

CAP reform and the reduction of subsidies

# Earning and profitability: identifying scope for manoeuvre

Cereal growers still have ways of making up for the lowering of support linked to the implementation of the CAP « Health Check ». Quite apart from the effects of a better market situation or increases in yields, the solution resides mainly in the productivity to be achieved on a farm scale.

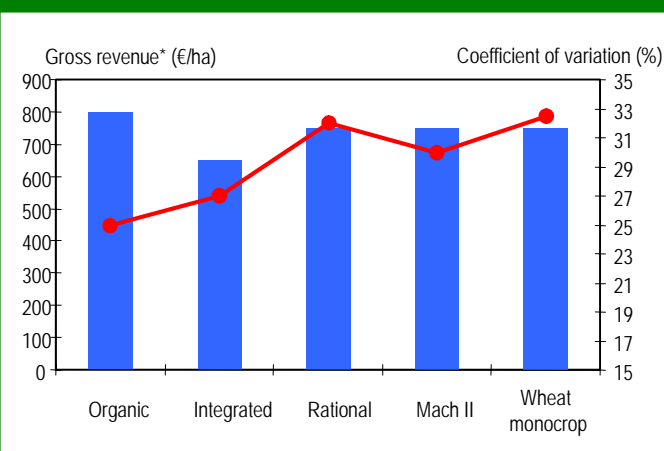


The objective is to test the long-term profitability and robustness of five very different production systems.

There are several profitable ways of growing arable crops ! This is the lesson one can learn from the system set up at Boigneville (91 – Parisian basin) by ARVALIS – Institut du végétal (see box page 4). Five cropping systems were tested over 20 years. They are based on very different production systems, but have in common the objective of remaining profitable in an increasingly restrictive and uncertain agricultural context. These five systems offer ideas to producers to help them to maintain their level of competitiveness while limiting their risk-taking.

The comparison of gross revenue (without subsidies) shows the production levels of the systems and the effect of the choice of rotation on the economic results (figure 2). The three systems, rational, Mach II (See box for the description of the systems) and wheat monocrop have similar gross revenue. The integrated system using less inputs has a lower gross revenue because of its slightly lower yields. As regards organic production, despite the lower yields than in the conventional system (3.9 t/ha of wheat as against 8 in Mach II), the high prices seen in recent years mean that it gives a better gross revenue. We find a relationship between

Mean and variations of gross revenue – by system – data for 2001 to 2008 (Fig. 2)



On average, the gross revenue is similar from one system to another.

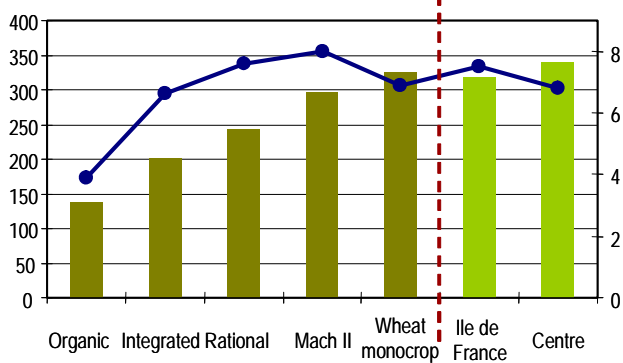
The comparison of gross revenue (yield x price + subsidies) shows the effect of the choice of rotation on the economic results of a system.

the crop yields and the mean operating costs of the systems (figure 3). The wheat yields increase in proportion to the inputs (averaged over all crops). By way of comparison, the same indicators were calculated for the period 2001-7 for arable farms of the Central region of France. (source Agreste – Agricultural Accounting Information Network).

The conventional systems tested at Boigneville are all more economical in inputs than the average for the region, with however much the same yields (figure 3).

The « wheat monocrop » system is an exception, with lower yields than the average for Ile-de-France and below those of the Mach II system, despite higher operating costs. Repeatedly growing the same crop leads to a more marked development of parasitism in the fields, requiring more sustained protection. Furthermore, root diseases (particularly take-all), which are difficult to control, limit the potential yield.

