome would be adverse for livestock producers. Overall the agricultural industry

would suffer a serious decline in its income and the UK would suffer a serious deterioration in its food trade deficit. Put simply rural economic activity and employment would suffer from the overall fall in farm incomes, the nation would witness a reduction in the output from its land and a rise in its bill for imported food.

The UK currently has a trade deficit in food, feed and drink of some £14bn (Defra (c), 2007). How much this would deteriorate would depend on the change in prices and the response of consumers to these higher food prices. Two conclusions can be drawn however: the deterioration would be positively related to the extent of the restrictions on crop protection substances – UK self-sufficiency ratio in indigenous products would also fall – and probably all of the efforts and gains made by UK agriculture and food companies to increase exports over the past twenty five years would be reversed. Ironically, the UK would increase its dependency on imports from other parts of the world that were not subject to such restrictions on crop protection substances outlined above.

The greater the availability of imports, the greater the loss of profitability and hence contraction of the UK agricultural industry. A less profitable, smaller agricultural industry would make less of a contribution to the UK economy. Figure 4, shows a highly simplified UK food and drink supply chain (Defra (c), 2007, p61). The UK farming industry annually purchases some £1.1bn of consumable inputs from British industries and in the process supports some 26,000 jobs in addition to the 526,000 jobs in farming. Not shown in Figure 4 is the farming industry’s annual investment in fixed capital and plant which in 2007 amounted to some £2bn (Defra (c), 2007, p85). A less productive industry would also have an impact on land values. Some two thirds of farms own their own land and the appreciation of land values has served to secure the viability of many farms and support investment. It is not possible to say how many of these ‘upstream’ jobs would be lost under the four scenarios, but for the reasons explained above it could be considerable.

Figure 4: The UK Food Chain



Looking downstream from the farm sector many of the jobs in wholesaling, processing and manufacturing of food would also be vulnerable to a reduction in domestic production and a switch to imports. In principle food manufactures could source raw materials abroad, thereby making up any shortfall from domestic producers, but many jobs in food processing and manufacture could be lost if overseas suppliers put greater emphasis on processing. Potatoes illustrate this point. In developed nations fresh potato consumption is being steadily replaced by processed products. It is more economical to trade processed potato products rather than raw potatoes, consequently the impact of lower potato yields is likely to be job losses in downstream processors. As can be seen from Figure 4 there are in excess of 1.2mn jobs involved in converting agricultural commodities into food, feed and drink products and most of these are dependent on domestic agricultural production. If, as seems the certain outcome of the proposed restrictions on crop protection substances, the UK agricultural industry contracts then jobs will be lost in the UK food chain. It should also be noted that the long term decline in the real price of food has benefited industries other than agriculture. It has allowed an increasing proportion of disposal income to be devoted to the purchase of other goods and services. A policy that raises the price of food will therefore have a knock on effect for other sectors of the economy. For example, the trend towards eating out – with its benefits for employment – is likely to suffer, as are other sectors that have gained over the years from discretionary expenditure arising from the decline in the real cost of food.

The Impact on Consumers

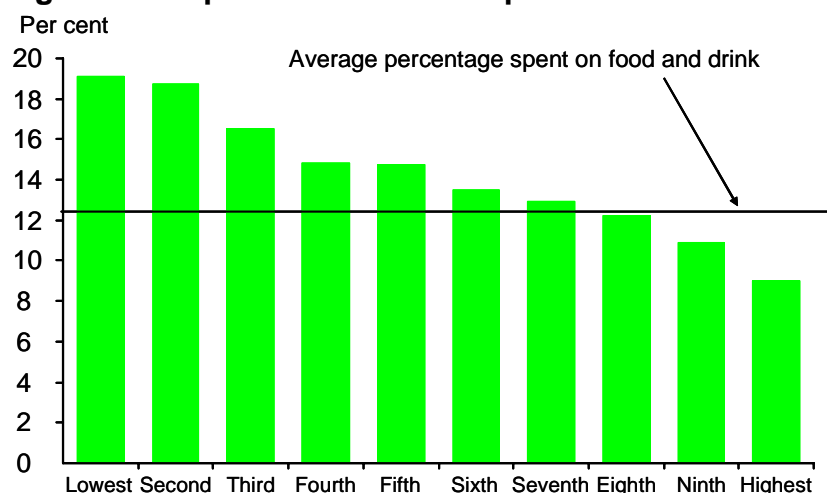
It is beyond dispute that the effect of the PSD's assessed impact of the loss of crop protection substances would result in a reduced supply of output from UK farms, but the impact on consumers would depend on the prices they pay for food and drink and the satisfaction they received from knowing food is grown locally and subject to traceability. The first section of this report explained how a combination of factors – mainly short term weather effects and growing world demand – had resulted in world agricultural commodity prices rising more than 100 per cent since 2005. The effect of this rise, combined with a similar increase in world oil prices and a weakened pound, has been to increase the index of retail food prices in the UK by more than 8 per cent – more than double the general rate of inflation. This pattern has been repeated across the EU where retail food prices have risen 7.5 per cent over the year to July 2008 compared to 3.9 per cent for overall inflation.

