Training material for extension advisors in irrigation water management

Volume 2: Technical Learner Guide
Part 7: Irrigation Economics

S van Zyl, PG Strauss & JB Stevens

TT 540/7/12

WATER RESEARCH COMMISSION

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Report to the

Water Research Commission

University of Pretoria

NQF Level 5

WATER RESEARCH COMMISSION

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Department: Agriculture, Forestry and Fisheries
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Volume 2: Technical learner guide
Volume 3: Extension learner guide

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Before we start.....

Dear Learner .....this learner Guide contains information to acquire the basic knowledge and skills leading to the unit standard:

Title: Develop a production and strategic plan for the agricultural business

US No: 116426 NQF Level: 5

Title: Analyse and interpret the financial statements and physical records in an agribusiness to generate managerial information

US No: 116428 NQF Level: 5

Title: Manage an input chain

US No: 116382 NQF Level: 5

Title: prepare a whole farm budget and establish a proper integrated information system for an agribusiness

US No: 116319 NQF Level: 4

The full unit standards are available and can be cited on the SAQA website. Read the unit standards at your own time and if there are any questions or aspects that you do not understand, discuss it with your facilitator.

The unit standards are some of the building blocks in the qualification listed below:

Title	ID no	NQF Level	Credits
National Diploma: Plant Production	49010	5	120
National Diploma: Animal Production	49011	5	120
National Certificate: Plant Production	49009	3	120

Assessment.....

You will be assessed during the course of the study (formative assessment) through the expected activities that you are expected to do during the course of the study. At the completion of the unit standard, you will be assessed again (summative assessment).

Assessment therefore takes place at different intervals of the learning process and includes various activities - some will be done before commencement of the program, others during the delivery of the program and others after completion of the program.

How to attend to the activities.....

The activities included in the module should be handed in from time to time on request of the facilitator for the following purposes:

- The activities that are included are designed to help gain the necessary skills, knowledge and attitudes that you as the learner needs in order to become competent in this learning module.
- It is important that you complete all the activities and worksheets, as directed in the learner guide and at the time indicated by the facilitator.
- It is important that you ask questions and participate as much as possible in order to be actively involved in the learning experience.
- When you have completed the activities and worksheets, hand it in so that the assessor can mark it and guide you in areas where additional learning might be required.
- Please do not move to the next activity or step in the assessment process until you have received feedback from the assessor.
- The facilitator will identify from time to time additional information to complete. Please complete these activities.
- Important is that all activities, tasks, worksheets which were assessed must be kept as it becomes part of your Portfolio of Evidence for final assessment.

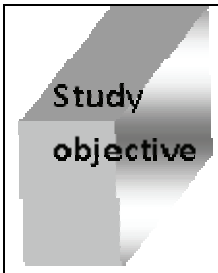
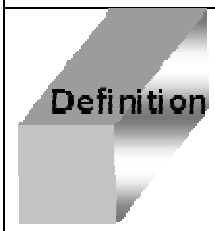
Check your progress.....

Use the following checklist to determine your competency regarding this specific learning module.

Confidence level	**I am sure**	**Still unsure**	**Do not understand and need help**	**Motivate your answer**
Can you identify problems and troubleshoot correctly?				
Are you able to work well in a team?				
Are you able to collect the correct and appropriate information required for decision making?				
Will you be able to perform the observation expected in an organised and systematic way while performing your task as an extensionist?				
Are you able to communicate the information and newly gained knowledge well to experts?				
Can you base your tasks and answers on scientific knowledge that you have learned?				
Are you able to show and perform the activities required in this learning module correctly				
Are you able to link the knowledge, skills and competencies you have learned in this module of learning to specific duties in your job?				

How to use this guide .....

Throughout the learner Guide you will come across certain re-occurring notifications. These notifications each presents a certain aspect of the learning process, containing information, which would help you with the identification and understanding of these aspects. The following will be found in the learning material:

	What are the study objectives for a specific module? This provides an idea of the knowledge, skills and competencies that are envisaged to be
	You will be requested to complete activities, which could either be group or individual activities. Please remember that the completion of these activities is important for the facilitator to assess, as it will become part of your ***Portfolio of Evidence.***
	What does it mean? Each learning field is characterised by unique terminology and concepts. Definitions help to understand these terminology and concepts and to use it correctly. These terminology and concepts are highlighted throughout the learner guide in this manner.

My notes.....

You can use this box to jot down some questions or notes you might have, concepts or words you do not understand, explanations by facilitators or any other remark that will help you to understand the work better.

What are we going to learn?

For each of the learning modules included in this learning area specific learning outcomes were set, which you need to be able to demonstrate a basic knowledge and understanding of.

Contents

Module 1

Farm management

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- Farm management and its importance in farming
- To identify and discuss some of the more important functions of farm management
- Various steps in decision making
- Farmer goals and objectives
- How to achieve the goals through farm business management

Table of contents

Agriculture is an ever-changing industry which constantly requires role-players to adapt to changing conditions. Examples of such changes is market conditions that change every year, the weather that never stays the same, decisions made and implemented by government (called policies) that concern farming and new products and production methods that are developed constantly. These changes have an impact on the type of enterprises held, the quantity of inputs and materials required and the method and destinations of products that are produced by the farmer. Farm management enable the farmer to respond better to these changes. It should be kept in mind that emphasis is placed on the financial part of irrigation farm management.

1. What is farm managagement?[1)]

The farmer has two main roles, namely to be the cultivator and the manager of the farm. The cultivation skills of the farmer are more physical, whereas management is about planning, decision-making and the implementation thereof. With farm management, the farmer must set objectives, plan to achieve these objectives, implement the plans, and exercise control over the whole process. The most important aspect of farm management is decision-making. The farmer must choose between different crops that must be planted in each field, how to best use the resources available for production and post harvesting operations, which technology is the best to use, how to distribute available labour between farming operations, when and where to sell his products and at the best price, just to name a few.

Farm management can be defined as an activity that combines:

- Planning: identify potential problems and opportunities
- Organisational and implementation: choose and implement a plan
- Control and evaluate the plan's progress over a period of time
- Coordination of activities to meet the planning objectives

The farmer is therefore a manager of operation who applies management principles:

- Apprehend the farming system
- Set objectives
- A plan to achieve these objectives
- Implement the plans through organising and coordination of production factors (labour, land, capital)
- Exercise control over the whole process.

2. The decision-making process[3,4)]

The fact that resources such as capital have to be allocated to several enterprises forces the farm manager to take decisions. The decision-making process can be divided into five steps as illustrated by Figure 1.

- *STEP 1: Identify the problem or opportunity and collect information:* For example, data can be collected about the performance of neighbouring farms and compared with the farm under consideration. Problems can be identified this way, for example it can be seen that yields are below the average in comparison with the other farms.
- *STEP 2: Identify and investigate alternative solutions or actions:* After identifying the problems, alternatives solutions should be investigated. For example, the farmer can improve its fertilizer application or use better seed cultivars. This should be tested to see what the likely impact will be on farm performance, for instance better yields that would increase profits can be a likely effect of more efficient input application.
- *STEP 3: Make a decision by choosing the best alternative:* Which of the alternatives are more likely to improve farm performance? To choose the best solution is not easy, therefore the comparison of advantages and disadvantages of every alternative is necessary (like rain fed versus irrigation).

- *STEP 4: Implement the decision and accept responsibility:* The alternative selected in step three should be put into action. The required resources should be mobilised and organised, which implies action. The decision maker should accept responsibility.
- *STEP 5: Evaluate the result of the decision:* Monitor the impact or progress of the decision made to see whether the objectives are achieved.

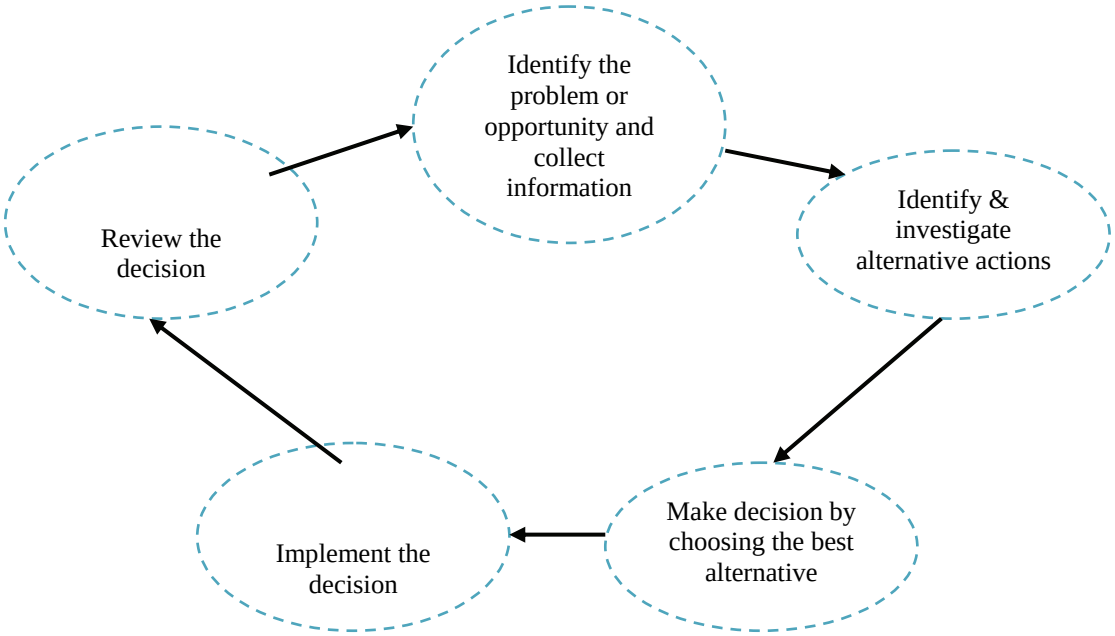


Figure 1. The decision-making process[3,4)]

3. Farmer goals and objectives[2)]

Since farming is a business-decisions cannot be taken in an *ad hoc* way but must be integrated with the natural resource potential of the farm, the market environment and the farmer's objectives. A farmer's objectives can be identified through discussion and the following should be identified:

- short term, medium and long term goals
- preferred faming style opted by the farmer
- personal preferences

A farmer's objectives can include any of the following:

- Maximising profits
- Increase production
- Increase sales
- Minimising costs

- Avoiding too much debt
- To achieve a satisfactory living standard and ensure that he can care for his family
- To reduce the risks involved with farming
- Ensuring that his farm survives in the long term
- Creating wealth over time.

The farmer's most important objective however is to be able to make a profit over the long term so that it can cover family expenses and production costs of his farm.

Definition

Profit is the difference between what it cost the farmer to produce and what he received after selling it. It therefore represents the farmer's gain. Profit will be discussed in more detail at a later stage.

4. How to achieve farming objectives?[3,4)]

Various "tools" and methods exist that can be used to achieve the objectives of the farmer. In a business perspective, these tools and methods form the base of irrigation farm management, and are divided into six sections which are illustrated in Figure 2. From Figure 2 it can be seen that the components for farm business management consists of production and resource planning (Modules 1 to 4), financial management (Modules 5 to7), marketing (Modules 8 to 9), human resource management (Module 10) and risk management (Module 11). All these sections are then incorporated in the business plan in Module 12. The business plan forms the road map for a farm, enabling the farmer to achieve his goals and objectives, or to obtain finance. These components are pursued in the modules to follow.

Modules 1-4 **Production and resource planning**	• **Introduction to farm management** • **The farm and its enterprises** • **Production economic principles and concepts** • **Farm management information system and record keeping**
Modules 5-7 **Financial management**	• **Financial statements** • **Financial analysis and planning** • **Financing the business** • **Capital investment analysis** • **Taxes** • **Farm budgets**

Modules 8-9 **Marketing**	• **Value chain** • **Marketing mix and plan** • **Commodity marketing**
Module 10 **Human resource management**	• **Identifying and appointing correct people** • **Managing staff**
Module 11 **Risk management**	• **Sources of risk** • **Risk mitigation strategies**
Module 12 **Putting it together**	• **The business plan**

Figure 2. Conceptual framework for irrigation farming management

ACTIVITY 1

Individual activity

1. Describe what you understand about farm management

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2. Describe the decision-making process in farm management.

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3. Name examples of a farmer's objectives. How can these objectives be determined?

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4. List the components/tools of farm management that are used by farmers to achieve their objectives.

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References

1. Boehlje, M.D., & Eidman, V.R., 1984. *Farm management*. New York: John Wiley & Sons.
2. Coetzee, K., 2008. *Die ABC van boerderybestuur (The ABC of farm management)*. 1st ed., Pretoria: Agri Connect.
3. Food and Agricultural Organisation (FAO), 2007. *Training manual for extension workers in Africa*.
4. Food and Agricultural Organisation (FAO), 2007. *Training manual for extension workers in the Caribbean*.

My notes.....

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Authenticators:

- Dr PG Strauss

Module 2

Farm business and its enterprises

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- Organisational structures
- What is a farm enterprise
- Gross and net farm income
- Production and variable costs
- Enterprise profitability
- Gross margin

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The farmer has to decide on the business form or organisational structure of his farm, which is discussed in the section to follow.

1. Organisational structures[8)]

The organisational structure (business form) of a farm is an important aspect, since it will have an effect on financial management and the flexibility of decision-making. It can also affect the taxes that a farmer has to pay. In order to choose the best organisational structure for a farm, it is best to seek professional advice from lawyers, financial advisors, bankers and tax experts. When deciding on the organisational structure, the following aspects must be kept in mind: availability of funds for membership, type of farm, capital needs, responsibility (liability), profit-sharing amongst owners, decision-making powers, and cost and tax implications. The different organisational structures are briefly described as follow:

- ***Sole proprietorship***

A sole proprietorship is owned by one person (usually the farmer) who runs the farm with the goal to maximise his profit. A sole proprietorship is responsible for all the decisions made, and is also responsible for all losses or claims against the farm – the farmer can thus lose everything when the farm fails. On the other hand, the farmer gets all the benefits when the farm makes a profit.

- ***Partnership***

A partnership consists of two to twenty persons who make a business agreement with the goal of maximising profits. This business is usually larger than a sole proprietorship, but less flexible regarding decision-making and management. However, a partnership has access to more capital than a sole proprietorship. All losses, claims and profits are shared between the partners, based on the terms of the partnership agreement. The partners are responsible for the management of a partnership. It is important to know that a partnership stop to exist when a partner steps out or dies.

- ***Company***

A company is not always the initial organisational structure of a farm, but as the farm grows, a company can be beneficial in terms of management and taxation. The members of a company is called the shareholders, and profits are divided according to the share of each shareholder holds in the form of dividends. A company is a more formalised organisational structure which is beneficial for a large farm business in terms of management capacity. A company usually has access to more capital than a partnership or close corporation. A board of directors is usually responsible for decision-making in the management of a company. A company does not stop to exist in case of a death of one of the shareholders.

- ***Cooperative***

A cooperative is usually started by a group of individuals (at least seven persons) that has the same need or purpose for forming the cooperative. These needs can be for example to get inputs cheaper or to have more bargaining power, which are better achieved by a group rather than an individual. The main purpose of a cooperative as an economic unit is to promote their members by rendering services, rather than to maximise profits. The decisions regarding management issues are made by the directors.

- ***Trust***

A trust is usually started for taxation and inheritance (especially in the case of minors) purposes and can consists of one to twenty members (trustees) who are also responsible for the management of the trust. When a trustee dies, the continuity of the trust depends on the trust deed.

- ***Close corporation***

A close corporation is an inexpensive business structure with the advantages of a company, but without all its formalisations. The members, who consist of one to ten persons, are not responsible for claims or losses (except in the case of an agreement where they signed as sponsors). Profits are divided according to a written agreement, and all members participate in the management activities of a close corporation. A close corporation does not cease to exist in the case of death of a member.

2. What is a farm enterprise?

An irrigation farm usually include structures such as buildings, irrigation channels and pipes, pivots and other irrigation means, machines and equipment, and the crops that are produced[4,5]. The most important features of a farm are the farmer (the decision-maker and manager) and productive resources such as land, labour and capital. Within a farm and its structures several productive activities exist. These activities are called farm enterprises. Examples of farm enterprises are maize, wheat, potatoes, barley, sheep, cattle, etc. Inputs are factors that are used in the production process, namely land, labour, seeds, fertilisers, pesticides, irrigation electricity and water etc. In turn, the outputs are the crop products that are produced by the farm in the production process. Each farm enterprise has specific inputs and outputs and sometimes the output of one farm enterprise is the input of another. For example, the inputs for a maize enterprise can be maize seed, fertilizer, irrigation electricity and water, herbicide, labour and land that are used to produce maize (the output). This maize can in turn be used as feed (input) for the livestock enterprise. Thus, the whole production process for a farm business can be simplified in Figure 1 as follows:

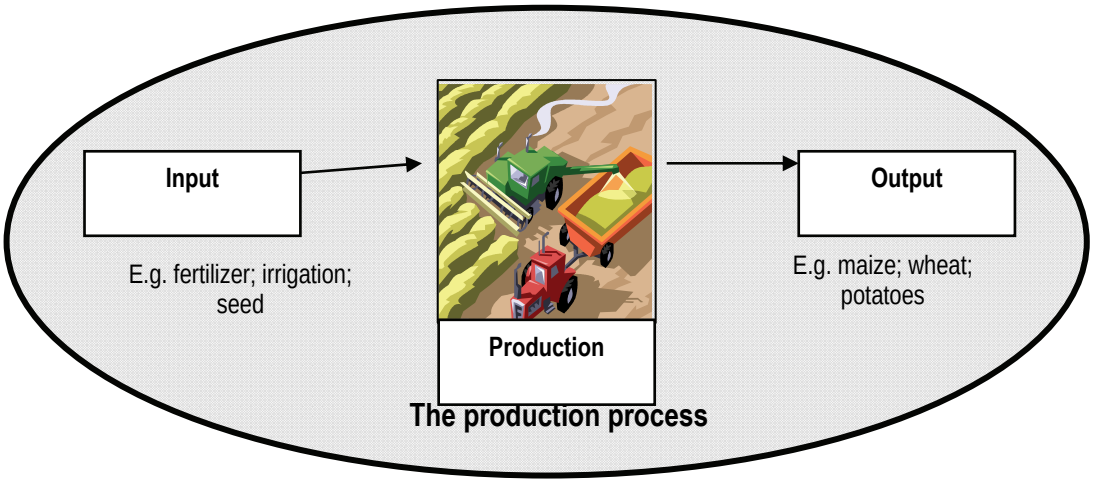

Figure 1. The production process on a farm[5,6]

3. Income, costs and profitability: key concepts of a farm enterprise[1,2,3,4,8)]

This section provides an introduction to the concepts of income, costs and profitability that are associated with the farm's enterprises and which is necessary for successful farming. The key concepts to be considered are gross income, costs of production, gross margin, enterprise profit (net income) and whole-farm income.

a. Gross income

Gross income is the value of an enterprise's output. It is calculated by multiplying the physical output at the farm gate price of the product. The farm gate price is the price the farmer initially receives for his product off the farm. Notice that there is a difference between gross income for a season and gross income for a year. Gross income for a year is the sum of all the crops produced each season of a year.

b. Costs of production

It is important to note that certain factors that have an impact on the farmer's income can be controlled, while others cannot. For example, a farmer cannot control the price he receives for his products, because prices are determined by international and other external factors. Therefore, if a farmer wants to increase his income, his best option is to reduce the costs of production. Production costs can be classified into *variable* costs and *fixed* costs, depending on the nature and time-span thereof:

c. Variable costs

Variable costs are short-term costs that are usually incurred within one year or a single production cycle. Features of variable costs are:

- vary according to the size of the enterprise (area planted for example)
- vary according to the intensity of production unit changes, and
- are usually allocated to individual enterprises.

Examples of variable costs in irrigation are seed, fuel and lubricants, fertilizer, hired labour, irrigation electricity, irrigation water, contract work, herbicide and insecticide, packing material, insurance, and diverse costs (costs incurred that have not been included in the other headings.

d. Fixed costs

Fixed costs are costs that stay the same regardless of the size of the enterprise and usually last for longer than one year (therefore it can be regarded as long-term costs). For example, depreciation (the fall in value) on vehicles will stay fixed, whether the farmer increases his land or not. Other examples of fixed costs are capital costs of obtaining farm machinery (maize harvester), permanent labour, insurance and land rent. Fixed costs can be allocated to a specific farm enterprise (for example a maize harvester), or it can be allocated to the whole farm (for example a tractor that can be used for maize, wheat, potatoes and even livestock

farming). Out of a farm management perspective, high fixed costs usually put pressure on the profitability of a farm, and should be managed carefully. A reduction in fixed costs without affecting production could increase profits.

e. Gross margin

A simple tool to analyse farm performance is the gross margin. The gross margin is calculated simply by subtracting variable costs from the gross income.

Gross margin = Gross income – variable costs

The gross margin shows what value the specific enterprise adds to the overall farm profits. Variable costs vary according to input prices and decrease or increase in the size of an enterprise, etc. At the same time, fixed costs are not affected and therefore it is important to manage variable costs. For example, if a maize enterprise is expanded, then variable costs (fuel, fertilizer, irrigation etc.) will increase. The farmer must ensure that the value of the extra production is not lower than the extra variable costs in order to generate a profit. This can be done by using budgets, which are discussed in Module 5. If a higher gross margin is generated from a specific crop in comparison with another (e.g. maize versus sunflower), then more of that crop can be planted.

f. Enterprise profit (net enterprise income)

Although the gross margin of an enterprise gives an indication of the profitability, fixed costs were not taken into account. In calculating the enterprise profit, fixed as well as variable costs (thus the total cost of production) are considered.

Enterprise profit = Gross income – (Variable costs + Fixed costs)

An example of the calculation of enterprise profit together with all the factors that affect it is provided in Figure 2.

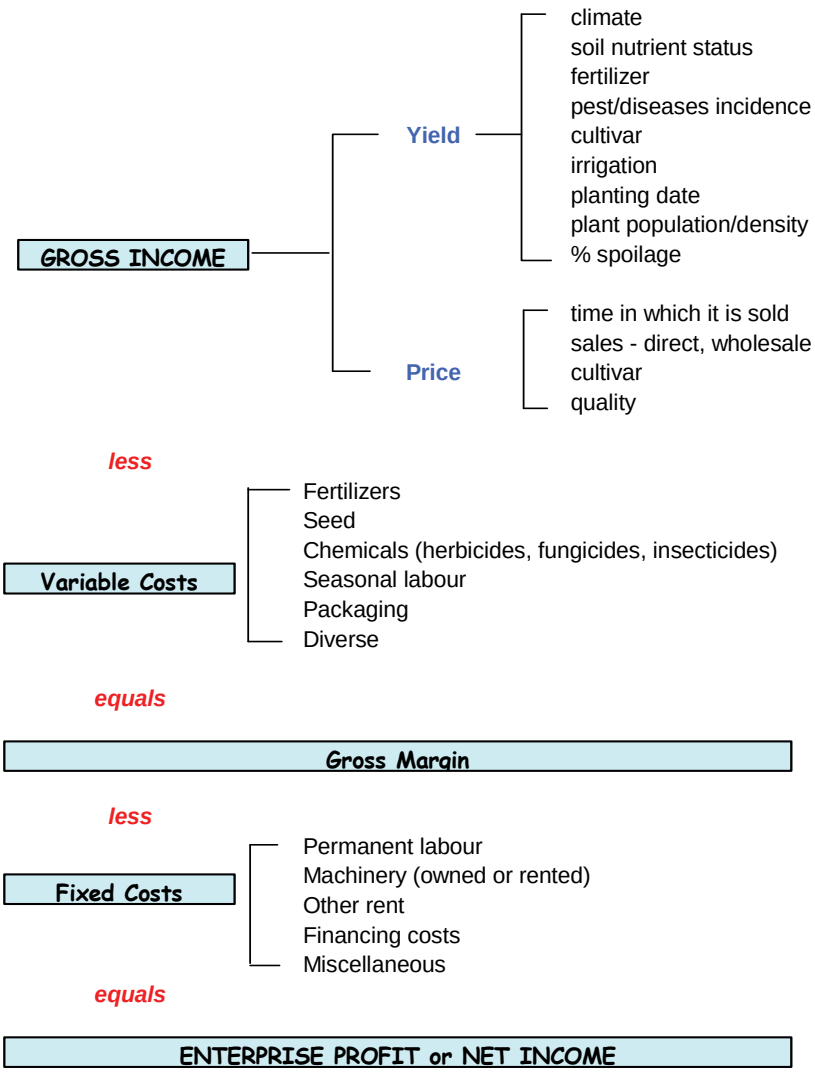

Figure 2.Factors affecting the profitability of a typical farm enterprise[5,6)]

g. Whole farm income (net farm income)

In the introduction of this section, it can be recalled that the most important features of a farm is the farmer as the manager and decision-maker, and the resources such as land, water, labour, and capital. Whole farm income is the farmer's reward for the labour, capital and management contributed during a year. It can be calculated in two ways: (1) by combining the gross margins for each farm enterprise and then deducting the fixed costs; and (2) by estimating enterprise profit for each of the farm enterprises and adding them up. The final income represents the profit of the whole farm.

