Farm Budgets: Farming Plan, Total Budget and Financing Budget

OBJECTIVES

• To outline the meaning, purpose and importance of a farming plan, a total budget and a financing budget.
• To identify and discuss factors that should be considered in the development of a farming plan.
• To discuss the steps and procedures to be followed in developing a farming plan.
• To illustrate the procedure for developing a farming plan with the aid of a numerical example.
• To suggest linear programming as an alternative technique for creating a farming plan.
• To indicate how the farming plan is used to compile a main (total) budget.
• To explain the purpose, importance and nature of a financing budget.

A farming plan refers to the branches of production (both type and extent) to be included in a farming enterprise and the ultimate decision on this is determined by the interaction between several factors of a physical, biological, economic and personal nature. The farming plan that is eventually implemented determines — to a very large extent — the future financial success or failure of the farming enterprise.

In a few exceptional cases the development of a farming plan is relatively simple and can be inferred from given circumstances. An example would be where the natural resources are only suitable for utilisation by a single branch. However, in South Africa this is only true to a limited extent and most farms lend themselves to the inclusion of a variety of branches of production. In such instances the farmer
must have the knowledge and insight to make the correct decisions when choosing the branches that will be the most profitable under his specific circumstances.

The farmer could use the branch and partial budgets discussed in the previous chapter as aids to develop the farming plan, but the procedures for creating and developing a farming plan, a total budget and a financing budget differ from those used in other budgets. The procedure is of a three-fold nature, namely:

- The development of a farming plan;
- The use of the farming plan for compiling a main budget; and
- Use of the main budget to compile the financing budget.

The first step involves the choice and combination of production branches, the second is estimating the income from and the cost involved in the implementation of the farming plan, synopsis thereof in a main budget, and the third is an analysis of the way in which the farming plan is to be financed.

If the premise is that an enterprise's main objective is to make a profit, the compilation of a farming plan and main budget is aimed at finding the most profitable combination of production branches and to estimate the potential farm profit. Since there may be different alternatives according to which resources can be used, the purpose of farming planning is to eliminate the less profitable alternatives systematically so as to eventually retain the most profitable plan. The profit of the final plan is reflected in the main budget.

Figure 4.1 Procedure for developing a farming plan and the compilation of a total and financing budget
It is essential to compile a farming plan at least when a new enterprise is being organised or the existing one is reorganised. The existing farming plan should also be revised from time to time since the relative profitability of a production branch and other circumstances may change. Planned small changes in a farming plan, such as extending a branch or the partial replacement of one branch by another, could be evaluated by means of partial budgets and therefore do not necessitate a completely new farming plan (see paragraph on partial budgets in chapter 3). Even if the relative profitability of production branches and other circumstances do not change, there are regular changes in product and input prices and this makes it necessary to compile a new main and financing budget on an annual basis to make responsible management possible.

THE FARMING PLAN

The development of a farming plan can be divided into two stages, namely:

- Analysis and consideration of the factors that influence the choice of branches of production.
- The choice of branches of production.

Factors that affect the choice of branches of production

The following factors are applicable and therefore demand careful analysis and consideration when developing a farming plan:

- The available resources
- Marketing aspects
- The relationship between production branches
- Specialisation as opposed to diversification.

The available resources

The following available resources must be analysed, namely the farm, the buildings and equipment, capital, labour and management.

THE FARM

Because of various factors, the situation of the farm has an important influence on the production branches that can be included in the enterprise. Physical and biological factors are of special importance in this regard.

- Physical factors include, among other things, the nature of the soil, the climate, the topography, availability of water (rivers, springs and under-
ground sources) and the distance from the market. These factors determine whether a farm lends itself to a specific production branch, or not.

One aspect cannot be over-emphasised, namely that a farmer must know his farm very well if he wants to plan his production branches properly. It is futile for a farmer to assume that because the district or region concerned is known for wheat production, his own farm as a whole will also be suitable for wheat production. The soil, topography, etc. not only differ between regions and farms within the same region, but also on the same farm. It is therefore essential that a farm, especially its physical traits, be analysed in detail before making a final decision on suitable production branches.

If a farmer therefore wants to develop an effective farming plan, he must know the potential of his soil. Determining soil potential is, however, a specialised task that should preferably be undertaken by specialists in the field, unless the farmer himself has the necessary expertise.

- **Biological factors** include animal diseases, insect pests, plant diseases and the incidence of weeds. Unless these factors are controlled, it may not be possible to include certain production branches in the enterprise. However, control implies cost and the question that must be answered is: can the expected yield compensate for the cost that will have to be incurred?

**BUILDINGS AND EQUIPMENT**

The nature and condition of the existing buildings and equipment could also, especially over the short term, have an important influence on the farming plan. It may sometimes be better to include a less profitable or less suitable branch in the farming plan because it fits better with the existing buildings and equipment on a farm than another branch would. If other buildings have to be erected or other equipment has to be bought, the cost involved may be so substantial that it neutralises the bigger initial profitability or suitability of a branch.

**CAPITAL**

Capital in the form of land, buildings and equipment has already been discussed in other paragraphs and what is involved here is the additional available capital for buying production supplies (seed and fertiliser) and equipment (implements and other farming equipment that may become necessary). This additional available capital includes the surplus own capital and the estimated amount in loan capital, and therefore represents the maximum amount of capital available for developing the farming plan. When estimating the amount available in loan capital, it is necessary for the farmer to always bear in mind the principles of sound financing explained in chapter 8, because too much loan capital and/or loan capital of the wrong kind and/or loan capital that is too expensive, could cause even the
best farming plan to fail.

LABOUR
The available labour must be analysed in terms of numbers, quality and cost. It is also important to take into account whether seasonal labourers are available on a temporary basis to supply in peak needs (harvest time). The quality of the available labour also deserves serious consideration. If a certain production branch demands trained labourers and these are not available, then inclusion of such a production branch, regardless of how profitable it might appear to be, will obviously cause production problems. This applies especially in the short term since training will have to be given during this period. On the other hand, the available labour may have special skills and this could make the farmer decide rather to include that branch in which they are trained than another, more profitable, production branch for which the labourers are not trained.

MANAGEMENT
The management ability and preferences or dislikes of the owner or hired manager are factors that must also be seriously considered when determining resources. If the owner or manager has no knowledge or experience of a specific branch, it is doubtful whether it will be possible to operate that branch efficiently and profitably. Management skill can, however, be developed through training and experience and it would be wrong to eliminate a potentially profitable branch because the necessary managerial experience is lacking at a specific moment.

Personal likes and dislikes could, however, be a completely different matter.

Marketing aspects
Marketing aspects embrace both long and short-term marketing considerations. Long-term considerations concern the future expectations and market movements that affect supply, demand and prices. The issue here is therefore the future market expectations of the production branches under consideration. Long-term marketing considerations are of special importance in perennial production branches such as fruit, sugar-cane and livestock. They are, however, not unimportant in annual production branches that demand expensive special equipment and/or specialised management and labour skills.

Short-term marketing aspects deal with the immediate market and marketing circumstances and include aspects such as present prices and transport facilities. A farmer should not concentrate only on the short-term marketing aspects within his own geographic area when choosing production branches. He should also give careful consideration to expected future market and marketing trends at
The relationship between different production branches

It was pointed out in chapter 2 that the relationship between different production branches could be competitive, supplementary or complementary.

- A competitive relationship exists between two production branches when the inclusion or extension of one results in a drop in production in the other. The reason why production branches are in a competitive relationship is because they compete for the same resources (land, labour, capital, management skill) at the same stage. This means that the resource(s) made available to one branch is automatically withdrawn from the other.

- A supplementary relationship exists between two production branches when the inclusion or expansion of the one production branch in the enterprise will have little or no influence on the yield from another branch of production.

- A complementary relationship prevails when the inclusion or expansion of one production branch in an enterprise leads to increased yield from another production branch.

It is, however, important to realise that if the production of supplementary and complementary production branches expands adequately, a stage will be reached where they become competitive. The reason is obvious — no enterprise has unlimited resources and at some stage or another products will start competing for resources.

Once a farmer has established the relationship between the potential production branches, and before he initiates the development of a farming plan, he should first consider the relative pros and cons of specialisation as opposed to diversification.

Specialisation versus diversification

A farming enterprise is diversified when a number of divergent production branches are included in the farming plan. A person farming with maize, wheat, cattle, sheep, pigs and poultry has a diversified enterprise.

A specialised enterprise is the opposite of a diversified enterprise and a farmer who is fully specialised will concentrate on a single branch (maize). However, where a farmer restricts his production to a few related products — for example a grain farmer who produces maize and wheat — this could also be referred to as
**Specialisation** holds several advantages for the farmer, the most important being:

- The farmer becomes a "specialist" in the production of one or a few products, which could lead to enhanced managerial skill. Diversification expects a farmer to be a "specialist" in many fields, and what average person can achieve this?
- Specialisation makes it possible to expand the production quantity of one product. It enables the farmer, because of diminishing costs, to increase his profit per unit and also his total profit (higher profit per unit and more units).
- Because of the specialised nature and high prices of agricultural equipment, specialisation enables the farmer with limited capital to buy enough equipment for efficient production.

**Diversification** also has advantages, the most important probably being that it is a counter-measure against risk and uncertainty. This advantage must not, however, be over-emphasised. It is, unfortunately, true that a factor such as rainfall affects all cash crops and fodder crops to a greater or lesser degree.

There is, however, a general rule that two or three production branches ensure the best stability of income over the long term. As more production branches are added, the percentual improvement in the stability of income does, however, decline every time a new one is added.

If a farmer wishes to diversify, it is not necessary to produce more than three or at most four products over the long term to keep his income fairly constant. There is no doubt that diversification in the enterprise does lead to greater stability of income than is the case with specialisation. If one assumes that the enterprise is soundly financed and well managed, one is justified in asking whether this greater stability in income can compensate for the advantages of specialisation.

Another advantage of diversification that is sometimes mentioned, is that the practice lends itself to the inclusion of complementary and supplementary production branches in the enterprise. Specialisation has, however, already been defined in such a way that it makes provision for the inclusion of a few related products. As long as the farmer has complementary and supplementary production branches, he must naturally include these in his enterprise because, by definition of the concepts, these will increase or leave unchanged the production of the existing basic branches. However, few farmers have enough land, capital, labour and management skill to operate one production branch on an efficient scale, and then still cope with more than three or at most four complementary and/or supplementary branches.
The planning procedure

After analysing and considering the factors discussed in the previous paragraph, the farmer should be able to identify a number of potential production branches that could be included in the farming plan. Once these potential production branches have been identified, the further steps in the farming planning process are:

Step 1: Make a list of the available resources, personal limitations and/or preferences (see step 1 of example 1 in the next paragraph).