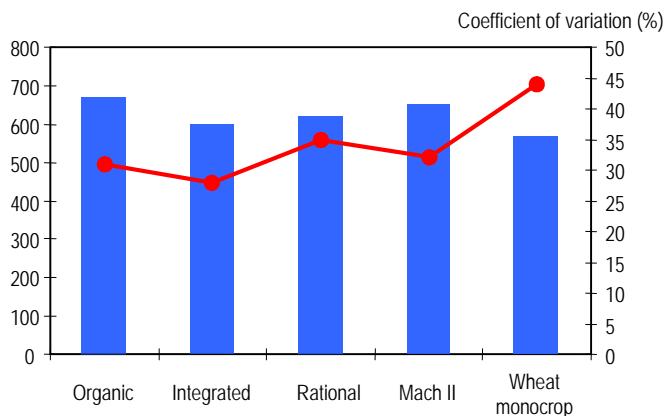
Operating costs of each system and wheat yields in the five systems of the ARVALIS- Plant Institute (means 2001-2008) and in cereal farms in the Centre and Ile-de-France regions (Fig. 3)



With the exception of wheat monoculture, the systems tested in Boigneville have lower input costs than those of the cereal farms of Ile-de-France and Centre regions.

The mean yield of the organic wheat system (3,9 t/ha) is not representative of the national average (2,7 t/ha, source FranceAgriMer).

Profits – Average for each system – 2001-2008 (Fig. 4)



As for the total average gross revenues, the mean profits obtained from each system are more or less the same for the Boigneville farms.

In spite of the marked differences in revenue and costs, these four systems yielded roughly the same profit when averaged over the eight years of the study (between 575 and 678 €/ha) (figure 4). On the other hand the year to year coefficients of variation of the profits show that the organic and integrated systems are more robust, followed by the rational and Mach II systems.

When we speak of a system, the « farm profit » is a better indicator than the gross revenue, because it takes account of the machinery costs.

We should however add that the organic and integrated systems were particularly optimized and controlled, and are not representative of the national average. The « wheat monoculture » is more fragile when confronted with the problems of the global context (essentially climate and market price).

In a given environment there are thus various profitable ways to manage a farm, but no ideal model: each method of production should respond sensibly to particular constraints. The Mach II system is efficient provided that machinery can be used on large areas (it can support up to 720 ha in our trial in Boigneville). The low-input systems (integrated and organic) do not have any more variable results than the most intensive, contrary to popular opinion. However they require more technical skills.



There are various profitable ways of producing arable crops !

## The Boigneville farms, a unique experiment

The « Boigneville farms » are five production strategies implemented in the small agricultural region of Gâtinais (80km south of Paris), whose feasibility and results have been studied for 20 years. The objective is to test at full scale, in the same soil and climatic conditions, their long-term profitability and robustness.

The organic system follows the specifications for organic farming and aims to sell its crops in a more profitable market.

The « rational » system corresponds to standard current production, which makes use of decision tools to adapt applications of inputs according to the needs of the crop and to the potential yield. It aims to maximise the gross margins of the crops.

The so-called « integrated » system is half-way between the organic and the rational. It does not preclude the use of mineral fertilisers or pesticides, but it limits their use as far as possible by seeking alternative solutions. It limits the risks of crop disorders with the help of preventive strategies, such as varied sowing dates, rotations, varieties etc.

The « Mach II » system aims to reduce as much as possible the time spent on the fields, with fast machinery (drilling at 15 km/h) and time spent on the tractor (2.1 h/ha).

The « wheat monoculture » system aims to simplify management to the extreme by working with a single crop.

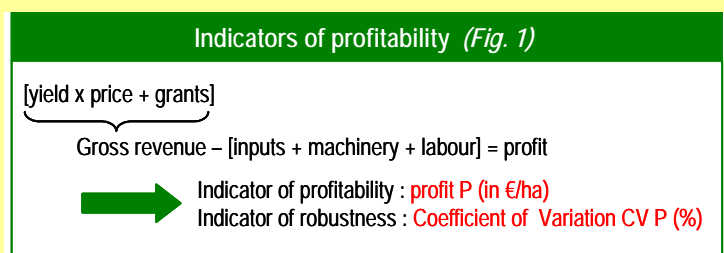
These five systems observe the regulations in force, especially the environmental ones.