Gross margin = Gross income – variable costs

Whole farm income = Gross margin – fixed costs

Whole farm income measures the economic strength of the business and indicates how much money is available to cover family living expenses, to pay taxes and to reinvest in the farm (e.g. buying additional land). An example of how to calculate the whole farm income is provided in Figure 3 below.

Farm enterprises	Gross Income	Variable Costs	Gross Margin	Area in hectares	Total gross margin
	(R/ha)	(R/ha)	(R/ha)	(ha)	(R)
A) Maize	13750	10250	3500	100	350000
B) Wheat	11500	9500	2000	110	220000
				Total	**570 000**

Gross Income Enterprise "A" (Maize) Less **Variable costs** for "A" Equals **Gross margin** "A"

Plus

Gross Income Enterprise "B" (Wheat) Less **Variable costs** for "B" Equals **Gross margin** "B"

Equals

Total farm gross margin

Less

Farm's fixed costs

Equals

Whole farm income

Figure 3. Calculation of gross margins for farm enterprises and the whole farm income[5,6,8)]

Activity 1

Small group activity

1. Describe what you understand about farm enterprises and give an example of a farm enterprise.

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2. Explain the following concepts:
   i. Gross income
   ii. Cost of production
   iii. Variable costs
   iv. Fixed costs
   v. Gross margin
   vi. Enterprise profit
   vii. Whole farm income

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3. Xolani farms with maize and potatoes under irrigation. He harvested 120 hectares of maize with a gross income of R8000/ha and variable costs of R6500/ha. His potato enterprise consists of 80 hectares, with a gross income of R12500/ha and variable costs of R10500/ha. Total fixed cost for his farming business amounts to R80000. Calculate (1) total gross margin for the maize enterprise; (2) total gross margin for the potato enterprise; (3) total farm gross margin; and (4) whole farm income of Xolani's farm.

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3) Boehlje, M.D., & Eidman, V.R. 1984. *Farm management*. New York: John Wiley & Sons.
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My notes.....

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Authenticator:

- Dr PG Strauss

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Technical Learner Guide

Irrigation Economics

Level 5

Module 3

Farm management information systems and record keeping

Study objective

In order to make the best decisions a farmer should evaluate his farm's financial position as accurately as possible. After completion of this module, the learner should be able to have a basic understanding of:

- How to identify information sources and know how to obtain information in and outside the farm required for decision making
- Develop a simple record keeping system for the farm
- The use of financial statements like balance sheet, cash income and flow statement to determine the financial position of the farm

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In order to make the best decisions a farmer should evaluate his farm's financial position as accurately as possible. To achieve this, the farmer needs accurate historical, present and future information. He will need to know what costs, yields, input use and production were involved in the *past*, what are the *present* financial and physical condition of his farm business and what costs, yields and production levels to expect in the *future*. This information is important since in this manner the farmer can determine what his farm's position and performance were in the past, where it is at present and where it wants to be in future. He can also use this information to develop risk management strategies for the future (more on this in the module on risk management). Apart from gathering financial information for all enterprises it is also important to update this information on regular basis.

1. Farm management information systems [5,10)]

The sources of information can be from two places, namely outside (external) the farm (like magazine articles, farmers' days, study groups, consultants, cooperatives etc.) and inside (internal) (e.g. the farm's own records and financial statements). This information is important since it is used for the following:

- to measure the performance and progress of the farm over time
- to create a basis that can be compared to previous years
- to set objectives and evaluate the farm's financial position according to these objectives
- to evaluate alternative strategies for controlling the available resources and enabling the farmer to determine where the strong and weak points of his farm are
- to plan for the future and decisions that should be made
- to comply with tax requirements, improve tax planning and management
- to establish a basis to get credit or financing
- to determine and monitor the cash flow position of the farm
- to have effective control over the finances of the farm and enabling the farmer to know what have been spent and done at any given time during the year
- and to improve the farmer's ability to think, decide and act in order to handle the management of the farm more objectively and effectively.

All the information obtained can be used to create a farm management information system. This information system usually consists of farm record, financial statements and the analyses and interpretation of the results. An example of such a farm management information system is provided in Table 1.

Table 1. An example of the composition of a farm management information system[10)]

Gather, collect and process information		Analyse and interpret results
Farm records	**Financial statements**	
• Physical inventory • Depreciation • Record of accounts receivable and accounts payable • Records of receipts and expenditure • Labour records • Machinery records • Physical production records	• Balance sheet • Income statement • Cash-flow statement	i)Financial analyses o Solvency o Liquidity o Profitability ii) Diagnostic analysis o Investment criteria o Labour o Machinery o Crops o Livestock (if applicable) iii) Sustainability analyses

2. Record-keeping and data[5,9,10)]

As illustrated by Table 1, farm records usually consist of physical inventory, depreciation, record of accounts receivable and payable, records of receipts and expenditure, labour records, machinery records, physical production records. These are discussed in more detail in the rest of this module.

2.1 Farm inventory

The first step in drawing up a record-keeping system is by creating an inventory. An inventory is a statement in which all the physical assets on the farm as well as their values (in Rand) are recorded. An asset is an item of value that is owned by the farm and is expected to provide future benefits to the farm (e.g. by contributing to sales). Examples of assets are land, buildings and machinery on the farm, crops on the field and harvested crops, etc. A farm inventory usually consists of the following:

- Size of the farm, right of ownership, land utilisation and valuation of the production unit
- Description and valuation of fixed improvements
- Investment in vehicles, machinery and equipment, as well as numbers and types
- Numbers and types of investment in livestock (if applicable)
- Stocks, supplies, and production inputs, finished and semi-finished products on hand at the beginning and end of the financial year.

An inventory is generally done at least once a year at the end of a farm's financial year, and consists of a *physical* inventory (hectares of land, tons of grain, etc.), and the *value* of inventory (e.g. the money value of the assets).

A basic inventory for farm assets for an irrigation farm is illustrated by Table 2.

Table 2. An example of an inventory form for farm assets[6,7)]

Items	Year of purchase	Purchase cost (R)	Expected life time	Annual deprec. (R)	Accum. deprec (R)	Beginning number	Beginning value (R)	Ending number	Ending value (R)
1	2	3	4	5	6	7	8	9	10
Land: Irrigation Dryland Other									
Machinery/ Equip/Tools: Plough Harrow Tractor Harvester Planter Others									
Production inputs: Fertilizer Seed Chemicals									
Total									

Explanation of columns:

Column (1) - Walk around the farm and make a general inspection of farm properties. List the items according to main categories (farm buildings, land, machinery/equipment, farm supplies)

Column (2) - Indicate the year when each item of property was purchased

Column (3) - Indicate the purchase cost of each item

Column (4) - Indicate the expected lifetime of machinery/equipment

Column (5) - Compute annual depreciation for each item

Column (6) - Formula: Purchase price – accumulated depreciation

Column (7) - Accumulated depreciation is equal to the annual depreciation x the number of years the item is in use.

Formula to calculate depreciation ***(straight line method):***

$$AD = \frac{PP - SV}{EL}$$

With:

AD = annual depreciation
PP = purchase price
SV = salvage value
EL = expected lifetime in years

(More detail in Sec 2.3)

Column (8) - Compute the ending value = Beginning value – annual depreciation

The following guidelines can be used to determine the expected lifetime and salvage value of particular assets (Table 3):

Table 3.Guidelines for determination of expected lifetime and salvage value of farm assets[10)]

Assets	Expected lifetime in years	Salvage value as percentage of purchase price or replacement value
Vehicles	5 years	10%
Tractors	10 years	10%
Implements	10 years	10%
Tools	10 years	0%
Sprinklers	5 years	0%
Laterals	10 years	0%
Centre pivots	15 years	0%
Electrical motors	15 years	0%
Pumps	15 years	0%

2.2 Asset valuation

Assets are expressed in monetary terms (money is the unit of measurement). The method used for asset valuation depends on the specific asset's nature and purpose. It is important that to know that in order too keep an accurate inventory, the same valuation method should be used every time in order to ensure that it can be compared with previous or future years (consistency). Some assets can be sold on the market easily (e.g. potatoes) and are valuated by the market price they fetch. Other assets are not sold often (e.g. machinery, land) and are more difficult to valuate – less direct methods should then be used. Valuation methods that are generally used are:

- Market value
- Cost
- Lower cost or market price
- Farm production cost
- Cost minus depreciation

These methods are briefly explained in the following paragraphs.

- *Market value method* – An asset is valuated according to its current market price. It can be used for various types of assets, especially those that can be sold in a short period for which market prices are available. Examples are crops and livestock.

- *Cost* – This method valuates assets according to the asset's original purchase cost. This method works best for items that are recently bought and still have purchase prices available, e.g. feed, fertilizer, fuel and other supplies. Items that lose value over time (e.g. machinery and implements) are valuated differently. Crops under cultivation cannot be valued this way, since there is not a purchase price for it.

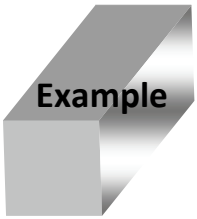
- *Lower cost or market price* – This method values an item at both its cost and market value, and then the lowest value is chosen. The advantage of this method is that the chances of placing too high a value on an item are reduced.

- *Farm production cost* – If costs of production or enterprise records are kept, items can be valued by using this method. This can especially be used on crops that are planted but not ready to be harvested, for instance vineyards.

- *Cost minus depreciation* – This method is used for items that are used in the production process, but lose value over time due to age or being outdated. Such items include machinery, vehicles, implements and other equipment. Such items are valued at their original cost minus depreciation from the purchase date until the valuation date. The value of these items is reduced by the amount of depreciation for that year.

2.3 Depreciation

Much has been said about depreciation, but what is it exactly and how is it calculated? Depreciation refers to the loss or decline in value of assets such as vehicles, machinery, implements, equipment and tools. The loss in value is because of age, wear and tear and obsolescence (being useless). Depreciation is not a physical cash cost and the decrease in value are written of over the expected lifetime of the asset.



An asset such as a tractor for example cannot work for an infinite period. There will come a time when the tractor broke down completely or will not perform well anymore. This period, starting with the purchase of the asset until it is not useful anymore (the asset is then said to be *obsolete*) is called the *lifetime* of the asset. When determining depreciation of an asset, the *expected lifetime* of an asset is used. The *expected lifetime* is the period which the farmer expects to be able to use the asset. For example, the *expected lifetime* of a tractor is 10 years.

The *purchase price* is the price the farmer pay for the new asset.

The *salvage value* is the value of the asset at the end of its expected lifetime. For example, a tractor is bought for R400 000 and its expected lifetime is 10 years after which the tractor will be sold for R40 000, then:

Purchase price = R400 000

Expected lifetime = 10 years

Salvage value = R40 000

Inventory value (or *book value*) is the value of the asset in a specific year, when the total depreciation of the asset until that year is deducted from its purchase price. For example, the purchase price of a tractor is R400 000. After 3 years, the total depreciation for the tractor amounts to R108 000. The *inventory value* of the tractor after 3 years is thus R400 000 – R108 000 = R292 000.

2.3.1 Methods to calculate depreciation

There are several methods to calculate depreciation, but the *straight-line* and the *reducing-balance* methods are the easiest to apply and used widely.

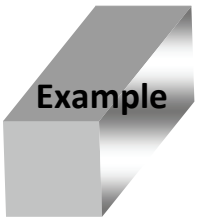
a. Straight line method

The formula for the depreciation by the straight line method is as follows:

$$AD = \frac{PP - SV}{EL}$$

With:
AD = annual depreciation
PP = purchase price
SV = salvage value
EL = expected lifetime in years

It is important that the depreciation stays the same each year for the lifetime of the asset. An example of calculating the yearly depreciation for a vehicle on the *straight-line method* is provided in the following example:



Straight-line method

The purchase price of a diesel bakkie is R200 000. Its expected lifetime is 5 years and the salvage value will be approximately 10% of the purchase price of the bakkie (thus salvage value = R200 000 × 0.1 = R20 000). The annual depreciation for the bakkie will be:

$$AD = \frac{R200000 - R20000}{5}$$
$$= R36000$$

The annual depreciation for the bakkie is R36 000. The inventory value of the bakkie will thus decrease by R36 000 every year. What will the inventory value of the bakkie be after 3 years?

Answer:

Purchase price of bakkie = R200 000
Depreciation in year 1: R36 000
Depreciation in year 2: R36 000
Depreciation in year 3: R36 000
Total depreciation after 3 years = R36 000 + R36 000 + R36 000 = R108 000
Thus inventory value of bakkie = purchase price – total depreciation after three years

= R200 000 – R108 000
= R92 000

The inventory value (or book value) of the bakkie after three years will be R92 000.

b. Reducing method

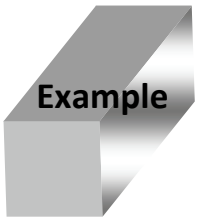
The *reducing-balance method* is based on the following formula:

$$AD = \frac{200}{EL}$$

Where AD = annual *rate* of depreciation

EL = expected lifetime in years

The following example explains how the reducing-balance can be used to calculate depreciation:



Reducing-balance method

A harvester is bought 4 years ago and has a replacement value of R100 000. Suppose its expected lifetime is 10 years, calculate the inventory value (book value) of the harvester for the current year.

Step 1: Calculate annual rate of depreciation

$$AD = \frac{200}{10}$$
$$= 20\%$$

The value of the harvester will thus decrease every year with 20%

Step 2: Calculate the book value of the harvester after 3 years

Replacement value =	R100 000
Depreciation at 20% for year 1 =	R100 000 × 0.2 = R20 000
Book value after year 1=	R100 000 – R20 000 = R80 000
Depreciation at 20% for year 2 =	R80 000 × 0.2 = R16 000
Book value after year 2=	R80 000 – R16 000 = R64 000
Depreciation at 20% for year 3 =	R64 000 × 0.2 = R12 800
Book value after year 3=	R64 000 – R12 800 = R51 200

The book value of the harvester is R51 200 after four years.

2.4 Records of accounts receivable and payable, records of income and expenditure

All the income and expenditure for the farm should be recorded. An efficient accounting system consists of:

- a cash journal
- buying journal for credit purchases
- sales journal for credit sales
- a ledger to record all transactions
- separate records to record income and expenditure of every individual enterprise on the farm (e.g. records for maize enterprise, potatoes, etc.)

A record-keeping system is needed to:

- calculate the net farm income and taxable income for a financial year
- determine whether each product is produced efficiently in terms of finances
- make management decisions
- analyse the cash flow
- provide useful information to create budgets for the future

The sources from which information for income and expenditure and accounts receivable and payable can be obtained include:

- Bank statements – contain entries of receipts and payments as well as details of debit orders and bank fees
- Cash analysis book – receipts and payments are included here
- Petty cash book – only cash transactions are recorded in this book, which include small, daily cash receipts and payments

- Wage book – includes details of labourers employed, wages paid, debts and repayments
- Chequebook counterfoils and deposit slips – details of payments made by check are included here
- Deposit book – all cash receipts should be recorded here
- Proof of payment, credit vouchers and sales slips, statements, invoices and delivery slips (expenses)

3. Production records [3,9,10)]

Records should be kept for every enterprise on a farm, as well as other farm-related matters. Production records are useful to identify production problems and to identify opportunities that can be exploited to improve overall farm performance. The most common statements used are crop cultivation, livestock, labour and machinery statements.

3.1 Crop cultivation statements

This statement includes all the various field or orchard numbers, areas, yield potential and soil analyses of the land used for that specific crop or fruit. Other items included in the cultivation statement are fertilisation, seeding, cultivation methods, weed and pest control and yields.

3.2 Livestock statements (if applicable)

All information related to stock-farming enterprises on the farm is included here. Examples are feed, remedies, dosing, marketing costs and individual animal records such as milk production, calving records, wool production, weaning mass and weight gains. The opening and closing numbers of livestock should be valued according to their age and gender (e.g. bulls, cows, heifers, 1-2 year old heifers, etc).

3.3 Labour records

Labour matters such as service contracts, wages received, rations, medical costs and worker's compensation are recorded in the labour statement. Other items that should be included are number of labourers, loans, debts, leave and absences.

3.4 Machinery records

Machinery information is included in the machinery statement and includes items such as model type, age, book value, repairs, service records, hours worked and insurance.

4. Financial statements[5,9,10)]

Financial statements are the second component of the farm management information system. The farm records discussed in this module is used to draw up financial statements. Financial statements include the balance sheet, income statement and cash flow statement. In short, the balance sheet shows the farm's financial position at a given time, showing what the farm owes and owns; the income statement shows the expenses and income from one balance sheet to the next; and the cash flow statement shows the flow of cash into and out of the farm

during a given period (the financial year). The financial statements are discussed in the sections that follow.

4.1 Balance sheet

The balance sheet shows the financial position of a farm on a certain date, usually the last or first day of the financial year of the farm. A balance sheet should be drawn up parallel with the period for which the income and cash-flow statements were compiled. A period should thus be chosen and all the statements should be recorded accordingly. This period is known as the *financial year* of the farm. The balance statement is then completed at the end of this period, which can be the end of a calendar year, tax year or production period. Three aspects are important in the balance sheet namely *assets*, *liabilities* and *net worth*.

- *Assets* are everything that is owned by the farm such as land, fixed improvements, machinery and equipment, stocks, supplies and cash. This information is based on the asset inventory discussed earlier.

- *Liabilities* are all the debts that the farm owes at the date of the balance sheet.

- *Net worth* is the amount of money the farmer would have if he sold all his assets and paid all his debt. Net worth is also called ownership interest or own capital and can be calculated by subtracting liabilities from assets:

$$Net\ worth = Assets - Liabilities$$

If a farmer's net worth is negative (smaller than one), then the farmer is bankrupt or insolvent. The net worth is entered in the liability side of the balance sheet, since it is the amount that the farm owes the owner.

Thus, the asset side of the balance sheet indicates all the assets of the farm, while the liability side shows how are these assets financed (paid for). The basic accounting formula for the balance sheet can be derived:

$$Assets = Liabilities + Net\ worth$$

As its name indicates the most important feature of a balance sheet is that that the two sides of the equation (assets on the one side versus liabilities and net worth on the other side) must be balanced.

a. Assets

Assets are classified according to their ability to be converted to cash (liquidity). Three types of assets exist namely, *current assets*, *medium term* assets and *fixed assets*.

- *Current assets*, or short-term assets, are the most liquid assets such as cash on hand; cash in the bank, stocks and supplies, debtors, finished and semi-finished products, short-term investments and prepaid accounts. These items can easily be converted into cash in less than a 12 month period.

- *Medium-term assets*, or movable assets, are assets that are used in the production process to produce products that can be sold. These assets are usually subjected to depreciation and also have a medium service lifetime, which are 2-10 years. Examples of movable assets are vehicles, machinery, implements, tools, equipment, orchards, breeding-stock, plantations and medium-term investments.

- *Fixed assets* are also used in the production process but have a longer service lifetime, which is 10 years or more. Examples are fixed improvements and land.

b. Liabilities

Liabilities are classified according to the period available during which the debt should be paid back. Three types of liabilities can be distinguished, namely *current liabilities*, *medium-term* liabilities and *long-term* liabilities.

- *Current liabilities* or short-term liabilities are debt that should be repaid within 12 months. Examples are bank overdrafts, unpaid cheques, overdue accounts, production accounts (e.g. accounts at cooperative), creditors and provision for instalments on medium and long-term loans.

- *Medium-term liabilities* are debt that should be paid back between 1 to 10 years. Examples are instalment sale credit; leasing and medium-term loans (e.g. loan to buy a bakkie).

- *Long-term liabilities* are debt that should be paid back over a period that is longer than 10 years. A mortgage bond on land is an example of a long-term liability.

c. Net worth

Net worth is also known as owner's equity and is the amount of money that belongs to the owner. Net worth is classified as *contributed capital*, which is the value of resources that the owner has provided (e.g. to start the farm business), or *retained earnings* which are profits generated by the farm and reinvested into the farm (and not given to the owner).

d. Growth in net worth

The growth in net worth is calculated by deducting the owner's equity of the previous year (e.g. 2009) from the owner's equity in the current year (e.g. 2010). The net disposable income from the income statement is then added to this amount in order to get the growth in net worth. The growth in net worth is not the amount that a farmer has at the end of the financial year, but merely the amount the farmer can spend without reducing the own capital in the business.

It is important to let that the balance sheet does not focus on the *profitability* of the farm, but rather what the business owns (assets) and owes (liabilities) to other businesses. An example of a balance sheet is provided in Table 4.