Step 2: Estimate the resource requirements of each potential production branch per ha in the case of crop branches and per livestock unit (LSU or SSU) in the case of livestock branches. In this way the resource requirements to produce one ha of a specific crop could be one ha land, ten labour hours, 2.5 tractor hours and R125 working capital. On the other hand the resource requirements of one head of beef cattle (LSU) could be four ha grazing, two labour hours and R100 working capital. Estimating the resource requirements could present several problems and own records (where they already exist), branch budgets, external information (e.g. published statistics) and the farmer’s own experience could be used.

Step 3: Estimate the gross margin (margin above direct allocatable variable costs or margin above specified costs — see chapter 3) per unit (e.g. per ha) for each potential production branch. This can be done with the aid of branch budgets dealt with in chapter 3, or, as an alternative, published statistics can be used. Published or other general statistics do not, however, usually apply directly to a specific farmer’s circumstances and adjustments will have to be made to accommodate such individual circumstances.

The unit in which the gross margin should be expressed will depend on the most limiting resource (the resource that will be the first to restrict the expansion of production branches). The following formula should be applied:

\[
\text{Gross margin per limiting resource unit} = \frac{\text{Gross margin per ha}}{\text{Required limiting resource unit per ha}}
\]

If land is the most limiting resource unit and the gross margin for a specific production branch is R300 per ha, the gross margin per limiting resource unit (land) is R300 (\(\frac{300}{1}\)) per ha. If, however, labour is the most limiting resource and 20 labour hours are required per ha for a specific production branch, the gross margin
per limiting resource unit (labour hours) is R15 \((30\%\text{h})\) per labour hour.

Land is generally regarded as the most limiting factor and this serves as a good point of departure if the most limiting resource is not easy to identify.

Now arrange the potential production branches in order of diminishing gross margin per limiting resource unit (see step 3 of example 1).

**Step 4:** Tabulate the resource requirements, as determined in step 2, per potential production branch according to the priority order of production branches as determined in step 3 (see step 4 of example 1).

**Step 5:** Compile a branch-planning table (see step 5 of example 1), and start with the selection of the production branches to be included in the farming plan.
- Take the potential production branch with the highest gross margin per ha and expand the planned extent of this branch until a resource limitation restricts further expansion, that is until the branch demands more of a resource than is available.
- Take the potential production branch with the second highest gross margin and expand its planned extent until prevented by a further resource limitation.
- Repeat the process with the next potential production branches until resource availability prevents the inclusion of any further production branches.

**Step 6:** Make a summary of the production branches to be included in the farming plan and calculate the expected gross margin of the enterprise as a whole.

**Step 7:** Control the final plan by using a different resource to the one already used as the most limiting one (see step 3). By following steps 1 to 5, the farmer would have seen to it that the less profitable potential production branches were eliminated. However, this is still no guarantee that the most profitable farming plan has, in fact, been found, because a more profitable alternative may have been omitted. By taking a different resource as the most limiting one, it is possible to gain a different perspective. Seen from the point of view of total enterprise profitability, the results should, under normal circumstances, not differ too much, unless a more profitable alternative was initially overlooked. A change in approach (a different resource as the most limiting one) could, however, lead to the production branches that are included in the farming plan being different, in both composition and extent, from the original ones.

**Step 8:** Make a summary of the surplus resource capacity.

It was mentioned in the introduction to this chapter that the assumption in the development of a farming plan is that the enterprise pursues maximum profit. It
may therefore seem strange that the preceding planning procedure maximises gross margin. The idea behind this approach is that the enterprise’s fixed costs over the short term are constant, with the result that any positive gross margin contributes to the payment of fixed costs and any further surplus represents profit. Over the short term, where fixed costs are a given constant, maximising of the gross margin therefore also means maximising profit.

An example of the development of a farming plan

The preceding explanation of the development of a farming plan will now be illustrated by means of a simplified numerical example.

Example 1

The situation: N. Farmer has a 370-ha farm, 51 ha of which is grazing which is mainly utilised by livestock for domestic and labourers’ consumption. Buildings, farmyard and waste land account for ten ha, while the rest (309 ha) is lands. He decides to develop a farming plan to determine the optimum combination between row crops that will, under his specific conditions, produce the maximum profit. Grain sorghum, kidney beans, maize, groundnuts and teff (as cover crop) are identified as potential production branches.

Step 1: Make a list of the available resources, personal preferences and limitations

THE FARM

<table>
<thead>
<tr>
<th>Resource</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area</td>
<td>370 ha</td>
</tr>
<tr>
<td>Buildings, farmyard and waste land</td>
<td>10 ha</td>
</tr>
<tr>
<td>Grazing (non-commercial purposes)</td>
<td>51 ha</td>
</tr>
<tr>
<td>Lands: High potential</td>
<td>121 ha</td>
</tr>
<tr>
<td>Medium potential</td>
<td>148 ha</td>
</tr>
<tr>
<td>Low potential</td>
<td>40 ha</td>
</tr>
</tbody>
</table>

To control soil erosion, the 40 ha low-potential land must be planted with a cover crop.

LABOUR

Eighteen full-time labourers are available (no seasonal labour is available) and they work 300 days per year at an average of 10.5 hours per day, or ± 8.63 hours per calendar day (3 150/365 = ± 8.63 hours). The available labour hours per month
are as follows:
January = 4 815, February = 4 350, March = 4 815, April = 4 660,
May = 4 815, June = 4 660, July = 4 815, August = 4 815,
September = 4 660, October = 4 815, November = 4 660 and
December = 4 815.

MECHANICAL EQUIPMENT
The available tractor hours are as follows:
January = 1 296, February = 1 150, March = 1 296, April = 1 248,
May = 1 296, June = 1 248, July = 1 296, August = 1 296,
September = 1 248, October = 1 296, November = 1 248 and
December = 1 296.

WORKING CAPITAL
The available working capital is R20 000, R10 000 of which is own capital and
R10 000 a loan facility at the agricultural cooperative.

PERSONAL LIMITATIONS/PREFERENCES
• To spread risk, at least three production branches, apart from the cover crop,
  must be included in the farming plan.
• The minimum area per branch may not be less than 40 ha because smaller
  areas do not justify the mechanisation costs and management time.

Step 2: Estimate the resource requirements per potential production branch (see
  table 4.2 for the relevant particulars.)

Step 3: Estimate and tabulate the gross margins per hectare of the potential
  production branches

    Table 4.1 Gross margins per hectare of potential production branches

<table>
<thead>
<tr>
<th>Potential production branch</th>
<th>Gross margin per ha for different soil potentials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High potential</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>R 238</td>
</tr>
<tr>
<td>Kidney beans</td>
<td>R 214</td>
</tr>
<tr>
<td>Maize</td>
<td>R 212</td>
</tr>
<tr>
<td>Grain sorghum</td>
<td>R 153</td>
</tr>
<tr>
<td>Teff</td>
<td>R 110</td>
</tr>
</tbody>
</table>

Step 4: Tabulate the resource requirements per potential production branch
  according to the order of priority determined in step 3.
<table>
<thead>
<tr>
<th>Resource</th>
<th>Groundnuts</th>
<th>Kidney beans</th>
<th>Maize</th>
<th>Grain sorghum</th>
<th>Teff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H  M  L</td>
<td>H  M  L</td>
<td>H  M  L</td>
<td>H  M  L</td>
<td>H  M  L</td>
</tr>
<tr>
<td>Soil</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
</tr>
<tr>
<td>High potential</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
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<tr>
<td>Medium potential</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>1  1  1</td>
</tr>
<tr>
<td>Labour hours</td>
<td></td>
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</tr>
<tr>
<td>January</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
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<td>February</td>
<td></td>
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</tr>
<tr>
<td>March</td>
<td>50,00 40,00 35,00</td>
<td>1,00 1,00 1,00</td>
<td>2,00 1,50 1,00</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
</tr>
<tr>
<td>April</td>
<td>50,00 40,00 35,00</td>
<td>30,00 25,00 20,00</td>
<td>18,00 14,00 13,00</td>
<td>150,00 100,00 90,00</td>
<td>150,00 100,00 90,00</td>
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<tr>
<td>May</td>
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<td>June</td>
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<tr>
<td>July</td>
<td></td>
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<tr>
<td>August</td>
<td>2,15 2,15 2,15</td>
<td>2,15 2,15 2,15</td>
<td>1,55 1,55 1,55</td>
<td>3,10 3,10 3,10</td>
<td>0,25 0,25 0,25</td>
</tr>
<tr>
<td>September</td>
<td>2,15 2,15 2,15</td>
<td>2,15 2,15 2,15</td>
<td>1,55 1,55 1,55</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
</tr>
<tr>
<td>October</td>
<td>3,10 3,10 3,10</td>
<td>3,10 3,10 3,10</td>
<td>1,55 1,55 1,55</td>
<td>2,10 2,10 2,10</td>
<td>1,00 1,00 1,00</td>
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<tr>
<td>November</td>
<td>0,40 0,40 0,40</td>
<td>1,00 1,00 1,00</td>
<td>4,75 4,75 4,75</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
</tr>
<tr>
<td>December</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
<td>2,00 2,00 2,00</td>
<td>2,00 2,00 2,00</td>
<td>2,00 2,00 2,00</td>
</tr>
<tr>
<td>Tractor hours</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>0,50 0,50 0,50</td>
<td>0,50 0,50 0,50</td>
<td>1,55 1,55 1,55</td>
<td>3,10 3,10 3,10</td>
<td>0,85 0,85 0,85</td>
</tr>
<tr>
<td>February</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>5,00 4,00 3,50</td>
<td>1,00 1,00 1,00</td>
<td>1,55 1,55 1,55</td>
<td>0,70 0,70 0,70</td>
<td>0,85 0,85 0,85</td>
</tr>
<tr>
<td>April</td>
<td>5,00 4,00 3,50</td>
<td>1,00 1,00 1,00</td>
<td>1,55 1,55 1,55</td>
<td>0,70 0,70 0,70</td>
<td>0,85 0,85 0,85</td>
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<td>May</td>
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<tr>
<td>August</td>
<td>1,70 1,70 1,70</td>
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<td>3,10 3,10 3,10</td>
<td>0,85 0,85 0,85</td>
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<td>September</td>
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<td>1,70 1,70 1,70</td>
<td>1,55 1,55 1,55</td>
<td>0,70 0,70 0,70</td>
<td>0,85 0,85 0,85</td>
</tr>
<tr>
<td>October</td>
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<td>1,70 1,70 1,70</td>
<td>1,55 1,55 1,55</td>
<td>0,70 0,70 0,70</td>
<td>0,85 0,85 0,85</td>
</tr>
<tr>
<td>November</td>
<td>0,40 0,40 0,40</td>
<td>0,50 0,50 0,50</td>
<td>0,50 0,50 0,50</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
</tr>
<tr>
<td>December</td>
<td>0,50 0,50 0,50</td>
<td>0,50 0,50 0,50</td>
<td>0,50 0,50 0,50</td>
<td>1,00 1,00 1,00</td>
<td>1,00 1,00 1,00</td>
</tr>
<tr>
<td>Working capital (R)</td>
<td>61 51 44</td>
<td>47 43 39</td>
<td>80 69 54</td>
<td>61 47 45</td>
<td>42 39 35</td>
</tr>
</tbody>
</table>
plant to groundnuts is 93 ha high-potential soil because in April he only has 4 660 labour hours, while the production of 93 ha groundnuts demands 4 650 labour hours. A bigger planting is therefore restricted by the available labour.