*Wheat monoculture, although giving the most variable results, has the advantage of simplifying the management of the farm as much as possible.*



### Two main indicators

To describe and analyse these five systems, numerous indicators have been calculated: economic (profitability, competitiveness, level of economic risk), techniques (work productivity, cultivation times etc.), environmental (global nitrogen balance, energy impact etc.). Here it is the profitability indicators which interest us (figure 1): the profit and its year-to-year variation, measured by its coefficient of variation. It expresses the robustness of the system, i.e. its capacity to limit the impact of the factors which cause the variability in the results (effects of weather, market prices, input costs, policies and regulations etc.)



*The profit (in €/ha) is the difference between the gross revenue and the cost of the production factors – inputs, machinery and labour*

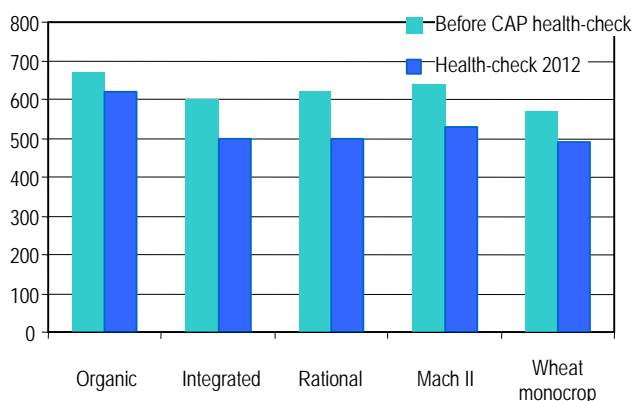
### Technical description of the five systems (Table 1)

	Organic	Integrated	Rational	Mach II	Wheat monocrop
Rotation	8 years	4 years	4 years	3 years	mono
Working time (h/ha) (2008)	3.70	3.15	3.36	2.21	3.16
Soil cultivation	Ploughing	Preferred min-till	Preferred ploughing	Min-till	Min-till
Crop management	Observations	Observations	Observations	<i>In principle</i>	<i>In principle</i>
N rate - average for the system (kg/ha) (kg/ha)	0	93	128	131	185
Farm TFI* (2006-2008)	0	2.20	3.94	7.6	6.16

\*Treatment Frequency Index. Quantity of pesticides used per hectare as a fraction of the approved rate (ITR of 0,5 = half the normal dose).

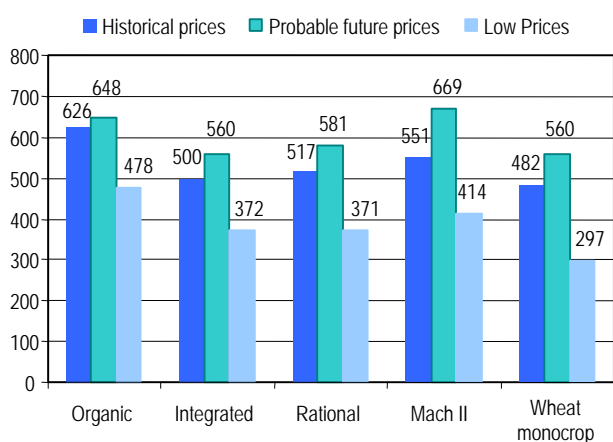
➔ To allow economic comparisons, all these systems assume 2 annual labour units and a machinery pool of the same value, but comprised of different machinery, adapted to their strategy.

### Profits – Average per system – before and after application of the Health Check (HC) (Fig. 5)



We estimate about 90 €/ha loss of profit from the CAP reform.

### Profits (after HC) – Mean for each system according to price scenarios (Fig. 6)



With the combination of future price scenarios, higher than in the past (2001-2008), all the economic results are improved.