Table 4. Example of a balance sheet[1]

BALANCE SHEET OF FARMER FELIX AS ON 28 FEBRUARY 2010

No.	ASSETS	Rand		Calculation
		2010	2009	
1	**Fixed assets**	**20 000 000**	**18 750 000**	**=2**
2	Land and buildings (including irrigation equipment	20 000 000	18 750 000	
3	**Meduim term assets**	**7 200 000**	**6 850 000**	**4+5+6**
4	Machinery and equipment	4 000 000	3 800 000	
5	Vehicles	1 200 000	1 150 000	
6	Other	2 000 000	1 900 000	
7	**Current assets**	**2 045 000**	**2 320 000**	**8+9+10**
8	Cash	785 000	900 000	
9	Marketable livestock	260 000	270 000	
10	Production inputs (fertilizer bags)	1 000 000	1 150 000	
11	**TOTAL ASSETS**	**29 245 000**	**27 920 000**	**1+3+7**
	LIABILITIES AND OWNER'S EQUITY			
12	**Long term liabilities**	**8 000 000**	**7 800 000**	**=13**
13	Loan on land	8 000 000	7 800 000	
14	**Medium term liabilities**	**2 930 000**	**2 700 000**	**15+16**
15	Loan on vehicles	730 000	700 000	
16	Loan on tractors	2 200 000	2 000 000	
17	**Short term liabilities**	**9 557 497**	**9 010 000**	**18+19+20+21**
18	Credit card	270 000	320 000	
19	Bank overdraft	87 497	90 000	
20	Production loan	7 200 000	7 000 000	
21	Other creditors	2 000 000	1 600 000	
22	**TOTAL LIABILITIES**	**20 487 497**	**19 510 000**	**12+14+17**
23	**Owners equity (net worth)**	**8 757 503**	**8 410 000**	**11-22**
24	**Growth in net worth**	**449 589**	**-**	

[1]*Calculation of growth in net worth: Owner's equity in 2010 minus owner's equity in 2009 plus net disposable income (from income statement). Therefore:*

Growth in net worth = R8 757 503 – R8 410 000 + R 102 086 = R449 598

From the balance sheet in Table 4 it can be seen that the value of the assets of the business exceeds the value of its liabilities by R8 757 503 in 2010 and R8 410 000 in 2009. This implies that the owner's equity was R8 757 503 and R8 410 000 in 2010 and 2009 respectively. Since the owner's equity is an indication of the health of the business in terms of its financial position, Farmer Felix's farm is in a healthy financial position (because of his positive owner's equity). If these amounts were negative, the owner would have been bankrupt and the farming business would have been closed down. The difference between the owner's equity in 2009 and 2010, plus his net disposable income (from the income statement in Table 5 to follow) for 2010 represents the growth in his net worth for 2010, which in the case of Farmer Felix amounts to R449 589. This indicates that Felix's farm is progressing financially.

4.2 Income statement

The information from the farm records (especially the record of accounts receivable and accounts payable, records of income and expenditure) can now also be used to complete the income statement for the farm. As mentioned in Section 3.6.1, the balance sheet shows the financial position of the farm at a given date. On the other hand, the income statement now shows how this financial position was reached. The income statement provides a summary of all the income and costs over the financial year of the farm. If income is greater than costs, then a *profit* is generated. If costs are greater than income, then the farm has made a *loss*. The income statement thus measures the success of a farm for the financial year (or any other given period) in terms of profitability. Figure 1 illustrates the composition of an income statement.

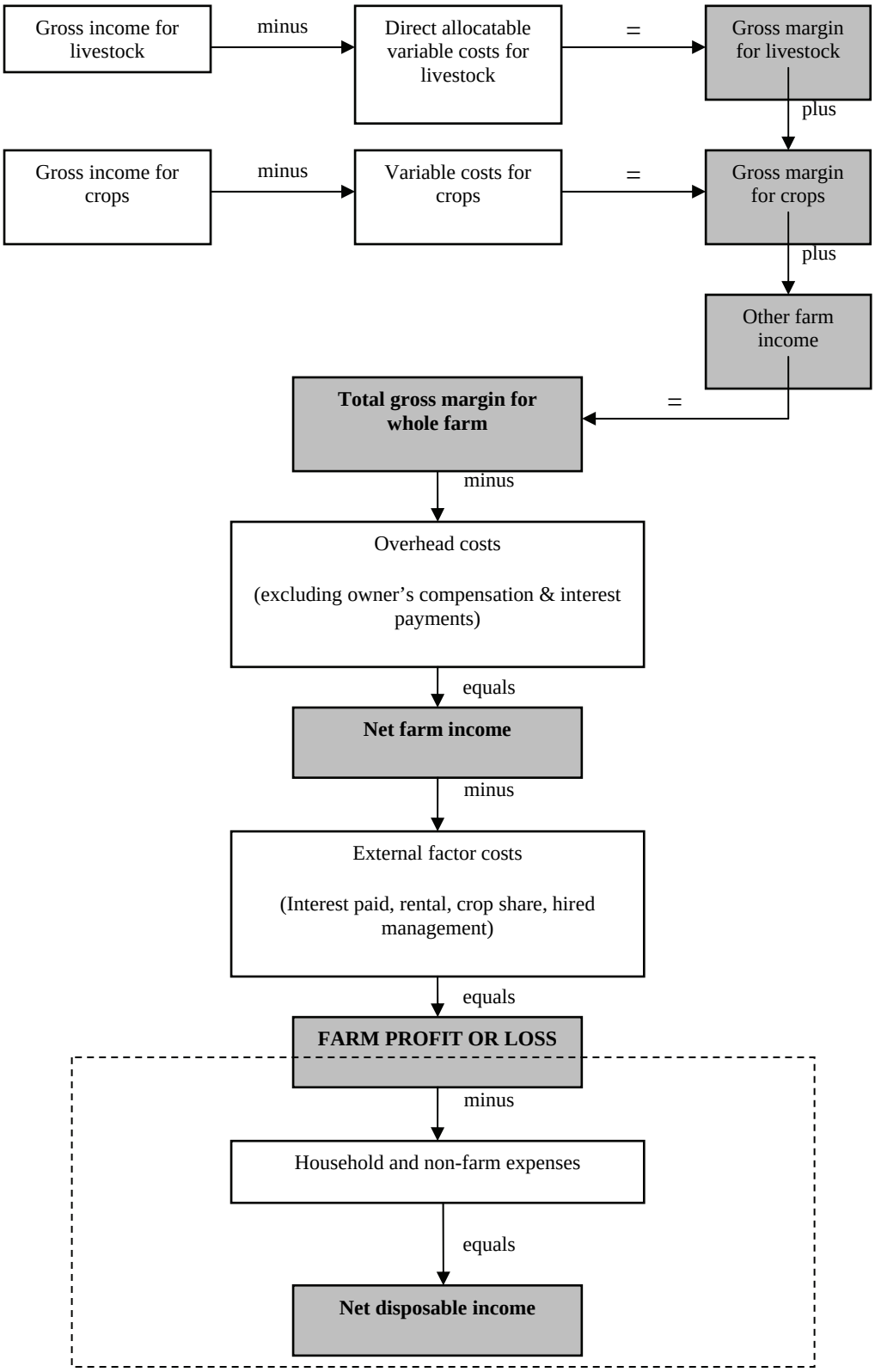


Figure 1. Summary of the composition of an income statement[10)]

It is important to note the following important aspects:

- Production inputs should be accounted for in the year they were used. Therefore the calculation for production inputs used in a specific year is done as follows:

  Production inputs used = (Opening stock + purchases of production inputs) – (closing stock + sales of production inputs)

- Rental of depreciable assets (e.g. tractors, harvester) is usually an allocated variable cost, while non-depreciable assets (e.g. land) are viewed as external factor costs. This is done in order to be able to compare the farm with other farms.

The income statement consists of the following components:

o *Gross income*

Gross income is usually the total value of the products produced by the various enterprises plus other farm income (also called sundry farm income). For example, a farmer has a maize and sheep enterprise, and also do contract harvesting work for other farmers in his region. His total gross income will thus be the sum of the gross income from these enterprises. The gross income for a crop enterprise can be calculated as follows:

Gross income for crops = Gross sales + insurance payments received (due to crop losses) + consumption by household and labourers + crop used on the farm for feed and seed + change is stock levels (closing stock – opening stock)

Gross income for the livestock section of the farm can be calculated as follows:

Gross income for livestock = Livestock sales + livestock slaughtered for households and labourers + insurance payments received for livestock losses + change in livestock inventory (closing value minus opening value) – minus livestock purchases

Other farm income is income that are generated by the farm or farm activities, but that cannot be allocated to a specific enterprise. For example, suppose an irrigation farmer has a combine harvester, but he usually finishes early in the harvesting season. In the meantime he hires his combine harvester and driver to other farmers which pay him an amount per hectare (contract work). Other examples are hiring out pasture, selling hay for feed, etc.

The total gross income for the farm is thus the sum for the gross income for crops, livestock and other farm income.

o *Directly allocatable variable costs*

Variable costs are short-term costs that are usually incurred within one year or a single production cycle, and vary according the size of the enterprise and the intensity of production unit changes. *Directly allocatable variable* costs are those costs that can be allocated to a

specific enterprise (e.g. fertiliser, herbicides, pesticides, specific contract work, casual labour, marketing costs, crop insurance, etc.)

- ***Gross margin (GM)***

Gross margin is the gross income minus total directly allocatable variable costs. The total gross margin for the farm is thus the sum of all the gross margins for every enterprise. The gross margin is used to evaluate the performance of the farm's enterprises.

- ***Net farm income (NFI)***

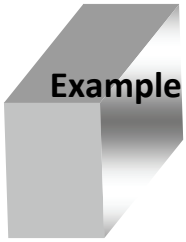
Net farm income is the total gross margin less *overhead costs*. Overhead costs are costs incurred that ***cannot be allocated*** to a specific enterprise, and consist of both variable and fixed cost. Examples are variable costs such as fuel, lubricants, repairs and spare parts for vehicles and implements; and fixed costs such as depreciation, insurance on buildings, machinery and implements, licences, regular labour, administration costs, bookkeeping costs, bank charges, telephone and electricity. It is important to know that NFI does not imply profit, since hired management, interest on capital and rentals are excluded. Net farm income is simply used to compare "apples with apples" when comparing farms, since management, rental and capital costs differ from farm to farm.

- ***Farm profit***

Farm profit is the NFI less compensation to hired management, rentals and interest on capital (external factor costs). There is farm profit before tax (tax not taken into account) and farm profit after tax (tax deducted from farm profit).

- ***Net disposable income***

This is income that the farmer has after non-farm income (e.g. shares) and non-farm expenses (e.g. household expenses) were taken into account. This is thus the money the farmer has at his disposal. He can invest this money in his farm (e.g. buy better irrigation equipment), which will improve his farm further.



An example of an income statement is provided in Table 5. The way calculations are done is indicated in the column on the right side, while the allotted number of each variable is provided on the left side. The income statement in Table 5 indicates that gross farm income for Farmer Felix was R5 801 808 during the period 1 March 2009 and 28 February 2010. After deducting direct allocatable costs, Farmer Felix obtained a farm gross margin of R1 109 000. After overhead costs, the farm has a net farm income of R694 408. Farm profit amounts to R192 086 after interest, land rent and tax were taken into account. After deducting household expenses and non-farm expenses, Felix obtained a net disposable income of R102 086.

Table 5. Example of income statement

INCOME STATEMENT FOR FARMER FELIX FOR THE YEAR ENDED 28 FEBRUARY 2010				
No.	**Description**	**Rand**		**Calculation**
1	**Gross farm income**		**5 801 808**	**2+3+4+5**
2	Maize	2 880 000		
3	Wheat	2 200 000		
4	Tomatoes	461 808		
5	Other farm income	260 000		
6	**Direct allocatable costs**		**3 998 400**	**7+8+9**
7	Maize	2 458 400		
8	Wheat	1 300 000		
9	Tomatoes	240 000		
10	**Total farm gross margin**		**1 803 408**	**1-6**
11	**Overhead costs**		**1 109 000**	**12+13+14+15**
12	Unallocated fuel and repair expenses	330 000		
13	General and administrative expenses	254 000		
14	Other fixed expenses	280 000		
15	Depreciation	245 000		
16	**Net farm income**		**694 408**	**10-11**
17	**External factor costs**		**420 000**	**18+19**
18	Interest expenses	340 000		
19	Land rent	80 000		
20	**Farm profit before tax**		**274 408**	**16-17**
21	Tax (30%)		82 322	
22	**Farm profit after tax**		**192 086**	**20-21**
23	Household expenditure		270 000	
24	Non-farm income		180 000	
25	**Net disposable income**		**102 086**	**22-23+24**

4.3 Cash flow statement

Although it plays a very important role in financial management of a farm, the cash-flow statement is often neglected. The balance sheet and income statement do not give an indication of the cash-flow of the farm, thereby making the cash-flow statement an essential tool. There is a huge difference between being profitable and having enough cash.

Why is the cash-flow statement so important? In order to generate income on a farm, a huge amount of money must be spent in the beginning of the production period on items like seed,

fertilizer, pesticides, fuel, etc. The farmer will thus have an overdraft (i.e. "in the red") during the year, and after he has sold the products, he will receive an income. If the farmer does not have cash, he cannot pay his debt, care for his family, have extra cash for unforeseen incidents, etc. In addition, banks will not be willing to provide finance since they do not know that the farmer will be able to pay their money back. These factors can ruin the farmer financially and for this reason it is important to monitor the cash position of the farm by means of the cash-flow statement. The purpose of the cash flow statement is to indicate the ability of the farming business to generate cash through its total activities.

The cash-flow consists of three important components namely *income*, *expenditure* and *surplus or shortage*:

- *Income* consists of operating income (income from maize, wheat, potatoes, etc.), capital income (income from sales of machinery, land, etc) and non-farm income. Only **cash** inflows are taken into account and in the month when the income was received.

- *Expenditure* consists of operating expenditure (seed, fertilizer, pesticides, fuel, etc.), capital expenditure (purchase of machinery, land, etc.), debt repayments (e.g. interest) and non-farm expenses. Again, only **cash** outflows should be recorded in the month of payment. Items that were bought with credit, non-cash expenditure such as depreciation, etc. are not recorded.

- *Surplus* or *shortage* is calculated by subtracting the total expenditure from the total income. After the surplus or shortage is calculated, the amount is added to the opening bank balance (the amount of money in the farm's bank account in the beginning of the month) of the farm for the particular month. If this new amount is negative (therefore an overdrawn account or overdraft), interest should be calculated and added as interest should be paid on the overdraft. If the calculated amount is positive, then no interest is payable. The farmer will then *receive* interest on his positive balance from the bank. This newly calculated balance is then the *closing balance* (the balance at the end of the month). The closing balance of one month is the opening balance for the next month.

Example

An example of a cash flow statement at the end of the financial year is provided in Table 5. The cash flow statement is very similar to the cash flow budget. Although the cash flow statement is also constructed on a monthly basis, the example in Table 5 shows a cash flow statement at the end of the financial year. The cash flow statement of Farm Felix indicates that through production, investment (capital inflows or outflows), financing and non-farm activities, Farmer Felix was able to generate a cash surplus of R7086. However, he had a negative bank balance (overdraft) of R80 000. After adding the surplus to the bank balance, he had a negative balance of R72 914, on which he had to pay 20% interest (thus R14 583). After subtracting the interest, Farmer Felix has a negative ending bank balance of R87 497.

Table 6. Example of a cash flow statement

Cash flow statement of Farmer Felix ended on 28 February 2010

No.	Item	Source	Rand
	Cash inflows		
1	Maize	Transactions	2 880 000
2	Wheat	Transactions	2 200 000
3	Tomatoes	Transactions	461 808
4	Increase in liabilities (capital cash inflow)	Transactions	532 000
5	Non-farm income	Transactions	180 000
6	**Total income**	**1+2+3+4+5+6**	**6 253 808**
	Cash outflows		
7	Maize	Transactions	2 458 400
8	Wheat	Transactions	1 300 000
9	Tomatoes	Transactions	240 000
10	Purchase of assets (capital cash outflow)	Transactions	500 000
11	Non-farm expenditure	Transactions	112 000
12	Other (debt repayments, land rent etc)	Transactions	1 636 322
13	**Total expenditure**	**7+8+9+10+11+12**	**6 246 722**
14	**Surplus/shortage**	**6-13**	**7 086**
	Bank balance		
15	**Begin balance**	**Previous year end saldo**	**-80 000**
16	Surplus/shortage	No.14	7 086
17	**Balance after surplus/shortage**	**15+16**	**-72 914**
18	Interest (20%) on overdraft	No.15 (if negative) × 20%	-14 583
19	Interest (5%) on positive balance	No. 15 (if positive) × 5%	0
20	**Ending balance**	**17+18+19**	**-87 497**

Activity 1

Use the information and instructions in the Excel worksheets: ***Mod 3 Financial statements*** *to complete activities (1-3)*

Complete the following statements of Farmer Jack by using the Excel worksheets (complete the indicated cells):

- Income statement ("Income" worksheet)
- Balance sheet ("Balance" worksheet)
- Cash flow statement ("Cash flow summary 97-98" worksheet)

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Activity 2

Calculate the following ratios by using the Excel file "Mod 3: Financial statements" you have completed for Farmer Jack, and indicate whether these ratios are acceptable or not for his farm. Motivate your answer.

- Solvency: Net capital ratio and leverage ratio
- Liquidity: Current ratio and intermediate ratio
- Profitability: Return on assets (ROA) and return on equity (ROE)
- Efficiency: Capital turnover ratio and cost ratio
- Debt-servicing ratio (assume debt repayments amount to R420 900, while gross value of production is equal to the gross income in the income statement

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Activity 3

Andreas has bought pumps for his irrigation system for R650 000. Use Table 3 (page 5) to determine its salvage value and expected lifetime. Use the information to calculate the total depreciation and inventory value of the pumps after 4 years. Use the straight-line method to do your calculations.

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My notes.....

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Authenticator:

- Dr PG Strauss

Module 4

Production economic principles and concepts

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- The concept of production economics and its application in the planning of resources and production on the farm.
- To economically determine how much input to use on the farm, how much to produce and what to produce while considering the cost principles.

Table of contents

It is important to understand the economic environment (micro and macro) in which a specific farm functions. Planning is the most important management function – but many farmers do not focus on it sufficiently. No planning or bad planning is like jumping in a motorcar and setting on a long journey without considering of all the opportunities.

Planning involves making decisions (see Module 1 – the decision-making process) with regard to the most profitable and sustainable alternatives from all possible alternatives. The production resources (land, labour and capital) will not produce maize, wheat, potatoes or

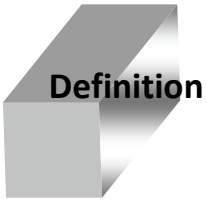
meat by themselves – these resources should be combined appropriately, applied in the right quantities and at the right time. A plan provides the guidelines on the best combination of resources and actions to get the best possible profits. Why is planning so important? Because of the many risks and uncertainties involved in farming – weather conditions are uncontrollable and unpredictable, while prices move constantly up and down without prior notice – making planning in agricultural production and marketing so essential. For this reason, planning in agricultural production and marketing is discussed in the following sections, which will enable the farmer to plan ahead for possible uncertainties and risks that might arise.

Production resources such as land, labour and capital cannot automatically produce maize, wheat etc. – they should be correctly combined and applied. It is therefore important that the farmer and the extensionists has a basic understanding of the main production economic principles that ca be applied with decision making in order to maximise profits.

1. The concept of production economics

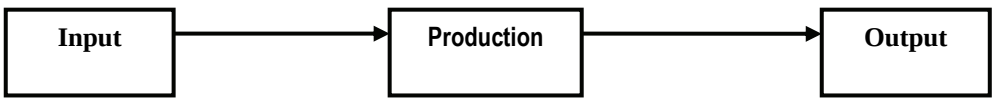
a. Marginality

An important aspect of farming is the knowledge of how change will affect the farming business. It is necessary for a farmer to know what will happen to the farm's profit when he changes one of the production factors (land, labour, inputs, capital) under his control, while keeping other factors constant.



The term "marginality" refers to change (an increase o decrease) in one factor as a result of a change in another factor (e.g. what additional or extra income or loss would for example result from a change in input). The change in input is indicated by a small triangle (Δ). A change in maize production is written as Δmaize production.[5)]

For example, if a farmer wants to plan additional hectares of maize (while keeping other factors constant), he should know how this decision will affect the farm's profit. In Module 1 we learned that resources (land, labour, capital,) and inputs are used in the production process to generate output:



This relationship also can be rearranged as follows:

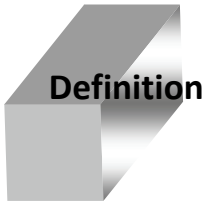
Output = Inputs (variable) + Inputs (constant)

e.g.

Wheat production = seed (variable) + fertilizer (variable) + water (constant)

b. Production function

The production function indicates what is going to happen to the output level (e.g. wheat production) when the farmer changes the level of inputs (e.g. fertilizer application) while keeping all the other input factors (e.g. water, pesticides, labour) constant.



This relationship between the output and inputs is called the *production function*. The production function thus helps the farmer to make decisions about input applications and the impact thereof on his production levels. The production function is illustrated in table format in Table 1.[5)]

In the example used in Table 1, wheat yield (also called the total product) is calculated according to the level of nitrogen application (the variable input). These two factors are then used to calculate the *average product*[1] (kilogram wheat per each kilogram nitrogen applied) and the *marginal product*[2] (the change in kilogram wheat produced per change in kilogram nitrogen applied). The average product thus indicates that if 40 kilograms nitrogen is applied, the yield is 42.8 kilograms per nitrogen applied. When nitrogen application is increased from 30 kg/ha to 40 kg/ha (a change of 10 kg/ha), the wheat yield increased from 1350 kg/ha to 1710 kg/ha (a change of 360 kg/ha). The marginal product is the change in wheat yield (360 kg/ha) divided by the change in nitrogen application (10 kg/ha) which is 36 kg/ha. The marginal product thus indicates that for every *additional* kilogram nitrogen applied, the wheat yield increased by 36 kg/ha.

If one analyse Table 1 in more detail, it is clear that as nitrogen application increases, the marginal product decreases until it becomes zero and then later negative. This means that the wheat yield did not increased with each additional kilogram of nitrogen applied. In fact, it started to decrease when nitrogen application was at 110 kg/ha (from a cultivation perspective, too much nitrogen was applied). This decline in wheat yield is known as the *law of diminishing marginal returns*.

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[1] Average product = Total product/input level
[2] Marginal product = Change in total product/change in input level

Definition

The law of diminishing marginal returns states that *as additional units of a variable input (e.g.) are applied in combination with one or more fixed inputs (e.g. labour), the marginal returns will eventually start to decrease*. This concept is important for the farmer to decide on the best possible combination of inputs to apply or the best possible production level.

Table 1. Production function of wheat production to nitrogen application[5)]

Input level	Total product (output)	Average product	Marginal product
Nitrogen application (kg/ha)	Wheat yield (kg/ha)	kg wheat per kg nitrogen	kg wheat per kg nitrogen
X	Y	$\frac{Y}{X}$	$\frac{\Delta Y}{\Delta X}$
10	400	40.0	
20	910	45.5	51
30	1350	45.0	44
40	1710	42.8	36
50	1960	39.2	25
60	2110	35.2	15
70	2190	31.3	8
80	2235	27.9	5
90	2250	25.0	2
100	2250	22.5	0
110	2230	20.3	-2
120	2200	18.3	-3

910 - 400 = 510 = ΔY

20 - 10 = 10 = ΔX

$\frac{Y}{X} = \frac{400}{10} = 40$

$\frac{\Delta Y}{\Delta X} = \frac{510}{10} = 51$

c. Production opportunities

A farmer is thus faced with several questions about production, namely:

- How much of an input to use?
- How much to produce?
- How to produce?
- What to produce?

These questions should be addressed before a farmer can start with the planning of a specific enterprise.

c.1 How much of an input or how much to produce? – Input/output ratios

It is no use to increase production when no attention is paid to the profit generated as a result of production. There is a huge difference between input application for maximum *production* and input application for maximum *profit*. A farmer should rather produces *more economically* than just to produce *more*. In order to get the best possible profits, a farmer will need to now what the best possible input application or production level should be. By taking the example from Table 1 and applying input prices at R2.00/kg and output prices at R0.50, the optimum production level or input application can be determined. This is illustrated in Table 2.

