

## IMPROVING THE SUGARCANE FARMING SYSTEM WITH FEAT: A DECISION-MAKING TOOL TO FACILITATE ON-FARM CHANGE

By

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### Abstract

A FARM Economic Analysis Tool (FEAT) was developed by QDPI&F FutureCane officers specifically for the Australian cane industry using grower knowledge and feedback. Using specific grower and miller examples, this paper explores the application of the tool and how it has helped improve decision making and on-farm profitability. FEAT has been used across Queensland within the growing, harvesting and milling sectors of the sugarcane industry. It was found that the use of this computer-based tool allowed growers and millers to assess, in economic terms, changes they were considering to improve their farming systems. Changes made in the paddock as a result of using the tool have led to significant savings in costs and improvements of profitability. It was also found that the use of this tool has provided significant social benefits to the cane industry by increasing communication within farming businesses; improving the sharing of skills and knowledge between partners within the business; and increasing confidence in the future of the cane industry. Increasingly, industry advisors are also using this tool to assist their cane farmer clients.

### Introduction

The Farm Economic Analysis Tool or FEAT (Cameron, 2005) has been developed within the FutureCane project which is a partnership between the Department of Primary Industries and Fisheries (DPI&F) and BSES Ltd. FutureCane is providing an avenue of extension for the Sugar Yield Decline Joint Venture (SYDJV) research findings.

In previous projects, emphasis was usually placed on either agronomic issues and practices or business development and planning (including economic issues). Usually the agronomic issues overshadowed the profitability messages and, in some cases, they may have been considered in isolation from each other.

The FutureCane project combines both these elements, simultaneously showing both the agronomic and economic implications of making changes to the farming system. By doing this, FutureCane hopes to strengthen a new culture in the cane industry by improving decisions made by all sectors of the industry.

Productivity gains have been a large focus for research and development in the past. Examples of this include variety breeding, disease control and management, water use efficiency and cane plant nutrition. R&D in these areas continues to make significant advances in productivity for growers in Australia and around the world. However, with world

sugar prices likely to remain challenging for the industry in the longer term, and with increasing prices of inputs, the assumption that profitability will automatically follow productivity needs to be challenged.

To add value to productivity improvements, officers from DPI&F identified the need for raising the awareness and understanding of economic factors when making decisions. In conjunction with industry bodies, DPI&F officers from Bundaberg ran workshops in South East Queensland centred around business planning principles. They had a strong emphasis on farm business management, combining the economics of running the farm with the improved agronomic practices.

These workshops were very successful given that the industry was receiving low prices for sugar, and priorities needed to be re-evaluated on the farm. As a component of this workshop series, growers were introduced to the concepts of farm business management including gross margins.

One workshop was built around growers building a one sheet gross margin using Microsoft Excel. This was a basic spreadsheet designed as a teaching tool for growers to learn Excel and the basics of gross margins.

This was then incorporated into a complex whole farm decision making tool. As part of the FutureCane project, this tool has been made less complex and more cane specific.

### **FEAT features**

FEAT has been developed primarily to compare the economic performance of different cane farming systems. The tool does this by calculating several different economic performance indicators used in the agricultural sectors, eg gross margins, break-even yields and prices etc, and presenting them in the whole farm context.

One of the key building blocks when looking at farm profitability is gross margins. Put simply a gross margin consists of the income from one enterprise e.g. cane, soybeans, peanuts etc., minus the costs directly associated with growing that crop (variable costs).

To be a useful decision making tool, gross margins are calculated on an individual crop class basis for the following classes: autumn plant cane; spring plant cane after a fallow; plant cane in a plough out, replant system; ratoon cane; standover cane, split between years grown and harvested. Individual ratoon cane gross margins can be calculated either as individual crops or grouped as one class. There are also additional sheets for complementary and rotational crops such as soybeans and peanuts.