The product with the second highest gross margin per ha is kidney beans. However, kidney beans are harvested during April and May, when groundnut production already claims all the available labour in April, thereby bringing these two crops in competition with one another for labour. With his available resources N. Farmer can therefore not plant kidney beans.

Maize is the next product on the profitability list and does not compete with groundnuts in respect of planting and harvesting time. N. Farmer also has enough labour hours and tractor hours to plant the rest of the soil available for row crops to maize. However, N. Farmer’s personal preference is to include at least three row crops in the farming plan so as to spread his risk, and the minimum area per production branch has been set at 40 ha. N. Farmer therefore has 136 hectare available (176 minus 40 ha) on which he can cultivate maize, and he decides to use the remaining 28 ha high-potential soil (the most profitable remaining alternative) and 108 ha medium-potential soil for this.

The third row crop that will be included in the farming plan is grain sorghum and it will be produced on the remaining (40 ha) medium-potential lands. Teff (the only potential production branch) will be produced on the 40 ha low-potential soil as a cover crop.

**Step 6: Summary of the production branches included in the farming plan and the calculation of the estimated total gross margin of the enterprise**

<table>
<thead>
<tr>
<th>Production branch</th>
<th>Soil potential</th>
<th>Area (ha)</th>
<th>Gross margin per hectare (R)</th>
<th>Total gross margin (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundnuts</td>
<td>High</td>
<td>93</td>
<td>238</td>
<td>22 134</td>
</tr>
<tr>
<td>Maize</td>
<td>High</td>
<td>28</td>
<td>212</td>
<td>5 936</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>108</td>
<td>161</td>
<td>17 388</td>
</tr>
<tr>
<td>Grain sorghum</td>
<td>Medium</td>
<td>40</td>
<td>108</td>
<td>4 320</td>
</tr>
<tr>
<td>Teff</td>
<td>Low</td>
<td>40</td>
<td>72</td>
<td>2 880</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>309</td>
<td></td>
<td>52 658</td>
</tr>
</tbody>
</table>

**Step 7: Control the final farming plan by taking a different resource as the most limiting one**

The efficiency (maximum gross margin) of the farming plan that was developed by taking land as the most limiting resource, should now be tested by taking a different resource as the most limiting one. The procedure will be the same as the preceding and will therefore not be repeated.
Step 8: Make a summary of the surplus resource capacity

- **Labour hours**: January = 4 586, February = 4 174, March = 165, April = 10, May = 4 219, June = 3 340, July = 3 495, August = 4 280, September = 4 209, October = 4 222, November = 3 937 and December = 4 370.

It is obvious that N. Farmer has, for the greater part of the year, too many labourers in his employ and that he could effect substantial savings if he could obtain seasonal labourers for his peak needs during March and April. Should he succeed in achieving this, he can implement the farming plan during the rest of the year with 12 fewer full-time labourers.

- **Tractor hours**: January = 1 181, February = 1 017, March = 831, April = 783, May = 1 180, June = 1 116, July = 1 164, August = 741, September = 777, October = 960, November = 933 and December = 1 141.

It therefore emerges that N. Farmer also has a surplus capacity of tractor hours and a replanning of his mechanisation could bring about substantial cost savings in terms of interest, depreciation and insurance premiums.

- **Working capital**: R1 355.

**Final remarks**

The technique suggested for developing a farming plan is fairly complex, and its implementation could be time-consuming. Moreover, it is based on several assumptions which, owing to the numerous uncertainties of farming conditions, will not always materialise exactly. The advantages of using this technique are, however, obvious — apart from promoting the maximising of profit, it prevents the inclusion in the production plan of production branches that will compete for the same limited resource(s) in times of crisis. Moreover, it offers the farmer an overview of the nature, extent and times of surplus resource capacities which could in turn lead to substantial cost savings and a resultant increased profitability. In the case of enterprises that have a large number of potential production branches and/or resource limitations, successful implementation of the technique explained above is very difficult if done by hand. In such cases it is advisable to develop the farming plan with the aid of a computer. The technique used then would be that of linear programming. Apart from saving time, it enhances accuracy and ensures that the best plan for the given circumstances will be found. In the RSA there are several institutions that can assist farmers in this regard.
THE MAIN (TOTAL) BUDGET

A main budget — which should be drawn up at least once a year — involves an estimate of the annual gross production value; the production, marketing and administrative costs; the net farm income; remuneration to providers of foreign capital; the farm profit; and the growth in net worth that the implementation of a specific farming plan will provide. An estimated final balance sheet should also form an integral part of the main budget, although this is optional. The main budget, as regards contents and form, is in essence therefore the same as an income and capital reconciliation statement and a final balance sheet — see chapter 6 for an explanation of the meaning of these statements and the forms in which they can be presented. The main budget only differs from the income and capital reconciliation statement and final balance sheet explained in chapter 6, in one important aspect. The main budget is based on future estimates, while the income and capital reconciliation statement and the final balance sheet are compiled from historic — and therefore actual — data.

One aspect needs to be emphasised at this stage, namely that there is a close interaction between the main budget and the financing budget — which will be dealt with in the next section. Although the main budget serves as basis for the financing budget, sections of the main budget (remuneration to the providers of foreign capital and the final balance sheet) cannot be completed before the financing budget has been drawn up.

Most of the information required for compiling the main budget has generally already been collected for the development of the farming plan. In general terms, preparation of the main budget calls for the following basic steps:

- An estimate of the gross production value. Where the main budget follows the development of a new farming plan, the estimated gross production value will equal the sum of the expected gross incomes from the relevant individual production branches that served as point of departure for calculating the gross margins of those production branches. In essence the gross production value of a branch is, however, always the physical yield from a branch multiplied by the expected net selling price per unit (100 ha maize x 3 ton/ha x R214/ton = R64 200). If, however, an existing farming plan is basically continued, stock adjustments in respect of half-finished products could arise — see the explanation on the calculation of gross production value in chapter 6 — and this could, especially in the case of livestock branches, complicate the estimate to some extent.

- Estimating the production, marketing and administrative costs. For purposes of the main budget a distinction can be made, in principle, between two types of costs, namely:
— Variable costs that can be allocated to a specific production branch and which, as such, were taken into account in estimating the gross margins of the individual production branches; and
— Variable and fixed costs that cannot be — at least not fairly accurately — allocated to individual production branches and which were therefore not taken into account in the calculation of the gross margins.

As already indicated in the discussion on branch budgets in chapter 3, the division of costs that can/cannot be allocated to branches will differ from one enterprise to the next. What is, however, important for the main budget, is to ensure that all relevant cost items are, in fact, included in the budget. In the discussion on the income and capital reconciliation statement in chapter 6, a comprehensive list is given of the relevant cost items that also belong in the main budget and this could serve as control list. However, where the implementation of a farming plan in a specific year requires the acquisition of additional farming equipment or other resources, the compiler must make quite sure that the cost of such resources (e.g. depreciation of equipment) is included in the main budget.

• Estimating the remuneration to providers of foreign capital. As will emerge from the discussion of the income and capital reconciliation statement in chapter 6, this remuneration consists of interest payments to the providers of loan capital and rental to the lessors of inherently non-depreciable assets (land). It is only possible to make a fairly accurate estimate of the extent of interest payments after the financing budget (see next section) has been completed.

• An estimate of the extent of non-farming activities such as non-farming income, private expenditure and income tax liability to be able, eventually, to determine the expected growth in the farmer’s net worth (see also the discussion on the determination of growth in net worth in chapter 6).

• An estimate of the enterprise’s asset value and the extent of its debt at the end of the budget period so as to be able to draw up the final balance sheet. The expected bank balance (asset or debt) and the expected extent of debts can only be estimated fairly accurately once the financing budget (see next paragraph) has been completed.

Apart from the fact that the main budget gives an estimate of the farm profit and the growth in net worth for a specific farming plan and as such offers a basis for comparison between different plans for expansion, it has several other uses from a management point of view:

• It serves as basis for compiling a financing budget.
• Together with the financing budget, it serves as an important basis for
negotiating with providers of loan capital.

- It enables the farmer to make a critical analysis of the expected financial structure resulting from a specific farming plan so that he can maintain sound financing principles (see the discussion on the enterprise’s financing policy in chapter 8). It could easily happen that the most profitable farming plan has to be abandoned because the main budget indicates that its implementation could result in an unsound financial structure and therefore excessive risk.

- The main budget enables a farmer to calculate his expected rate of return ratios (see the discussion in chapter 7) and on the grounds of this he can determine at what interest rates he can "afford" to attract loan capital and what the maximum extent of his loan capital should be (see the discussion on the enterprise’s financial policy in chapter 8.)

- Since the working documents that are used to compile the main budget contain information on input requirements, they can be used to place orders timeously, thereby exploiting possible discounts for early orders.

- The main budget can serve as control instrument because actual results can constantly be measured against it. This will enable the farmer to take preventative or alternate steps if so required, and to make the necessary adjustments to his planning in good time.

The compilation of a main budget is usually not an easy task, but, for the farmer who plans and, therefore, manages rationally, it is an essential one. Without such a budget there can be no mention of scientific management, but only random action — something which, in the present economic climate, is doomed — without any doubt — to failure over the long term.

**THE FINANCING BUDGET**

The last logical step in the planning or budgeting process involves the compilation of a financing budget. This should be done at least once a year. When compiling a financing budget, *which consists of a cash and a loan budget*, the farmer envisages —

- obtaining a continuous overview of the expected inflow of funds into and the outflow of funds from his farming enterprise during the budget period (usually a year);
- budgeting for the way in which his expenditure will be financed during the budget period; and
- obtaining a continuous overview of the expected extent of his loan commitments and/or cash surplusses during the budget period.
Although the main budget forms an important basis for compiling the financing budget, there are important differences between the two. The following are some of these differences:

- All the items that appear in the main budget, do not appear in the financing budget. The financing budget is primarily concerned with the flow of funds which is why "non-cash items" such as changes in stock values and depreciation do not appear therein.
- Because the financing budget is concerned with the flow of funds, it contains items that do not appear in the main budget. These include sales of capital assets such as old farm equipment (the main budget shows only the capital gain or loss on such sales), the purchase of capital assets, debt repayments, monies received from debtors and new loans acquired.
- The main budget deals with the origin and extent of income and expenditure during the budget period, and also the extent of the debt and/or the cash balance at the end of the budget period (if a final balance sheet does form part of it). The financing budget, on the other hand, is concerned with the origin, extent and time of receipts and expenditure, and also with the current extent of the debts and/or cash balance during the budget period.

