



## **The impact of rising oil prices on organic and non-organic farm profitability** – a study by Andersons for the Soil Association

August 2008

# **The impact of rising oil prices on organic and non-organic farm profitability** – a study by Andersons for the Soil Association

August 2008

## **Introduction**

The Soil Association asked Andersons, the farm business consultants, to look at the impact of high oil prices on the profitability of organic and non-organic farming. Andersons have calculated some crop and system (whole rotations) gross margins at the roughly current oil price of \$135 per barrel, and at the higher, but regularly predicted price of \$200 per barrel. In a recent Chatham House report ('The Coming Oil Supply Crunch', Chatham House Report, August, 2008) Prof Paul Stevens says that oil could cost \$200 a barrel in 5-10 years.

Projections of the impact of future changes in costs are much more complex than might first appear. As prices change, so will the behaviour of people running farm businesses. In addition, as the costs of production change, at least in theory farmers should be able to command a higher price for their produce, but if that happens, higher prices are likely to affect consumer demand and maybe the level of imports, which will then feed back into changes in demand for primary products from farmers. In this case, as the

price of oil and therefore nitrogen fertiliser rises, all farmers are likely to try and reduce their machinery use to save on fuel bills, and non-organic farmers are likely to try and apply nitrogen fertiliser and pesticides with greater care and precision than they might have done in the past. For the sake of this analysis, which aims to look simply at the impact of increasing oil prices on farming systems, Andersons have not assumed that other changes in farming practice would occur, nor that prices for the crops studied would increase. At a time of great volatility in food prices, prices for both organic and non-organic food are changing rapidly. In future, prices will be affected by relative demand, availability of cheaper imports, and farmers' (traditionally weak) ability to insist that the prices they are paid reflect their increasing costs. Prices paid for organic and non-organic farm produce will crucially affect what actually happens to farm profitability in the coming years, but this has been ignored in these calculations, which aim simply to isolate the impact of rising oil prices.



Comparisons between organic and non-organic farming frequently focus on individual crops or enterprises, which makes it easier for researchers and others to make simple comparisons. These are invariably misleading. Organic farming depends on a crop rotation (usually over 4 to 8 years) which will always include two or more years of fertility building clover leys. In some comparisons, for example that carried out by Cranfield University for the Department of the Environment, Food and Rural Affairs looking at comparative greenhouse gases (ghgs) from organic and non-organic systems, the clover leys are treated as unproductive. In practice, most organic farmers will have livestock enterprises to utilise the typically three cuts of silage per year available from a fertility-building red clover ley. In other cases, clover leys may produce grass seed, or provide the organic land needed by organic, free range poultry or pig enterprises, or grazing for dairy or beef cattle and sheep. The economic returns achieved by such livestock enterprises will vary enormously, and make any economic assessment such as this extremely difficult. In this study, Andersons

have provided two figures for the rotational margin earned by the two organic rotations illustrated. Under one, they assume a nil financial return from the two or three years of clover fertility cropping, which they feel may represent the actual financial return from some livestock enterprises when they are fully costed as stand alone activities. Secondly, they show the rotational margin if the fertility-building clover leys provide a gross margin of £100 per hectare per year, which is a not unreasonable figure for the grazing rent available were an organic farmer to let the land out to another organic farmer. This study has only looked at the profitability of arable crops, not livestock. The increasing cost of feed is having adverse effects on the gross margins of both organic and non-organic livestock farmers.

Finally, both non-organic and organic farming systems vary widely. In particular, organic rotations will vary according to climate and soil type, farm infrastructure, the experience and ability of the farmer and farm staff, and the type of market (for example wholesale or local) that the farm aims to supply. For the purposes of this work, Andersons have taken three conventional rotations (two with combinable crops, one with a root crop in the rotation), and two organic rotations (one combinable crops, one with two root crops), based on actual farms they work with, and the costs and returns are based on real figures. So these are not necessarily typical, and certainly not average figures for yield, prices or costs, but they have the advantage of being based on actual and current figures. Many studies rely on average figures for yields and prices, and for organic farming, where the number of farms is still small, and farms are located generally on lower quality agricultural land, and disproportionately in the south and west of the UK, average yield figures can be misleadingly low.