The focus of the tool is to look at the Return on Investment when minor or major changes are made to the farming system. Gross Margins are calculated for each enterprise and these are added together to give a Total Farm Gross Margin.

Other income using farm resources, for example contract planting, is added to this figure from which fixed costs are subtracted, resulting in Farm Operating Return. This figure is expressed as a percentage of capital farm resources invested including land, improvements, plant and machinery, to provide a Return on Investment.

FEAT can make accurate comparisons because it is based on a lot of detail such as kilograms of fertiliser or litres of chemicals applied per hectare. Machinery costs are based on detailed costings using tractor size, fuel consumption, implement speed, width, efficiency and repairs and maintenance. Accurate tillage costs become especially important when growers are considering changes to tillage practices and with rising fuel costs.

One additional feature of this tool is its ability to identify the optimum number of ratoons based on an economic basis. This obviously needs to be used with agronomic considerations, but this has helped growers to decide how long to ratoon the cane on their farm.

As a result of feedback provided by users, the FEAT version that is now available has been further improved. Due to effective linking between its 26 sheets, it requires minimal input of data.

### **FEAT activities**

When FEAT was developed, two of the major design considerations were ease of use and functionality across a wide range of different learning situations and user skill level. It has been used in many innovative ways, from on-farm decision making used by a single grower, to industry groups discussing the costs and benefits of new farming systems at large field days.

FEAT is a decision tool that can be used in many situations. Some of these are:

#### **One on one**

In these situations, a FutureCane or extension officer works with a grower, miller or harvester, assisting them to gather and enter the necessary data. In most cases it is best practice to use long term averages for such things as yield and CCS figures, as seasonal variability is open to too many influencing factors such as weather and disease.

Most users find this 'modelling' approach acceptable and establish their figures around this base. The user or officer can then provide suggestions for changes to their existing system, and evaluate them in terms of whole farm profitability.

One on one interaction has great benefits for the individual user, as farm specific information can be used, resulting in a personalised, relevant outcome. However, the individual misses out on the experiences of other growers who may have made, or partly moved towards, the changes that are being evaluated.

#### **Workshops**

FEAT has been used in workshops as an extension tool to explore farming systems and evaluate changes to practices in terms of profitability. Many suggested changes to farming systems have a positive effect based on a sound agronomic background.

By reflecting this in FEAT, Future Cane officers are also able to show the economic impact of such changes which may not have been as apparent. This can lead to discussion about how and where to save money in making these changes by sharing the experience of the group members.

Once the workshop participants are able to accept or develop a base set of figures, valuable demonstrations of changes can be made. Although individuals do not use their own figures, workshops have been designed so that participants gain adequate skills to use the tool when returning to the farm office.

#### **Field based extension activities**

Field days, farm walks and bus tours have been enhanced using FEAT and its outputs. If facilities are available, FEAT can be used 'live', running scenarios that have been discussed during the day, possibly even using the host's figures.

Similarly, the outputs of FEAT can be used to provide financial justification to the extension message and provide extra information for discussion and informed decision making.

#### **Electronically and paper based**

While FEAT is an electronically based tool, the paper outputs can be used to discuss management practices and farming systems changes. An extension officer can enter data gathered from a grower relating to their existing and new farming system options, and then print out the appropriate pages necessary to discuss options for that farm. For those who are

not comfortable using a computer-based tool, the data collection and discussions can happen on farm or in larger groups and then later be entered into FEAT.

### **Self guided**

In many cases, users have had extensive experience with decision making tools and/or spreadsheets and are able to use FEAT with minimal assistance. These users have often contacted FutureCane staff to further clarify and investigate uses of the tool.

### **FEAT uses**

An email survey of current users covering a wide range of sectors within the industry was conducted to determine which questions they are trying to answer and what outcomes they are able to achieve.

Two broad categories of users were surveyed. The first included service providers such as cane productivity officers, BSES Ltd staff, CSIRO staff, mill staff and FutureCane staff. The second group included growers and grower/harvesters who are working individually or as part of a grower group.

