

AusFarm User Notes #3 Financial Reporting in AusFarm

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Contents

1.	Introduction	3
2.	The Cashbook Component.....	3
2.1	Concepts.....	3
2.1.1	Transaction	3
2.1.2	Line item	4
2.1.3	Price function	4
2.2	Reporting the results.....	4
2.3	Examples	5
2.3.1	Simple expense item	5
2.3.2	Expense items with ranges of costs	6

1. INTRODUCTION

AusFarm is a software tool that allows problems to be analysed with simulation models of physical and biological systems. AusFarm is highly generic, but it has been built primarily to assist decision-making in agricultural enterprises at scales ranging from paddocks to whole landscapes.

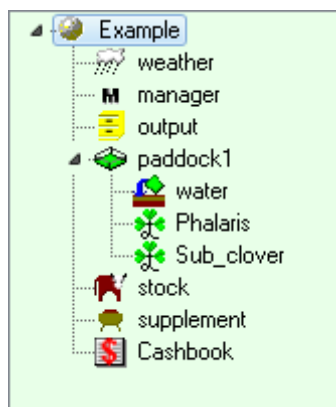
This document contains notes to assist users of AusFarm with the construction of simulation analyses that will output Gross Margin summaries for financial periods.

It should be read in conjunction with the AusFarm Help file and the document “AusFarm – a Tutorial” that is distributed with the AusFarm software.

2. THE CASHBOOK COMPONENT

The Cashbook component is used as a Gross Margin calculator for set financial periods during a simulation. Each expense or income is an item that can be defined for the Cashbook component in the simulation. The reporting periods are shown in the output by column and each income and expense item by row.

As each expense or income transaction is incurred, the Cashbook component is notified of the event and the values of the transaction. The Cashbook component is configured to write the summary output to a specified text file.



2.1 Concepts

2.1.1 Transaction

A transaction is a signal to the Cashbook component that an expense or income has occurred. Normally this is done in a Manager component script at a suitable time as close as possible to the actual event taking place in the simulation. To signal a transaction in a script you would normally do it like this:

```

=====
!Pasture costs
=====
each 1 Apr
{
  Cashbook.spend name='pasture', amount=area, param1=350.0
}

```

In the example above; the 'pasture' value specifies the line item that was defined for expenses. The 'area' variable is the numeric amount used as one of the factors in the line item calculation. There is also another parameter that will be used by the price function.

To specify an income transaction it would look something like this script.

```

Cashbook.earn name='lamb_sales', amount=stock.number[i], param1=stock.weight[i],
param2=dress percent, param3=stock.cond score[i]

```

Below is an example of recording income and expenses at the time of the management event.

```

!an example of recording income and expenditure at a sales event

for i = 1 to stock.no_groups
  if stock.tag_no[i] = 10
  {
    Cashbook.earn name='lamb_sales', amount= stock.number[i], param1= stock.weight[i],
    param2=dress percent, param3= stock.cond score[i]
    Cashbook.earn name='skin', amount= stock.number[i], param1=skin price
    Cashbook.spend name='freight_meat', amount= stock.number[i], param1= 2.50
    stock.sell group=i, number= stock.number[i]
  }
}

```

2.1.2 Line item

A line item represents a category of expense or income. Each item has a price function associated with it.

2.1.3 Price function

The price function can consist of a number of constants and parameters and inbuilt functions. See the component help file for examples. The price function represents one of the factors of the final line item. The **amount** parameter is the other factor.

2.2 Reporting the results

The report file is written as a text file in a row by column form. An example is shown here:

Period		Jul-70	Jul-71	Jul-72	Jul-73	Jul-74
Sheep sales	\$	60720	60885	60390	60720	42900
INCOME	\$	60720	60885	60390	60720	42900
Buy sheep	\$	21780	21615	22110	21780	39600
Pasture costs	\$	17500	17500	17500	17500	17500
EXPENSE	\$	39280	39115	39610	39280	57100
GROSS MARGIN	\$	21440	21770	20780	21440	-14200
Item	Units	Jul-70	Jul-71	Jul-72	Jul-73	Jul-74
Sheep sales	No.	368	369	366	368	260
Buy sheep	No.	132	131	134	132	240
Pasture costs	ha	50	50	50	50	50

To generate the report file, an event has to be called in the Manager component script. This can be called at the end of the simulation.

```
Cashbook.report filename='TestGM_report.txt'
```

2.3 Examples

2.3.1 Simple expense item

A simple expense transaction such as purchasing breeding rams shows how to record an expense based on numbers of animals with a simple cost structure. The calculated value for **ram_no** is sent to the Cashbook component using the **spend** event.

```
each 1 Dec
{
  set ram_no = flock_size/100*ram_ratio*prod_life  !replace x% each year
  Cashbook.spend name='rams', amount=ram_no
}
```

The Cashbook component contains the cost per head. From this the gross margin item is calculated. The price of the rams is defined as a constant on the Constants & Grids tab. By selecting the **Add Constant** option the ram price can be configured as in the next illustration.

The expense item then needs to be defined on the Income & Expenditure tab. The short name is the reference used by the **Cashbook.spend** event. The *amount* parameter is used as a ‘hidden’ factor in the price function. As shown below it is necessary only to enter the **ram_price** constant in the price function. The *full name* and *units* are displayed in the Gross margin report.

The report will show the ram expense item similar to below:

```
...
Ram purchases $      1000.00      ...

Ram purchases No.    2.0000      ...
...
```

2.3.2 Expense items with ranges of costs

Buying sheep could be configured like this:

1. Open the Cashbook component dialog. On the Constants & Grids tab, add a Price Grid.

Initialise Cashbook

Income & Expenditure Constants & Grids

Grid name: buy_prices

3 columns x 2 rows

	45.00	50.00	
12.00	320.00	330.00	310.00
	300.00	290.00	280.00

Buttons: Add Constant, Add Price Grid, Delete, Delete All, OK, Cancel, Help

2. Add columns and rows to make it three columns and two rows.
3. Name the grid **buy_prices**. Fill in the grid with values. The values shown are cents per kg. The values from the grid will be used as follows: For all animals of 12 months or less that are greater than 45kg and less than or equal to 50kg their value is 330 cents/kg.
4. Add an expense item on the Income & Expenditure tab.

Initialise Cashbook

Income & Expenditure Constants & Grids

Income: sales

Expenses: purchase_stock, pasture

Currency: \$ Start of accounting year: 1 Jul

Initial balance: 0.00 Accounting period: 12 months

Discount rate: 0.00 % p.a.

Line Item:

Short name: purchase_stock

Full name: Buy sheep

Units: No.

Parameters: months, weight

Price function: buy_prices[months, weight] / 100.0 * weight

Buttons: Add Income Item, Add Expense Item, Delete Item, Delete All Items, OK, Cancel, Help

5. Set the Short name to **purchase_stock**. This will be used to refer to this income item.
6. Complete the other details for purchase_stock as shown on the dialog as above. The Price function will be used to calculate the value per animal. It is:

$$\text{buy_prices}[\text{months}, \text{weight}] / 100.0 * \text{weight}$$
The **buy_prices** term refers to a prices grid that contains the range of prices based on weight and age.

7. Now the expense item can be used by the Management script by writing an event call like this where **no_to_buy** has been calculated beforehand:

```
Cashbook.spend name='purchase stock', amount=no to buy, param1=12.0, param2=50.0
```

8. The line item in the Gross margin report will be equal to: $\text{no_to_buy} * \text{Price function}$.

An income item can be configured in a similar way.



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