From Table 2 can be seen that the highest profit margin – R958 – can be obtained at 80 kg/ha of nitrogen application which produce 2235 kg/ha of wheat. Thus, in this case the farmer knows that in order to generate the best profit, he should apply 80 kg/ha of nitrogen and thus produce 2235 kg/ha of wheat. If one looks closer, it can be seen that this is where the value of the marginal product (Y/X*Px) is equal to the input price (Px). Hence, for optimum profits, the following decision-making rule should be used:

Decision-making rule: *The optimum input application level or the optimum production level is the level at which maximum profit is achieved. This level is where the marginal product is equal to the input price, or in other words, where marginal income is equal to the marginal cost.*

For maximum profit, the marginal income (MI) should be equal to the marginal cost (MC)

$$MI = MC$$

with $MI = \Delta YP_y$ (marginal income= change in production (ΔP) x input price of product (P_y))

$MC = \Delta XP_x$ (marginal cost= change in input application (ΔX) x input price of the input (P_x)

Table 2. Calculation of the best production level or input application with input price P_x = R2.00/kg and output price P_y = R0.50/kg

Input level	Total product (TP) (output)	Marginal product (MP)	Value of MP	Value of TP	Total input price	Margin (profit)
X	Y	$\Delta X / \Delta Y$	$MP \times P_y$	$Y \times P_y$	$X \times P_x$	$(Y \times P_y) - (X \times P_x)$
10	400			200	20	180
20	910	51	25.5	455	40	415
30	1350	44	22.0	675	60	615
40	1710	36	18.0	855	80	775
50	1960	25	12.5	980	100	880
60	2110	15	7.5	1055	120	935
70	2190	8	4.0	1095	140	955
80	**2235**	5	**2.5**	1118	160	**958**
90	2250	2	1	1125	180	945
100	2250	0	0	1125	200	925
110	2230	-2	-1	1115	220	895

$\frac{\Delta Y}{\Delta X} = \frac{510}{10} = 51$

$MP \times P_y$ = 51 × 0.5

$Y \times P_y$ = 910 × 0.5

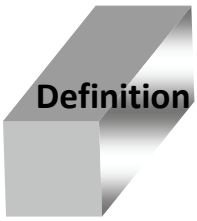
$Y \times P_y$ = 20 × 2

$(Y \times P_y) - (X \times P_x)$ = 455 - 40 = 415

c.2 How to produce a specific product? – Input/input ratios

The production process usually required two or more inputs. For example, when producing maize, several inputs such as fertilizer, water, pesticides, seed are needed. The farmer must then choose the best combination of these inputs in order to generate the maximum profit. Since inputs reflect costs of production, higher profits can only be generated by reducing the

input cost. Thus, the farmer should choose the combinations of inputs that will lead to the lowest possible cost in order to generate the best possible profits, while retaining the current production. Thus, a good farm manager always ask the following question: *"Will another input combination produce the same result at a lower cost?"* Practically, this question means that to determine how much of one input (X_1) should be added extra (in the production process) in order to generate the same production with the reduction of another input (X_2). Thus, how much of an input is replaced (or substituted) by another input, in order to produce *at the lowest cost*.



This rate at which one input is substituted by another is called the **physical rate of substitution**, and is calculated as by dividing the quantity of the transferred input (X_2) by the quantity of the added input (X_1). Mathematically it can be expressed as follows[3,4,5)]:

$$\textit{Physical rate of substitution} = \frac{\Delta X_2}{\Delta X_1}$$

With ΔX_2 = quantity of transferred input

and ΔX_1 = quantity of added input

An example of determining the combination of variable inputs at the lowest cost possible is provided by Table 3. If assumed that the input combinations (nitrogen and potash) illustrated by Table 3 all produce 8000 kg of maize per hectare, what will the combination with the least cost be? It can be seen that the least cost is R2640 of combination F, with nitrogen application at 240 kg/ha and potash at 45 kg/ha. It can be further seen that this combination is where the rate of substitution is equal to the inverse price ratio. Therefore the following decision-rule should be used when choosing the least cost combination of variable inputs:

***Rule for decision-making**: The least-cost combination required to produce a given output, by using two variable inputs, is the point where the physical rate of substitution of the two inputs is equal to the inverted price ratio of the inputs.*

This rule can be mathematically expressed as follows

$$\textit{Least-cost combination of inputs} = \frac{\Delta X_2}{\Delta X_1} = \frac{Px_1}{Px_2}$$

With ΔX_2 = change in quantity of transferred input

ΔX_1 = change in quantity of added input

Px_1 = price of input X_1 Px_2 = price of input X_2

In practice where more than just two variable inputs are used, the formula for the least-cost combination of inputs can be adjusted to accommodate the additional inputs as follows:

Least-cost combination of inputs =

$$\frac{\Delta X_2}{\Delta X_1} = \frac{Px_1}{Px_2}$$

$$\frac{\Delta X_2}{\Delta X_1} Px_2 = Px_1$$

$$\Delta X_2 Px_2 = \Delta X_1 Px_1$$

Table 3. Least cost combination of two variable inputs applied per hectare for a given quantity of maize production[5)]

Combination	Nitrogen (kg)	Change in nitrogen (kg)	Potash (kg)	Change in potash (kg)	Rate of substitution	Inverse price ratio	Cost of nitrogen (R)	Cost of potash (R)	Total cost (R)
	X_1	ΔX_1	X_2	ΔX_2	$\Delta X_2 / \Delta X_1$	Px_1/Px_2	$X_1 \times Px$	$X_2 \times Px$	$X_1 \times Px_1 + X_2 \times Px$
A	40		200				320	3200	3520
B	80	40	160	40	1.00	0.50	640	2560	3200
C	120	40	125	35	0.88	0.50	960	2,000	2960
D	160	40	93	32	0.80	0.50	1280	1488	2768
E	200	40	65	28	0.70	0.50	1600	1040	**2640**
F	**240**	40	**45**	20	**0.50**	**0.50**	1920	720	**2640**
G	280	40	33	12	0.30	0.50	2240	528	2768
H	320	40	25	8	0.20	0.50	2560	400	2960

ΔX_1 = 80 - 40 = 40

ΔX_2 = 200 - 160 = 40

$\Delta X_2 / \Delta X_1$ = $40/40$ = 1.00

Px_1 / Px_2 = $8/16$

$X_1 \times Px_1$ = 80 × 8 = 640

$X_2 \times Px_2$ = 160 × 16 = 2560

Total cost = 2560 + 640 = 3200

With:

X_1 = nitrogen quantity in kilograms;
Px_1 = price of nitrogen at R8.00/kg;
X_2 = potash quantity in kilograms; and
Px_2 = price of potash at R16/kg.

c.3 What to produce to maximise profit? – Output/output ratios

The third decision that the farm manager must make, is to decide what to produce in order to maximise profit. In other words, should he produce more maize and less groundnuts? Or should he plant more potatoes and fewer onions? When expanding one enterprise, it is logical that another enterprise should be scaled down. For example, if a farmer plant 100 hectares of his crop field with maize and 40 hectares with groundnuts and wants to plant extra 10 hectares with maize, there would be 10 hectares less for groundnuts.

In order to find the answer to "What to produce to maximise profit?" the same approach as in determining the best combination of inputs to maximise profit can be followed. Firstly, the physical relationship between the products that are to be chosen between should be determined and their prices should be known. In order to determine the best possible combination of products, the income generated from the combinations should be calculated. It should be kept in mind that inputs are fixed; therefore only the amount of outputs is variable. The combination with the highest income is then chosen, since higher income will result in higher profit when the cost stays the same.

An example of choosing the best combination of two products, namely wheat and maize is provided in Table 4. From Table 4 it can be seen that combination F with 1000 kg wheat and 440 kg maize (at prices of R21.00/kg and R12.00/kg respectively) generates the highest income at R2628. This is also the point where the rate of substitution and inverse price ratio of the products are the same. This also leads to the following decision-making rule:

Rule for decision-making: *Profit is maximised when two outputs or products are produced using a given number of limited inputs, where the physical rate of substitution of the two products is equal to the inverse price ratio of the products.*

Mathematically, it is expressed as follows:

$$\textit{Maximum profit combination} = \frac{\Delta Y_2}{\Delta Y_1} = \frac{Py_1}{Py_2}$$

With ΔY_2 = change in quantity of transferred output

ΔY_1 = change in quantity of added output

Py_1 = price of output Y_1 Py_2 = price of output Y_2

Similar to the least cost combination for inputs, the profit maximising combination of more than two outputs can be expanded as follows:

$$\Delta Y_2 Py_2 = \Delta Y_1 Py_1 = \Delta Y_2 Py_2 = ... = \Delta Y_n Py_n$$

Table 4. Best profit combination of products with a fixed number of available inputs[5)]

Combi-nation	Wheat (kg)	Change in wheat (kg)	Maize (kg)	Change in maize (kg)	Rate of substi-tution	Inverse price ratio	Income from wheat (R)	Income from maize (R)	Total income (R)
	Y_1	ΔY_1	Y_2	ΔY_2	$\Delta Y_2 / \Delta Y_1$	Py_1/Py_2	$Y_1 \times Py_1$	$Y_2 \times Py_2$	$(Y_1 \times Py_1) + (Y_2 \times Py_2)$
A	0		1,500				0	1800	1800
B	200	200	1400	100	0.50	1.75	420	1680	2100
C	400	200	1260	140	0.70	1.75	840	1512	2352
D	600	200	1060	200	1.00	1.75	1260	1272	2532
E	800	200	790	270	1.35	1.75	1680	948	**2628**
F	**1000**	200	**440**	350	**1.75**	**1.75**	2100	528	**2628**
G	1200	200	0	440	2.20	1.75	2520	0	2520

With Y_1 = wheat quantity in kilograms

Py_1 = price of wheat at R2100/kg,

Y_2 = maize quantity in kilograms

Py_2 = price of maize at R12/kg

2. Cost principles and concepts

In the discussion about farm management and enterprises in Modules 1 and 2, you were introduced to concepts such as fixed costs and variable costs. Cost principles can also be used to make production decisions instead of the production function concepts discussed in the previous sections. Decisions made according to the cost principles are discussed in more detail in this section. Cost principles that are looked into are the following:

- *Total variable cost (TVC):* This is the costs incurred in the production process, and usually varies according the size of the specific enterprise. Examples are seed, fertilizer, pesticides, irrigation water, irrigation electricity, seasonal labour, etc.
- *Average variable cost (AVC):* This is the total variable cost, expressed as a unit of production, e.g. Rand per ton, per hectare or per kilogram. It is calculated as follows:

$$AVC = \frac{TVC}{\text{Pr}\,oduction}$$

- *Total fixed cost (TFC):* It is the cost that stays fixed whether more or less is produced. Examples are depreciation, capital cost and permanent labour.
- *Average fixed cost (AFC):* It is the TFC per unit of production (per hectare, etc.) and is calculated as follows:

$$AFC = \frac{TFC}{\text{Pr}oduction}$$

- *Total cost (TC):* Is the sum of TVC and TFC
- *Average total cost (ATC):* The sum of AVC and AFC, or the TC divided by the total production to give an amount per unit of production.

$$ATC = \frac{TC}{\text{Pr}oduction}$$

or $ATC = AVC + AFC$

- *Marginal cost (MC):* When an extra unit of production is produced (e.g. an extra ton of maize), the MC is the extra costs incurred to produce that extra ton maize. It is calculated as follows:

$$MC = \frac{\Delta TC}{\Delta Y}$$

Where the delta (Δ) represents the change in the TC and total production (Y)

As can be recalled from the decision-making rule for the best level of production, *profit is maximised where marginal income (MI) is equal to MC.* Thus, where MI=MC. This also forms the decision-making rule for production under the costs principles:

Rule for decision-making: *The optimum production level is where marginal income is equal to marginal cost (MI = MC).*

Sometimes it happens that the price that the farmer receives for his products is so low that a loss is made. Then profit will not be maximised where MI = MC, but losses will be minimised.

An illustration of how to use the cost principles to determine the best production level for maximum profits is provided by Table 5. In the example, the TFC is R1000, nitrogen price is R8/kg and wheat price is R2.00/kg. Using the formulas provided in this section, TFC, TVC, TC, AFC, AVC, ATC, MC and MI can be calculated in order to determine the optimum production level. From Table 5, it can be observed that MI is equal to MC (2.00) at the point where 80 kg of nitrogen is used to produce 2230 kg of wheat.

Table 5. Application of the cost principles for the production cost of wheat at various nitrogen levels with all other inputs at constant levels[3,4,5].

Nitrogen (kg/ha)	Wheat (kg)	Marginal returns	Rand	Rand	Rand	R/t	R/t	R/t	R/kg	R/kg
X	Y	$\frac{\Delta Y}{\Delta X}$	TFC	TVC	TC	AFC	AVC	ATC	MC	MI
0	0		1000	0	1000					
10	400	40	1000	80	1080	2,500	200	2,700	0.20	2.00
20	910	51	1000	160	1160	1,099	176	1,275	0.16	2.00
30	1350	44	1000	240	1240	741	178	919	0.18	2.00
40	1710	36	1000	320	1320	585	187	772	0.22	2.00
50	1960	25	1000	400	1400	510	204	714	0.32	2.00
60	2110	15	1000	480	1480	474	227	701	0.53	2.00
70	2190	8	1000	560	1560	457	256	712	1.00	2.00
80	**2230**	4	1000	640	1640	448	287	735	**2.00**	**2.00**
90	2250	2	1000	720	1720	444	320	764	4.00	2.00
100	2250	0	1000	800	1800	444	356	800	-	2.00
110	2230	-2	1000	880	1880	448	395	843	-4.00	2.00

Wheat price = R2/kg; Nitrogen price = R8/kg
TFC = R1000/ha

Example

A farmer cannot always expect to make a profit, now the question arises: At what prices can the farmer still expect to have a profit? Or: At what prices can the farmer gets money by producing? Three possible situations might occur, namely:

a) Product price is higher than ATC (e.g. price for maize per ton is R1400, while the total cost to produce one ton of maize is R1200)

b) Product price is lower than ATC, but higher than AVC (e.g. maize price is R1400/ton, while total cost to produce one ton of maize is R1600, with AVC = R1000/ton and AFC = R600)

c) Product price is lower than AVC (e.g. maize price = R1400 and AVC = R1600)

In each of above mentioned situations, what will a farmer do? What decision should the farmer make?

Profit = Total income – (Variable cost + Fixed cost)

OR

Profit per unit = Product price per unit – (AVC + AFC)

By using the profit calculation and applying it to the three possible situations that might occur, the farmer will be able to see whether he can still produce or not. This is explained as follow:

a) **Product price is higher than minimum ATC**: When the product price, for example maize (R1400/ton), is higher than the ATC (R1200/ton), then the farmer will still make a profit (1400-1200 = R200/ton profit) as total income will be higher than total cost. The farmer will maximise his profit where MI = MC.

b) **Product price is lower than minimum ATC, but higher than minimum AVC:** When the maize price is for example R1400/ton, but ATC is R1600/ton (with AVC = R1000/ton and AFC = R600/ton). In this case, the farmer is making a loss of R200/ton (R1400-R1600). Now he should decide to produce or not. If he decides not to produce because he is going to make a loss, his total loss will be equal to his total fixed costs, namely R600 per ton that he could have produced. This is higher than the R200 loss he will make, thus it is best to produce as it will reduce his losses.

c) **Product price is lower than minimum AVC:** When the AVC is higher than the maize price at R1600/ton and R1400/ton respectively, with AFC at R600/ton, the

   farmer will make a loss of 1400-(1600+600) = R800. With AFC at R600/ton, he will better off by not producing at all, since his losses will be lower.

3. Economics of scale

Except for decisions about how much inputs to use, how much to produce, what to produce and how to produce in order to maximise profit, a farmer must also decides on what farm size will be the most profitable. This comes from the relationship between cost and size of the farm, and is called *economies of scale*, or *economies of size*. A farmer must be able to combine inputs and production factors in such a way to get the most suitable size for the farm. This relationship between the output and cost as the size increases is expressed as follows:

Returns-to-scale parameter = Percentage change in cost / Percentage change in production value.

This ratio generally produces three scenarios:

- Where the ratio (relationship) is smaller than one – This is called *increasing returns-to-scale* and means that the larger the farm, the more profitable it becomes as costs are decreasing.
- Ratio is equal to one – *Constant returns-to-scale*. This means that the farm is at its optimum size – costs are increasing at the same rate as farm size increases.
- Ratio is larger than one – *Decreasing returns-to-scale*. This means that the larger the farm, the less profitable it becomes because its costs are rising faster than its outputs.

Activity 1

Individual activity

Answer the following questions by means of the Excel file **"Production"** provided.

1. Bonghiswe is a maize irrigation farmer who is faced with the decision of choosing the best production level, with nitrogen at R6/kg on the one hand, and maize output at R1.50/kg on the other hand. Bonghiswe asked you to assist him with this decision. Use the worksheet **"input-output"** and complete the identified cells by using the appropriate calculations. State the decision-rule that should be used and advice Bonghiswe on the best production/input application level accordingly.

Nitrogen input level	Maize Total product (TP)	Marginal product (MP)	Value of MP	Nitrogen (input) price	Value of maize	Total nitrogen price	Margin (profit)
X	Y	Change in X/ Change in Y	MP*Py	Px	Y*Py	X*Px	Y*Py-X*Px
30	910			6	1 365		
60	1 600	23		6	2 400		
90	2 200	20		6	3 300		
120	2 650	15		6	3 975		
150	3 050	13		6	4 575		
180	3 400	12		6	5 100		
210	3 550	5		6	5 325		
240	3 675	4		6	5 513		
270	3 740	2		6	5 610		
300	3 743	0		6	5 615		
330	3 673	-2		6	5 510		

Instructions:

Complete the pink cells by calculating the following:

1) Value of MP
2) Total input price
3) Margin (profit)
4) Use the table to calculate the best production level or input application given the input and output prices
5) Input price = R6 per kilogram
6) Output price = R1.50 per kilogram

2. Bonghiswe's neighbour, Farmer Jack is challenged with the decision of deciding on the optimum combination of nitrogen and potash to apply to his maize crops. He paid R12/kg for nitrogen and R21/kg for potash. Complete the worksheet **"input-input"** and follow the instructions. State the decision-rule that applies to this question, and advise Farmer Jack on the best combination (in other words, least cost combination) of nitrogen and potash.

Nitrogen (kg)	Change in nitrogen (kg)	Potash (kg)	Change in potash (kg)	Rate of substitution	Inverse ratio	Cost of nitrogen (R)	Cost of potash (R)	Total cost (R)
X1	Change in X1	X2	Change in X2	Change in X2/Change in X1	Px1/Px2	$X_1 \times Px_1$	X2*Px2	X1*Px1 + X2*Px2
35		200						
70	35	160	40		0.57			
105	35	125	35		0.57			
140	35	93	32		0.57			
175	35	65	28		0.57			
210	35	45	20		0.57			
245	35	33	12		0.57			
280	35	25	8		0.57			

Instructions

Complete the pink cells by calculating the following:

1. Rate of substitution

2. Cost of nitrogen
3. Cost of potash
4. Total cost
6. Nitrogen price (Px1) = R12
7. Potash price (Px2) = R21

3. It is winter time and it is time for Farmer Sasko to plant his winter crops. In order to spread his risk, Farmer Sasko decides to plant wheat and barley. Farmer Sasko signed a deal with Tiger Brands to deliver his wheat at a price of R2800/ton, while SAB offered Farmer Sasko R2340/ton for his barley. Farmer Sasko asked you to help him to determine the best combination of wheat and barley to plant, in order to maximise his profit. Complete the table in worksheet **"output-output",** state the decision-rule that applies and advise Farmer Sasko on the best combination of wheat and barley that he should plant.

Combi-nation	Wheat (kg)	Change in wheat (kg)	Barley (kg)	Change in barley (kg)	Rate of substitution	Inverse ratio	Income from wheat (R)	Income from barley (R)	Total income (R)
	Y1	Change in Y1	Y2	Change in Y2	Change in Y2/Change in Y1	Py1/Py2	Y1*Py1	Y2*Py2	Y1*Py1 + Y2*Py2
A	0		2 000						
B	400	400	1 850	150		1.20			
C	800	400	1 650	200		1.20			
D	1 200	400	1 380	270		1.20			
E	1 600	400	1 007	373		1.20			
F	2 000	400	528	479		1.20			
G	2 400	400	0	528		1.20			

Instructions:

Complete the pink cells by calculating the following:

1. Rate of substitution
2. Income from wheat
3. Income from barley
4. Total income
5. Wheat price (Py1) = R2800
6. Barley price (Py2) = R2340

4. Farmer Durum is a wheat farmer who wants you to calculate his profit-maximising point by means of the cost principle. The data is provided in worksheet **"cost principle".** Complete the table in this worksheet and state the rule for decision-making. Advise Farmer Durum on his profit-maximising level.

Combination	Nitrogen (kg/ha)	Maize (kg)	Marginal returns	Rand	Rand	Rand	R/t	R/t	R/t	R/kg	R/kg
	X	Y	Change in Y / Change in X	TFC	TVC	TC	AFC	AVC	ATC	MC	MI
A	0	0		2200			-	-	-	-	-
B	40	1500	38	2200							1.50
C	80	2500	25	2200							1.50
D	120	3350	21	2200							1.50
E	160	4100	19	2200							1.50
F	200	4600	13	2200							1.50
G	240	5026	11	2200							1.50
H	280	5350	8	2200							1.50
I	320	5650	8	2200							1.50
J	360	5813	4	2200							1.50
K	400	5900	2	2200							1.50
L	440	5860	-1	2200							1.50

Instructions:

Complete the pink cells by calculating the following:

1. TVC
2. TC
3. AFC
4. AVC
5. ATC
6. MC
7. TFC = R2200
8. Nitrogen price = R16/kg
9. Maize price (MI) = R1.50/kg
10. Two graphs (Average and marginal cost as well as Total cost) will automatically be updated

References

1) Agricultural Economics 220 (LEK 220). Lecture notes. University of Pretoria, Pretoria.
2) Agricultural Economics 320 (LEK 320). Lecture notes. University of Pretoria, Pretoria.
3) Food and Agricultural Organisation (FAO). 2007. *Training manual for extension workers in Africa*.
4) Food and Agricultural Organisation (FAO). 2007. *Training manual for extension workers in the Caribbean*.
5) Van Zyl, J, Coetzee, G.K., Kirsten, J.F. and Geyser, M. 2005. *Finance and Farmers*, 4th ed., Standard Bank, Johannesburg.

My notes.....

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Authenticators:

- Dr PG Strauss

Module 5

Farm budgeting

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- The concept of budgets and their role in planning
- Enterprise budgets and how to construct it
- Partial budgets
- Break even budgets
- Capital budgets
- Total budgets
- Cash flow budgets
- To apply budgets to a farming business

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A budget can be defined as a written financial and physical plan for action to be taken in the future. A budget helps the farmer to plan ahead and make sure that all the farm activities are coordinated effectively. In addition, a budget is a tool with which the farmer can control his farm since budgets are used to determine whether the planned outcomes have been achieved. In the process, the farmer can thus make adjustments in case the desired outcomes have not been achieved. The most important functions of budgets are:

- planning of a farming system with all its components
- to compare all the alternative plans with each other to determine the best alternative
- helping the farmer to decide how and when to invest, and
- helping the farmer to plan the cash flow position of the farm and thus assist in obtaining credit at the right time and conditions.

It should be kept in mind that the objective of the farmer is to maximise his profits, therefore the discussions regarding budgets will be based on this assumption. A budget is created by accurately estimating the cost, quantity and nature of inputs; the expected yield (output) and price of output and applying this information in the budget. It is important to estimate this information accurately; otherwise the budget will not be useful. Estimation of the cost and quantities of inputs is easy as opposed to the output prices and yields. Output prices and yields can be difficult to be estimated, because of uncertain weather conditions (which affect yield) and price movements.