This study looks at gross and net margins - but the net margins quoted do not, first, include property and administrative costs, which could typically be around £100 per hectare (combinable crop rotation) to £175 per hectare (rotations including root crops). The margins also do not include rent and finance costs as these will vary significantly between farms, depending on whether the land is rented or owned, the level of the farmer's borrowings, and the income paid to the farmer or farm owner.

## The results

- Andersons' calculations show that an increase in the price of oil to \$200 per barrel would have an adverse affect on the rotational margins of organic farming, but a more significant adverse affect on non-organic farms.
- At current oil prices, in this study the non-organic rotation that includes root crops has a margin of £638, and for the organic rotation that includes root crops the margin ranges from £539 to £589 per hectare (depending on whether any income from the clover leys is included or not) - the non-organic system is more profitable.
- With oil at \$200, the non-organic root crop rotation has a margin of £448, and organic margins range from £375 to £425 (depending on whether any income from the clover leys is included or not) - the two systems are approaching equality in profitability, but the organic system is still just behind.
- At current oil prices, the two non-organic combinable crops systems' margins range from £397 to £449 (depending on the rotation), and the organic combinable crop rotation's margins range from £405 to £445 per hectare (depending on whether any income from the clover leys is included or not) – in other words, the two systems currently show similar rates of return.
- With oil at \$200, non-organic combinable crops systems' margins range from £296 to £348 (depending on the rotation), and organic margins range from £371 to £411 (depending on whether any income from the clover leys is included or not) – organic farming is now more profitable.

## Conclusion

This modelling shows that higher input prices will, naturally, increase costs for all farmers. The results are subject to the caveats discussed above. In addition, there are factors that have not been considered, such as the increasing scarcity of oil and in particular natural gas, currently used to manufacture artificial Nitrogen fertiliser. It is clear from the figures supplied by Andersons that the current wholesale price for organic potatoes is not high enough given the costs and risks of growing the crop, which is why many organic producers aim to supply the public direct through farmers' markets, farm shops and organic box schemes, where more reasonable returns are available. This study does not consider the impact of changes in demand, led by both increased food prices, and the public health drive to change diets to reduce the £6 billion per annum cost to the NHS and the UK economy caused by diet-related ill-health.

Both organic and conventional farmers will respond to all of these changes to try and defend the profitability of their business, and it is likely that a number of new approaches will be introduced in response to the pressures outlined above. In a period of rapid change, and bearing in mind the narrowness of the gap between the systems, the quality of the management of individual farm businesses will be even more important in determining their profitability.

However, with all these qualifications in mind, the study does show that higher oil prices will have a more significant impact on non-organic farmers, and will move some organic systems into higher profitability than similar non-organic rotations.

Peter Melchett

Policy Director, The Soil Association  
August 2008

SOIL ASSOCIATION

SYSTEM/OIL PRICE COMPARISON

Rotation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Rotational Margin (£/ha)	
<b>Oil @ \$135</b>									
<b>Conventional</b>									
WW,WW,Bns,WW,WW,OSR	<i>Wheat 4 in 6</i>	WW	474 WW	474 OSR	344 WW	474 WW	474 Beans	144	397
WW,WW,S Bly,OSR,	<i>Wheat 2 in 4</i>	WW	474 WW	474 Sp Bly	507 OSR	344			449
Pots,WW,WW,OSR,WW,WW		Pots	1592 WW	474 WW	474 OSR	344 WW	474 WW	474	638
<b>Organic</b>									
WW, Sp Oats,S Bly,Fert, Fert*	<i>3 in 5 cropped</i>	WW	709 Sp Oats	709 Sp Bly	605 Fert	Fert			405
Pots,Fert,WW,Fert,Onions,Fert	<i>3 in 6 cropped</i>	Pots	1263 Fert1	WW	709 Fert	Onions	1263 Fert		539
									Fert @£100ha 445
									589
<b>Oil @ \$200</b>									
<b>Conventional</b>									
WW,WW,Bns,WW,WW,OSR	<i>Wheat 4 in 6</i>	WW	309 WW	309 OSR	425 WW	309 WW	309 Beans	114	296
WW,WW,Sp Bly,OSR,	<i>Wheat 2 in 4</i>	WW	309 WW	309 Sp Bly	348 OSR	425			348
Pots,WW,WW,OSR,WW,WW		Pots	1025 WW	309 WW	309 OSR	425 WW	309 WW	309	448
<b>Organic</b>									
WW,Sp Oats,S Bly,Fert, Fert	<i>3 in 5 cropped</i>	WW	653 Sp Oats	653 Sp Bly	551 Fert	Fert			371
Pots,Fert,WW,Fert,Onions,Fert	<i>3 in 6 cropped</i>	Pots	799 Fert1	WW	653 Fert 2	Onions	799 Fert		375
									Fert @£100ha 411
									425

