# NOVEL TEACHING METHODS IN FARM MANAGEMENT

**P.J. Cain, G. Bright, M. Bent and I. Edwards**

Universities of Newcastle upon Tyne, Bangor, London and Aberdeen, UK

*Abstract*

*The subject of whole farm budgeting can be tedious for both teacher and student because emphasis is necessarily placed on the separate components of a budget, often losing sight of their interrelationships and leaving little time to use the budget. This paper describes a CAL module developed to address this situation by a group of UK farm management lecturers and a development team supported by central Government funding. BUDGET BUILDER is a spreadsheet-based whole farm budgeting tool which, with a linked tutorial component, leads the student through the construction of a whole farm budgeting model beginning with simple enterprise gross margins and fixed cost budgets and culminating in projected cash flow, profit and balance sheet statements. Both the tutorial and the model are structured to permit different levels of both entry and exit to accommodate students from different academic backgrounds and at different stages in their courses.*

## INTRODUCTION

Whole farm budgeting is often a core component of the farm business management courses of agricultural degrees and diplomas. Traditional teaching of budgeting is normally by explanation of the individual parts - enterprise gross margins, fixed costs, cash flow, profit statement and balance sheets, and by case study example of the construction process. Students often fail to appreciate the interrelationships between the components, or if they do, become so engrossed in the arithmetic calculations that they are reluctant to proceed to use the completed budget for its intended purpose.

The use of spreadsheet software has eased the burden of calculation and can greatly assist in the understanding of the linkages.

An understanding of the linkages between cash, profit and capital achieved in the context of budgeting helps students to recognise these in historical accounting statements. This is often difficult to achieve when approached purely from an accounting perspective, and the budgeting approach can obviate the need for further lengthy teaching of accounting principles.

Courses of formal lectures with referenced texts are well established in the teaching of farm budgeting but, by its nature, budget building is an active process which lends itself well to the application of Computer Assisted Learning (CAL). In this environment students are "learning by doing", and pace of learning can be determined by the individual's requirements.

The CAL package described here - *Budget Builder 1* - is one of a number of CAL modules developed under a Government supported programme designed to expand the use of computer technology in teaching.

## COMPONENTS OF THE SOFTWARE

### Overview

*Budget Builder 1* is designed to both explain the components of a whole farm budget and to describe the construction process based on spreadsheets. There are two principal components: a **tutorial** and a **spreadsheet example model** - the Budget Builder itself. Students would normally be expected to work through the tutorial before proceeding to the main part of the package working with the spreadsheet. During this latter stage, as well as detailed guide notes accompanying each spreadsheet, **help** is available both in context sensitive form and as a menu from which students can select help on budgeting or agricultural topics and spreadsheet operation. Therefore, although the student is expected to have some understanding of agricultural production, no previous knowledge of either financial management or

spreadsheets is assumed. Finally, the package contains a student **exercise** in which the student builds a budget for a case study farm using spreadsheet pro formas. Figure 1 shows the "contents page" of *Budget Builder 1* describing its main components.

**Tutorial**

The tutorial begins by explaining the concepts of cash, profit and capital and then leads the student through the various steps involved in the process of whole farm budgeting based on enterprise gross margins. It has six main parts, the first being a general explanation of what budgeting is and how it is carried out and the remainder dealing with each of the budgeting stages - Gross margins, Fixed costs, Cash flow, Profit statements and Balance sheets. The terms used in each part are based on MAFF definitions (MAFF (1984)) and are explained at each stage. Illustrations and animations are used where appropriate and some self-testing is built into the tutorial. A typical "page" from the tutorial is shown in Figure 2.

The menu structure of the tutorial enables students to select any of the six main parts, allowing them to review previous parts or exit at any stage and return later. A built in notebook facility means that students can select text and paste it into their own file to build up a set of notes from the tutorial.

**Spreadsheet Model**

The budget building process is presented in the form of **guide notes** linked to prepared **spreadsheets**. The student is guided through the steps in the preparation of a whole farm budget for a simple example farm situation. This farm system used at this level includes only year enterprises with no carry-over of stocks or creditors or debtors and uses contractors for farming operations on rented land. (These "complications" are introduced sequentially in a higher level package - *Budget Builder 2*). At each of the stages, which are in the same order as that presented in the tutorial, the guide notes explaining the construction process are presented on screen with the relevant spreadsheet.

