AGRONOMY AND FARM VIABILITY

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Summary. Farm financial performance indicators were determined from a study of 78 farming businesses in northern Victoria. Farm physical performance indicators and a sustainability rating system were developed. The linkages between farm financial performance and physical sustainability are described. Farmers need agronomic skills to be able to grow highly productive crops and pastures but without sound criteria for assessing financial viability the farming business is at risk.

INTRODUCTION

The economic viability of emerging farming systems is uppermost in farmers minds. Since the 1982 drought many farmers in the winter temperate zone intensified their cropping in the hope of accelerating financial recovery. This included the incorporation of lupins, faba beans, chick peas, canola and linola to areas where they had not previously been grown. In addition, minimum tillage and direct drilling were adopted as a means of minimising land degradation. These so called sustainable farming systems were heavily promoted by government and private *change agents*.

Skilled managers on good soils were successful. After several years they opened their farm gates to demonstrate their success. They became *icons* of intensive cropping. Many farmers followed their lead and took the new cropping systems to their own areas. In the past five years there have been some serious failures and there have been severe financial penalties resulting from the adoption of new techniques in areas where they were not suited. Some farm families will not recover from the changes made in management in the 1980s.

The FAST (FM500 And Sustainable Technology) project is investigating the management practices which result in long-term viability. FAST is funded by the GRDC, NLP and RIRDC and farmers.

METHODS

The viability of adopting intensive cropping systems is being investigated by the FAST project. An intensive monitoring program is underway with FM500 (Farm Management 500) members to identify the reasons for success and failure. Within this program the following parameters are being monitored:

* crop selection and climate/soil capability and variability

* factors limiting production on bottom paddocks

* paddock productivity in relation to farm viability

* farm business structures, including: debt, machinery assets, operating and overhead costs, number of farm families within the one business, farm size, cropping intensity

Financial data were collected from seven years of taxation records on 78 farms. Additional data collected during the collection of financial data dealt primarily with cropping intensity and production figures. The physical data were obtained from long-term records of inputs (fertilisers, herbicides , machinery operations, stubble handling, crop types etc.), in paddock description of soil types, measurements of soil condition (soil structure and chemical composition), monthly rainfall and crop growth and performance using the Maximum Economic Yield crop monitoring program.

RESULTS AND DISCUSSION

Financial Performance

The FAST Systems Economic Analysis has been completed on 78 farms in the Wimmera and Mallee regions of Victoria. Disposable income per family is one of the main criteria to assess the long-term viability of the enterprise. Disposable income is calculated from what is left after operating costs, machinery replacements and interest have been paid. Disposable income (including off-farm wages) is what families have left to live on and use to pay off debt, buy more land or invest off-farm (Fig. 1).

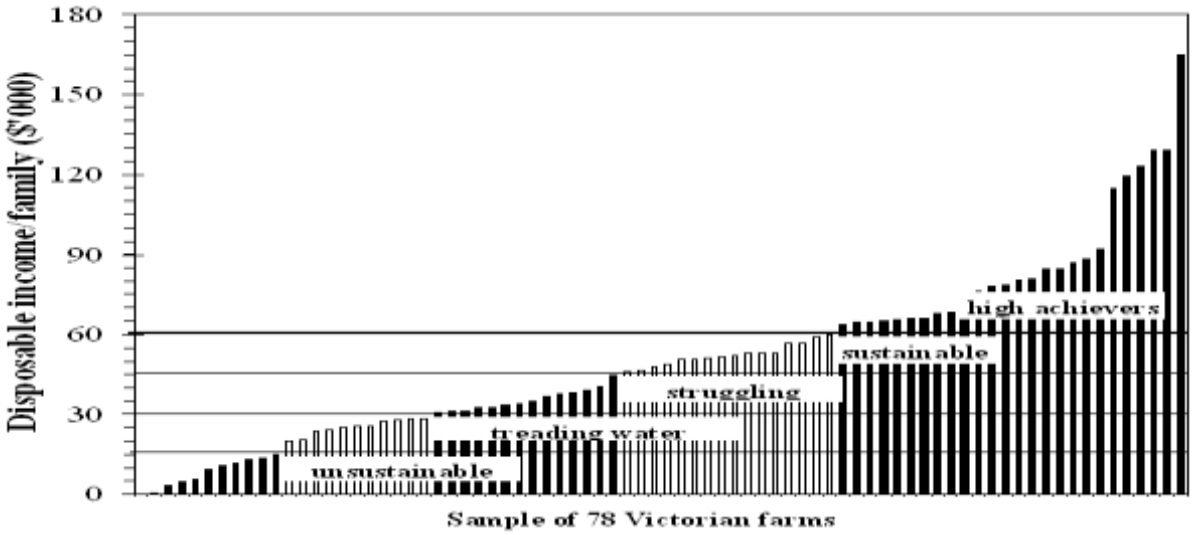

Figure 1. Average (seven years) disposable income ($/family) for 78 farming enterprises.