\* Fert = fertility break, nil margin

Assumptions

The output of crops is static which is unlikely with such a large price increase in oil.

Oil price is not in linear relationship to gasoil price and fertilizer - a simplistic comparison has had to be used.

The costing of crop inputs relates to example farm data.

The costing of rotational margin is difficult as organic systems will have a variety of fertility building breaks, and enterprises associated, no margin has been used.

Spring Barley used in conventional cereals rotation, but be aware Barley margin on heavy land unlikely.

Overhead costs not included assumed to be equal between Organic and Conventional eg Admin and property costs.

This is a simplistic comparison without modelling other market influences.



**MARGIN DATA**

	Oil \$Barrel	Gasoil p per litre	ORGANIC				CONVENTIONAL			
			Winter Wheat	Spring Barley	Potatoes		Winter Wheat	Spring Barley	Potatoes	
		(Approx = to)								
<b>NET MARGIN</b>	135	67p	£/ha	709.03	605.23	1263.50	-	473.50	507.40	1591.80
<b>NET MARGIN</b>	200	92p	£/ha	652.76	550.51	799.00		309.34	347.59	1024.59

Oil Price: \$135  
Gas Oil Price: 0.67p/l +

**HARVEST 2009  
ENTERPRISE GROSS MARGINS**

			Organic			Conventional		
			Winter Wheat	Spring Barley	Potatoes	Winter Wheat	Spring Barley	Potatoes
<b>OUTPUT</b>								
	Yield	t/ha	4.50	4.25	30.00	10.13	6.67	42.00
	Price	£/t	290.00	285.00	285.00	130.00	175.00	170.00
	Aid							
<b>TOTAL OUTPUT</b>		£/ha	1305.00	1211.25	8550.00	1316.90	1167.55	7140.00
<b>VARIABLE COSTS</b>								
	Seeds	£/ha	126.75	111.80	2537.50	48.75	70.13	775.00
	Fertiliser	£/ha	175.00	175.00	815.00	272.39	182.49	700.00
	Sprays	£/ha	-	-	272.46	160.01	75.54	600.00
	Arable Sundries (incl Agronomy) Haulage/Storage	£/ha	10.00	10.00	74.00	10.00	10.00	74.00
		£/ha			1050.00			1470.00
<b>VARIABLE COSTS</b>		£/ha	311.75	296.80	4748.96	491.15	338.15	3619.00
<b>GROSS MARGIN</b>		£/ha	993.25	914.45	3801.04	825.75	829.40	3521.00
<b>FIXED COSTS</b>								
<b>TOTAL FIXED COSTS</b>		£/ha	284.22	309.22	2537.54	352.25	322.00	1929.20
<b>NET MARGIN</b>		£/ha	709.03	605.23	1263.50	473.50	507.40	1591.80

