

# The use of gross and net margins in the economic analysis of organic farms

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## ABSTRACT

In order to assess the technical and economic efficiency of conventional farm businesses a variety of management techniques have been developed. These include gross and net margin analysis and full cost accounting. This paper reviews their effectiveness in organic farming systems and finds that all of the techniques can be useful in helping to assess the economic efficiency of individual enterprises within an organic farming business, although they have their limitations. Organic systems require the integration of a number of usually complementary enterprises and therefore gross and net margins for particular enterprises taken out of the rotational or whole farm context can be misleading. Consequently it is important that any economic investigation of an organic system also includes whole farm economic analysis.

*Key words: gross margin, net margin, organic farming*

## INTRODUCTION

Many of the early converts to organic farming did so for non financial reasons, however, more recent conversions have been made by established farming businesses attracted by the commercial gains to be made from the change. As the supply of organic food increases the market is becoming more competitive and profit margins in many sectors are being eroded. Thus, there is increasing need to study the technical and economic efficiency of organic farming. For this purpose a number of farm management tools, such as gross and net margins can be used. This paper will review and assess the usefulness and appropriateness of these tools when used to assess the economic efficiency of resource use in organic farm businesses.

## ECONOMIC ANALYSIS TECHNIQUES

The process of analysing a farm business has been traditionally divided into two parts (MAFF, 1980); general analysis based primarily upon financial accounts and other appropriate records and an a more detailed analysis of the individual enterprises on the farm in the form of gross margins for each enterprise. In recent years, with the increasing economic pressure on agriculture, there has been a greater use of cost accounting techniques which result in net margin or profit per enterprise.

### Gross margins

A gross margin for an enterprise is its financial output minus its variable costs (Table 1). The use of gross margins became widespread in the UK from about

1960, when it was first popularised amongst farm management advisers for analysis and planning purposes (Barnard and Nix, 1979). The gross margin per hectare or per head for crops and livestock can be compared with 'standards' (published averages of what might be typically possible in average conditions) obtained from other farms. Gross margins, however, should only be compared with figures from farms with similar characteristics and production systems. With this reservation in mind, the comparisons can give a useful indication of the production and economic efficiency of an enterprise. In organic systems gross margins are also useful for farm planning and for making comparisons of enterprises, on the same farm, between organic holdings, or between conventional and organic enterprises (Lampkin, 2001).

Table 1: Comparison of organic and conventional peas using gross and net margins (£/ha).

	Organic	Conv.
<b>OUTPUT</b>		
Marketable yield (t/ha)	3.5	3.8
Price per tonne (£)	200	75
Arable area payment	300	300
<b>Total output (£/ha)</b>	<b>1000</b>	<b>585</b>
<b>VARIABLE COSTS (£/ha)</b>		
Seeds (organic 350kg/ha)	175	80
Fertilisers	35	13
Sprays (conventional includes herbicides)	24	98
Other (cleaning)	20	-
Total variable costs (£/ha)	254	191
<b>GROSS MARGIN (£/ha)</b>	<b>746</b>	<b>394</b>
<b>ALLOCATABLE FIXED COSTS (£/ha)</b>		
Cultivations (disc & power harrow)	54	54
Planting (drilling and rolling)	25	25
Mechanical weeding	63	-
Spraying & fertilising	9	36
Combine harvest	90	90
Total fixed costs (£/ha)	241	205
<b>NET MARGIN (£/ha)</b>	<b>505</b>	<b>189</b>

Source: (HDRA, 2001)

Gross margins specifically for organic crops and livestock were first published in the Organic Farm Management Handbook in 1994 (Lampkin and Measures, 1994). It was noted in the preface to the first edition of this that these figures were 'best possible estimates' for the physical and financial performance of organic crops and livestock enterprises. With subsequent editions (1995, 1999, and 2001) the data has expanded to include additional enterprises. The figures have also become more robust in the light of the experience of an increasing number of organic farmers, and research projects with linked commercial farms which have systematically collected full accounts and enterprise data.

There are, however, some important limitations to the use of gross margins in organic systems: Comparison of gross margins between enterprises with different

fixed cost structures can be misleading, particularly when conventional variable costs have been substituted by fixed costs in the organic context e.g. weed control by herbicides replaced by mechanical weeding (Table 1). It is often inappropriate to consider the economics of a single enterprise, such as organic vegetables, outside the context of the whole farm rotation, which will often include fertility building crops (Table 2). This phase of the rotation may be considered a part of the 'costs' of achieving high returns for potatoes or carrots. Also certain inputs applied on a rotational basis, with residual effects on subsequent crops such as organic manures need to have their costs spread over the whole rotation. It is unrealistic to expect their costs to be carried by the individual enterprises to which they were first applied.

Table 2 : Economics of a typical organic arable/roots rotation (£/ha)

	W. Wheat	Potatoes	Peas	S. Barley <sup>1</sup>	Clover <sup>2</sup>	Average
<b>Output</b>	1016	7000	1000	692	306	2003
<b>Variable costs</b>	105	3284	254	173		763
<b>Gross margin</b>	911	3716	746	519	306	1240

<sup>1</sup> Spring barley undersown with clover

<sup>2</sup> Set aside payments are assumed to be claimed on this clover ley

Source: HDRA (2001)

The economics of any rotation is largely tied up with three types of relationships between the different enterprises. They can be either complementary, competitive or supplementary (Barnard and Nix, 1979). Complementary enterprises assist one another, for example a break crop, such as peas, might rest the land, improve the structure and fertility of the soil. The second relationship is competitive, for example two crops in a rotation compete for the same nutrients. The final relationship is supplementary, where increased production of one crop or enterprise has no effect at all on the production of another e.g. making use of slack labour.

### Full cost accounting and net margins

In cost accounting or complete enterprise costing, not only are the outputs and variable costs allocated to individual enterprises, as for gross margins, but the fixed costs are also allocated. This results in a net profit per enterprise and, with all costs allocated, enables the calculation of costs per tonne of grain or per litre of milk produced on the farm and break-even budgets. The strength of such techniques are that they help to identify all costs involved in a particular enterprise. Despite its apparent simplicity, however, the full cost approach is fraught with difficulties. Awkward and sometimes arbitrary decisions have to be made concerning the allocation of overhead expenses between enterprises. For simplicity this is often done on a per hectare basis but for greater accuracy labour and machinery costs need to be recorded in great detail and allocated carefully.

Net profit figures per enterprise tend to ignore the interrelated nature of enterprises and are thus less useful for organic systems. They are of most use where a farm has one core enterprise, such as top fruit (Firth, 1999) and the other

enterprises are minor or could be thought to contribute to that core enterprise. One alternative is to apportion only the more easily allocatable costs, such as those related to field operations in crop production, to arrive a net margin per crop/enterprise. (Table 1) This technique has been adopted in a number of studies investigating the economics of organic farming (Leake, 1999; Cormack, 1994; HDRA, 2000). This overcomes, to some extent, the limitations of gross margins, which fail to take account of fixed costs changes when comparing conventional with organic farming.

The difficulties of using net margins are that; firstly there are few if any published 'standards' with which to compare. Secondly costs of field operations are not accurately recorded on all farms, therefore they rely on estimates that may vary from farm to farm, which can cause problems when farm comparison is made. This was overcome in a number of the studies referred to above by using contractor's charges to arrive at the costs of various operations. Finally net margins and net profit per enterprise are less appropriate for farm planning, since the fixed costs elements are unlikely to vary directly in proportion to the size of the enterprise.

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