In the sections to follow, the following budgets will be discussed:

- enterprise budgets
- partial budgets
- break-even budgets
- total budgets
- capital budgets, and
- cash flow budgets

1. Enterprise budgets[1,2,8,9,10)]

An enterprise budget is usually used in the development of partial budgets, total budgets, capital budgets and cash flow budgets, which make it an important part of the budgeting process. Enterprise budgets consist of the following:

- *Gross margin analysis* – The income and directly allocatable variable costs of an enterprise are estimated on a per unit basis (e.g. per hectare for crops).
- *Monthly transaction flow* – All monthly income and expenditure of the enterprise on a per-unit basis is reflected here. This includes credit as well as cash transactions.
- *Summary of monthly machinery usage* – Monthly machinery activities and the associated costs are included here. This is important in order to coordinate farming activities and to construct a total budget.
- *Sensitivity analysis of the gross margin* – Since expected yields and future output prices are uncertain and fluctuate constantly, a sensitivity analysis should be conducted. A sensitivity analysis reflects the various gross margins at both high (optimistic) and low (pessimistic) prices and yields. A sensitivity analysis thus shows how sensitive the gross margin of a crop would be to price and yield fluctuations.

The construction of an enterprise budget can be divided into four steps:

Step 1: Construct a summary of machinery usage

The summary of machine usage is also a useful tool to calculate the total mechanisation cost for the enterprise in order to plan for mechanisation application. An example of a machinery usage cart is provided in Table 1. In the machinery usage cart all the machinery usage is indicated, for example, what kind of cultivation did the do (ploughing, planting, spraying), what implements and tractors were used, how many times was the cultivation done (e.g. the field was sprayed twice), the amount of hours the implement, tractor or labour was used, as well as the relevant costs per hectare for each activity. The total cost is then calculated at the end.

Table 1. Example of a machinery usage cart

Machinery activity/ha				Hours/ha			Cost/ha				Total
Month and type of cultivation	Imple-ment	Tractor	Repe-titions	Imple-ment	Tractor	Labour	Imple-ment	Tractor	Fuel & lubes	Labour	
Total cost/ha											

Step 2: Construct a monthly transaction flow chart

An example of a monthly transaction flow chart is provided in Table 2. The transaction flow chart shows the monthly transactions of the farmer and indicates how much money the farmer receives and spends each month on farming activities.

Table 2. Example of a monthly transaction flow chart

No	Item	Monthly summary											Total
		Jun	Jul	Aug	Sept	Oct	Nov	Des	Jan	Mar	Apr	May	
1	**Total receipts**												
2	**Operating costs**												
	Crop insurance												
	Seed												
	Fertilizer												
	Micro nutrients												
	Insecticide												
	Herbicide												
	Fungicide												
	Fuel												
	Contract work												
	Seasonal labour												
	Marketing cost												
	Irrigation cost												
	Water cost												
	Machinery cost												
	Interest on operating capital												
3	**Total expenses (1-2)**												

Step 3: Construct a gross margin analysis

The information from the machinery usage summary and the transaction flow chart is used to construct a gross margin analysis. A typical example of a gross margin analysis is provided by Table 3. From Table 3 it can be seen that this specific maize enterprise, with its given yields, price and production costs, has a gross margin of R2108 per hectare.

Table 3. Example of a gross margin analysis

No.	Item	Product	Unit	Price/ton	Yield (ton/ha)	Total (R/ha)	Calculation
	Income from production						
1	Maize	Grain	ton	1 200	12	14 400	
2	**Gross income**					**14 400**	**=1**
No.	**Item**	**Product**	**Unit**	**Price per unit**	**Quantity**	**Total (R/ha)**	
	Direct allocatable costs						
3	Fuel	Diesel	litre	7.00	52	364	
4	Fertilizer	N	kg	12.00	280	3 360	
		P	kg	35.00	50	1 750	
		K	kg	17.00	65	1 105	
5	Micro nutrients	Maize pholate	kg	65.00	2	130	
		Tripholate	kg	64.00	2	128	
		Solubor	kg	25.00	2	50	
		Marinure DS	litre	70.00	1	70	
6	Seed	Non-BT	pips	0.017	80 000	1 320	
7	Herbicide	Atrazine	litre	55.00	1.5	83	
		Wenner	litre	40.00	1.0	40	
		Relay	litre	60.00	0.8	48	
8	Crop insurance	Farmsure inc.	ton	12.00	1.4%	202	
9	Contract work	X. Matlakoyane	ha	750.00	1	750	
10	Transport	Own transport	ton	45.00	12	540	
11	Irrigation cost	Water Affairs	mm	0.55	650	358	
		Eskom	mm	1.45	650	943	
		Scheduling	ha	30.00	1	30	
12	Centre pivot cost	Repairs & maintenance	ha	225.00	1	225	
13	Mechanisation		ha	135.00	1	135	
14	Marketing costs	Grain broker inc.	ton	1.25	12	15	
15	Seasonal labour	Labourers	ha	40.00	1	40	
16	**Total direct allocatable cost**					**11 684**	**Sum of No.3 to 15**
17	Interest on production loan	XYZ Bank	months	13.0%	4	608	
18	**Total production cost**					**12 292**	**16+17**
	Gross margin					**2 108**	**2-18**

Step 4: Conduct a sensitivity analysis[4.5.10)]

After a gross margin analysis is conducted, the expected income and expenditure at various prices and costs are analysed and presented in a table. An example of a sensitivity analysis is provided by Table 4. The sensitivity analysis is conducted by calculating how the gross margin changes as a result

of a change in yields and prices. In the example, the gross margin of R2108 per hectare is the basis (0% change in both maize yields and price). If maize yields increase with 7.5% and the maize price decreases with 15%, it can be seen that the gross margin will be R841 per hectare. This way a farmer can see how a possible change in yields and price will influence the profitability of his enterprise, and he can thus plan accordingly.

Table 4. Example of a sensitivity analysis

		Maize yield (ton/ha)	% change in maize price				
			-15.0%	-7.5%	0.0%	7.5%	15.0%
Maize price (R/ha)			R 1 020	R 1 110	R 1 200	R 1 290	R 1 380
% change in yield	-15.0%	10.2	-1 741	-837	68	972	1 877
	-7.5%	11.1	-881	104	1 088	2 072	3 057
	0.0%	12.0	-20	1 044	2 108	3 172	4 237
	7.5%	12.9	841	1 985	3 129	4 273	5 416
	15.0%	13.8	1 702	2 925	4 149	5 373	6 596

2. Partial budgets[10,8,5,)]

Partial budgets are used to test the profitability of a certain farming activity or enterprise. Farmers usually use partial budgets to compare the profitability of two enterprises with each other in order to choose the most profitable one. Examples of alternative decisions are:

- comparison of cultivation practices or production techniques (e.g. conventional farming versus precision farming)
- Whether to use own machinery and equipment or make use of contract work
- Expansion or contraction of an enterprise
- Adding a new enterprise

In partial budgeting only the applicable costs and income are taken into account. The steps in partial budgeting include the following:

- **Step 1:** Determine which income and expenditure will be changed by the change
- **Step 2:** Calculate the income that will be given up as result of the change
- **Step 3:** Calculate the costs that will be saved as a result of the change
- **Step 4:** Determine what additional income will be obtained due to the change
- **Step 5**: Determine the additional cost that will occur as result to the change
- **Step 6:** Construct the partial budget
- **Step 7:** Choose the best alternative

The data from the enterprise budget is used to get the necessary information (yield expectations, price expectations and production costs). The partial budget can be compiled as represented by Table 5:

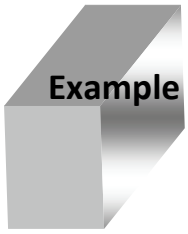
Table 5. Construction of a partial budget

Current irrigation system		Alternative irrigation system	
Income forfeited	a	Additional income	c
Costs saved	b	Additional costs	d
Difference (sacrifice)	**a – b**	**Difference (benefit)**	**c – d**

The expected change in net income as a result of a change in practice is calculated by subtracting the difference of the existing practices (a – b) from the difference of the alternative (c – d):

$$\textit{Expected change in net income} = (c - d) - (a - b)$$

If the change in net income is positive (larger than zero) the benefit is more than the sacrifice and thus desirable. If the change is negative (smaller than zero), it will lead to a decrease in net income and is thus not desirable.



An example of a partial budget for an alternative irrigation system

Question:

Farmer Mathias is a maize farmer who wants to replace his existing irrigation system, a travelling sprinkler with a centre pivot, since he is of the opinion that he will be able to use his water sources more efficiently with a centre pivot. He had read in an irrigation magazine that a centre pivot increases yields on average with 1 ton per hectare. Since he obtains average maize yields of 11 tons per hectare, he will thus be able to get on average 12 tons per hectare with a centre pivot. He has a fixed price of R1200 per ton for his maize. He compared his average costs of using the travelling sprinkler with the estimated costs of a centre pivot as provided by an irrigation equipment supplier. The compared costs are listed as follows:

Costs of travelling sprinkler		**Costs of centre pivot**	
Depreciation	R 18 000	Depreciation	R 30 000
Interest	R 21 450	Interest	R 35 750
Repairs & maintenance	R 20 000	Repairs & maintenance	R 15 000
Insurance	R 3 000	Insurance	R 5 000
Direct allocatable costs	R 900 000	Direct allocatable costs	R 855 000

Construct a partial budget with the information at hand, and calculate whether Farmer Mathias will benefit from purchasing a centre pivot to replace his existing travelling sprinkler

Answer:

Current irrigation system: Travelling sprinkler		**Alternative irrigation system: Centre pivot**	
Income forfeited	**R 1 320 000**	**Additional income**	**R 1 440 000**
Income (R1200×11×100)	R 1 320 000	Income (R1200×12×100)	R 1 440 000
Costs saved	**R 962 450**	**Additional costs**	**R 940 750**
Depreciation	R 18 000	Depreciation	R 30 000
Interest	R 21 450	Interest	R 35 750
Repairs & maintenance	R 20 000	Repairs & maintenance	R 15 000
Insurance	R 3 000	Insurance	R 5 000
Direct allocatable costs	R 900 000	Direct allocatable costs	R 855 000
Difference	**R 357 550**	**Difference**	**R 499 250**

Expected change in net income = (1440000-940750) – (1320000 – 962450)
= 499250 – 357550
*= **R141700***

Farmer Mathias will benefit by buying a centre pivot, since the expected change in net income is positive. His net income will thus increase with R141 700 by implementing the centre pivot irrigation system.

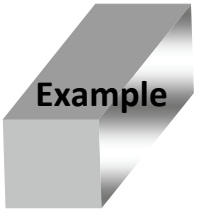
3. Break-even budgets [5,6,8,9,10)]

Break-even budgets determine the volume of production that is needed in order for total costs and total income to break even. For example, a farmer can calculate how much should be produced before a tractor can be purchased. This can be expressed in terms of physical units or money. The break-even point is defined as the point where total income (TI) equal total cost (TC). The concepts of total income and total cost are already explained in previous modules, and will therefore not be discussed in this section. The break-even point can be mathematically calculated as follows:

$$\begin{aligned} TI &= TC \\ &= TFC + TVC \\ (Y \times AI) - (Y \times AVC) &= TFC \\ Y(AI - AVC) &= TFC \\ Y &= \frac{TFC}{(AI - AVC)} \end{aligned}$$

Where:

Y	=	Break-even point (BEP)
TFC	=	Total fixed cost
AI	=	Average income per unit
AVC	=	Average variable cost per unit
TI	=	Total income
TC	=	Total cost



An example of a break-even budget

Question

Mr Aarto is a potato farmer in the Northern Cape Province. He wants to know what is the minimum acreage has to be in order break even. His depreciation, repairs and maintenance, fixed labour and all other fixed costs amount to R850 000. His variable cost is R115 000 per hectare. His average yield is 4000 bags (10 kilograms each) per hectare and the average price is R30 per 10 kg bag. Determine the break-even acreage of Mr Aarto.

Answer:

Fixed cost = R850 000

Variable cost = R115000 per hectare

Income = 4000 × R30 = R120 000 per hectare

$$Hectares = \frac{TFC}{(AI - AVC)} = \frac{850000}{(120000 - 115000)} = 170$$

Mr Aarto's break-even acreage is 170 ha. He thus needs to plant 170 ha in order to break even, given an average yield of 4000 bags per hectare and price of R30 per bag.

4. Capital budgets[5,6,8,9,10)]

Capital investments in assets such as tractors, land, implements, etc. is made for use over several years to come, while investments are made to provide additional income in the future. Income and expenditure that arise as a result of the investment should thus be taken into account for the expected lifetime of the investment. Capital expenses occur as a result of growth that takes place in the farm that requires additional capital investments; wear and tear of assets that requires new assets; and outdated technologies that need to be replaced in order to be more productive.

An example of a capital budget is provided in Table 6. From Table 6 it can be seen that the business will experience a shortage in cash to finance capital expenditure of R1 606 000 during January 2010. This indicates that the farmer knows that he is going to run out of cash and he should therefore make an appointment with his financiers as early as October 2010 and tell him that he is going to experience cash deficits during January to March 2010. The business will thus need lending facilities or loans in order to bridge those periods during which they will have no cash. By organising the financing ahead of time and managing the budget as presented the examples, the farmer will secure business during periods of cash shortages.

Table 6. Example of a capital budget

Capital budget for a period of six months (2010)								
No.	**Item**	**Source**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**March**
1	Tractors	Transactions	12 000 000	0	0	0	0	0
2	Bakkie/vehicle	Transactions	0	285 000	0	0	0	0
3	Accessories for centre pivot/sprinklers	Transactions		120 000				
4	Pumps and pipes	Transactions	1 200 000					
5	New centre pivot	Transactions				5 000 000		
6	Other	Transactions	0	0	0	0	0	500 000
7	**Total expenses**	**1+2+3+4+5+6**	**13 200 000**	**405 000**	**0**	**5 000 000**	**0**	**500 000**
8	**Begin cash balance available for capital expenditure**	**Previous month**	**17 000 000**	**3 800 000**	**3 395 000**	**3 395 000**	**-1 605 000**	**-1 605 000**
9	**End cash balance**	**8-7**	**3 800 000**	**3 395 000**	**3 395 000**	**-1 605 000**	**-1 605 000**	**-2 105 000**

5. Total budgets[5,6,8,9,10)]

A total budget is used when changes to the farm are considered, for example by introducing a new enterprise to a crop farm. The impact of these changes on the *total* farm structure should then be evaluated by using a total budget. All the information from the enterprise, partial, break-even and capital budgets are then used to compile a total budget.

The following aspects should be included in the total budget:

- A review of the objectives and goals of the farmer
- An inventory of the availability of resources such as land, capital, labour and management.
- A crop cultivation system that is based on the sustainable utilisation of soil and the specific climate that applies to it.
- A plan to apply labour, machinery and other resources efficiently
- Sufficient compensation for the owner to ensure that his household has a minimum standard of living
- A practical financial budget to execute the aspects mentioned above.

The steps involved in constructing a ***total budget*** are as follow:

- **Step 1:** Compile a complete inventory of all available resources
- **Step 2:** Identify all the possible alternative plans that are viable and make a provisional choice.
- **Step 3:** Obtain information regarding various input and output prices, their possible future prices and make adjustments for inflation.
- **Step 4:** Estimate expected yields and production
- **Step 5:** Construct the enterprise budgets
- **Step 6:** Estimate all expected fixed costs
- **Step 7:** Summarise the various enterprise budgets and expected fixed costs for all the different plans with the various combinations
- **Step 8:** Evaluate the profitability for the each combination of plans as well as the financial viability thereof.
- **Step 9:** Repeat steps 7 and 8 for all the alternative plans and compare the results. Choose the best alternative based on the results.

It is wise to get professional assistance in order to help the farmer in determining the best possible solution.

6. Cash-flow budgets[5,6,8,9,10)]

A cash flow budget is the same as a cash flow statement , except that in the case of a cash flow budget, expected future cash flows are used (obtained from the enterprise budget and total budget) instead of historical cash flows as is the case with a cash flow statement. A cash flow budget indicates the following:

- when and how much cash income is received as cash
- when and how much cash expenditure is incurred
- when cash surpluses and sash shortfalls are experienced

- when and how much credit have to be obtained
- what the credit is needed for, and
- the time and amounts of repayments.

Where the previous budgets show how *profitable* specific plans are, the cash flow budget shows how *viable* these plans are. The cash flow budget is also important since the farm's cash flow income is seasonal (less cash during planting season, more cash after harvest when products are sold), while payments are done throughout the year. This usually results in the farmer being short in cash at certain times. For this reason, the cash flow budget plays an important role, since it assists the farmer to manage his cash flow efficiently and enabling him to make timely arrangements with financiers in case of cash shortfalls. For example, the farmer could arrange with his financiers to extend credit facilities, postpone debt repayments, take out additional loans to cover cash shortfalls, and to schedule purchases so that it coincide with times of cash surpluses. It can be seen that cash flow budgets are crucial financial management tools for the farmer.

The steps when constructing a cash flow budget are as follow:

- **Step 1:** Choose the period intervals for the cash flow budget. For normal farming activities a monthly budget for one year can be constructed. For capital investments (e.g. purchasing of additional land) a summarised annual budget for several years can be drawn up.
- **Step 2:** Construct a total budget for the period under review with the various enterprise budgets.
- **Step 3:** Record the estimated cash receipts according to the source and date thereof.
- **Step 4:** Record the estimated cash expenditure according to the source and date thereof.
- **Step 5:** Calculate the cash surplus or shortfall for each period in the cash flow statement.
- **Step 6:** Review the original total budget in order to make sure that it is realistic in comparison with the expected future cash flows.
- **Step 7:** Calculate the bank overdraft facility needed for each period.
- **Step 8:** Compare the actual cash flows with the budgeted cash flow and manage it accordingly.

An example of a cash flow budget is provided in Table 7. From Table 7 it can be seen that the farmer will experience cash shortages from May to October 2010, with the exception of August 2010. The farmer needs to discuss this with his bank and tell his banker that he expects to have cash shortages during these periods. The farmer must then negotiate lending facilities or loans in order to bridge those periods which he will have no cash.

Table 7. Example of a cash flow budget

Cash flow budget for a period of six months (2010)								
No.	**Item**	**Source**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**
	Cash inflows (income/sales)							
1	Maize	Transactions	0	120 000	710 000	800 000	750 000	250 000
2	Wheat	Transactions	120 000	0	0	0	0	0
3	Tomatoes	Transactions	0	0	81 205	120 043	103 984	72 373
4	Other	Transactions	45 000	41 200	23 000	32 000	27 000	45 000
5	Non-farm income	Transactions	24 000	12 000	17 500	24 000	13 500	26 000
6	**Total income**	**1+2+3+4+5+6**	**189 000**	**173 200**	**831 705**	**976 043**	**894 484**	**393 373**
	Cash outflows (expenses)							
7	Maize	Transactions	275 000	185 000	285 000	156 000	1 150 000	235 000
8	Wheat	Transactions	230 000	116 400	221 000	84 000	123 000	240 000
9	Tomatoes	Transactions	9 709	17 475	61 515	50 491	54 655	46 137
10	Other	Transactions	42 500	39 400	20 300	31 200	21 000	42 670
11	Non-farm expenditure	Transactions	18 000	7 000	14 500	19 500	11 200	24 500
12	**Total expenses**	**7+8+9+10+11**	**575 209**	**365 275**	**602 315**	**341 191**	**1 359 855**	**588 307**
13	**Surplus/shortage**	**6-12**	**-386 209**	**-192 075**	**229 390**	**634 852**	**-465 371**	**-194 935**
	Cash balance							
14	**Begin cash balance**	**Previous month**	**120 000**	**-266 209**	**-458 284**	**-228 894**	**405 958**	**-59 413**
15	Surplus/shortage	No.13	-386 209	-192 075	229 390	634 852	-465 371	-194 935
16	**End cash balance**	**14+15**	**-266 209**	**-458 284**	**-228 894**	**405 958**	**-59 413**	**-254 347**

The cash flow and capital budgets show the farmer how to manage the farm income and costs in order to ensure that the business remains healthy. It also warns the farmer ahead of time in terms of potential financial problems. These daily warnings help the farmer to plan ahead of time on how to overcome these problems. This will ensure that the business is sound and stays profitable.

Activities

Individual activities

Ms Mphatjie is an irrigation maize farmer who asked for your assistance. Her depreciation, repairs and maintenance, fixed labour and all other fixed costs amount to R654 000. Variable cost for the maize farm is R9 000 per hectare. Her average yield is 11 tons per hectare and the average price is R1200 per ton. What is the minimum amount of hectares that should be planted by Ms Mphatjie?

Use the Excel file **"Budgets"** to complete the following activities:

1. Complete the gross margin analysis for a cabbage enterprise in the worksheet **"Gross margin".** Follow the instructions provided in this worksheet and use the provided information to complete the table and to calculate the gross margin for this enterprise.