Figure 1. Budget Builder 1 Contents Page Screen

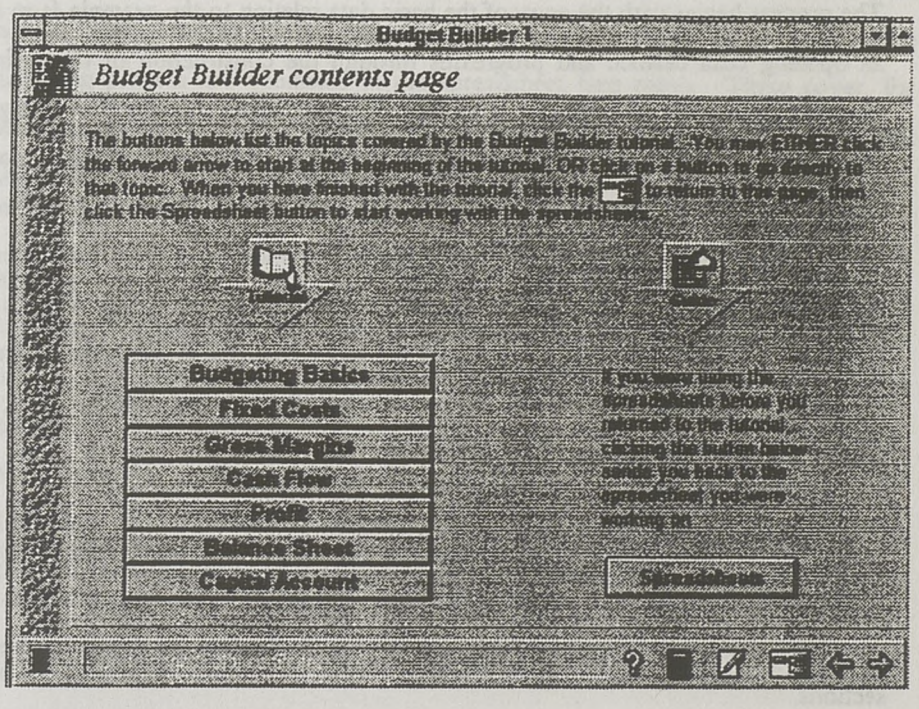
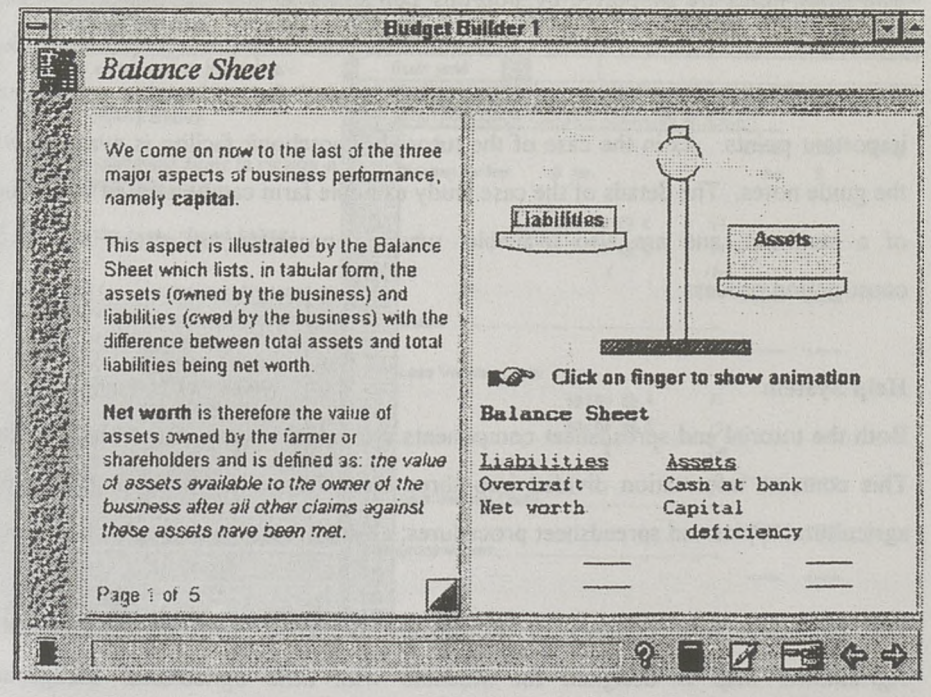



Figure 2. A Screen from Budget Builder 1 Tutorial



The process begins with the entry of the basic data relating to the example farm such as opening cash balance and progresses through the construction of three simple enterprise gross margin budgets. In these early stages detailed instructions are given on the entry of data and formulas, with the entry being made by the student in some cases, and as a demonstration by the package itself in others. Fixed costs relating to the example farm are then incorporated to produce a whole farm profit budget based on the gross margins. A cash flow budget is constructed by allocating receipts and payments to the relevant time periods and the interest charge is calculated from the budgeted bank balance. Finally, a profit budget and closing balance sheet are constructed and all of the statements reconciled.