In the discussion on the financing budget so far, constant reference was made to its ongoing nature. To serve its purpose meaningfully, it is necessary to draw up a financing budget on a monthly (or at most quarterly) basis for the budget period under review. This is necessary because a farming enterprise in general is largely season-bound and the flow of funds is therefore not even, but sporadic.

The financing budget has now become one of the most important planning and financial aids for the farmer, and it is inconceivable that the management-orientated farmer can do without it. On the other hand it must be realised that the financing budget cannot replace the other budgets that have been discussed - every type of budget has its specific place and purpose in the overall planning process.

Together with the main budget, the financing budget forms a very important basis for negotiations with the providers of loan capital. On the other hand the financing budget provides a criterion for assessing the feasibility of a specific farming plan. This is particularly true in cases where capital is a limiting factor.

The steps that should be followed when compiling a financing budget will now be explained as well as the form in which a financing budget can be presented. An example giving figures will be used. In this explanation the nature of the financing budget will also be elucidated.
Example 2

Step 1: Choose the intervals according to which the financing budget is to be compiled

As already indicated, the financing budget should be divided into monthly or at most quarterly intervals. In example 2 it was done on a quarterly basis. If it is done on a monthly basis, the principles and procedures remain the same.

Step 2: Record the estimated cash receipts

The estimated cash receipts are recorded according to the source of origin (e.g. Farming: livestock sales - line 1) in total, and in the quarter or quarters during which the farmer expects to receive it.

**Financing budget of N. Farmer**

1 September 1985 to 31 August 1986

A. CASH BUDGET

<table>
<thead>
<tr>
<th>Description</th>
<th>Total</th>
<th>Sept. to Nov</th>
<th>Dec. to Feb.</th>
<th>March to May</th>
<th>June to August</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPECTED CASH RECEIPTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FARMING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Livestock sales</td>
<td>120 000</td>
<td>30 000</td>
<td>30 000</td>
<td>60 000</td>
<td></td>
</tr>
<tr>
<td>2 Milk sales</td>
<td>16 200</td>
<td>3 900</td>
<td>4 200</td>
<td>4 300</td>
<td>3 800</td>
</tr>
<tr>
<td>3 Grain sales</td>
<td>195 000</td>
<td></td>
<td></td>
<td></td>
<td>195 000</td>
</tr>
<tr>
<td>4 Less: Payment of account</td>
<td>(81 213)</td>
<td>(81 213)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(see 54)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Grain cheque</td>
<td>113 787</td>
<td></td>
<td></td>
<td></td>
<td>113 787</td>
</tr>
<tr>
<td>6 Sundry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Subtotal (1+2+5+6)</td>
<td>249 987</td>
<td>33 900</td>
<td>34 200</td>
<td>64 300</td>
<td>117 587</td>
</tr>
<tr>
<td>CAPITAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Farm equipment sold</td>
<td>5 000</td>
<td>5 000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Debtors (from previous year)</td>
<td>1 800</td>
<td>1 800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Subtotal (8 to 10)</td>
<td>6 800</td>
<td>6 800</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Rent</td>
<td>6 000</td>
<td></td>
<td></td>
<td></td>
<td>6 000</td>
</tr>
<tr>
<td>13 Interest</td>
<td>5 000</td>
<td>2 500</td>
<td></td>
<td>2 500</td>
<td></td>
</tr>
<tr>
<td>14 Salary (wife outside farm)</td>
<td>10 400</td>
<td>2 400</td>
<td>2 400</td>
<td>3 200</td>
<td>2 400</td>
</tr>
<tr>
<td>15 Sundry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Subtotal (12 to 15)</td>
<td>21 400</td>
<td>4 900</td>
<td>2 400</td>
<td>5 700</td>
<td>8 400</td>
</tr>
<tr>
<td>17 Total cash inflow (7+11+16)</td>
<td>278 187</td>
<td>45 600</td>
<td>36 600</td>
<td>70 000</td>
<td>125 987</td>
</tr>
<tr>
<td>EXPECTED CASH EXPENDITURE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FARMING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Livestock purchases</td>
<td>57 000</td>
<td>57 000</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>19 Labour costs (wages, rations, etc.)</td>
<td>16 200</td>
<td>3 600</td>
<td>5 400</td>
<td>3 600</td>
<td>3 600</td>
</tr>
<tr>
<td>20 Repairs and maintenance</td>
<td>13 000</td>
<td>4 000</td>
<td>3 000</td>
<td>3 000</td>
<td>3 000</td>
</tr>
<tr>
<td>21 Fertiliser deposit (balance in 46)</td>
<td>20 000</td>
<td>20 000</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>22 Electricity and telephone</td>
<td>4 200</td>
<td>1 050</td>
<td>1 050</td>
<td>1 050</td>
<td>1 050</td>
</tr>
<tr>
<td>23 Fuel and oil</td>
<td>2 400</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>24 Insurance</td>
<td>10 000</td>
<td>7 000</td>
<td>—</td>
<td>—</td>
<td>3 000</td>
</tr>
<tr>
<td>25 Miscellaneous (eg. cooperative monthly account)</td>
<td>7 600</td>
<td>2 500</td>
<td>1 500</td>
<td>1 300</td>
<td>2 300</td>
</tr>
<tr>
<td>26 Subtotal (18 to 25)</td>
<td>130 400</td>
<td>95 750</td>
<td>11 550</td>
<td>9 550</td>
<td>13 550</td>
</tr>
<tr>
<td><strong>CAPITAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 Farm Implements - new harrow</td>
<td>1 500</td>
<td>—</td>
<td>—</td>
<td>1 500</td>
<td>—</td>
</tr>
<tr>
<td>28 Instalment-sales deposit (balance in 62)</td>
<td>5 000</td>
<td>—</td>
<td>—</td>
<td>5 000</td>
<td>—</td>
</tr>
<tr>
<td>29 Instalment-sales instalments (See 63)</td>
<td>10 000</td>
<td>10 000</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>30 Lease instalment - new (balance in 67)</td>
<td>5 700</td>
<td>5 700</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>31 Lease instalment - existing (see 68)</td>
<td>2 500</td>
<td>—</td>
<td>—</td>
<td>2 500</td>
<td>—</td>
</tr>
<tr>
<td>32 Fixed improvements - borehole and pump</td>
<td>3 000</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3 000</td>
</tr>
<tr>
<td>33 Land - bond repayment (see 72)</td>
<td>50 000</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>50 000</td>
</tr>
<tr>
<td>34 Creditors (see 59)</td>
<td>1 800</td>
<td>—</td>
<td>—</td>
<td>1 800</td>
<td>—</td>
</tr>
<tr>
<td>35 Sundry</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>36 Subtotal (27 to 35)</td>
<td>79 500</td>
<td>15 700</td>
<td>—</td>
<td>10 800</td>
<td>53 000</td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37 Private withdrawals</td>
<td>12 000</td>
<td>3 000</td>
<td>3 000</td>
<td>3 000</td>
<td>3 000</td>
</tr>
<tr>
<td>38 Income tax</td>
<td>4 000</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>4 000</td>
</tr>
<tr>
<td>39 Miscellaneous (land rent)</td>
<td>16 000</td>
<td>8 000</td>
<td>—</td>
<td>8 000</td>
<td>—</td>
</tr>
<tr>
<td>40 Subtotal (37 to 39)</td>
<td>38 000</td>
<td>11 000</td>
<td>3 000</td>
<td>11 000</td>
<td>7 000</td>
</tr>
<tr>
<td><strong>SUMMARISED CASH POSITION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 Total cash outflow (26 + 36 + 40)</td>
<td>241 900</td>
<td>122 450</td>
<td>14 550</td>
<td>31 350</td>
<td>73 550</td>
</tr>
</tbody>
</table>

| 42 Opening bank balance (overdraft) | (10 000) | (10 000) | (89 756) | (72 430) | (36 966) |
| 43 Quarterly surplus (deficit) (17 less 41) | 36 287 | (76 850) | 22 050 | 38 650 | 52 437 |
| 44 Estimated closing bank balance before interest on overdraft | — | (86 850) | (67 706) | (33 780) | 15 471 |

91
## B. LOAN BUDGET

<table>
<thead>
<tr>
<th>Description</th>
<th>Total</th>
<th>September to November</th>
<th>December to February</th>
<th>March to May</th>
<th>June to August</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SHORT-TERM LOANS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FARMING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47 Cooperative production loan (recoverable against crop)</td>
<td>40 000</td>
<td>40 000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 Fertiliser, seed, etc. (balance - see 21)</td>
<td>20 000</td>
<td>5 000</td>
<td>5 000</td>
<td></td>
<td>9 000</td>
</tr>
<tr>
<td>49 Fodder</td>
<td>15 000</td>
<td>5 000</td>
<td>5 000</td>
<td>5 000</td>
<td></td>
</tr>
<tr>
<td>50 Diesel</td>
<td>15 000</td>
<td>5 000</td>
<td>5 000</td>
<td>5 000</td>
<td></td>
</tr>
<tr>
<td>51 Quarterly total</td>
<td>75 000</td>
<td>50 000</td>
<td>11 000</td>
<td>14 000</td>
<td></td>
</tr>
<tr>
<td>52 Cumulative total</td>
<td>6 213</td>
<td></td>
<td></td>
<td></td>
<td>6 213</td>
</tr>
<tr>
<td>53 Plus: Accumulated interest</td>
<td>6 213</td>
<td></td>
<td></td>
<td></td>
<td>6 213</td>
</tr>
<tr>
<td>54 Less: Recovery against grain delivery (See 4)</td>
<td>81 213</td>
<td></td>
<td></td>
<td></td>
<td>81 213</td>
</tr>
<tr>
<td>55 Sundry creditors</td>
<td>1 700</td>
<td>700</td>
<td>700</td>
<td>1 200</td>
<td>1 700</td>
</tr>
<tr>
<td>56 Stock remedies (private supplier)</td>
<td>1 700</td>
<td>1 200</td>
<td>1 600</td>
<td></td>
<td>1 700</td>
</tr>
<tr>
<td>57 Cumulative total</td>
<td>1 200</td>
<td></td>
<td></td>
<td></td>
<td>1 200</td>
</tr>
<tr>
<td>58 Plus: Accumulated interest</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>59 Cash repayment (See 34)</td>
<td>1 800</td>
<td></td>
<td></td>
<td></td>
<td>1 800</td>
</tr>
<tr>
<td><strong>MEDIUM-TERM LOANS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 Bank - Instalment-sales agreement</td>
<td>30 000</td>
<td>30 000</td>
<td>20 000</td>
<td></td>
<td>40 000</td>
</tr>
<tr>
<td>61 Opening Balance</td>
<td>20 000</td>
<td></td>
<td></td>
<td>20 000</td>
<td></td>
</tr>
<tr>
<td>62 Plus: Purchases (Balance - see 28)</td>
<td>(10 000)</td>
<td></td>
<td></td>
<td></td>
<td>(10 000)</td>
</tr>
<tr>
<td>63 Less: Repayment (see 29)</td>
<td>22 800</td>
<td>22 800</td>
<td></td>
<td></td>
<td>(2 500)</td>
</tr>
<tr>
<td>64 Closing Balance</td>
<td>27 300</td>
<td>29 800</td>
<td>29 800</td>
<td>27 300</td>
<td>27 300</td>
</tr>
<tr>
<td><strong>LONG-TERM-LOANS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 Bank - First bond</td>
<td>150 000</td>
<td>150 000</td>
<td>150 000</td>
<td>150 000</td>
<td>150 000</td>
</tr>
<tr>
<td>71 Opening balance</td>
<td>50 000</td>
<td></td>
<td></td>
<td></td>
<td>(50 000)</td>
</tr>
<tr>
<td>72 Less: Repayment (see 33)</td>
<td>100 000</td>
<td>150 000</td>
<td>150 000</td>
<td>150 000</td>
<td>100 000</td>
</tr>
</tbody>
</table>
In example 2 three main sources are distinguished from which cash can normally be expected in the farming situation (farming, capital and other). These main sources are further subdivided into subsources such as grain sales (farming), farm implements (capital) and interest (other). These subsources could, depending on circumstances and preferences, be further subdivided, for example Farming: grain sales — maize, wheat, etc.