In the case of the service providers, by far the largest use for FEAT is to compare conventional farming systems with new or improved systems at the whole farm level. The majority of these included introducing a legume rotation crop, minimum tillage and controlled traffic practices.

Extension advisors have been evaluating different scenarios with growers on their farm. By using individual farm data, they have been able to show what SYDJV recommendations could mean on an individual basis.

One advisor commented that initially he thought it was a good base tool to explore the profitability of different farming systems. However, after using the tool with several growers, he has discovered that it is a valuable tool in identifying underlying farming problems.

When he has been comparing figures from various farms, he has noticed substantial differences in the way growers do things across the farm and has been able to discuss with growers why they do these things. FEAT has helped to highlight the variations and identify the most profitable alternatives for each grower.

An advisor in the north had a similar comment about how he is using FEAT. He has been able to identify areas of high expense and possible areas to make savings e.g. altering fertiliser rates to meet BSES recommendations in line with soil tests, zonal tillage versus broad acre, identifying excessive fallow costs. He thinks it is an excellent tool for showing all the business activities, costs and returns in one place.

Another advisor said that they have found it extremely useful for economic analysis of changing farming practices. He said the major benefit of the tool is that the economics of the change can be measured prior to any investment in time or capital, thus preventing poor investment choices. Advisors involved in research have been able to accurately record and analyse research data from trials using FEAT. With the comprehensive structure of FEAT, it describes what data across the whole farm, or trial plot, needs to be collected for an effective economic comparison to be made. Once the data needs have been established, it becomes a simple matter to enter each set of trial practices and results to generate a quick and easy comparison between farming systems. Advisors now have a tool which can simply and effectively support their extension messages with real economic data in a timely fashion.

A different approach by an advisor is using FEAT by herself to solve grower queries over the phone. She also sends them out an email with what information they need to gather, and then growers can come into her office prepared to work through FEAT. This reduces the

time needed to enter the data and gives the grower more time to gather the necessary figures which may come from different parts of the business.

Growers have also found it a useful and easy-to-use tool. Growers from a recent workshop in the Isis area commented that it was user friendly, relevant to what is happening on the farm and by seeing changes happen in front of them, they find it very useful for planning.

A large scale grower in the southern district has been using FEAT to make financial decisions such as whether they can afford new equipment; if it is worth growing different crops; and whether to buy extra water to get an extra five tonnes per hectare. She said you just put in the figures and the answer is there! She commented that it is great to be able to give the men a quick answer to ideas that they bring in from the paddock. She said it is a quick way to help make decisions on a weekly basis.

Geoff McCarthy, an Isis grower, said, 'I don't like computers and usually find them time consuming, but this spreadsheet was easy to use and gave a great overall view of our business performance.' He has been using the tool to evaluate alternative crops and to work out how much machinery operations are costing him. One grower in north Queensland claims to have saved \$50 000 by using this tool to analyse the effect of change on his bottom line profit (Benjamin, 2005). He said he now has more confidence in the industry because FEAT has helped him evaluate several different options and he can use it as a management tool for any decisions in the future.

Several growers have used FEAT to establish contracting rates when they have purchased new machinery. By using the machinery sheet to work out how much it will cost for fuel, oil, repairs and maintenance, they can take it a step further to include things such as interest and depreciation to work out a rate at which it would be profitable to do contract work.

Millers have used FEAT effectively to make important decisions such as changing row spacings on their farms. Being large growers themselves, several mills have used FEAT with their farm and supply managers to evaluate changes and then use it as a format to deliver proposals to their boards and committees.

This has led to on-ground changes being made across large areas, usually starting with trials of farming practices that have been demonstrated to be profitable by FEAT. Millers have also used it for decisions about leasing land from growers. By being able to evaluate a given block using expected yields and costs, they have had another source of information to help with their decisions.