Progression through each stage of the construction process depends on the successful completion of each section of the spreadsheet. However, students can exit at any point and the menu structure allows re-entry at the beginning of any of the six sections.

The guide notes are supported by 'pop-ups' containing further explanation as well as 'hot words' within the text linked to a context-sensitive help facility. (An example is shown in Figure 3). There are also questions used for self-testing to reinforce important points. As in the case of the tutorial, a notebook facility is available with the guide notes. The details of the case study example farm can be printed in the form of a hand-out, and are also available, where appropriate, on-screen during the construction process.

**Help System**

Both the tutorial and spreadsheet components are linked to a structured help facility. This contains information divided into three main categories; budgeting concepts, agricultural topics and spreadsheet procedures: all are accessible through a help menu.

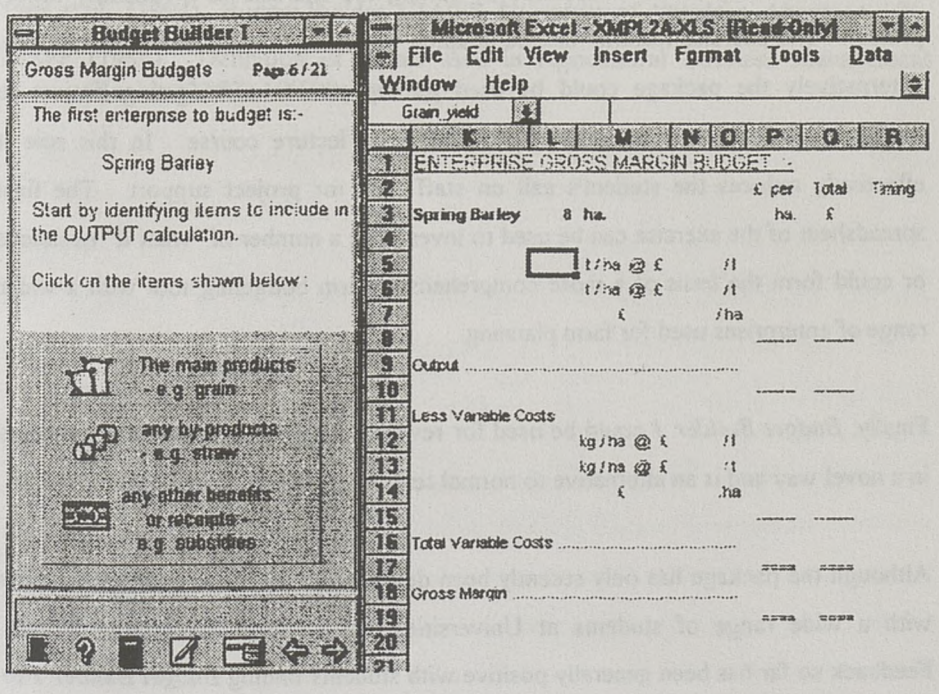
The budgeting help consists of a glossary of terms arranged alphabetically. Agricultural help is designed for students with little agricultural background knowledge and has information on the husbandry of the main farm enterprises which

comprise the example and exercise case studies as well as on the main resources such as land, labour and machinery. Finally the spreadsheet operations required in the budgeting process are contained in the spreadsheet help menu. These cover, for example, the layout of the spreadsheet and its component parts as well as operations such as formula entry and copying.

**Exercise**

An exercise is provided and is intended for use after completion of the Example budget. It is based on a simple farm case-study for which the details can again be printed to form a hand-out. The student is also provided with a spreadsheet pro-forma, structured in the same way as the example, but requiring the student to enter all the data and formulas. Although no guide notes are linked to this spreadsheet students can refer back to the relevant stage in the example.

**Figure 3. Budget Builder 1 - A Part of the Spreadsheet and Linked Guide Notes**



## TEACHING WITH *BUDGET BUILDER*

The package is sufficiently comprehensive to stand alone as a teaching resource since it requires little, or no, prior knowledge of either budgeting or spreadsheet operation. Alternatively it can be used to provide support for teaching, allowing students to progress at their own pace.