As point of departure a farmer should endeavour to include all expected cash receipts in the financing budget, and the more elaborate the subdivision of sources, the less possibility that certain potential cash receipts will be omitted.

Estimating the period during which the cash inflow from a specific source can be expected could present problems and the historic cash flow (cash book) is a useful aid in many respects.

Where a farmer markets products via an institution (e.g. his cooperative) which retains part of his yield from the products to pay his account (e.g. production loan) with that institution, the procedure is as follows:

The estimated income (before repayment) from the product is recorded in the period during which the farmer expects to receive it (line 3) and the amount that he expects to be retained for repaying the loan (also see the later discussion on production loans secured from cooperatives) is subtracted to estimate the cash receipts (lines 3 to 5).

Once all expected cash receipts have been recorded, the subtotals for each main source (lines 7, 11 and 16) and subsequently the total estimated cash inflow (line 17) is obtained in total and per quarter.

Step 3: Record the estimated cash and credit expenditure

What was written in the discussion of step 2 on the division and subdivision of cash receipts in main and subsources of origin, essentially also applies to the recording of all anticipated expenditure — the finer the subdivision of potential centres of expenditure, the less likelihood of omissions.

The estimated expenditure is recorded in total according to centre of spending and in the period in which a farmer expects to spend it. Expenditure expected to be totally in cash, is only included in the cash component of the financing budget (e.g. line 18). In estimated credit expenditure which also requires a cash deposit (e.g. acquisitions by means of instalment-sales agreement) the deposit is recorded in the cash budget (e.g. line 28) and the balance in the loan budget (e.g. line 62). Anticipated expenditure which is expected to be totally on credit, is only recorded in the loan budget (e.g. line 49).

When loans are repaid, the amount in the loan budget is subtracted from the initial balance of the loan concerned to calculate the final balance (e.g. lines 63, 68 and 72). However, repayment of a loan also has cash spending implications.
and therefore the corresponding amount is also included in the cash budget (e.g. lines 29, 31 and 33).

Estimated farm expenditure that is normally financed by means of a cooperative production loan, is included under cooperative production loan per cost centre in the loan budget (lines 48 to 50). But interest is also charged on this production loan and, taking into account the method and rate at which a specific cooperative calculates the interest, provision must also be made for this (line 53). Cooperatives generally retain part of crop proceeds to recover farmer’s production loans, and this recovery is reflected in the loan budget under the period in which it occurs (line 54).

Anticipated credit expenditure that is normally paid monthly (e.g. cooperative monthly account), is recorded directly in the cash budget in the period in which payment is expected to be made (see line 25).

Credit expenditure which will be settled only once or twice during the budget period is recorded first in the loan budget under the period in which the expenditure is expected to be incurred (line 56) and thereafter in the cash budget under the period in which settlement is expected to occur (line 34).

Once all expected expenditure has been recorded in the financing budget, the relevant subtotals and totals are calculated as in the example given (e.g. lines 41 and 64).

**Step 4: Summary of cash position**

The farmer is now in a position to calculate his expected closing bank balance for each period (quarter). The procedure is clear from lines 42 to 46 of example 2, so only the method of calculating interest will be further elucidated.

Commercial banks calculate interest on overdrawn accounts on the daily balance. For farm budgeting purposes this is an impractical if not impossible method. The point of departure is therefore that all cash receipts and all cash expenditure occur in the middle of a period (quarter). Where a period is therefore expected to begin and end with a bank overdraft, the bank interest for that period is calculated on the average overdraft for that period. If it is assumed that N. Farmer pays 24% p.a. interest on his overdraft, the interest that he has to pay for the quarter September-November will be

\[
R\left(\frac{10\,000 + 86\,850}{2}\right) \times \frac{24}{100} \times \frac{1}{4} = R\,2\,906
\]

and his closing bank balance on 30 November will be R89 756 (overdraft).

Should, however, a specific period start with an overdraft and end with a credit balance (or vice versa), the interest calculation for, say, June-August will be
\[ R \left( \frac{36966 + 0}{2} \right) \times \frac{24}{100} \times \frac{1}{4} = R1\,109 \]

and the closing bank balance will be R14,362 on 31 August.

**Step 5: Consider adjustments**

The farmer now has an overview of his expected flow of funds, bank balance and outstanding loans for the budget period and he may wish to make some adjustments to the financing budget because a bank or cooperative limit could be exceeded. The following adjustments could be considered:

- A change in the farming plan to fit in better with the flow of funds. Such a step should not, however, adversely affect the profitability of the enterprise simply to adapt to the flow of funds. It should only be done after all other alternatives have been investigated.
- Certain expenditure on new capital equipment could be postponed or possibly financed in a different way.
- Existing commitments to repay debts could possibly be moved to other periods to suit the flow of funds better.

Once the necessary adjustments have been made, the farmer is in a position to also finalise his main budget — see the discussion of the main budget earlier in this chapter.

**Step 6: Exercise control**

Since most enterprises are exposed to numerous uncertainties and unforeseen circumstances, it is essential to constantly compare the financing budget with the actual results obtained.

If important deviations do occur, adjustments and alternative arrangements can be made timeously.

**SUMMARY**

This chapter dealt with the development of a farming plan and the compilation of a main and financing budget. From the discussion it is clear that the three types of budgets cannot be regarded as separate entities, but that they are, in fact, interdependent units of the total farm budgeting process. It also became obvious that scientific farm management is not possible without these budgets.
Farm Management Information: General Review and Records

OBJECTIVES

- To identify the information required for farm management purposes and the main sources from which it can be obtained.
- To outline the importance of a farm management information system.
- To give a broad outline of the requirements and scope of a farm management information system.
- To identify the steps that should be followed in the development of a farm management information system.
- To provide a schematic representation of a farm management information system.
- To indicate the purpose of calculating depreciation and depreciating assets.
- To analyse the four most commonly used methods for calculating depreciation.
- To express a few thoughts on the calculation of depreciation and the depreciating of assets under inflationary conditions and to explain the creation of a replacement reserve under such circumstances.
- To emphasise a few aspects of the form in which an inventory can be presented.
- To briefly mention the other records that a farmer should keep.

Good management is of cardinal importance in the farming enterprise. Management of the enterprise, as of any other business enterprise, briefly involves the following:

- Decision-making;
- The implementation of those decisions; and
- Accepting responsibility for the decisions (see also chapter 1 in which the concept of management is discussed in detail).

The decisions that should be taken in farming cover a wide field and include aspects such as branches of production, the extent of mechanisation, the purchasing as opposed to the leasing of land and the organisation of the enterprise. To be able to make the best decisions on these and other relevant matters, a farmer should have the following:
- Integrity and a sense of responsibility.
- Practical experience.
- Business acumen.
- Technical knowledge.
- Information about the enterprise which he is managing.

The information required about his farming enterprise includes the following:
- The historic costs, yields (both physical and monetary) and inputs.
- The current financial position and physical condition of the factors of production; and
- The expected costs, yields and inputs.

To manage a farming enterprise efficiently, is to manage its future, and this means the management of information.

The information needed by the farmer can basically be obtained from two main sources, namely from external and internal sources. The external sources are mainly represented by agricultural journals and by government and private institutions. Regarding external sources, suffice to say, that it is in the farmer's interest to know which information can be obtained from which source, and how it can be obtained.

However, the most important source of information in an enterprise remains the internal one, which is known colloquially as the own record system, but more correctly as the management information system. This, and the following two chapters deal with various aspects of this management information system.

THE IMPORTANCE OF A MANAGEMENT INFORMATION SYSTEM

A proper management information system has the following functions:
- It serves as basis for scientific decision-making concerning the farming enterprise.
- It facilitates the presentation of accurate returns, for example for tax and credit purposes.
A management information system consists of the systematic handling of figures, and working with figures leads a person to more systematic thinking and actions.

It regularly brings the financial results of the enterprise to the attention of the farmer, which gives him a better idea of how much money he and his family have for spending.

It compels a farmer to think in terms of figures or measurable quantities, which usually improves his judgment of physical and financial concepts. It enables him to approach matters more objectively.

THE REQUIREMENTS AND SCOPE OF A MANAGEMENT INFORMATION SYSTEM

The computer is often referred to as an aid for providing and processing farm management information. This aid can undoubtedly be used very satisfactorily for this purpose (see chapter 13), but one must not lose sight of the fact that the same prerequisites apply to both a manual and a computer management information system. The same basic data required for a manual system are required by a computerised system. Similarly, the knowledge which the farmer must have to analyse and interpret his financial information is the same in both systems. The computer simply facilitates and accelerates more complicated calculations.

A first prerequisite for a management information system is that it must be simple and easy to operate. Even if the information is not available to the last detail, it is more valuable to have a simple system that works in practice, than a complete, comprehensive one that does not, because of its complexity and the work involved. The system must therefore be easy to use, simple to understand, but still complete enough to provide essential information. A second prerequisite for a farm management information system is that it must be used. It is pointless to gather information if that information is not processed and used in the management of the enterprise. From the above it follows that a farm management information system demands that its user (the farmer) must have the knowledge to process the information correctly, interpret it logically and be able to make rational decisions based on the information.