If attention is confined to basic necessities eg, bread, milk, dairy products, meat and vegetables then the increase in retail food prices has been more marked. In the UK the percentage increase in the prices of these products over the past year has been 15, 16, 12, 9 and 8 per cent respectively, and are in large measure the product of the global increases in agricultural commodities. We have demonstrated above that the price of cereals, potatoes and vegetable brassicas would need to rise by more than 100 per cent under the more severe proposed crop protection restrictions if arable farm margins are to be protected and it is therefore reasonable to ask what impact this would have. What would be the impact of a rise of 100 per cent in cereal prices on the prices of basic foodstuffs? Cereal prices underpin the bulk of foodstuffs consumed in Europe and therefore the prices of all grain based products – from bread to milk products and meat – would rise to reflect the

increased costs associated with cereals. If a 100 per cent increase in the price of cereals was passed on to consumers – without any mark-up along the chain – the price of a standard loaf would rise by around 9p (€0.11), a litre of milk would increase by 3p (€0.04) while a kilogram of pork would rise by 40p (€0.48). Attempting to provide an assessment of the increase in retail prices of a 100 per cent rise in the farm-gate price of potatoes and brassicas is difficult given the wide range of products but a reasonable average is £1 (€1.2) per kilogram suggesting a doubling in the prices of these products.

Food is the most basic of necessities and therefore rises in the prices of foodstuffs cannot be avoided by households. But for low income families the impact would be more severe. Not only do they devote a larger proportion of their incomes to food but also basic foodstuffs such as bread, milk, dairy products, meat and vegetables make up a larger proportion of the weekly food basket. It follows from the figures quoted above that low income families are most at risk from restrictions on the use of crop protection substances. Figure 5 is based on data drawn from the Family Spending Survey which confirms that lower income households eg, pensioners, single parents, spend a higher proportion of their incomes on food and therefore increases in food prices represent a proportionally greater burden for these households.

Figure 5: Proportion of Income Spent on Food



Source: *Family Spending, 2007, ONS*

As explained above the fall of 60 million tonnes in world grain production between 2004/05 and 2006/07 was sufficient to spark an increase of more than 100 per cent in the prices of grains. This was the product of adverse weather conditions – both in Europe and in other parts of the world – and the consequential decline in global stocks of agricultural commodities. It is reasonable to expect that the return of more normal weather conditions and the rebuilding of stocks will result in some easing in agricultural commodity prices but as reported in the first section, the OECD-FAO believes agricultural commodity prices have now moved to a higher plateau for the foreseeable future. It seems that the proposed restrictions on crop protection products could reduce EU production of cereals by a similar amount generating a similar rise in cereal prices but in

this case the impact on retail food prices and household living standards would be in addition to the rise predicted by the OECD-FAO.

The previous section demonstrated the pressures the assessed impact of the reduction in crop protection substances would have for the production of vegetable brassicas. Indeed, it is the opinion of the ADAS experts that commercial production of these crops would not be viable under the PE and PS scenarios. The outcome could only be a reduced supply and higher prices for these vegetables, a situation that is in direct conflict with the UK government's healthy eating policy; namely, the consumption of five portions of fruit and vegetables each day. The last is an annual series of research conducted by the Food Standards Agency (FSA, 2004) indicated that over the five years that the survey had been running there had been a significant increase in consumers' awareness of the recommended amount of fruit and vegetable to be consumed each day but in its last national survey the Agency pointed out that less than half the population were consuming the recommended quantity of fruit and vegetables each day. Raising the price of vegetables can not but frustrate the government's health eating policy.

Higher food prices will represent a burden for households and the political imperative will be to seek ways to alleviate the situation. The only affordable, sustainable and equitable way of doing this is for the world's governments to do what they can to help their agricultural industries to increase production so that the global supply of food increases at a rate that matches the growth of demand. The EU is a major world producer of agricultural commodities and from the perspective of the world's growing population, let alone the EU's population, the proposing of a policy whose effects – in the opinion of experts – will be to significantly reduce the supply of arable crops and the area land in production for the foreseeable future will appear at best insensitive and at worst a chronic failing in their responsibilities.

The price, choice and quality of food may be the most important considerations for consumers, but they are not the only ones. Consumers in the EU are under increasing pressure from their governments to reduce their carbon footprints, yet the proposals to reduce crop protection substances will according to the ADAS experts result in an increase in the agricultural industry's carbon footprint. Although not the prime purpose of the ADAS study, its experts observed that in many instances farmers will be forced to replace crop protection substances with increased cultivations; that is, the farming industry will increase its dependence on fuel and with it a rise in the industry's carbon footprint.

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