No.	Item	March	April	May	June	July	August
1	Tractors						
2	Bakkie/vehicle						
3	Accesories for centre pivot/sprinklers						
4	Pumps and pipes						
5	New irrigation system						
6	Other						
7	**Total capital expenses**						
8	**Begin cash balance available for capital expenditure**	**10 000 000**					
9	**End cash balance**						

	Instructions
1)	Use the information at hand to complete the capital budget for Mr Tom Matu for each month
2)	Fill in the expected capital expenses in the appropriate cells
3)	For each month, calculate the following:
a)	Total capital expenses
b)	Begin cash balance available for capital expenditure
c)	End cash balance
4)	Should Mr Tom Matu make arrangements for a possible cash shortage and when? What should he do?
	Mr Tom Matu plans to make the following capital purchases durin March to August 2010 to come:
1)	Buy a tractor for R2 500 000 in March
2)	Buy accessories for his irrigation system in April for R120 000
3)	New pumps must be purchased in April and May for R800 000 and R600 000 respectively
4)	Installation of new pipes in July for the amount of R100 000
5)	Mr Tom Matu wants to buy a new bakkie for R284 000 in July
6)	A small lorry needs to be bought during April for R320 000
7)	Two new irrigation systems needs to be bought for the cabbage enterprise, one in April and another one in July. Costs will be roughly R2 400 000 each.
8)	Other costs that can be expected for general farm use is R300 000 in April, R240 000 in June and R50 000 in August
9)	Mr Tom Matu wants to buy a further two tractors during May (R1 800 000) and July (R1 000 000)
10)	Mr Tom Matu has R10 000 000 available for capital expenditure

2. Use the gross margin analysis in the worksheet **"Gross margin"** to conduct a sensitivity analysis (below the gross margin table). Follow the instructions to complete the provided table. The sensitivity analysis should be based on the following yields and prices:

Cabbage yield (ton per hectare)	70	80	90	100	110
Cabbage price (R/ton)	R700	R800	R900	R1000	R1100

Item	Product	Unit	Price/ton	Yield (ton/ha)	Total (R/ha)
Income from production					
Cabbage	Vegetable	ton	900	90	
Gross income					**0**

Item	Product	Unit	Price/unit	Quantity	Total (R/ha)
Direct allocatable costs					
Fuel	Diesel	litre	8.00	40	320
Fertilizer	N	kg	12.00	145	1 740
	P	kg	40.00	65	2 600
	K	kg	17.00	145	2 465
Mikro nutrients	Various	ha	9000.00	1	9 000
Seed		seedlings	0.130	40 000	5 200
Herbicide	Various	ha			0
Crop insurance	Farmsure inc.			0.0%	0
Transport	Own transport	ton	0.00	90	0
Irrigation cost	Water Affairs	mm	0.55	560	308
	Eskom	mm	1.45	560	812
	Scheduling	ha	35.00	1	35
Centre pivot cost	Repairs &	ha	230.00	1	230
Mechanisation	maintenance	ha	140.00	1	140
Packaging		bag	0.00	3600	0
Marketing costs	Grainbroker inc.	ton	13.2%	90	12
Seasonal labour	Labourers	ha	780.00	1	780
Total direct allocatable cost					**23 642**
Interest on production	XYZ Bank	months	0.0%	4	0
Total production cost					**23 642**
Gross margin					

Instructions: Gross margin analysis

1) Yield = 3600 bags per hectare
   1 bag = 25 kg
2) Price = R23 per bag
   Calculate price and yield per ton as well as gross income per hectare, and fill in table (pink cells)
3) Fuel cost = 40 litres @ R8.00/litre
4) Herbicide = R745 per hectare
5) Crop insurance = 20% of gross income
6) Transport cost = R90 per ton
7) Packaging = R2 per bag
8) Interest on production loan = 14% of total direct allocatable cost (over 4 months)
9) With the information at hand, fill in all the pink cells and calculate the gross income and gross margin

2. Sensitivity analysis

	Cabbage yield	Change in cabbage price				
Cabbage price (R/ha)		R 700	R 800	R 900	R 1 000	R 1 100
Change in yield	110					
	100					
	90					
	80					
	70					

Instructions: Sensitivity analysis

1) Use the gross margin analysis table to determine the gross margin for the cabbage enterprise for each of the given yield and prices
   Note: change ONLY the price and yield, and calculate the gross income and gross margin. The production costs will be calculated automatically
2) Fill the gross margin for each given price and yield in the appropriate cell in the sensitivity analysis table (see example in Module 5)
3) Remember to change the yield, price and gross income in the gross margin table back to the original ones after the sensitivity analysis is completed

3. Farmer Johnson wants to investigate the possibility of replacing his existing travelling sprinkler with a centre pivot. He farms with wheat on 100 hectares. The current price of wheat is R2000 per ton. He usually gets an average yield of 6 ton per hectare with the travelling sprinkler. However, research indicates that he could improve his wheat yield with 0.5 ton per hectare if he used a centre pivot. The costs of the two systems are presented as follow:

Travelling sprinkler		Centre pivot	
Depreciation	R 18 500	Depreciation	R 43 000
Interest	R 21 000	Interest	R 50 000
Repairs & maintenance	R 18 000	Repairs & maintenance	R 35 000
Insurance	R 2 500	Insurance	R 5 500
Direct allocatable costs	R 740 000	Direct allocatable costs	R 800 000

Should Farmer Johnson purchase the centre pivot? Motivate your answer. Use the information provided to construct a partial budget for the alternative irrigation system. Complete the worksheet **"Partial"** to construct the partial budget.

Current irrigation system: Travelling sprinkler		**Alternative irrigation system: Centre pivot**	
Income forteited		**Additional income**	
Income		Income	
Costs saved		**Additional costs**	
Depreciation		Depreciation	
Interest		Interest	
Repairs & maintenance		Repairs & maintenance	
Insurance		Insurance	
Direct allocatable costs		Direct allocatable costs	
Difference		**Difference**	

Instructions:

Use the given information to complete the partial budget

Complete the table by filling in the pink cells

Calculate the income forteited and costs saved of the existing irrigation system

Calculate the additional income and additional costs of the alternative irrigation system

Calculate the differences of the respective irrigation systems (green cells)

Will Farmer Johnson benefit from purchasing a centre pivot system?

Information:

Price of wheat = R2000/ton

Yield of wheat with sprinkler = 6 ton per ha

Yield of wheat with centre pivot = 6.5 ton per ha

Acreage of wheat enterprise = 100ha

Costs of respective irrigation systems:

Travelling sprinkler		**Centre pivot**	
Depreciation	R 18 500	Depreciation	R 43 000
Interest	R 21 000	Interest	R 50 000
Repairs & maintenance	R 18 000	Repairs & maintenance	R 35 000
Insurance	R 2 500	Insurance	R 5 500

4. Complete the cash flow budget in the worksheet **"Cash flow budget"** in the Excel file "Budgets" by filling the indicated cells. Follow the instructions provided in the worksheet to complete the cash flow budget. Should this farmer make arrangements with his bank regarding possible cash shortages and when?

No.	Item	March	April	May	June	July	August
	Cash inflows (income/sales)						
1	Maize	0	0	0	1 300 000	660 000	250 000
2	Onions	300 000	80 000	0	0	0	0
3	Cabbage	0	0	81 205	120 043	103 984	72 373
4	Other	48 000	43 000	64 000	32 000	27 000	76 000
5	Non-farm income	2 000	15 000	17 500	24 000	13 500	26 000
6	**Total income**						
	Cash outflows (expenses)						
7	Maize	250 000	176 000	276 000	540 000	760 000	235 000
8	Onions	230 000	116 400	221 000	84 000	123 000	240 000
9	Cabbage	9 709	17 475	54 000	50 491	54 655	46 137
10	Other	18 000	23 000	20 300	13 000	21 000	23 000
11	Non-farm expenditure	13 200	7 000	14 500	12 000	8 000	12 000
12	**Total expenses**						
13	**Surplus/shortage**						
	Cash balance						
14	**Begin cash balance**	**116 000**					
15	Surplus/shortage	0	0	0	0	0	0
16	**End cash balance**						

Instructions

1) Complete the cash flow budget by filling in the pink cells

For each month, calculate the following:

a) Total income

b) Total expenses

c) Surplus/shortage

d) Begin cash balance (Begin cash balance for March 2010 is R116000)

e) End cash balance

5. Complete the capital budget in the worksheet **"Capital budget"** in the Excel file "Budgets". Follow the instructions provided in the worksheet to complete the capital budget and use the information provided. Should Mr Tom Matu make arrangements for a possible cash shortage and when? What do you recommend?

No.	Item	March	April	May	June	July	August
1	Tractors						
2	Bakkie/vehicle						
3	Accesories for centre pivot/sprinklers						
4	Pumps and pipes						
5	New irrigation system						
6	Other						
7	**Total capital expenses**						
8	**Begin cash balance available for capital expenditure**	**10 000 000**					
9	**End cash balance**						

	Instructions						
1)	Use the information at hand to complete the capital budget for Mr Tom Matu for each month						
2)	Fill in the expected capital expenses in the appropriate cells						
3)	For each month, calculate the following:						
a)	Total capital expenses						
b)	Begin cash balance available for capital expenditure						
c)	End cash balance						
4)	Should Mr Tom Matu make arrangements for a possible cash shortage and when? What should he do?						
	Mr Tom Matu plans to make the following capital purchases durin March to August 2010 to come:						
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2)	Buy accessories for his irrigation system in April for R120 000						
3)	New pumps must be purchased in April and May for R800 000 and R600 000 respectively						
4)	Installation of new pipes in July for the amount of R100 000						
5)	Mr Tom Matu wants to buy a new bakkie for R284 000 in July						
6)	A small lorry needs to be bought during April for R320 000						
7)	Two new irrigation systems needs to be bought for the cabbage enterprise, one in April and another one in July. Costs w						
8)	Other costs that can be expected for general farm use is R300 000 in April, R240 000 in June and R50 000 in August						
9)	Mr Tom Matu wants to buy a further two tractors during May (R1 800 000) and July (R1 000 000)						
10)	Mr Tom Matu has R10 000 000 available for capital expenditure						

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My notes.....

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Module 6

Financial management

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- Important financial ratios that could be used to determine the financial position of a farm business
- How to interpret these ratios in a farm business
- Investment possibilities in agriculture
- Various methods to apply in determining the best agricultural investment

Table of contents

The farm record system adopted for a specific farm should be adequate for the analysing of the farm business. The analysis will include the physical as well as financial analysis of the farm business and its various enterprises. This module will focus on the analysis of financial information and this is a very important aspect of the farm management information system.

1. Financial analysis

The purpose of financial analysis is to determine whether the farmer will be able to meet financial obligations, to carry risk and to use and apply his available capital safely on the farm. It is however important to be correctly analysed but also meaningful interpreted.

1.1 Financial ratios[4,5,9,10)]

Ratios are used to determine the financial position of the farm. Ratios provide norms or guidelines against which the financial position of the farm is measured. Ratios below these norms indicate financial problems in a specific area. It is important that ratios should not be studied in isolation, but it should be compared in relation with other ratios.

The following ratios are generally used:

- Solvency ratios
- Liquidity ratios
- Profitability ratios
- Efficiency ratios
- Debt-servicing ratios

- ***Solvency***

  Solvency shows how far a farm's assets exceed its liabilities. Therefore, solvency ratios show whether a farm is solvent or insolvent (bankrupt). Solvency ratios are usually used by financiers of the farm to determine the risk involved. If a farm's solvency is low, then the risk of being bankrupt is higher, which could result in the farm not being able to pay back the money borrowed from the financier. The solvency ratios that are often used are represented by Table 1.

Table 1. Solvency ratios and the calculation and rule of thumb thereof [4,5,7,10)]

Ratio	Calculation	Rule of thumb
Net capital ratio	Total assets ÷ total liabilities	More than 2:1
Leverage ratio	Total liabilities ÷ own capital (net worth)	Less than 1:1
Own capital ratio	Total own capital (net worth) ÷ total assets	At least 0.5:1
Growth of business	[Net worth (year 2) – net worth (year 1)] ÷ net worth (year 1)	Should exceed inflation rate

- *Net capital ratio* – This ratio indicates the relationship between total assets and total liabilities (total assets: total liabilities). This shows whether the farmer would be able to pay back his debt if he sold all his assets. The higher this ratio, the more favourable the financial position of the farm. If the ratio is less than 1:1, it means the liabilities are more

than the assets and the farm therefore is bankrupt. A safe position for the farm is to have a ratio of more than 2:1.

- *Leverage ratio* – This ratio shows whether the farmer will be able to pay his debt with his own capital. The ratio should be less than 1:1 which implies that the farmer should not own more capital that has been contributed.

- *Own capital ratio* – This is the ratio between the farmer's own contribution and the total assets of the farm. A ratio of at least 0.5:1 is desirable for the same reasons mentioned for the leverage and net capital ratios.
- *Growth of business* – The growth in net worth from one year to the next year shows that the farm is progressing financially. This shows how the farmer's own capital in the business is growing. It is important that the growth of the farm business is higher than the current inflation rate; otherwise the growth will be negative. For example, if the growth of the business is 15 percent per year and the inflation rate is 10 percent, then the growth of the farm is 5 percent. This means that the purchasing power of own capital is increasing with 5 percent per year.

- ***Liquidity***

In order to continue the daily operations and activities of the farm, the farm must be able to meet all the payments and liabilities that come along. For example, the farm must be able to pay for the production inputs such as fertilizer, debt on a tractor must be paid for, etc. Liquidity has thus to do with the inflow and outflow of funds in the short term. Three liquidity ratios are usually used, and are represented by Table 2.

Table 2. Liquidity ratios, there calculation and rule of thumbs

Ratio	Calculation	Rule of thumb
Net working capital	Current assets – current liabilities	
Current ratio	Current assets ÷ current liabilities	At least 2:1
Quick (acid -test) ratio	(current assets – inventory) ÷ current liabilities	1:1
Intermediate ratio	(Total current assets + medium-term assets) ÷ (Total current liabilities + medium-term liabilities)	At least 4:1

- *Net working capital* – The net working capital is the difference between current assets and current liabilities. This indicates the capital available in order to cover operational expenses. If the current liabilities are more than the current assets, then the net working capital will show a deficit/shortfall.

- *Current ratio* – The current ratio shows how much debt (liabilities) can be paid back by selling the cash and assets of the farm. This ratio should be at least 2:1 for the farm to be in a safe position. It is important because although a farmer can be profitable, he does not have enough *cash* to cover his day to day expenses, thereby placing him in financial trouble.

- *Acid test* – This ratio is the same as the current ratio but differs in the sense that it excludes items that cannot be converted to cash immediately. A ratio of 1:1 is desirable, as a too high ratio indicates that large amounts of capital are not used productively.

- *Intermediate ratio* – This ratio measures the liquidity of the farm in the *medium-term*. The higher this ratio is above 4:1, the better the liquidity position of the farm is in the medium-term.

- ***Profitability***

Profitability is the percentage ration between the profit earned in a given period and the capital used to generate this profit. This is thus the "interest earned" on capital invested in the farm. Profitability alone does not give an accurate indication of the farm's performance – it should be compared with capital used to achieve the specific profitability level. The profitability ratios are indicated by Table 3.

Table 3. Profitability ratios and their calculations

Ratio	Calculation
Return on assets (ROA)	(Net farm income ÷ total assets) × 100
Return on equity (ROE)	(Farm profit ÷ equity) × 100

- *Average capital investment* – Profitability is calculated on capital used during a financial year. Since capital amounts fluctuate during a financial year, these changes can be brought into account by using the *average capital investment*. The average capital investment gives a more accurate indication of capital used during a financial year and is calculated as follows:

  Average capital investment = (Opening capital + closing capital) ÷ 2

  The average capital investment is used in the following two profitability ratios, namely return on assets and return on equity.

- *Return on assets (ROA) – farm profitability* – Return on assets measures farm profitability by showing net farm income as a percentage of the total capital (assets) used during the financial period. Total capital consists of all the farm's assets, plus value of rented land, plus leased equipment and land used for share-cropping. The ROA is a favourite measure to compare farms with each other, as well as previous years with the current year. This method also helps the farmer to identify shortcomings and problems regarding profitability of the farm.

- *Return on equity (ROE) – profitability on own capital* – This ratio shows the interest that the farmer has earned by investing his own capital in the farm. This ratio can be compared with interest the farmer could have earned if he invested his capital elsewhere (e.g. shares, properties, etc.), ROA for the same period and profitability of won capital in previous years.

- ***Efficiency ratios***

Efficiency ratios are used to determine whether the farm's available resources are being used efficiently and to what extent. For this purpose, the *turnover ratio* and *cost ratio* are generally used. Table 4 shows the calculation and rule of thumb for these ratios.

Table 4. Efficiency ratios, their calculation and rule of thumbs

Ratio	Calculation	Rule of thumb
Capital turnover ratio	Total income ÷ total assets	Higher ratio indicates better capital employment
Cost ratio	Total expenditure ÷ total income	Higher ratio indicates higher financial pressure

- *Capital turnover ratio* – This ratio shows how efficient capital is used in the farm. Thus, the higher the ratio the more productive capital is used in the business. Some farms are more intensive than others (e.g. irrigation farms versus grazing livestock), therefore the capital turnover ratio will differ amongst various types of farms.

- *Cost ratio* – The cost ratio indicates the total expense in comparison with the total income. Private expenses are not included here.

- ***Debt servicing ratios***

The debt-servicing ratio of the farm shows if the farm will be able to repay its debt. A high ratio indicates that the farm can possibly expect financial pressure, while growth and production may be negatively affected. Table 5 represents the debt-servicing ratio.

Table 5. Debt-servicing ratio[4,5,9,10)]

Ratio	Calculation	Rule of thumb
Debt-servicing ratio	Debt repayment ÷ Gross value of production	High ratio indicates possible financial pressure

2. Investment analysis and decision-making

Investment is defined as the addition of valuable assets to the farm. Investment is about choosing the best possible investment that will give the best profits. Examples of investment decisions are whether to purchase farm machinery, to hire it or to make use of contract working; whether to install an irrigation system, etc. Capital investment decisions are especially very important since a lot of money is involved. The farm's future profitability and survival thus depend on correct investment decision-making.

Investment can be done in different ways. Firstly, a farmer can invest by saving some of the produce (e.g. maize that are stored in addition to the stock of capital). Secondly, an investment can be made by constructing a farm structure such as a store. Lastly, another way of investing is through purchasing assets such as tools, machinery and equipment for farming.

Capital assets are usually used up and it thus loses value over time (e.g. a tractor is later broken up for scrap due to wear and tear over years, or an old building falls down). When a farmer invests in something, he hopes that the value of the initial investment can be covered at the end of its productive life. Sometimes the productive life of capital an asset is prolonged by regular maintenance and repairs. These factors should be kept by the in mind when making investment decisions.

When making investment decisions, a farmer should also decide whether the investment and costs associated with it will be covered by the new activity will generate over time. Several methods exist to determine the best investment decision. However, several of these methods have shortcomings due to the time value of money. The most reliable methods that will be discussed which include the time value of money are the *net present value* and the *internal rate of return*. For now, the time value of money is explained in the following section.

2.1 Time value of money

If a farmer had a choice to get R10 000 today or R10 000 in five years, which would he prefer? Certainly he would choose to get R10 000 today. The reason is that he could earn interest on the R10 000 from today on and in five years it would be worth more. For example, one might place the R10 000 in a savings account earning 5 percent interest which will be worth R10 500 after just one year, thus more than the R10 000 he would have receive in five years.

The time-value of money is taken into account through the use of *discounting* and *compounding*, which are described as follow:

2.2 Compounding and discounting

Compounding is the method whereby the future value of an investment at the end of its life is calculated. An example of compounding is illustrated as follows:

Suppose a farmer lends R10 000 to a neighbour at an interest rate of 5 percent per year. The following year the neighbour will owe the farmer R10 500. Of the R10 500, R10 000 is the principal amount (the amount that was borrowed) and R500 the interest (which is calculated as R10 000 × 0.05). In other words, the *future value* of the R10 000 over a year will be R10 500. If the neighbour wants to borrow the money for two years instead of one, then he must pay 5 percent for the use of the money for the first year and in the second year an additional 5 percent. This is calculated as follows:

*Year 1: (*R10 000 × 0.05) + R10 000 = R10 500
Year 2: (R10 500 × 0.05) + 10 500 = R11 025

The neighbour must thus pay 5 percent for the use of the money for the first year (R10 500) as well as additional 5 percent in the second year (R11 025). The neighbour will have to pay additional interest on the amount he/she would have to pay back at the end of the first year. This is known as *compound interest*. Interest is thus compensation for the lender for the money he could have earned by investing it elsewhere than lending it.

On the other hand, suppose the borrower promises to pay the farmer R12 000 at the end of five years at an interest rate of 8 percent, how much is that worth to the farmer **today**? In other words, what is the *present value* of R12 000 five years in the future at an interest rate of 8 percent? To get the answer, the amount can be calculated by dividing it by 1.08 (1 + 0.08) for each year. This is illustrated as follows in Table 6:

Table 6. Calculation of present value by means of discounting [6,7)]

Year	Amount at beginning of year (R)	Interest rate factor (1 + 0.08)	Amount at end of year (R)
1	12000	1.08	11111
2	11111	1.08	10288
3	10288	1.08	9526
4	9526	1.08	8820
5	8820	1.08	8167

The present value of R12 000 five years in the future is R8170. This process is known as *discounting*. Discounting is a method by which future benefits and costs are reduced to a present value. The interest rate used for discounting is called the *discount rate*.

The process of compounding and discounting is illustrated by Figure 1.

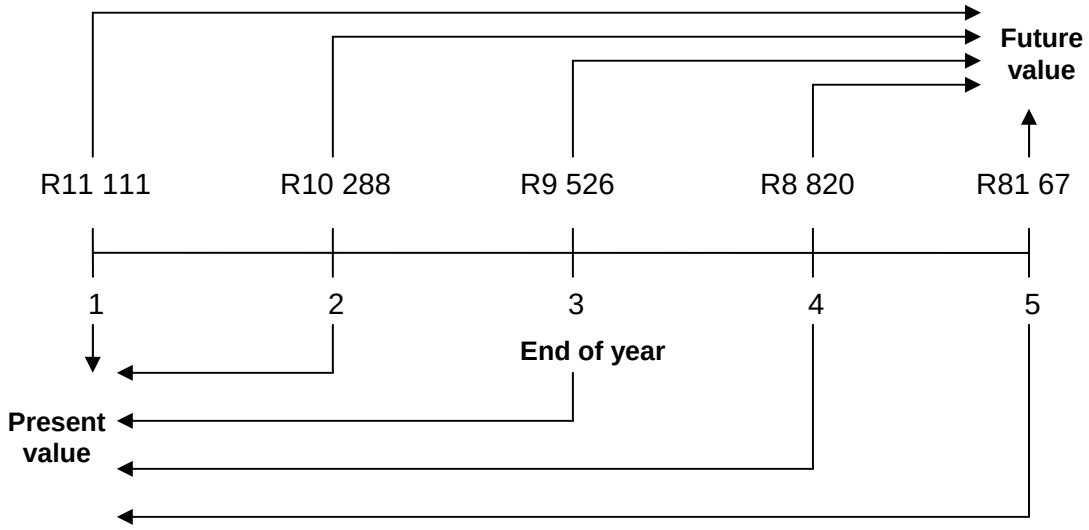

Figure 1. Compounding and discounting as adapted from van Zyl et al (2005)[10)]

The formula used to calculate the future value of an investment is as follows:

$$FV = PV(1+\frac{i}{m})^{n\times m}$$

Where:

FV = future value (amount to be calculated)
PV = present value (principal)
i = annual interest rate
n = number of years
m = number of times per year interest is compounded

The formula used to calculate the present value of an investment is as follows:

$$PV = \frac{FV}{(1+\frac{i}{m})^{n\times m}}$$

2.3 Annuity

An annuity is a series of equal payments made at equal intervals. Examples of annuities are premiums paid on insurance policies, benefits paid in respect of a pension scheme, loan or bond repayments or amortisation.

If a farmer would like to know how, for example, much his pension scheme will be worth in 10 years, he can calculate the future value of the pension scheme. The future value of an annuity can be calculated by using the following formula:

$$FV = A\left[\frac{(1+\frac{i}{m})^{n\times m}-1}{\frac{i}{m}}\right]$$

Where:

A = periodic payment
i = interest rate per year
m = number of times interest is compounded per year
n = number of payment intervals

On the other hand, if a farmer wishes to get a certain amount of annuity per month for ten years, then he should calculate the present value thereof that he should invest in the beginning. The present value of an annuity can be calculated by using the following formula"

$$PV = A\left[\frac{1-(1+\frac{i}{m})^{-n\times m}}{\frac{i}{m}}\right]$$

In order to determine how much a farmer should pay per month for a specific annuity, he can calculate the periodic payment (A) by reshuffling the formula for the present value as follows:

$$A = \frac{PV}{\left[\frac{1-(1+\frac{i}{m})^{-n\times m}}{\frac{i}{m}}\right]}$$

This formula is especially useful for the farmer to create a debt repayment (also called loan amortisation) schedule. This is explained in more detail in the section that follows.

2.4 Loan amortisation – debt repayment

Loan amortisation means that the annual equal loan payments required repaying debt at a specified interest rate and principal in a specified period is determined. For example, a farmer borrows R50 000 from a bank at an interest rate of 10 percent and has to pay everything back in 3 years, compounded yearly. What is the amount that he has to pay per year? These payments can be determined by using a loan amortisation schedule, which also breaks down the payment to show how much are paid for interest, what are the principal payments and the proportion between them. This process can be illustrated as with the example as follows:

Step 1: Determine the payment

$$A = \frac{PV}{\left[\frac{1-(1+\frac{i}{m})^{-n\times m}}{\frac{i}{m}}\right]}$$

$$A = \frac{50000}{\left[\frac{1-(1+\frac{0.1}{1})^{-3\times 1}}{\frac{0.1}{1}}\right]}$$

$$= \frac{50000}{2.486852}$$

$$= 20105.74$$

The annual payment for the R50 000 loan is thus R20 105.74.