**CULTIVATIONS**

**Organic**

Winter Wheat Primary Cultivation, Subsoil, Secondary Cultivation, Drill, Roll, Comb, Harvest & Cart  
Spring Barley Primary Cultivation, Subsoil, Secondary Cultivation, Drill, Roll, Comb, Harvest & Cart, Hand Weed  
Potatoes Primary Cultivation, Subsoil, Stone Separate, Bed Till, Bed Form, Plant, Hoe, Comb, Fertilise, Spray, Harvest & Cart, Potato Cart, Hand Weed, Grading, Irrigation

**Conventional**

Winter Wheat Primary Cultivation, Secondary Cultivation, Drill, Roll, Fertilise, Spray, Harvest & Cart  
Spring Barley Primary Cultivation, Secondary Cultivation, Drill, Roll, Fertilise, Spray, Harvest & Cart  
Potatoes Primary Cultivation, Subsoil, Stone Separate, Bed Till, Bed Form, Plant, Fertilise, Spray, Harvest & Cart, Potato Cart, Grading, Irrigation



Oil Price: \$200  
Gas Oil Price: 0.92p/l

**HARVEST 2009  
ENTERPRISE GROSS MARGINS  
PROJECTED HIGH OIL PRICE**

		Organic			Conventional		
		Winter Wheat	Spring Barley	Potatoes	Winter Wheat	Spring Barley	Potatoes
<b>OUTPUT</b>							
Yield	t/ha	4.50	4.25	30.00	10.13	6.67	42.00
Price	£/t	290.00	285.00	285.00	130.00	170.00	170.00
Aid							
<b>TOTAL OUTPUT</b>	<b>£/ha</b>	<b>1305.00</b>	<b>1211.25</b>	<b>8550.00</b>	<b>1316.90</b>	<b>1133.90</b>	<b>7140.00</b>
<b>VARIABLE COSTS</b>							
Seeds	£/ha	126.75	107.50	2537.50	48.75	74.25	775.00
Fertiliser	£/ha	200.00	200.00	999.00	381.96	261.62	980.00
Sprays	£/ha	-	-	313.33	175.86	83.02	675.00
Arable Sundries (incl Nematicide)	£/ha	10.00	10.00	74.00	10.00	10.00	74.00
Haulage/Storage	£/ha			1050.00			1470.00
<b>VARIABLE COSTS</b>	<b>£/ha</b>	<b>336.75</b>	<b>317.50</b>	<b>4973.83</b>	<b>616.57</b>	<b>428.89</b>	<b>3974.00</b>
<b>GROSS MARGIN</b>	<b>£/ha</b>	<b>968.25</b>	<b>893.75</b>	<b>3576.17</b>	<b>700.33</b>	<b>705.01</b>	<b>3166.00</b>
<b>FIXED COSTS</b>							
<b>TOTAL FIXED COSTS</b>	<b>£/ha</b>	<b>315.49</b>	<b>343.24</b>	<b>2777.17</b>	<b>390.99</b>	<b>357.42</b>	<b>2141.41</b>
<b>NET MARGIN</b>	<b>£/ha</b>	<b>652.76</b>	<b>550.51</b>	<b>799.00</b>	<b>309.34</b>	<b>347.59</b>	<b>1024.59</b>

**CULTIVATIONS**

**Organic**

Winter Wheat Primary Cultivation, Subsoil, Secondary Cultivation, Drill, Roll, Comb, Harvest & Cart  
 Spring Barley Primary Cultivation, Subsoil, Secondary Cultivation, Drill, Roll, Comb, Harvest & Cart, Hand Weed  
 Potatoes Primary Cultivation, Subsoil, Stone Separate, Bed Till, Bed Form, Plant, Hoe, Comb, Fertilise, Spray, Harvest & Cart, Potato Cart, Hand Weed, Grading, Irrigation

**Conventional**

Winter Wheat Primary Cultivation, Secondary Cultivation, Drill, Roll, Fertilise, Spray, Harvest & Cart  
 Spring Barley Primary Cultivation, Secondary Cultivation, Drill, Roll, Fertilise, Spray, Harvest & Cart  
 Potatoes Primary Cultivation, Subsoil, Stone Separate, Bed Till, Bed Form, Plant, Fertilise, Spray, Harvest & Cart, Potato Cart, Grading, Irrigation