### **FEAT impacts**

Observations made both on-farm and during workshops have shown that when both partners (usually husband and wife) have been involved with using FEAT, communication across the business has improved. Traditionally, many women have been in the book keeping and financial management roles while the men have worked in the paddock and, in many cases, made the decisions about farming practices and management. With prices relatively higher on average in the past than in recent years, those traditional roles and their boundaries were sufficient to run a profitable business.

However, in today's economic climate, a farm business needs good communication between all roles ensuring that decisions are made based on sound information from multiple viewpoints. FEAT has played a role in improving those communication channels through the gathering of knowledge and information from several partners on the farm to enter into the tool. FEAT pools this knowledge and assists in sharing specific farm details that are usually

outside the boundaries of their traditional roles. As a result, partners in the business are finding out details that they previously had little knowledge about, broadening the social capital that the industry has available.

Another social impact discussed at a recent workshop is that growers are feeling more comfortable using computers. There seems to be a gradual shift in the level of interest shown by men in using FEAT because it requires minimal data input and provides immediate, easy to see answers.

There has been a transition from men coming into the farm offices and asking their wives to enter the information, to the men using the computer and testing a few options for themselves.

With the emphasis on agriculture becoming more business-like in the future, this will not only help with making better decisions in the paddock, but it will also provide invaluable skills and attitudes towards using computers as a management tool.

Benchmarking can be an effective tool to identify improvements in practices at a local, district and regional level. However, it does have drawbacks if data are not collected consistently, which can be a difficult task to accomplish across different regions within the industry.

FEAT has the potential to be used as a standard structure for data collection in benchmarking activities. With its flexibility to suit the many variations in practices across the industry, and a standard, consistent layout, it is a suitable tool to both collect and compare data, and to discuss changes in management practices and the impacts on farm profitability.

Growers have also identified it as a useful benchmarking tool when comparing their own performance from year to year. They have been able to make changes from season to season on their farms and monitor what impact that is having on their profitability.

Growers, millers and service providers have found that FEAT is useful in many different situations, helping to make decisions easier across a wide range of issues. When considering possible uses for FEAT, it may be useful to explore what it is designed to do in the context of other decision tools and software in the industry.

FEAT is primarily a decision making tool for future decisions and analysis. It is not designed to replace record keeping, block recording and accounting packages. However, reports from growers that have kept meticulous financial records state that FEAT produces very accurate results when compared to their own records. This reassures us that FEAT is a comprehensive and accurate tool that growers can have confidence in using.

After having used FEAT during many on-farm visits, we have refined an effective and time efficient system to take growers through a complete analysis of potential changes they are considering for their farm. Ideally at least a week before the farm visit, we send the growers a list of all the essential figures that they will need to have available.

Most growers provide many of the required figures from memory or from their notebooks. FEAT doesn't require financial records as it only uses application rates and today's prices. Even working with growers that have no computer experience, we are able to complete a farm session in as little as two or three hours, depending on how many scenarios are tested.

## **Conclusion**

FEAT was established and developed as a grower orientated extension tool. Subsequently, FEAT was moulded by what growers found useful and easy to use. It is possible that grower-input during development was the biggest contributing factor to the tool's success and its widespread use across the industry.

The significance of grower input will be important for the development of future decision tools, especially when using relatively new technologies in the sugarcane industry.

Many users in the milling and service provision sectors of the industry feel at ease with using computer based decision making tools and have found many different ways to use FEAT. While some growers have enthusiastically incorporated its use into their decision making, many growers still face skill and attitude obstacles to the use of tools such as these.

Continued efforts by groups like cane productivity services, FutureCane and BSES Ltd should ensure that the effective use of tools such as FEAT increases throughout the industry. This will help growers stay profitable while they face the many challenges and changes ahead in the industry. The impact across the industry has only just started, as more users become familiar with FEAT's potential uses.

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