One method of introducing students to *Budget Builder 1* is simply to use the case study hand-out included with the package. This briefly explains the operation of the package, introduces the case study farm and sets the problem. The hand-out thereby provides both a starting point and a goal for the students. An example **student manual** describing the module in more detail is also included with the package.

*Budget Builder* could therefore replace a number of lectures dealing with these topics. In terms of student time the tutorial would take about two hours and the example a similar length of time although students can exit and return to the same point in a later session. Learning could be assessed by setting the exercise as a (possibly timed) project. The exercise material can be adapted by tutors to suit their particular use. Alternatively the package could be used as support for a budgeting project to reinforce concepts and procedures presented in a lecture course. In this role it effectively reduces the student's call on staff time for project support. The final spreadsheet of the exercise can be used to investigate a number of "what if" questions or could form the basis of a more comprehensive farm budgeting tool with a wider range of enterprises used for farm planning.

Finally, *Budget Builder 1* could be used for revision purposes as it presents concepts in a novel way and is an alternative to normal text-based reference material.

Although the package has only recently been developed it has been used successfully with a wide range of students at Universities and Colleges throughout Britain. Feedback so far has been generally positive with students finding *Budget Builder 1* to be a useful and enjoyable learning experience.

## CONCLUSION

*Budget Builder* is a CAL package for agricultural students who need to acquire whole farm budgeting skills. Its tutorial elements explain the individual components of budgeting and guide the student through the construction of a spreadsheet-based budget. The spreadsheet discipline helps to promote understanding of the linkages between the various parts of the budget. The resulting budgeting tool can be used in farm planning case studies. The whole package is flexible in use through the inclusion of different levels of complexity, numerous exit points and adaptability by tutors. It reduces teaching time and introduces variability into teaching methods. The *Budget Builder 1* is available to Higher Education Institutions in the UK at a discount price of £30 per copy and is sold outside for £95 per copy by CLUES* (Bent et al. (1994)). A network licence is also available and a more advanced version which introduces the complex issues of overlapping years, creditors and debtors, ownership of capital items etc. - *Budget Builder 2* - is now nearing competition.

## REFERENCES

Bent et al. (1994). Budget Builder, CLUES, University of Aberdeen, Aberdeen, UK.

MAFF (1984). Definition of Terms used in Agricultural Business Management (Booklet 2269), HMSO, London

* CLUES, William Guild Building, University of Aberdeen, AB9 2UB, UK.

## ACKNOWLEDGEMENTS

**Citation:**

Bent M, Bright G, Cain P, Dawson B, Edwards I, Schofield J, and Young C (1994), Budget Builder, CLUES, University of Aberdeen, Aberdeen, UK.

**Personnel:**

The Budget Builder CAL module comprises a tutorial, an example with guide notes and an exercise. The module was specified by:

| | | |
|---|---|---|
| Mr Martin Bent | Dept. of Agricultural Economics | Wye College, University of London |
| Dr Geoff Bright | School of Agricultural and Forest Sciences | University of Wales, Bangor |
| Dr Philip Cain | Dept. of Agriculture | University of Newcastle upon Tyne |
| Dr Ian Edwards | Dept. of Agriculture | University of Aberdeen |
| Dr David Green | Dept. of Agricultural Economics | University College of Wales, Aberystwyth |
| Mr Euryn Jones | Welsh Agricultural College | Aberystwyth |
| Dr Clive Young | Centre for Computer Based Learning in Land Use and Environmental Sciences (CLUES) | University of Aberdeen |

The content of the tutorial was written by Dr G Bright (University College of North Wales, Bangor) and Dr P J Cain (University of Newcastle upon Tyne). The example budget and exercise were developed by Mr M Bent (Wye College, University of London). Software design and development of this module was carried out by Dr B Dawson, J L Schofield and Dr C Young (CLUES, University of Aberdeen). The module was developed by the TLTP consortium for courseware in Land Use and Environmental Sciences.

The Consortium for Courseware in Land Use and Environmental Sciences comprises staff from 19 Higher Education Institutions in the UK. The Consortium, which is led by the Centre for Computer Based Learning in Land Use and Environmental Sciences at the University of Aberdeen, was set up to develop CAL courseware. The development of this CAL module was funded by the three Higher Education Funding Councils for England, Scotland and Wales and the Department of Education for Northern Ireland under their Teaching and Learning Technology Programme.