Step 2: Draw up an amortisation schedule

Beginning loan balance	R50 000
Annual payment	R20 105.74
Interest rate	10%

Year	**Beginning debt balance**	**Annual payment**	**Interest paid**	**Principal payment**	**Ending balance**
	(a)	(b)	(c)	(d)	(e)
	a = e	b = formula	c = a × i	d = b – *c*	e = a – d
1	50 000	20 106	5 000	15 106	34 894
2	34 894	20 106	3 489	16,616	18 278
3	18 278	20 106	1 828	18 278	**0**
Total:		**60 317**	**10 317**	**50 000**	

From the table above, it can be seen that the total interest paid (R10 317), plus the total principal payments (R50 000) amounts to total payments of R60 317.

2.5 Decision analysis tools: Capital budgeting

Two tools are generally used for analysing investment decisions, namely the net present value (NPV) and the internal rate of return (IRR). However, the NPV method is used most widely, and for the purpose of this course, it is discussed in more detail, while only a brief overview of the IRR method is provided.

- ***Net present value (NPV)***

The net present value of an investment is the sum of the present values for each year's net cash flow less the initial cost of the investment. This method is also called the discounted cash flow method as it uses a discounting method of analysis. The time value of money and the stream of cash flow over the entire life of the investment are taken into account.

The purpose of this method is to accept an investment with a positive NPV, reject one with a negative NPV and be indifferent to a zero NPV value. The reason for accepting investments with a positive NPV is twofold: Firstly, it means that the rate of return on the investment is grater than the discount rate used in the calculations. Secondly, the farmer can afford to pay more for the investment and still gets a rate of return equal to the discount rate used to calculate the NPV.

The steps for determining the NPV is as follow:

- ***Step 1:*** Calculate the discount rate or required rate of return
- ***Step 2:*** Calculate the amount and time of payment of investment and other cash expenses
- ***Step 3:*** Calculate the amount and timing of all cash inflow
- ***Step 4:*** Calculate the amount and timing of the annual net cash flow for the lifetime of the investment.
- ***Step 5:*** Calculate the present value of the annual net cash flow
- ***Step 6****:* Calculate the net present value (NPV) of the project
- ***Step 7:*** Make a decision

The decisions to be made are based in the following guidelines:

- If the NPV is smaller than zero, then it means that the investment does not pay since the internal rate of return is lower than the required return.
- If NPV is larger than zero, the investment is acceptable because the internal rate of return of the investment is greater than the required rate of return. The larger the NPV, the more profitable is the investment. If there are thus several investment decisions that should be made, they can be prioritised according to their NPV.

- ***Internal rate of return (IRR)***

The internal rate of return is the interest rate at which the NPV of an investment is equal to zero. This is the maximum interest rate that the farmer can afford to pay for the resources used in order to recover the original investment and its operating costs while still being able to break even.

The decision criterion for the IRR is to accept an investment with a return equal to or greater than the discount rate. If the IRR of the whole investment is lower than the discount rate the investment is not

profitable. If the IRR is greater than the discount rate, the farmer may try to borrow as much as possible to increase the return to his resources.

Activity 1

Individual activity

1. Bongani is a farmer who wants to invest part of his disposable income in The People's Bank in order to diversify his income. His objective is to have R100 000 in 5 years. He negotiated an interest rate of 9.25% per year (he will thus receive interest once per year) with The People's Bank to invest his money. What amount should he invest today (present value) in order to get R100 000 after 5 years (future value) at an interest rate of 9.25%? Use the following formula to calculate the amount he should invest today:

$$PV = \frac{FV}{(1+i)^n}$$

Where:
PV = present value
FV = future value
i = interest rate
n = amount of years

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2. Alternatively, if Bongani decided to invest an amount of R50 000 at The People's Bank <u>today</u> at an interest rate of 7.5% per year, how much money will he have after <u>6 years</u>? You must thus find the *future value*. Use the following formula:

$$FV = PV(1+i)^n$$

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Activity 2

Individual activity

After driving around his irrigation farm, Mark decided he should upgrade his irrigation system. After a visit to the cooperative representative, he determined that the upgrade will cost him R400 000. He decides to talk to his bank manager in order to get a loan from the bank. The bank manager agreed to give Mark a loan on the condition that it should be paid back in 6 years at an interest rate of 12%. In order to pay back the loan in 6 years, Mark should make a payment of R86 000 per year. Mark asked you to construct an amortisation schedule for him in order to plan the repayment of this loan.

- Complete the following "Amortisation schedule" as explained in Section 2.5 in order to help Mark.

Beginning loan balance	R400 000
Annual payment	R86 000
Interest rate(i)	12%

Year	**Beginning debt balance (a)**	**Annual payment (b)**	**Interest paid (c x i)**	**Principle payment (d= b-c)**	**Ending balance (e=a-d)**
1	400 000	86 000	48 000	38 000	362 000
2		86 000			
3		86 000			
4		86 000			
5		86 000			
6		86 000			
Total					

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My notes.....

Authenticator:

- Dr PG Strauss

Module 7

Financing Principles

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- Sources and types of finance as well as the importance for a farmer to be able to repay his debt
- The criteria financiers use when deciding whether they provide finance or not
- Leverage
- Obtaining credit and information required for credit evaluation
- Taxation and its underlying principles

Table of contents

After the financial position of the farm is analysed and investment decisions analysed and made, the farmer must take action to achieve the set objectives. He should get money to finance the investments he is about to make. This process of obtaining money to finance his farming operations and other investments is called financing. This section will provide a background on the different financing methods and sources and how to obtain them.

1. Sources of finance[2,3,4)]

There are three main sources where finance can be obtained, namely *state-supported financial institutions*, *private sector institutions* and *own sources of capital*. These sources are further explained in the sections to follow.

1.1 State-supported financial institutions

- ***The Land Bank***

Activities of the Land Bank are controlled by the Land Bank Board. Loan applications are evaluated by management. The Land Bank also offers loan facilities to cooperatives which in turn use it to provide production loans to farmers.

- ***Provincial agricultural banks***

Provincial agricultural banks provide short, medium and long-term loans to the agricultural sector in some provinces. These banks are traditionally stationed in the former homelands and can usually not survive without government subsidies.

1.2 Private sector institutions

- ***Commercial banks***

Commercial banks supply a wide range of products that are specifically designed to meet specific needs of farmers. Finance that is provided by them includes short, medium and long-term credit. Various factors are taken into account before a loan is approved to a farmer, namely amount of money needed, ability of the farmer to pay back the loan (thus the financial position of the farm), security offered by the farmer, his banking history, and all the risk involved with providing the loan. Interests are then charged based on the creditworthiness of the applicant.

- ***Cooperatives***

Cooperatives provide finance to their members mainly in the form of production loans to finance the purchase of production inputs (seeds, fertilizer, fuel, pesticides, etc.) for the production of a particular crop. Cooperatives in turn get cash loans from the Land Bank and overdraft facilities (credit) from commercial banks that are in turn redistributed to their members. Loan applications from their members are evaluated in the same way as commercial banks do.

- ***Other private sector institutions in agriculture***

Many agricultural companies and institutions such as sugar mills and cotton processing companies, also provide finance to farmers. They usually provide loans for a production season. The loan is provided to the farmer, while the company or institution also buys the products from the farmer at the end of the harvest season. The loan amount provided by the company is then recovered by subtracting it from their payment made to the farmer after delivery of the products.

- ***General Banks***

General Banks are companies that specialise in providing medium-term credit by means of *instalment sale agreements*. Farmers usually enter into instalment sale agreements with general banks to purchase vehicles, tractors and heavy implements from local dealers. In an instalment sale agreement, a farmer usually pay a deposit while the bank keeps ownership of the asset to be bought until it is completely paid of. If a farmer fails to pay everything back, the bank take the asset back from the farm (repossess) and sell it again to someone else. The farmer is then responsible for the difference between the instalment sale agreement and the price the bank got for selling the asset.

- ***Insurance companies***

Life insurance companies provide finance in the form of mortgage loans to farmers who want to buy land. In order to get a loan, the farm must be in a healthy financial position. Security by the farmer is usually provided in the form of mortgage bonds, while the loan that a farmer can get is more or less about 40 to 50 percent of the value of the security provided. The loan is usually paid back over a period of 20 years.

- ***Trust companies***

Trust companies also provide loans and various securities such as fixed property, bonds and guarantees; insurance policies; crops; shares; etc. are required. Farmers are not usually required to pay back regularly, which can help a farmer that does not have enough money at a specific time, or a farmer can use the money to reinvest further in his farm. However, a disadvantage is that the money can be recalled in up to three months notice, which could be a problem for a farmer that does not have money to pay back the loan at that stage. Trust companies are also very selective and cautious when granting loans, thus it could be difficult to obtain a loan in this matter.

- ***Suppliers' credit***

Sometimes farmers obtain short term loans from suppliers other than cooperatives. The period (or term) for these loans ranges from 30 to 120 days, and may be longer. Interest rates charged can be very high.

- ***Private individuals***

Private individuals can also be a source of finance for farmers. Sometimes a farmer lends to another farmer that needs finance. Interest rates are usually agreed upon by the parties involved. These loans are mainly short to medium-term loans. This type of finance mainly occurs between relatives rather than strangers.

1.3 Own sources of capital

Own sources of finance usually depend on the business structure of the farm. If it is a company, finance can be obtained from the company's shareholders by means of shareholder loans. If a farm is a sole proprietorship, these loans are often provided by family members. It can be especially beneficial to get finance from family members as it can lead to favourable interest rates and repayment periods.

2 Financing terms[1,3,4)]

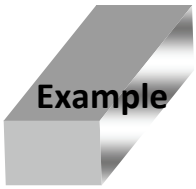
In order to make use of financing efficiently, it is important to take the period into account for which financing is required. The period or terms can be divided into three basic categories, namely short term, medium term and long term.

- *Short term* financing or credit is usually obtained for items that are used within one year. Examples are fertilizer, seed, and fuel. Types of short term credit include production loans and supplier credit.
- *Medium term credit* is required for items that are used over a few years, normally two to five year, but sometimes up to ten years. Examples of such items are tractors, implements, vehicles, etc. Types of medium term credit are instalment agreements and leasing.
- *Long term credit* is needed to finance assets such as land, usually for longer than ten years.

It is important to note that interest rates are higher for short term loans than medium or long term loans. Interest rates for medium term loans are in turn higher than interest rates for long term loans. It is therefore logical that a farmer must aim to repay his short term loans before medium or long term loans.

3 Leverage

An important concept that can assist farmer in using his debt efficiently is the concept of *leverage*. Leverage simply means that borrowed money is used to increase the rate of return on the farmer's own capital. Leverage can be positive or negative. A positive leverage means that the borrowed money increase the rate of return on own capital (in other words, the marginal cost of loan capital is less than the marginal income on that capital), while the opposite is true of negative leverage. Leverage is best explained by the following example:



Example illustrating the concept of leverage

A farmer wants to install a new irrigation system on his farm. The cost of the investment is R750 000, and the expected net income from this new irrigation system is R 375 000 per year. The farmer has two choices: He can either use his own money or buy the irrigation system on cash, or he can pay a deposit of 20% of the purchase price of the system and borrow the rest of the money at an interest rate of 10% and a repayment period of 15 years. Which choice will give him the highest return on his own capital? Table 1 represents the results of the example.

Table 1. An example showing the advantage of positive leverage

Variable	Calculation	Buy cash	Loan (20% deposit)
Own capital	a	R 750 000	R 150 000
Debt	b	R 0	R 600 000
Total	a + b	R 750 000	R 750 000
Leverage ratio	b/(a + b)	0%	80%
Net income from investment	c	R 375 000	R 375 000
Minus debt repayment at 10% interest	d	R 0	R 78 884
Annual net income before taxes	c – d = e	R 375 000	R 296 116
Annual net income after taxes at 35%	e – 35% = f	R 243 750	R 192 475
Return on own capital	f / a	**32.50%**	**128.32%**

Note that the R150 000 of own capital used for the loan is the 20% deposit for the loan.

From Table 1 it can be seen that by using positive leverage, the farmer can increase the return on his own capital from 32.5% to 128.32%.

The following should be kept in mind when considering loans:

- As the rate of return increase, risk will be higher.
- The rate of return can move up and down, depending on the price or crop yield movements.
- If the investment does not make a profit, then the farmer will be in trouble.

It is therefore important to make sure that these factors are taken into account and that debt ratios should be kept low by not borrowing too much.

4 Obtaining credit

Before finance can be obtained, there are several questions the *farmer* has to ask himself:

- When should one borrow
- Is the rate of return on capital in my farm business favourable enough to borrow money?
- How much money is needed and for how long?
- What is the money needed for? What type of loan is required?
- Will the money appreciate (get more) or depreciate in value over time?

- What security is required for the loan?
- What is the cost of the loan (is the interest rate and instalment affordable)?
- What are the repayment conditions of the loan?
- Can interest and capital be repaid without having a negative impact on the farm's cash flow or liquidity?
- How will the money be made available?
- What influence will the financier gain in decision-making in the farm business?
- Out of the *financier's* perspective, the following questions will need to be answered:
- Who is the applicant?
- What is the applicant's credit record?
- What is the applicant's current financial position?
- What is the quality of management of the applicant?
- Is the projected use of the loan and profit as result thereof realistic estimated?
- What is the medium and long term production capability and potential of the farm?
- What risks are involved in the farm business?

When financiers evaluate applications for finance by farmers, they measure the farm against a certain set of criteria. It is therefore very important for the farmer to show that his farming business is able to meet these criteria, in order to obtain finance. When one of these criteria is not met, the financiers do not grant the loans. In addition, when financiers are uncertain about certain aspects of the farm, they usually increase the interest rate on the borrowed money, thereby putting more financial strain on the farmer. These factors that affect credit evaluation are as follow:

- ***The applicant***

Financiers should know who the applicant is, his credit history and whether the person has a good reputation for repaying debt.

- ***Repayment ability***

It is very important for the financier to know whether the applicant will be able to pay back the borrowed money under the specific conditions with the given interest rate and within the required time.

- ***Security***

If something goes wrong and the farmer cannot pay the money borrowed from the financier, the financier must have security to cover the resultant losses.

- **Conditions**

The conditions under which the loan is granted, e.g. interest rate, repayment period, etc.

- **Investment**

It is important for the financier to know what the farmer wants to do with the loan (e.g. expand his land, invest in assets, etc). This is to determine whether the type of loan will be the right type and that the loan will help the farmer to be more profitable (thereby improving his ability to pay back the financier's money).

- ***Risk***

The financier wants to know what risks are involved regarding the planned investment in terms of product prices, yield, failure, etc.

5 Important information for credit evaluation

The following documents must be submitted along with the loan application:

- ***The farm's previous financial performance***

This information should consist of:

- an income statement of the previous year' farming activities
- balance sheets for the previous number of years, and
- a ratio analysis which indicates the changes in certain critical financial ratios.

- ***The farm's current financial position***

Important information that should be included here are:

- balance sheet of the current financial year
- changes that occurred in the important ratios compared with previous years.

- ***The farm's future financial requirements***

Information that is required:

- current budgets
- a debt repayment schedule
- budgets for non-farming income/expenditure
- cash-flow budget**,** and
- debt repayment ability of the farmer**.**

- ***Security position***

Important information regarding security is the valuation of the land and valuation of other assets.

6 Taxation: basic principles that apply in agriculture

A farmer should structure his farming business in such a way to pay as little tax as **legally** possible. There is two ways in which this can be done, namely through tax *evasion* and tax *avoidance*. Tax evasion is illegal where a business conceals or distorts facts (lying) in order not to pay taxes. This is a criminal offence. Tax avoidance is the legal planning for saving on taxes by making use of tax

concessions and avoiding tax pitfalls. Taxes are paid to the South African Revenue Service (SARS). Since taxation is such a complex concept, a farmer should get a certified tax advisor in order to assist him with tax planning. This section only provides an introduction to the most important types of taxation in farming, which are:

- income tax
- value added tax
- capital gains tax
- transfer duty, and
- estate duty

These types of taxes will be described briefly as follows:

6.1 Income tax

Income tax is the amount tax payable to SARS on the income the farmer receives. The amount payable is usually determined by subtracting the amount that is exempt from income tax from the farms income. The remaining answer is then the taxable income on which taxes are levied. By applying the rate of taxation that is applicable for the particular business structure of the farm, the tax payable is calculated. The applicable tax rates can be obtained from SARS.

6.2 Value-added tax (VAT)

Value-added tax is an indirect tax (meaning that it is not paid directly to SARS) and is levied when a supply is made. Basically, supplier of goods or services adds 14 percent VAT to the price of the goods or services that he provides to his customers. This VAT is then paid over to the Commissioner of SARS. This input tax can be deducted by the vendor as compensation for the VAT he has to pay to get the inputs. As services and goods move from manufacturer to retailer and at the end to the consumer, each trader in this process pays VAT when he buys (input tax) and again charges VAT when he sells (output tax). The consumer (at the end of this process or supply chain) carries the burden of the tax at the end as he has no one else to pass the tax on. A farmer must be registered for VAT in order to limit his tax liabilities, for example by deducting input tax he has to pay.

6.3 Capital gains tax

When a farmer dispose (e.g. selling, donating, grant, exchanged, etc.) some of his assets, he has to pay a tax on the particular assets. This is known as capital gains tax, where the farmer is taxed on the income he gets by selling assets. Examples of are fixed property, machinery, vehicles, shares, etc.

6.4 Transfer duty

Transfer duty is tax that is paid on property when the property rights thereof are transferred to another person in any matter. The rates at which property is taxed can be obtained from SARS, as they vary from year to year.

6.5 Estate duty

Estate duty is taxes payable on assets and property. This tax is imposed when the owner dies, and are calculated based on the value of the assets to be inherited by the farmer's beneficiaries (such as his children). Estate planning is very important here so that the farmer and his beneficiaries may enjoy and continue to enjoy the maximum of his assets.

ACTIVITY

Small group activity

1. Xolani is a farmer who wants to expand his farming activities by buying and developing a field for irrigation purposes. An agricultural economist estimated the cost of the proposed development at R2 840 000. Xolani asked you to do the following:

    a. List possibly sources of finance Xolani can approach to provide financing for his development

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    b. Would you classify the financing term as short term, medium term or long term? Motivate your answer.

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    c. Explain to Xolani what factors will affect his credit evaluation by his possible financiers.

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    d. Xolani decided to approach Xarre Xe Bank (a commercial bank) for a loan to do his proposed development. Advise him on the documents he must submit along with the loan application.

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2. Xarre Xe Bank informed Xolani that his loan was approved. However, the Bank requires a deposit of 15%, while Xolani will have to pay interest of 10% per year. His loan must be paid back over 15 years at a payment of R381 816 per year. However, Xolani has also been informed that he inherited R3 000 000 from his deceased grandfather. He is now faced with a

question whether to use his own cash to fund the planned development, or to use the Bank loan to improve his leverage. Use the example explained in Section 3: "Leverage" to complete the following table (indicated red cells in the table) to calculate the return on own capital for the two options (own cash and loan.

Variable	Calculation	Buy cash	Loan (15% deposit)
Own capital	a	R 2 840 000	R 426 000
Debt	b	R 0	R 2414000
Total	a + b	R 2 840 000	R 2 840 000
Leverage ratio	b/(a + b)	0%	?%
Net income from investment	c	R250 000	R 250 000
Minus debt repayment at 10% interest	d	R 0	R ?
Annual net income before taxes	c – d = e	R 250000	R ?
Annual net income after taxes at 35%	e – 35% = f	R ?	R ?
Return on own capital	f / a	**?%**	**?%**

References

1. Coetzee, K., 2008. *Die ABC van boerderybestuur (The ABC of farm management)*. 1st ed., Pretoria: Agri Connect.

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4. Van Zyl, J, Coetzee, G.K., Kirsten, J.F. and Geyser, M., 2005. *Finance and Farmers*, 4th ed., Standard Bank, Johannesburg.

My notes.....

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Authenticator: Dr PG Strauss

Module 8
Marketing

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- The concept of marketing and problems associated with marketing in South African agriculture
- Strategic marketing
- Working and use of SAFEX
- To construct a marketing plan for a farming business

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Definition

What is marketing? A common misconception is that marketing and selling or advertising is the same thing. It is correct to assume that selling and advertising is part of marketing, but marketing is much more than just selling and advertising. For instance, maize can be *marketed* long before it is produced, but it cannot be *sold* before it is produced. Although advertising forms an integral part of the marketing process, one must keep in mind that it is only one of the many functions of marketing. Marketing exists from the beginning of a product's life cycle through the end in the value chain[6,9,10,11)].

Why is marketing such an important feature? Because through marketing a business attempts to keep selling the product, to find new customers and to improve the product in order to make a profit and let its revenue grow. To succeed, a business should identify, evaluate and eventually select a good marketing opportunity.

The days are over when a farmer could simply deliver his products to a cooperative and forget about it. A farmer should manage his production according to the *needs* of the market - or in other words – the *consumer*. Therefore, farming starts at marketing. A market is an arena for facilitating and organising business activities, and address the basic economic questions namely, *what* to produce, *how much* to produce, *how to distribute*, and at *what price*.

This is commonly referred to as the four P's:

- **Price**
- **Product**
- **Promotion**
- **Place**

This section will guide you to a better understanding of marketing and its underlying components.

1. The marketing environment

Successful marketers know how markets work. The working of markets depends on several important factors that should be kept in mind:

- Supply and demand depend on the market size and product prices
- The marketer should understand how consumers make their buying decisions
- Long term profits require knowledge of costs and how prices of products and inputs are set
- Success in the market place is based on the understanding of the marketing situation in which you are

In order to operate a profitable agribusiness, it is important to deliver products as desired by consumers. This is explained briefly in the next section.

1.1 Consumer needs

This is not only a matter of matching the total supply according to the total demand, but rather the process of providing the product in the right form at the right place, time and price for buyers. By meeting the needs of consumers, you create an opportunity to increase your agribusiness' profits. Consumer needs are the questions about *what*, *why*, *how much*, *when*, *where*, *how*, and *how o*ften do people eat. In order to understand the needs of consumers, you have to look at their income level, food consumption patterns, expenditure patterns, per capita consumption, households sizes and characteristics and whether they own modern household appliances (such as refrigerators or microwaves).

1.2 Consumer demand

The price of a product is the most important factor that determines how much a consumer will buy. The higher the price of a product, the less of a product will be bought by a consumer. This relationship between the price of a product and the willingness of a consumer to pay for it is known as the demand curve. The demand curve is used to understand how consumers react to price changes. This responsiveness of consumers to price changes is known as the *elasticity of demand*. A product is said to be *elastic* when demand for that product decrease by more than 1 percent in response to a 1 percent increase of its price. On the other hand, a product is *inelastic* when the quantity demanded decrease by less than 1 percent when its price is increased with 1 percent. Another factor to keep in mind is that when a sought-after product is not readily available (supply is lower than demand), consumers will be willing to pay more in order to have that specific product. The opposite is true for a product that is readily available (when supply exceeds demand).

2 Production

Production can be defined as the use of inputs to produce outputs with economic value. In order to meet the needs of consumers, a farmer is usually faced with four production decisions, namely:

- What to produce
- How to produce
- How much to produce
- When to produce

It is therefore important to plan ahead by setting a goal to produce a specified product by a given time and quantity, after the demand for the specific product was determined and financial objectives set. The main objective for the farmer is usually to maximise his profits. For the farmer to achieve his goals and objectives production should then be planned accordingly to ensure that machine time, labour and materials will be available at the right time and best price.