It is pointless to keep detailed records and compile comprehensive reports if the farmer does not know -

• how the information has been processed;
• what the information means; and
• how to use it to good advantage.
As regards the scope of the management information system the farmer must be guided by its effectiveness and the cost involved. It is self-evident that the nature and extent of the system will depend on the nature and size of each individual enterprise. There are, however, certain general guidelines. To decide on which facets to gather information, a farmer should ask himself: *What do I want to know about my enterprise?*

*Firstly,* he should know the size of his enterprise. Size is measured by, among other things, area and capital investment. The net worth of the enterprise (owner's interest) can be deduced from the capital investment. The determination of capital investment in an enterprise at a given moment demands that decisions must be made on two complex aspects, namely the valuation and depreciation of assets. *Secondly,* the farmer should know the income yielded by and the cost of his farming enterprise so as to be able to determine the profitability and ultimately the growth in net worth. *Thirdly* the farmer should know how efficiently each product is produced and what the reasons for a high or low level of efficiency are.

A proper management information system should therefore make provision for the following:

- A physical and a monetary inventory of the enterprise;
- Physical production data;
- Financial data aimed at the calculation of the ultimate financial results and financial position of the enterprise; and
- Labour records, including a record of activities.

**STEPS IN DEVELOPING A MANAGEMENT INFORMATION SYSTEM**

If an enterprise has not previously had a systematic information system and it should be decided to introduce one, a start should be made by compiling an inventory (asset register). The steps to be taken are the following:

- The compilation of a physical inventory and, by the valuation of the assets, also a monetary inventory.
- The compilation of an initial balance sheet based on the data contained in the inventory.
- Recording of all income/receipts and expenditure/payments.
- Recording of all physical production data.
- Concluding and recording contracts with all permanent employees.
- Compilation of periodic financial statements, usually only at the end of the financial year, but sometimes also at the end of the production year.
Analysis and interpretation of the enterprise's results and planning or replanning on the basis of this.

SCHEMATIC REPRESENTATION OF A COMPREHENSIVE MANAGEMENT INFORMATION SYSTEM

Following the preceding explanation, a comprehensive farm management information system can be schematically represented as in figure 5.1:

**Figure 5.1 Schematic representation of a comprehensive farm management information system**

<table>
<thead>
<tr>
<th>Collection and arrangement of information</th>
<th>Analysis and interpretation of information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Records</strong></td>
<td><strong>Financial statements</strong></td>
</tr>
<tr>
<td>• Inventory</td>
<td>• Initial balance sheet</td>
</tr>
<tr>
<td>• Income/receipts &amp; expenditure/payments</td>
<td>• Income and capital reconciliation statement</td>
</tr>
<tr>
<td>• Physical production data</td>
<td>• Final balance sheet</td>
</tr>
<tr>
<td>• Labour records</td>
<td>• Flow of funds statement</td>
</tr>
<tr>
<td><strong>Analysis and interpretation of information</strong></td>
<td></td>
</tr>
<tr>
<td>• Ratios</td>
<td></td>
</tr>
<tr>
<td>• Efficiency analyses</td>
<td></td>
</tr>
<tr>
<td>• Enterprise analyses</td>
<td></td>
</tr>
</tbody>
</table>

The rest of this chapter will be devoted to an explanation and discussion of the records, while the financial statements and the analysis and interpretation of information will be dealt with in the next two chapters. It must, however, be borne in mind that in practice it is not always possible to have an exact demarcation between the collection and arrangement of information and the analysis and interpretation thereof. The reason for this is that analysis and interpretation often already crops up while the data are collected and arranged.

FARM RECORDS

The different records that a farmer should have at his disposal and their compilation will now be dealt with.

The inventory (asset register)

An inventory is a list of the physical assets (assets such as cash and investments therefore excluded) of an enterprise and their corresponding monetary values. The enterprise's inventory should be compiled at least once a year at the end of the
enterprise's financial year. As will become apparent during the following discussion, the inventory is basically an ongoing record of the assets and it would therefore be possible for a farmer to keep the greater part of the inventory up to date from one end of the year to the next without physical control of the assets concerned. Such a practice is, however, undesirable because some assets may have been lost during the year or because of excessive deterioration in their condition. It is therefore essential to make an annual physical inspection of all the assets concerned at the end of the financial year.

The monetary value of the assets included in the inventory is a figure which the farmer must have since it forms the basis for compiling the asset side of the balance sheet (see the discussion on the balance sheet in chapter 6) and therefore for the meaningful analysis of his farming results.

For inventory purposes, farming assets are normally classified into the following main groups:
- Land
- Fixed improvements
- Orchards, vineyards and sugar-cane plantations
- Vehicles, machinery and implements
- Stocks
  - Livestock
  - Finished products such as harvested but unmarketed grain and fruit
  - Semi-finished products such as crops on lands, fruit in orchards and wool on woolled sheep
  - Production supplies such as fertiliser, fuel and seed.

When compiling the inventory, two important aspects come to the fore, namely:
- The basis on which the assets to be included in the inventory must be valued; and
- The method for calculating depreciation and depreciating assets to calculate the assets’ continuous value from year to year.

The valuation of assets

The basis on which an asset will be valued will depend on the nature of the asset, the purpose for which it is used and the purpose of the valuation. Since we are here mainly concerned with the supply of management information for decision-making purposes, this will also be regarded as the purpose of asset valuation (see also the section on asset valuation for balance sheet purposes in chapter 6). With this as the point of departure, the following general guide-lines apply:
LAND

For inventory purposes, land should be valued at cost price plus accumulated appreciation — that is at market value.

A problem in this regard, however, is that it is difficult to determine market value if the land is not actually sold. Should the land be sold, the market value at the time of sale is the price at which it was sold. But since land is not sold in a going farming concern — which is under discussion here — market value must be determined on the basis of comparable selling prices. Great discretion must be used here. Selling prices (market values) are subject to considerable fluctuations and are sometimes influenced by irrational factors such as rumours, special predilections and other personal factors. It can therefore not be accepted unconditionally that the price paid at a specific time by a specific person represents the general market value of similar land. An average of land prices over a period can be regarded as an indication of general land value. Up or downward adjustments in this general market value can then be made on the basis of a comparison between the land being valued and that being sold. It is, however, important that the market value entered in the inventory represents a conservative market value — the value of the land should be under-estimated rather than over-estimated.

The market value of the land must also not be confused with the market value of the farm. For inventory purposes the market value of the bare land must be determined, that is the market value of the farm less the value of the fixed improvements such as buildings, kraals, dams and fences.

The market values of land in the RSA generally tend to rise continually. For practical reasons and for making meaningful comparisons of farming results over a period of time, it is recommended that adjustments to land values not be made annually, but rather every three to five years.

**Land should be valued at a conservative market value.**

FIXED IMPROVEMENTS, VEHICLES, MACHINERY AND IMPLEMENTS

Regarding the valuation of assets in this group, it is necessary to distinguish between a farmer —

- who has initiated a comprehensive management information system for the first time and is therefore valuing the asset concerned with a view to create a continuous inventory; and
- one who already has a comprehensive management information system and therefore has a continuous inventory.

When creating a first inventory, existing fixed improvements, vehicles, machinery and implements are valued at their initial value and subsequently in the continuous
inventory at initial value less accumulated depreciation since the date of first entry into the inventory. Depending on circumstances, the initial value can be determined in one of two ways:

- If the original cost price of the asset concerned is known, the initial value is obtained by subtracting the accumulated depreciation (depreciation from the date of construction or purchase to the date of first entry in the inventory) from the original cost price.

- If the original cost price of the asset concerned is not known (and this applies in many instances), the initial value is obtained by subtracting the accumulated depreciation (depreciation from the date of construction or purchase to the date of first entry in the inventory) from the estimated replacement value on the date of first entry in the inventory.

### Example of determining the initial value of an asset when creating an inventory

<table>
<thead>
<tr>
<th>Method of calculating depreciation</th>
<th>= R35 000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost price (or estimated present replacement value)</td>
<td>= R35 000</td>
</tr>
<tr>
<td>Expected total period of use</td>
<td>= 20 years</td>
</tr>
<tr>
<td>Expected salvage at the end of useful life</td>
<td>= R3 000</td>
</tr>
<tr>
<td>Period already in use</td>
<td>= 10 years</td>
</tr>
<tr>
<td>Total amount to be depreciated</td>
<td>= R(32 000 - 3 000) = R32 000</td>
</tr>
</tbody>
</table>

**Annual depreciation**

\[ \text{Annual depreciation} = \frac{R32 000}{20} = R1 600 \]

**Accumulated depreciation**

\[ \text{Accumulated depreciation} = R(1 600 \times 10) = R16 000 \]

**Initial value in first inventory**

\[ \text{Initial value in first inventory} = R(35 000 - 16 000) = R19 000 \]

In the continuous inventory the asset is now annually depreciated by R1 600 for the next 10 years until the expected salvage value of R3 000 is reached.

* The other methods used to determine the initial value will be dealt with in the discussion on depreciation methods.

When a farmer already has a continuous inventory, fixed improvements, vehicles, machinery and implements that were acquired after the inventory was created, are valued at cost price less accumulated depreciation from the date of acquisition of the assets concerned.

Fixed improvements, vehicles, machinery and implements acquired before a continuous inventory was created, are valued at initial value less accumulated depreciation from the date of first entry in the inventory. Similar assets acquired after the introduction of a continuous inventory are valued at cost price less accumulated depreciation from the date of acquisition.
Orchards, vineyards and sugar-cane plantations are basically valued in the same way as fixed improvements, vehicles, machinery and implements. Where cost price or estimated replacement value on the date of the first survey is the point of departure in the case of the latter category of assets, establishment cost or estimated present establishment cost on the date of the first survey are used in the former category.

The calculation of establishment cost can be approached in different ways. One is to capitalise each year’s total costs (plant material, labour, fertilisation, irrigation, etc.) minus incidental income up to before the year in which the annual income from the asset concerned (e.g. orchard) are equivalent to, or exceed the annual costs. This total capitalised amount (establishment cost) is then depreciated over the expected useful life of the asset.

This approach to calculating establishment cost can be illustrated by means of a numerical example.