Table 2 : The three price scenarios tested

Scenario	Price of wheat in each scenario	
	Conventional	Organic
Mean historical prices	120 €/t	253 €/t
Low prices	90 €/t	205 €/t
Probable future prices	132 €/t	272 €/t*

- We assumed historical price difference between organic and conventional crops, but this difference could decrease if organic farming expands in the years to come.

➔ In each scenario, the same prices are used for any given crop.

### The effects of the CAP reform

How will the profitability of the systems alter in the years to come ? We have tested three elements of economic context on our systems : the CAP Health Check, fluctuating prices, and the rising cost of inputs. By 2012 the CAP Health Check has a similar effect on the four conventional systems. The reduction of subsidies, estimated at 91 - 94 €/ha, results in a fall in profits of about 16%. For the organic system, the loss of subsidies is only 53 €/ha because of the lower SPS payment often made to farms of this type.

The lowering of grants due to the CAP reform has a similar effect on the four conventional systems at Boigneville.

To predict the effects of market prices, and after allowing for the Health Check in the results, we compared the results from the systems for three price scenarios : historical prices (actual observed prices between 2001 and 2008) ; low prices (« 2005 » type), and probable future prices (table 2 and figure 6).

With the combination of probable future prices higher than the mean historical prices, all the systems benefit. The ranking of the systems remains the same, but the differences tend to favour Mach II, for which the price effect is greater because of the better yields.

Assuming a low price, all the systems see their profits affected. The differences between the systems are reduced and the wheat monoculture is heavily penalised. Finally, from the results of the systems, we simulated the impact of a 20% increase in the cost of inputs. In this cases, profits fall in all the systems by 25 - 70 €/ha, with the most serious affected systems being naturally those with the highest inputs : wheat monoculture and Mach II. Conversely the organic and integrated systems are the least affected.

The low-price scenario penalises the wheat monoculture the most severely.

All these simulations reveal several ways of reducing the economic risks on a farm and of improving profitability.

With variable prices, monoculture should be avoided (three crops are OK ; one is risky), even though it has undeniable attractions in terms of farm management (stocks, cultural operations, recording of practices etc.) With three crops, compensatory effects come into play between the sale price of each crop and their yields, stabilising the economic results.

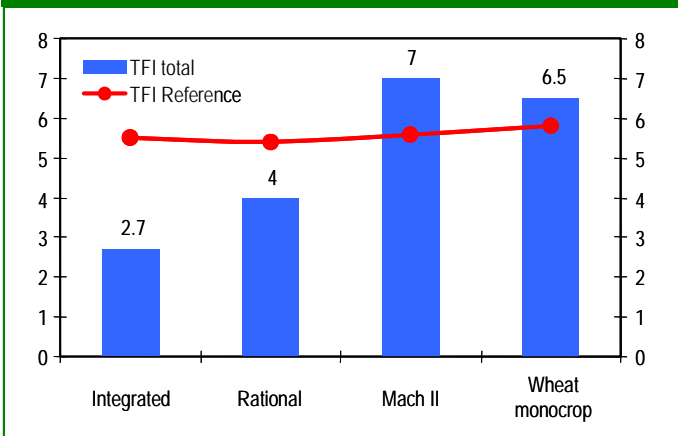


Tractor costs are high and suggest that farms are over-mechanised.



*The experience with the experimental farms in Boigneville shows that there are very many profitable ways of managing a farm.*

**Total Treatment Frequency Indexes (TFI) (Fig. 7)**



In a regulatory context which is tightening for the sake of environmental protection, one needs to explore « alternative » methods of production and to combine economic indicators with environmental indicators.

With increasing input costs it is better to be less dependent on inputs and be sure of high efficiency. The systems tested in Boigneville have consistent cultural practices which restrict input costs whilst maintaining productivity at the level of regional average. Improvements in profitability are obtained by matching the technical interventions with the needs of the crop. Finally, in a regulatory context which is tightening for the sake of environmental protection, one needs to explore « alternative » methods of production and to combine economic indicators with environmental indicators (TFI, total N, energy etc.) (figure 7).