The most important factors determining family disposable income is the value of the land farmed per family (Table 1).

Table 1. Disposable income per family linked to Land Value per family.

Land Value per Family ($/family)	Performance Level ($/family)		
	Average	Bottom 25%	Top 25%
< $500,000	$36,755	$9,728	$69,985
$500,000 - $700,000	$55,810	$26,090	$82,716
$700,000 - $900,000	$53,425	$13,585	$99,084
> $900,000	$93,748	$42,743	$146,856

Productivity is often seen as the key to farm viability. Productivity is calculated as the Operating Surplus per hectare and contrary to popular opinion is not directly linked to Farm Family Disposable Income (Fig. 2). There does appear to be a trend that some of the 'struggling' farmers have low productivity and that more of the *sustainable* farming enterprises have high productivity. But there are many exceptions to

these trends. The current indications are that the top income farming enterprises do not need to be as productive because they have larger areas under their control.

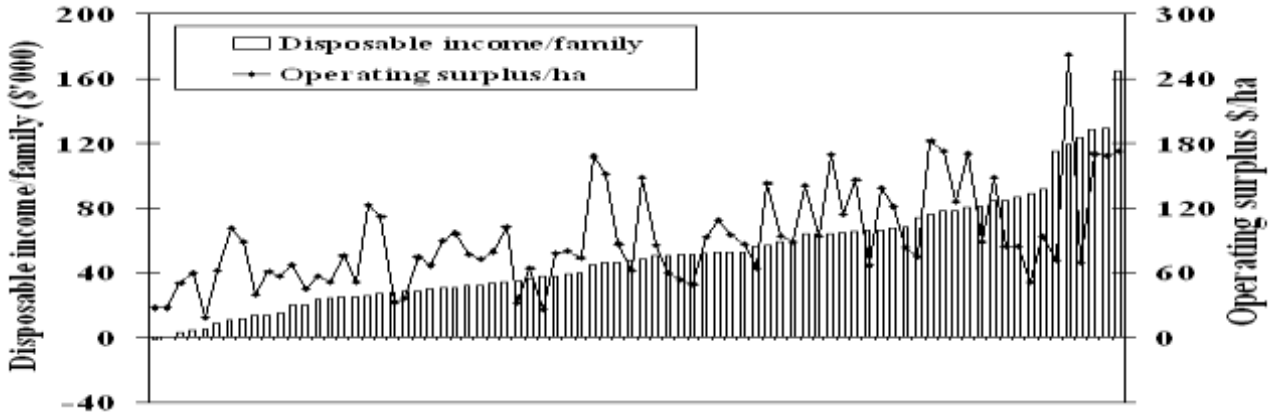

Figure 2. Operating surplus ($/ha) and disposable income ($/family).

Enterprise mix is an essential ingredient of farm profitability. The mix between cropping and pastures is strongly linked to productivity (measured as operating surplus/ha) (Fig. 3). The disparity in operating surplus per ha for those farmers in an intensive cropping rotation (>50% mix of cropping) is directly related to soil type being farmed. Those farmers on mixed soil types (hard-setting red duplex soils and non-mulching clay soils) are at risk when adopting an intensive cropping rotation compared to farmers on the well structured soils, such as the Wimmera self-mulching clays.