Suppose the distribution of costs and income over the first five years of a new orchard are as given in table 5.1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Costs (a)</th>
<th>Income (b)</th>
<th>Establishment cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>R</td>
<td>Annual (a)-(b)</td>
</tr>
<tr>
<td>1</td>
<td>8 000</td>
<td>0</td>
<td>8 000</td>
</tr>
<tr>
<td>2</td>
<td>2 500</td>
<td>1 500</td>
<td>1 000</td>
</tr>
<tr>
<td>3</td>
<td>3 000</td>
<td>1 750</td>
<td>1 250</td>
</tr>
<tr>
<td>4</td>
<td>3 000</td>
<td>2 000</td>
<td>1 000</td>
</tr>
<tr>
<td>5</td>
<td>3 500</td>
<td>4 000</td>
<td>(R500)</td>
</tr>
</tbody>
</table>

In this instance the total costs minus the total incidental income of the first four years (R11 250) will be regarded as the establishment cost and the income and costs from the fifth year onwards will be regarded in the normal way as current income and current costs.

STOCKS

- Livestock: Strictly speaking, a distinction should be made between the valuation of commercial livestock (current assets) on the one hand, and breeding, dairy and wool flocks or herds (movable assets) on the other. According to this approach commercial livestock must be valued at net sales value (market value less marketing costs), while breeding, dairy and wool flocks or herds are then valued on the same basis as other movable assets (vehicles, machinery and implements). Although these approaches can be
recommended, it is, for various practical reasons, not always possible and all livestock are valued at net sales value. From a practical point of view there are no serious objections to this, provided that the decline in sales value is always borne in mind — especially of expensive breeding animals as they become older and functionally less efficient.

- **Finished products**: Like livestock, finished products are valued at net sales value.
- **Semi-finished products**: The valuation of stocks of semi-finished products such as crops on the lands, present special problems. The most conservative and recommended method of valuation is to enter these assets in the inventory at the estimated production costs up to the date of the inventory, or the expected net selling price, whichever is lowest. Where the crop is insured against all risks, the insurance value may also be used.
- **Production supplies**: Production supplies such as unused seed, fertiliser and fuel are valued on the date of inventory either at purchase price (cost price) or market price whichever is the lower.

As mentioned in the introduction to this paragraph, the valuation standards discussed are valid only as general guidelines in the valuation of farming assets and their merit may be arguable, as is true of any valuation basis. It must, however, be borne in mind that this valuation is made for decision-making purposes. What is therefore of cardinal importance is to maintain the basis of valuation for at least a number of years. This will make it possible for the farmer to make meaningful comparisons of his farming results over a period of time. What is also important is to be aware of the fact that there are other bases of valuation, and that all farmers do not necessarily use the same methods. The results of one farming enterprise cannot therefore be compared — without qualification — with that of another.

### Calculating depreciation and depreciating assets

In the previous paragraph constant reference was made to depreciation. The calculation of depreciation and depreciating assets has two basic objectives:

- The recovery of the capital invested in an asset over its useful life so that every year’s farming production makes its rightful contribution towards the recovery of capital. In this way the entrepreneur ensures that enough capital has been recovered by the end of the asset’s useful life to replace it.
- Determining the annual book value of an asset for balance sheet purposes. The inventory value — and therefore the balance sheet value — of an asset should always be related to its realisation value at any given moment.

The calculation of depreciation and depreciating assets therefore deals with two questions:
• What is the extent of the capital that has to be recovered from farm production in a specific year?
• How much has the realisation value of the asset declined during a specific year?

Under more or less static economic conditions the answers to these two questions will be the same amount.

It is obvious that it is a practical impossibility to give exact answers to these questions. Nevertheless, alternative methods for calculating depreciation and for depreciating assets have been developed that can, for practical purposes, give satisfactory answers. The implementation of all these methods, however, call for advance establishment of —

• the expected useful life of the asset concerned; and
• the expected salvage or scrap value of the asset if it is sold at the end of its useful life.

It is clear that these are two highly individual aspects that will differ from one farmer to the next, depending on the type and intensity of the work performed by the asset, the maintenance care which it receives and the owner’s replacement policy.

**METHODS TO CALCULATE DEPRECIATION AND DEPRECIATE ASSETS**

The following are the most commonly-used methods:

- The straight-line method
- The declining balance method
- The sum-of-the-year’s-digits method
- The use method.

**The straight-line method**

The straight-line method is the one most commonly used and it is also the easiest to apply. The formula for calculating the annual amount of depreciation according to this method is as follows:

\[
D = \frac{CP - S}{L}
\]

Where

- \(D\) = Annual depreciation amount
- \(CP\) = Cost price or replacement value of asset
- \(S\) = Expected salvage value at the end of the asset’s useful life
- \(L\) = Expected useful life in years.
The application of the straight-line method can be explained as follows:

Cost price or replacement value of asset = R30 000
Estimated salvage value = R3 000
Estimated useful life = 5 years

Annual depreciation amount = \( \frac{30 000 - 3 000}{5} \) = R5 400

The annual capital that will be recovered from production for the next five years comes to R5 400, while the book value of the asset for inventory and therefore balance sheet purposes, declines by the same amount every year until the estimated salvage value of R3 000 is reached at the end of the fifth year.

The greatest advantage of the method is its simplicity. Its greatest disadvantage seen in terms of depreciation calculation and asset depreciation, is that the realisation value of most assets do not diminish by the same amount every year, and also that the asset is not used to the same extent every year.

According to the straight-line method, a fixed amount of depreciation is calculated annually.

The declining balance method
The formula for calculating the annual amount of depreciation according to the declining balance method, is as follows:

\[ D = BV \times R \]

Where

- \( D \) = Annual depreciation
- \( BV \) = Book value at beginning of year
- \( R \) = Depreciation rate = \( \frac{100}{\text{expected useful life} (L)} \)

Calculation of depreciation according to the declining balance method can be explained as follows:

Cost price or replacement value of asset = R30 000
Expected salvage value = R3 000
Expected useful life = 5 years
Depreciation rate = \( \frac{100}{5} \times \frac{2}{1} \) = 40% or 0.40 per year.
The annual capital recovery and depreciation will then always be 40% of the opening book value for the year concerned (year 1 = 40% x R30 000 = R12 000; year 2 = 40% x R18 000 = R7 200, etc.).

Note, however, that the total depreciation that can be written off during the useful life of the asset, can never, according to the declining balance method, exceed the cost price or replacement value of the asset minus the expected salvage value. The asset is therefore only depreciated by the calculated rate until salvage value is reached. It may therefore happen that the calculated rate cannot be applied to the last year or even years.

Since most assets — under normal economic conditions — decrease in value more rapidly at the beginning of their lives than in later years, the fact that the depreciation is initially high when using this method and then diminishes, is regarded as a great advantage of the method. It is, however, unlikely that it also applies to the annual use (capital recovery) of the asset in the production process and it would therefore appear to be wrong to tax the production more heavily in the earlier than in later years.

According to the declining balance method the annual amount of depreciation is a fixed percentage of the remaining book value of the asset.

The declining balance method is more complex than the straight line method and it could indeed lead to cumbersome calculations should a farmer wish to determine the initial value or the book value of an asset at any given moment during its life. The following formula can be used for this purpose:

\[
BV = CP \times (1 - r)^Y
\]

*Where*

- \(BV\) = Book value
- \(CP\) = Cost price or replacement value of asset.
- \(r\) = Depreciation rate = \(\frac{2}{L}\)
- \(Y\) = End of the year of use on which book value is to be determined
- \(L\) = Expected useful life in years.

Taking the previous example and assuming that the initial value of the asset at the end of the third year of use is to be determined, the calculation will be as follows:
In the continuous inventory for the first year (fourth year of use) the amount of the depreciation will then be 40% of R6 480 (R2 592) and the end book value will be R3 888, etc.

The sum-of-the-year’s-digits method
The formula for calculating the annual depreciation according to the sum-of-the-year’s-digits method is as follows:

\[
D = \frac{(CP - S) \times N}{SD}
\]

Where
- \(D\) = Annual depreciation
- \(CP\) = Cost price or replacement value
- \(S\) = Expected salvage value at the end of useful life
- \(SD\) = Sum of the numbers for the expected years of useful life
  (e.g. for an expected useful life of 5 years, \(SD = 5 + 4 + 3 + 2 + 1 = 15\))
- \(N\) = The remaining number of years of useful life.

The calculation of depreciation according to this method can be explained as follows:

Cost price or replacement value of asset = R30 000
Expected salvage value = R3 000
Expected useful life = 5 years
SD \((5 + 4 + 3 + 2 + 1)\) = 15

The depreciation and capital recovery for year 1 will then be

\[R9 000 \times \left(\frac{5}{15}\right) \times R27 000\]

and the book value at the end of year 1 R21 000 (R30 000 - R9 000).

For year 2 the depreciation is

\[R7 200 \times \left(\frac{4}{15}\right) \times R27 000\]

and for year 5
while the corresponding end book values for the two years are respectively R13 800 and R3 000.

As was the case with the declining balance method, the initial depreciation here is also high and gradually decreases with each passing year. The same remarks made about the connection between the annual capital recovery and the use made of the asset in the production process, are also valid here.

If this method of calculating depreciation and asset depreciation is preferred, the initial value of the asset in the preceding examples can be determined as follows after the third year:

Cost price = R30 000
Expected salvage value after 5 years = R3 000
Accumulated depreciation for first three years

\[ \text{Initial value} = \text{Cost price} - \text{Accumulated depreciation} \]

\[ = R30000 - R1800 \]

\[ = R28200 \]

In the continuous inventory for the first year (fourth year of use) the depreciation will then be

\[ D = \frac{(CP - S) \times H}{HU} \]

Where

\[ D = \text{Annual depreciation} \]

\[ CP = \text{Cost price or replacement value of asset} \]

\[ S = \text{Expected salvage value at the end of the useful life} \]

\[ HU = \text{Expected useful life in hours} \]

\[ H = \text{Hours used during year concerned.} \]
The calculation of depreciation according to the use method can be explained as follows:

Cost price or replacement value of asset = R30 000
Expected salvage value = R3 000
Expected life = 10 000 hours
Hours used in year concerned = 1 000 hours
Depreciation for year concerned = \( \frac{(30 000 - 3 000)}{10 000} \times \frac{1}{1} \)

To calculate the initial value of an asset for inclusion in a first inventory if the asset is depreciated according to this method, is fairly simple: Say the cost price of the asset was R25 000, the expected useful life 20 000 hours and the estimated salvage value at the end of its useful life is R3 000. When compiling the first inventory the asset has already worked 8 000 hours. The initial value for inclusion in the first inventory will then be as follows:

Rate of depreciation per hour = \( \frac{25 000 - 3 000}{20 000} \)
Accumulated depreciation = R(8 000 x 1,10)
Initial value = Cost price minus accumulated depreciation

The annual book value of this asset in the continuous inventory will depend on the number of hours it is used annually. From the date on which it was included in the first inventory, it still has an expected useful life of 12 000 hours (20 000 - 8 000) which, at the hourly rate of R1,10, leaves an amount of R13 200 that has to be written off as depreciation before the expected salvage value of R3 000 is reached. The depreciation for each specific year (and therefore the book value at the end of the year concerned) will depend on the number of hours that the asset is used in that year. Note that the useful life in this case is not linked to a number of years, but to a specific number of hours of use.