### To evolve, you have to take stock!

All the results obtained in Boigneville were compared with a group of twelve Gâtinais farms (located in the same area). This comparison is necessary because there are big differences between the systems tested in Boigneville and the real farms in the region. This analysis allows us to evaluate and rank the possibilities which exist to gain competitiveness. The main potential saving concerns machinery.

On average, the machinery costs of the group were 364 €/ha, whereas they were between 131 and 237 €/ha for the Boigneville farms. Often, farms could use machinery on a larger area, or share it with neighbours. The « machinery costs » indicator is difficult to calculate as it depends on the financing policy and the fiscal management of the farm. Simpler to access, but just as informative, the traction power per hectare is another indicator of the equipment level. The number of hp / ha was 2.4 for the group of Gâtinais, compared with 0.6 to 1.5 in Boigneville. Machinery costs are high and reflect a degree of over-mechanisation of the farms.



*The conventional systems tested in Boigneville all use less inputs than the average for the region, with however much the same wheat yields*



The Mach II system is efficient provided that the machinery can operate over large areas.

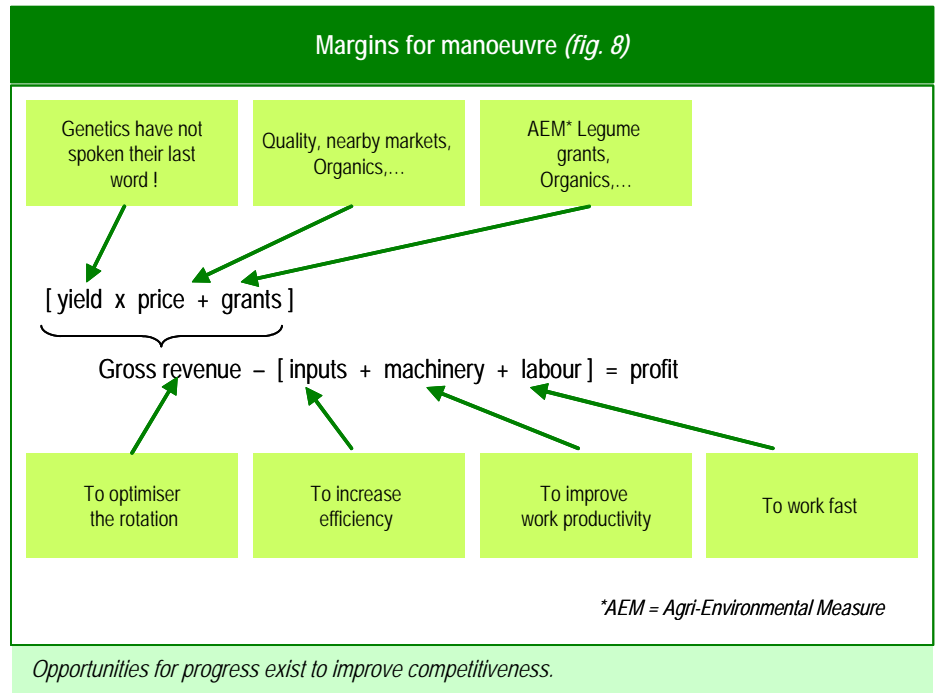
The working time per hectare is also higher in the sample (4.3 h/ha as against 2.2 to 3.3 in Boigneville). However if it is to pay off, this effort to free up time needs to be combined with a way of making good use of the time saved, for example by cultivating more hectares with the same machinery and labour force.

To a lesser extent, scope for progress exists within the operating costs by making better use of inputs, i.e. by reducing them without loss of yield.

These adaptations are tricky, and need to be made consistently. The ratio of profit to input costs is a good indicator to measure the efficiency of inputs : it reveals the profit obtained for each euro invested in inputs. One possibility for action (among others) to improve this ratio would be, for example, to better adapt the fungicide treatment to each variety according to its disease tolerance, and not have the same fungicide programme for all wheat varieties.

The search for better profitability of a farm should not be made crop by crop, but also on the scale of the rotation (figure 8). The response and the solutions for improving profitability differ for each farm.

The analysis should begin with a fairly elaborate diagnosis, which will allow each one to identify its room for manoeuvre.



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