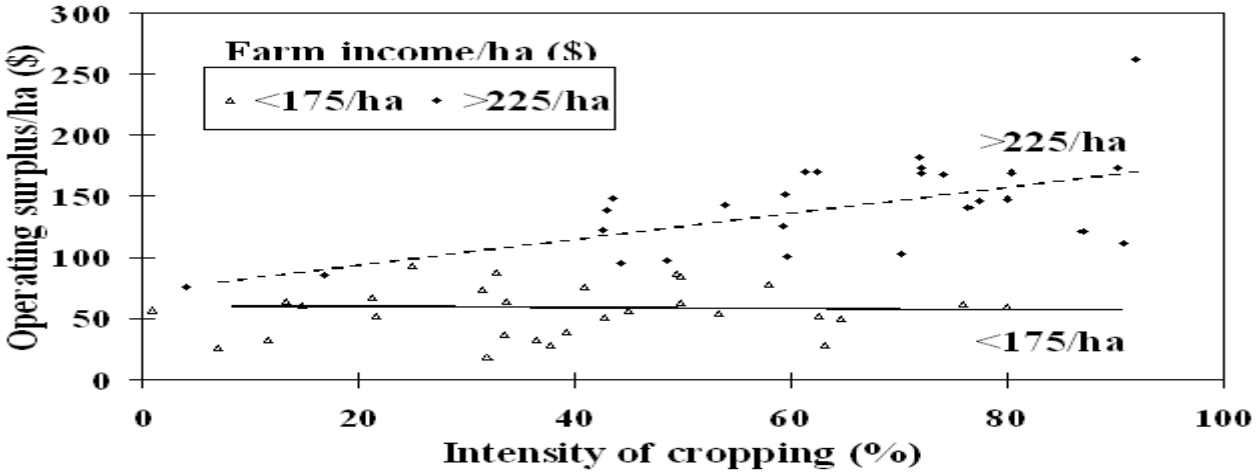

Figure 3. Operating surplus ($/ha) versus intensity of cropping (Enterprise Mix).

Paddock performance and productivity

Individual paddock performance is often the key to farm viability. The criteria used for assessing performance were: water use efficiency, nutrient status, herbicide resistance risk, soil health and disease risk. The financial assessment is currently being linked to individual farm and paddock performance, to ascertain what the physical limiting factors are and what management practices are successful in overcoming these limitations. The following is a description of the physical performance of one farm and how that is related to the financial performance of the farm.

There is a large variability on farm between the performance of top and bottom paddocks (Fig. 4).

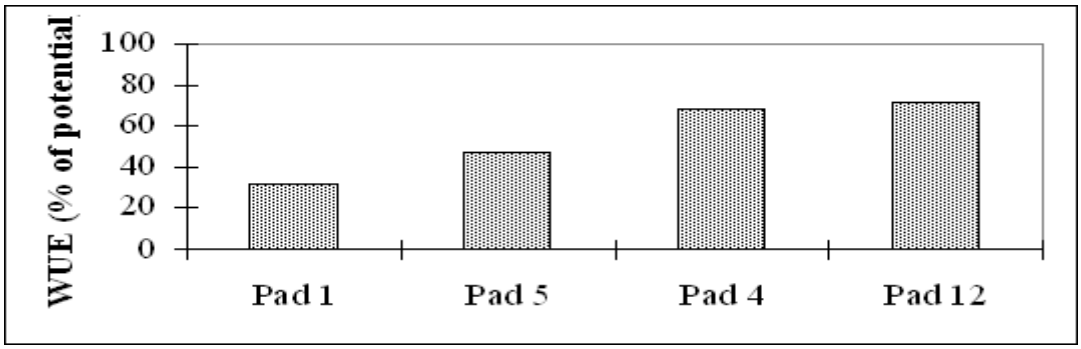

Figure 4. Example of the average (over 10 years) water use efficiency (calculated as a percentage of potential) for four paddocks on one farm in the FAST analysis.

The long-term macro-nutrient audit for this farm is that inputs are at replacement only for the top paddocks, but that the bottom producing paddocks are in surplus. This was confirmed with soil tests.

Ryegrass and wild oats resistance to the fop and dim group of herbicides is becoming a feature of continuous cropping rotations. A variety of alternative methods for weed control, including green manuring, delayed sowing, crop topping etc. are being investigated.

Soil health is being assessed using the criteria developed by Tim Hermann in the South Australian Right Rotations program. The long-term assessment is based on tillage intensity, stubble retention and rotation. On this farm all crops are sown using direct drilling or following one single pass with a tyned implement. The overall rating for soil health was highly sustainable (see Right Rotations - Crop Rotation Sustainability Index). However, there are some problems with soil structure resulting from an inherent soil sodicity problem. Especially the sub-soil of the bottom producing paddocks are sodic (ESP>6%), which is resulting in poor sub-soil structure and problems with waterlogging.

Disease risk was assessed from the rotation, stubble retention and cultivation intensity. The assessment of this farm was that the disease risk was low and that the current farming practice will result in minimal long-term disease problems.

The overall assessment is that if herbicide resistance can be managed through the judicious use of alternative control practices then the farm physical performance is on track in terms of sustainability.

The linkage between financial and physical performance

The financial performance of the farm for which the physical assessment was described, indicates that the farm is a financially viable operation (Table 2).

Table 2. Farm financial performance indicators (average of seven years).

Indicator	Level achieved	Rating
Family Disposable Income	$65K	high achiever
Production Income/ha	$270/ha	high
Operating Cost as a % of farm income	55%	average

Machinery Replacement as a % of farm income	20%	high
Operating surplus/ha	$115/ha	average
Return on Capital	5%	average