According to this method the allocation of capital recovery of the asset to the production of a specific year is therefore strictly according to its use. This appears to be correct. The reduction in the realised value of the asset is however, also
calculated strictly according to use, and this is not correct, since an asset also diminishes in value for other reasons (age and technological obsolescence).

Summary
Judged by the dual purpose of calculating depreciation and asset depreciation, the four methods for calculating depreciation and asset depreciation that have been discussed all have pros and cons. If it is further borne in mind that most farming enterprises have, at any given moment, a variety of inherently depreciable assets of different ages, expected useful life and values, it is clear that the pros and cons of the different methods that apply in the case of a single asset are probably equalised in the overall whole. In the final analysis, the choice of method(s) to calculate depreciation appears to be a matter of individual preference.

CALCULATING DEPRECIATION AND ASSET DEPRECIATION UNDER INFLATIONARY CONDITIONS
The RSA has for some years been experiencing a strong inflationary economy and there seem to be few signs of any noteworthy change in this state of affairs in the foreseeable future. Inflationary periods are characterised by continual price increases and this also applies to agricultural equipment, as is confirmed by the data in table 5.2.

<table>
<thead>
<tr>
<th>Type of equipment</th>
<th>Average annual percentage price increase over the period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractors</td>
<td>14</td>
</tr>
<tr>
<td>Lorries</td>
<td>13</td>
</tr>
<tr>
<td>Implements</td>
<td>12</td>
</tr>
<tr>
<td>Irrigation equipment</td>
<td>12</td>
</tr>
<tr>
<td>Combined</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 5.2 The average annual approximate percentage increase in the prices of agricultural equipment in the RSA for different periods*

* Processed from data contained in the Department of Agricultural Economics and Marketing's Abstract of Agricultural Statistics, Pretoria: the Department, 1985, p.106.

From the data in table 5.2 it appears that tractor prices in the RSA for the five-year period between 1979 and 1984 increased annually at an average rate of 16%. If a farmer therefore bought a tractor for R15 000 in 1979 and had to replace it with a similar tractor five years later in 1984, he would probably have paid ± R31 500 (see table 1.4 in the annexure - n =5; i = 16%; multiplying factor = 2.1) for it.
Should the same trend continue and he should wish to replace this latter tractor in 1989, he would have to pay R66 000 for it.

Although it cannot be proved statistically, it also emerged from contact with farmers over the past few years that there has been little, if any, drop in the value (price) of most purchased agricultural equipment during their useful life. The expected salvage value of the equipment at the end of its useful life is the same as or very close to the original purchase price of the equipment.

Earlier in this chapter it was indicated that the calculation of depreciation and asset depreciation are aimed at recovering the capital investment in an asset over its useful life and determining its annual book value by writing off depreciation for balance sheet purposes.

When prices are more or less stable, the capital sum that has to be recovered and the depreciation over the useful life of the asset are much the same and the annual calculation of depreciation and asset depreciation are done in the traditional way as shown in the examples used to illustrate methods of depreciation. The price trends outlined above make it necessary, however, to distinguish between the amount needed for capital recovery from farming production during the useful life of the asset, and the depreciation that must be written off from the asset's cost price during the same period to obtain its realisation value. Capital recovery equals the expected replacement cost minus the expected salvage value of the asset at the end of its useful life, while the depreciation or reduction in value of the asset equals its cost price minus the expected salvage value. The difference between capital recovery and depreciation of the asset is then regarded as a "replacement reserve".

Capital recovery and depreciation of an asset differ in times of inflation.

Capital recovery = Replacement cost minus salvage value.
Degression = Cost price minus salvage value.

Suppose N. Farmer buys a tractor for R20 000 cash on 2 January 1986. He expects to use the tractor for five years, after which the estimated salvage value will be R15 000. From the latest price trends in tractors, it appears that tractor prices increased by an average 16% over the past five years and the expected replacement cost of the tractor at the end of its useful life at the end of 1990 is therefore R42 000 (table 1.4 in the annexure; \( n = 5; i = 16\%; \) multiplying factor 2.1).

\[
\begin{align*}
\text{Depreciation} & = \text{Cost price less salvage value} \\
& = R(20 000 - 15 000) = R5 000 \\
\text{Capital recovery} & = \text{Replacement cost less salvage value} \\
& = R(42 000 - 15 000) = R27 000
\end{align*}
\]
Replacement reserve = Replacement cost less cost price
= R(42 000 - 20 000) = R22 000
or
= Capital recovery less depreciation
= R(27 000 - 5 000) = R22 000

Determination of
• the amount (capital recovery) that will be deducted annually in the form of depreciation and addition to the replacement reserve from gross production value to calculate net farm income;
• the depreciation that will be deducted annually from the opening book value of the tractor to calculate the end book value; and
• the annual addition to the replacement reserve that will be added to the farm profit to calculate growth in net worth (see chapter 6 for an explanation of the concepts and the accounting procedure) will depend on the method used for calculating depreciation.

If the farmer decides to use the straight-line method, the annual amounts will be calculated as follows:

Annual depreciation
= (cost price - salvage value) / Life
= R(20 000 - 15 000) / 5
= R1 000

Annual capital recovery
= (Replacement cost - salvage value) / Life
= R(42 000 - 15 000) / 5
= R5 400

Annual addition to replacement reserve
= (Replacement cost - cost price) / Life
= R(42 000 - 20 000) / 5
= R4 400
or
= Annual (capital recovery less depreciation)
= R(5 400 - 1 000)
= R4 400
(N.B. It is desirable to show the annual depreciation and the annual addition to the replacement reserve as separate cost entries — see the example of the income and capital reconciliation statement in chapter 6.)

A farmer is expected to base his financial planning on, among other things, his (expected) farm profit. A specific farm profit gives a farmer an indication of how much he can spend on his family and himself and what additional interest load he can afford if, for example, he should want to borrow money to expand his enterprise (see also the discussion on the analysis and interpretation of farming results in chapter 7 and the financing policy in chapter 8). Implementation of the traditional approach has in the recent past often landed farmers in a financial dilemma. A specific farm profit was realised and on the basis of this a certain standard of living was established and other interest-bearing commitments were entered into. However, when assets have to be replaced at inflationary prices, the necessary means are not available and replacement is postponed which results in reduced efficiency owing, for example, to old tractors. If they are replaced, the farmer saves on inputs such as fertiliser, with resultant lower yields. This reduces the profitability of the enterprise and triggers off a vicious circle. For this reason the approach sketched above is preferred.

Even though the procedure is somewhat more complicated than the traditional approach, the result is worth the extra trouble. The more complex arithmetical approach can also be counteracted to some degree by calculating depreciation and depreciating assets according to the straight-line method. With the very slight decrease in the cost price value of assets under inflationary conditions, there is in any case very little reason for using a different method for calculating depreciation and depreciating assets.

The form of the inventory

The form in which the inventory is presented will mainly be determined by individual circumstances and preferences and should, taking into account what has already been said about the valuation of assets, present no real problems. The only possible exception is in the case of assets where, as explained in the preceding paragraph, a replacement reserve is created.

When designing inventory statements, a few aspects must always be borne in mind:

- The inventory is a continuous annual physical record of the individual assets in the enterprise and their corresponding monetary values.
- For reasons that will become apparent from the chapters on the financial statements and the analysis and interpretation of results, assets should be grouped together in meaningful groups and subgroups in separate inventory sheets.
The inventory should contain a full description of each asset. In the case of vehicles, for example, the type of vehicle, the model and registration number.

In the case of depreciable assets the following should also be included in the inventory in respect of each asset:

- The date of purchase or construction
- The cost price or initial value
- The expected replacement cost (where applicable)
- The expected salvage value
- The method and rate of depreciation
- The annual capital recovery
- The annual decrease in inventory value (depreciation) of the asset and the annual addition to the asset's replacement reserve (where applicable)
- The book value of each asset at the end of each financial year over its total life.

Other records

The farmer should also keep the following other records:

A RECORD OF INCOME/RECEIPTS AND EXPENDITURE/PAYMENTS

Careful recording of all income/receipts and expenditure/payments necessitates the maintenance of a proper accounting (bookkeeping) system that consists of at least a cash-book, purchases journal (for credit purchases), sales journal (for credit sales), journal and a ledger. Depending on the extent of credit transactions (both purchases and sales) it may also be necessary to maintain creditor and/or debtor ledgers in addition to a general ledger. As far as it is feasible, a separate record should be kept of the various expenditure and income entries per branch, since this facilitates analysis and interpretation of the results.

It is also essential to keep a careful record of the use of self-produced products on the farm, such as farm products supplied to labourers as rations, what is consumed by the household and products from one branch used in another (silage for the dairy branch or maize for poultry). The products referred to here are normally only those that would have been sold had they not been used internally, and should be credited to the production branches which produced them at the net selling price and debited against the production branch or household that consumed them.
A RECORD OF PHYSICAL PRODUCTION DATA

To obtain a complete picture of his entire farming enterprise, the farmer must also record physical information concerning his various branches of production. For this purpose he may develop any records he prefers and use them as he finds necessary in his farming system. The following are some of the most common records used:

- **Land records**: In these records the land or orchard size, soil potential and soil fertility are recorded. Fertiliser applications, the crop grown on the land, the seed or type of tree planted as well as the physical yields are recorded annually and summarised at the end of the specific year.

- **Livestocks records**: These records are used to reflect all essential information concerning the livestock branches. The initial and end values of livestock are recorded and also the feed and remedies used per group during the year. For this purpose the livestock must be grouped in meaningful groups such as breeding bulls, heifers under two years of age and steers between 1 and 2 years. Where there is a dairy enterprise, the yields of individual cows are also recorded in these statements.

- **Miscellaneous records**: In addition to the above statements, the farmer could also develop and use the following:
  - A farm map
  - Mechanisation records
  - Records of fixed improvements and equipment.

LABOUR RECORDS

Labour records are used to keep track of all matters concerning the labour force. Information usually recorded here includes the number of labourers, service contracts, salary and leave, advances and debts. Where an enterprise is very labour-intensive or where labour could present a problem, it is recommended that an accurate record be kept of the duties performed by individual labourers. This facilitates planning and control (see chapter 10).

SUMMARY

In this chapter a general review of a farm management information system was firstly supplied. Special attention was then given to the inventory (asset register). Concerning this latter aspect, the emphasis was on the valuation of assets, the calculation of depreciation and asset depreciation. Finally, the other records that a farmer should keep were highlighted. In the next chapter attention will focus on the financial statements of the enterprise.