3 Strategic marketing: the marketing mix[9,10,11)]

In order to ensure that his products are marketed correctly, it is important for a farmer to understand the concept of the "marketing mix". The marketing mix consists of aspects such as product, price, promotion, place and people.

- ***Product***

As mentioned in the previous paragraph, a farmer needs to decide which products to produce. The farmer will have to decide on how to produce his products in such a way that it will be different from similar products in the market. In other words, it should be unique. Since the consumer has a large variety of similar products to choose from (for example, tomatoes), the farmer has to present his products in such a way that it is attractive to the consumer. The farmer is thus faced with the challenge to *differentiate* his products in such a way that the consumer will choose his products instead of other farmer.

- ***Price***

One way for a farmer to differentiate his products is through the price he asks for his products. For example, a farmer can either make his tomatoes less expensive that other competitors' tomatoes, or he can make it very expensive and brand it as an exclusive product. Some consumers prefer to buy cheap products, while others prefer very expensive and exclusive products. It is thus important for a farmer to determine his potential consumers' needs in order to decide what price he will ask for his products.

- ***Promotion***

Promotion is another name for advertising. Advertising is the way in which a farmer informs potential consumers of his products, the advantages for consumers for consuming his product and where the consumer can buy his product. The product can be advertised via word-of-mouth, in the local newspaper, on radio, TV or the internet. Before deciding on the method to use, a farmer should first determine what type of media his potential consumers use. For example, if the potential consumers mostly watch TV between 7 pm and 9 pm, the farmer should use this medium during this time. It is a waste of money to advertise the whole day long while consumers only watch TV during a specific time slot.

- ***Place***

A farmer should know where his potential consumer will buy his products, for example, at a farm stall next to the road, a local grocery story in town, a taxi rank; take away, or at a restaurant. This information will assist the farmer to plant the transport of his products to the right place, which will enable a potential consumer to buy his products. If a farmer's products are not in the right place at the right time, the consumer might not buy the products, meaning the farmer will not be able to sell his product and make a profit.

- ***People***

Besides advertising the product at the appropriate price, getting it to the right place and ensuring it is sold, a farmer must surround himself with an effective tam of people. This team includes everybody who transports, packs and advertise the product. The farmer should therefore efficiently and regularly communicate with all these role players in order to ensure that they exactly know what to do in order to meet the needs of consumers. For example, if the person who is responsible for the transport of the product is not careful with the product, it might be damaged and will subsequently arrive in a condition at the market that is not acceptable for the consumer.

In due course, marketing of a farm product is all about getting the right product at the right time, place, format and price. Only then will the product be bought by the consumer and the farmer will be able to make a profit.

4 The marketing plan[9,10,11)]

The marketing plan plays an important role in the marketing process of a farm. It helps to identify the activities that are necessary to implement the agribusiness' marketing goals and forms part of the farm business plan (which is discussed in Module 12). The aim of the marketing plan is to provide an analysis of the factors that determine consumer needs, thus it assists the farmer in identifying the needs of consumers. It is important for a farmer to compile a marketing plan before planting. The first step in compiling a marketing plan is to decide which consumer need is to be satisfied – and how to do it better. Strategic planning plays a crucial role at this stage where the target market is identified. During this planning session five questions should be asked, namely:

- What is our business?
- Who are our clients?
- What is the value of our product to our clients?
- What *should* our business be?
- What would happen to our business in the case when nothing is done?

The marketing plan should be based on analyses on the factors that determine consumer needs. These factors are explained as follow:

- ***The current market situation***

The first step in developing a marketing plan is to analyse the market in which the farming business will be operating in order to exploit possible market opportunities. For the purpose of this course, a market can be defined as *a group of current or possible customers with the same unsatisfied needs and buying power*. The current market situation should be analysed in terms of consumer likes and dislikes, preferences and spending patterns, possibilities for growth, the demography of the market and the geographical distribution of consumers should be studied. A product analysis in terms of sales, price and possible profit of the specific product should be conducted. If a specific niche market (a specific segment of the market, e.g. sweet corn) will be served, the main competitors and their attributes such as and their sizes, market share and product quality should be studied.

- ***Opportunity analysis ('SWOT' analysis)***

An opportunity analysis will enable the farmer to identify opportunities in the market. Opportunities can be identified through a "SWOT" (**S**trengths, **W**eaknesses, **O**pportunities and **T**hreats) analysis. This is done by:

1. Determining the agribusiness' strengths in the market (e.g. highly productive soil)
2. Identifying weaknesses of the agribusiness that need attention (e.g. high maintenance costs of old equipment)
3. Identifying opportunities that exist in the market (e.g. better quality grain products such as wheat ensure that the farmer will receive a better price for his wheat)
4. Identifying threats in the market environment that will put the agribusiness at a disadvantage (e.g. high oil prices leads to higher fuel and fertilizer prices which will have a negative effect on the farm's profitability)

- ***Marketing strategy***

The marketing strategy should enable the farmer to achieve his goals, and should include a description of the marketing mix (product, price, promotion, place and people). The following questions should be answered when compiling a marketing strategy:

- Which target market will be served? (Vegetables, grains, livestock?)
- How will the product be positioned? In other words, how must customers see the product – good quality? (e.g. producing soybeans that have higher protein content than that of other producers which can be sold at a higher price as a premium)
- What will the product range consists of? (potatoes, onions, grains?)
- What will the price of the product will be?
- How, where and by whom will the product be distributed?
- How will the product be advertised and promoted?
- How will the trademark be established, advertised and promoted if the product is unique? (e.g. GWK Pty Ltd and Wildeklawer – sponsor and previous sponsor of Griquas rugby respectively).

- ***Action plan***

Upon completion and approval of the marketing plan, it should be put into action. This is done by compiling an action plan. The action plan consists of task and deadlines assigned to persons involved (e.g. *wha*t should be done, *who* is responsible for what and *when* the task should be completed). All the persons involved should have specific powers and responsibilities in order to carry the action plan out effectively.

- ***Financial analysis***

The financial analysis will determine what level of income, expenses and profits the farmer can expect for his farming business. The possible level of sales can be determined based on the price, positioning and distribution of the product, thereby enabling the farmer to get an idea of the probable income that he can expect. The costs can be determined by calculating the possible costs of obtaining additional workers, machinery, equipment etc, while the costs of advertising should also be kept in mind. The

estimated income and costs will enable the farmer to determine the expected profit for his agribusiness. Cash flow projections can also be used to determine whether the farmer will be able to generate enough cash in order meet his financial obligations (in other words, repaying his debt.).

- ***Control***

The last step in the marketing plan is to decide and implement mechanism to make sure that all the goals set in the previous steps will be achieved. For example, reports could be drawn up every four to six months in order to determine whether the farmer is still on track with his goals. If the farmer is not on track with his goals, he should then take corrective action.

5 Marketing costs[5,9,10)]

All the marketing activities of a product involve cost. This is the reason why the price of a product in a shop or retail market is usually much higher than the price paid to the farmer. In general, the more complex and longer the value chain of a product, the higher are the marketing costs. For example, if a farmer lives **5 kilometres away** form a market, he will normally have a higher gross margin that one who lives **30 kilometres away, because** the latter has higher transport cost. Also, a farmer who grows tomatoes will have more losses than an onion farmer, since tomatoes spoil easier than onions. Marketing costs consist usually of preparation costs, packaging costs, handling costs, transport costs, production losses and storage costs. An example of calculating marketing costs is provided as follows:

Example

Calculation of marketing costs

Farmer Tom grows tomatoes, and delivers it to the local supermarket. He gets a price of R8/kg for his tomatoes from the supermarket. His cost of production (seed, fertilizer, irrigation, etc.) is R4.00/kg Production losses is usually 10 percent of each kilogram tomatoes produced, meaning of each kilogram tomatoes produced, only 0.9 kilograms can be sold to the supermarket. Packaging, transport, and storage costs amount to R2.80/kg. Calculate Farmer Tom's margin.

Answer:

Production cost	= R4.00
Packaging, transport and storage costs (marketing):	= R2.80
Total costs:	**= R6.80**
Amount of tomatoes that can be sold (1kg minus 10%):	= 0.9kg
Sales revenue (R8 × 0.9kg):	= R7.20
Margin to farmer (R7.20 – R6.80):	= **R0.40/kg**

Farmer Tom will thus realise a margin of R0.40/kg for his tomatoes

6 Agricultural marketing of commodities in South Africa

Agricultural marketing in South Africa during the 1920' and 1930's took place by means of elevator certificates being traded at the Newtown market. In the mid 1930's the maize marketing scheme was introduced. Marketing of maize was regulated and maize was delivered at cooperatives (which were

acting as agents for the authorities). Farmers received prices as offered by the maize marketing regulatory body, namely the Maize Board. From the late 1930s to the early 1990's this regulated marketing schemes were applicable to almost all agricultural production, with the exception of vegetables and sub-tropical fruits. No marketing was therefore done by farmers; they simply delivered their maize at the cooperatives and received payment which was based on the price offered by the specific regulatory body (such as the Maize Board and Wheat Board). However, from the early 1990's the marketing boards were disbanded and deregulation started. This meant that farmers could sell their produce at the free market, meaning at any price being negotiated with buyers. The deregulation continued and today farmers are responsible for their own marketing of their produce.

6.1 Problems associated with commodity marketing in South Africa

- The deregulation agriculture in South Africa resulted in farmers being mostly at the mercy of market forces and do not have a lot of options other than to accept market prices for products. A farmer is therefore not in a position to determine prices, and he is thus a *price taker*.
- In the case of commodities (raw and unprocessed products such as maize, wheat, barley, beef and milk which cannot be differentiated), a farmer cannot do much to increase the value of his product. It is therefore important to implement innovative marketing practices (in other words, an innovative marketing plan should be drawn up beforehand!) to improve profits.
- One of the biggest problems in agriculture, is the fluctuations of prices (up and downward movement), especially agricultural commodities and important fresh products such as grain, vegetables and fruit. This fluctuations of prices are caused by various factors namely:
    - Production decisions of other producers (e.g. if everybody produce more of a specific product, the supply of the product becomes higher than the demand for it which result in lower prices.)
    - Weather conditions (e.g. if a drought occurs during a production period, supply of a product might be lower than the demand for it and then prices start to increase.)
    - Pests and diseases
    - Demand for the specific product (lower demand leads to lower prices, while higher demand results in higher prices)
    - Seasonal price changes (e.g. over Christmas there is a higher demand for meat products and therefore leads to higher meat prices)
    - Harvest period (E.g. most grains are harvested over a short period and prices are normally very low during harvest time. When time passes, prices start to rise again.)
    - Other unpredictable events beyond the farmer's control

6.2 Different practices to manage price movements

Since there are so many factors that affects price movements, a farmer's knowledge of price movements will help him a lot when marketing his products or trying to obtain a better price (e.g. by storing the product until he can get better prices). It will therefore be wise if farmers familiarise themselves with agricultural price trends and also implements practices to manage these price movements. One such a practice to manage prices and the risks associated with is the ***futures market***. A futures market is where buyers and sellers meet to trade commitments to make or take delivery of commodities. This is done electronically. The futures market offers different marketing

mediums to both producers and consumers to protect themselves against adverse price movements. For example, a maize *seller* (the farmer) can:

- Enter into forward contracts
- Sell futures contracts
- Buy "put" options

On the other hand, a maize *buyer* can:

- Enter into forward contracts
- Buy futures contracts
- Buy "call" options

- **Forward contracts**

  A forward contract is an agreement to buy or sell an asset at a certain time *in the future* for a certain price (the delivery price). It can be contrasted with a spot contract, which is an agreement to buy or sell *immediately*. A forward contract is traded over-the-counter (OTC), meaning the commodities are traded directly between the seller and buyer.

- **Futures contracts**

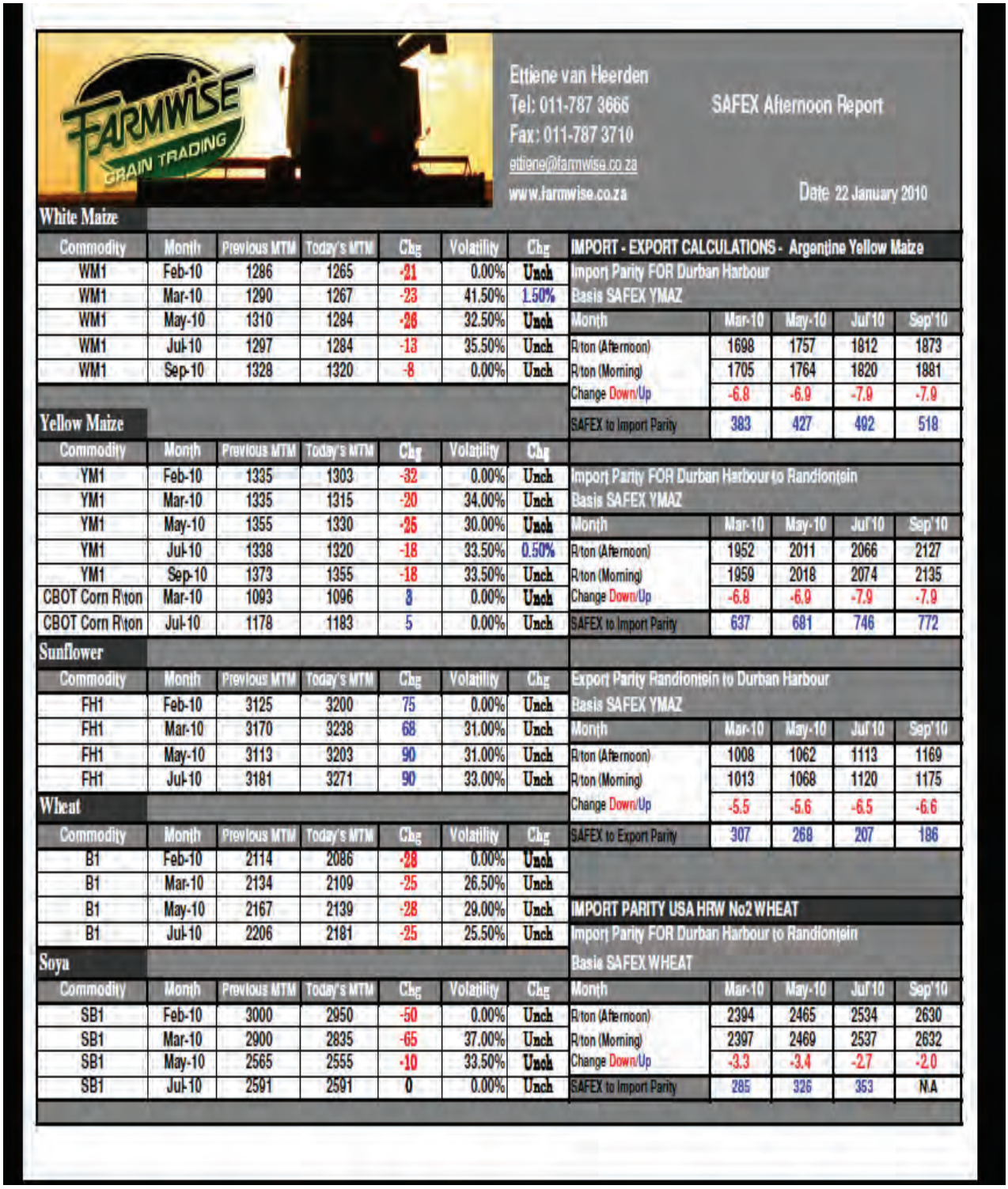
  A futures contract is an agreement to buy or sell an asset for a *certain price* at a *certain time*. It is similar to a forward contract, but whereas a forward contract is traded OTC, a futures contract is traded on an exchange. This exchange in South Africa is the Agricultural Markets Division (AMD) of the South African Futures Exchange (SAFEX). When trading on SAFEX, one should rather use a qualified SAFEX trader.

- **Options on futures**

  An option provides the *right*, but not the *obligation*, to buy or sell an agricultural futures contract at a specified price at a specified date. A *buyer* holds the *rights*, but not the obligation, to buy or sell an underlying agricultural futures contract at a specific price. A seller has the *obligation* to buy or sell and underlying futures contract at a specific price if the option is *exercised* (buying or selling a futures contract) by the buyer. There are two option types, namely a *call* option and a *put* option.

  A *call* gives the option buyer the right to buy the underlying futures contract at a specified price. When the call option is exercised, the call option buyer receives an underlying long futures position (*long* means you will *purchase* the asset), while the call option seller is assigned an underlying short futures position (*short* means you will *sell* the asset). A *put* gives the option buyer the right to sell the underlying futures contract at a specified price. When exercised, the put option buyer receives an underlying short futures position, while the put option seller is assigned an underlying ling futures position.

Example of SAFEX Report



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SAFEX Afternoon Report

Date: 22 January 2010

White Maize

Commodity	Month	Previous MTM	Today's MTM	Chg	Volatility	Chg
WM1	Feb-10	1286	1265	-21	0.00%	Unch
WM1	Mar-10	1290	1267	-23	41.50%	1.50%
WM1	May-10	1310	1284	-26	32.50%	Unch
WM1	Jul-10	1297	1284	-13	35.50%	Unch
WM1	Sep-10	1328	1320	-8	0.00%	Unch

Yellow Maize

Commodity	Month	Previous MTM	Today's MTM	Chg	Volatility	Chg
YM1	Feb-10	1335	1303	-32	0.00%	Unch
YM1	Mar-10	1335	1315	-20	34.00%	Unch
YM1	May-10	1355	1330	-25	30.00%	Unch
YM1	Jul-10	1338	1320	-18	33.50%	0.50%
YM1	Sep-10	1373	1355	-18	33.50%	Unch
CBOT Corn R\ton	Mar-10	1093	1096	3	0.00%	Unch
CBOT Corn R\ton	Jul-10	1178	1183	5	0.00%	Unch

Sunflower

Commodity	Month	Previous MTM	Today's MTM	Chg	Volatility	Chg
FH1	Feb-10	3125	3200	75	0.00%	Unch
FH1	Mar-10	3170	3238	68	31.00%	Unch
FH1	May-10	3113	3203	90	31.00%	Unch
FH1	Jul-10	3181	3271	90	33.00%	Unch

Wheat

Commodity	Month	Previous MTM	Today's MTM	Chg	Volatility	Chg
B1	Feb-10	2114	2086	-28	0.00%	Unch
B1	Mar-10	2134	2109	-25	26.50%	Unch
B1	May-10	2167	2139	-28	29.00%	Unch
B1	Jul-10	2206	2181	-25	25.50%	Unch

Soya

Commodity	Month	Previous MTM	Today's MTM	Chg	Volatility	Chg
SB1	Feb-10	3000	2950	-50	0.00%	Unch
SB1	Mar-10	2900	2835	-65	37.00%	Unch
SB1	May-10	2565	2555	-10	33.50%	Unch
SB1	Jul-10	2591	2591	0	0.00%	Unch

IMPORT - EXPORT CALCULATIONS - Argentine Yellow Maize

Import Parity FOR Durban Harbour
Basis SAFEX YMAZ

Month	Mar-10	May-10	Jul'10	Sep'10
R/ton (Afternoon)	1698	1757	1812	1873
R/ton (Morning)	1705	1764	1820	1881
Change Down/Up	-6.8	-6.9	-7.9	-7.9
SAFEX to Import Parity	383	427	492	518

Import Parity FOR Durban Harbour to Randfontein
Basis SAFEX YMAZ

Month	Mar-10	May-10	Jul'10	Sep'10
R/ton (Afternoon)	1952	2011	2066	2127
R/ton (Morning)	1959	2018	2074	2135
Change Down/Up	-6.8	-6.9	-7.9	-7.9
SAFEX to Import Parity	637	681	746	772

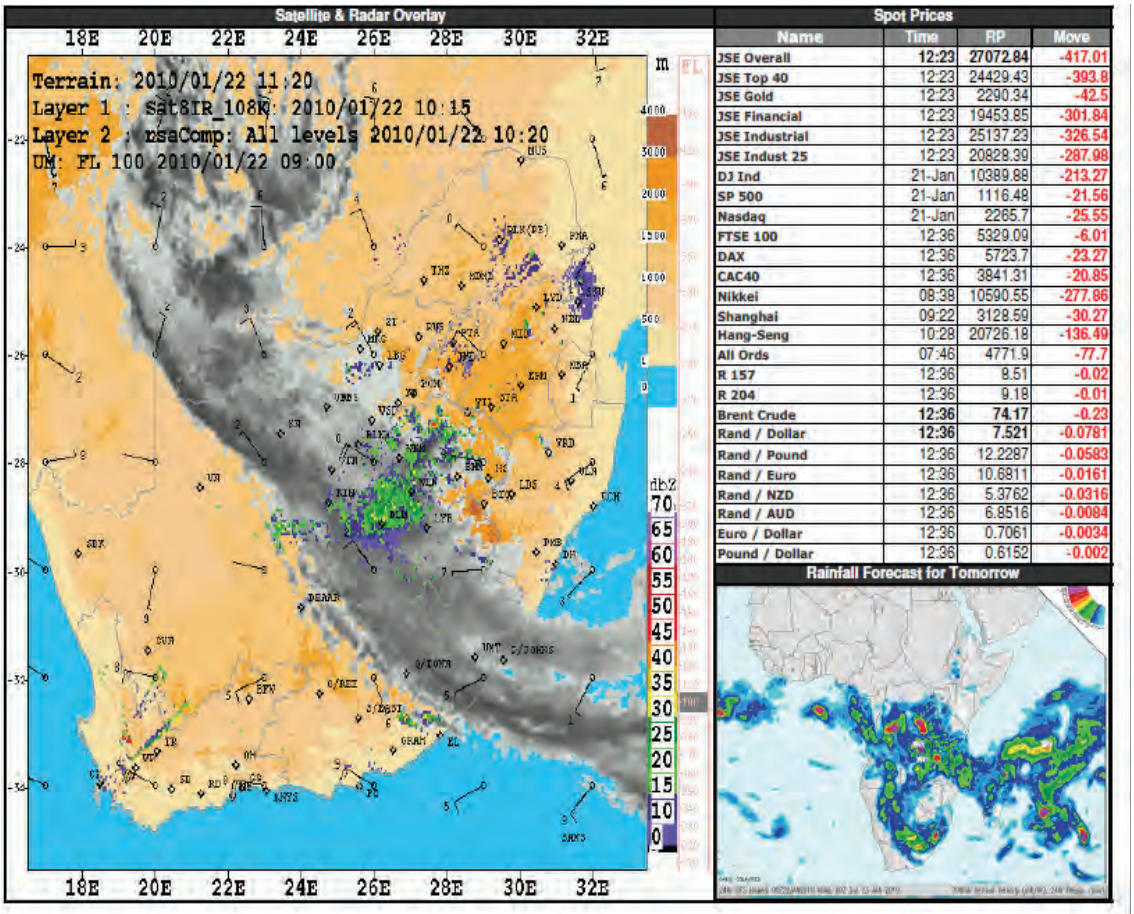
Export Parity Randfontein to Durban Harbour
Basis SAFEX YMAZ

Month	Mar-10	May-10	Jul'10	Sep'10
R/ton (Afternoon)	1008	1062	1113	1169
R/ton (Morning)	1013	1068	1120	1175
Change Down/Up	-5.5	-5.6	-6.5	-6.6
SAFEX to Export Parity	307	268	207	186

IMPORT PARITY USA HRW No2 WHEAT

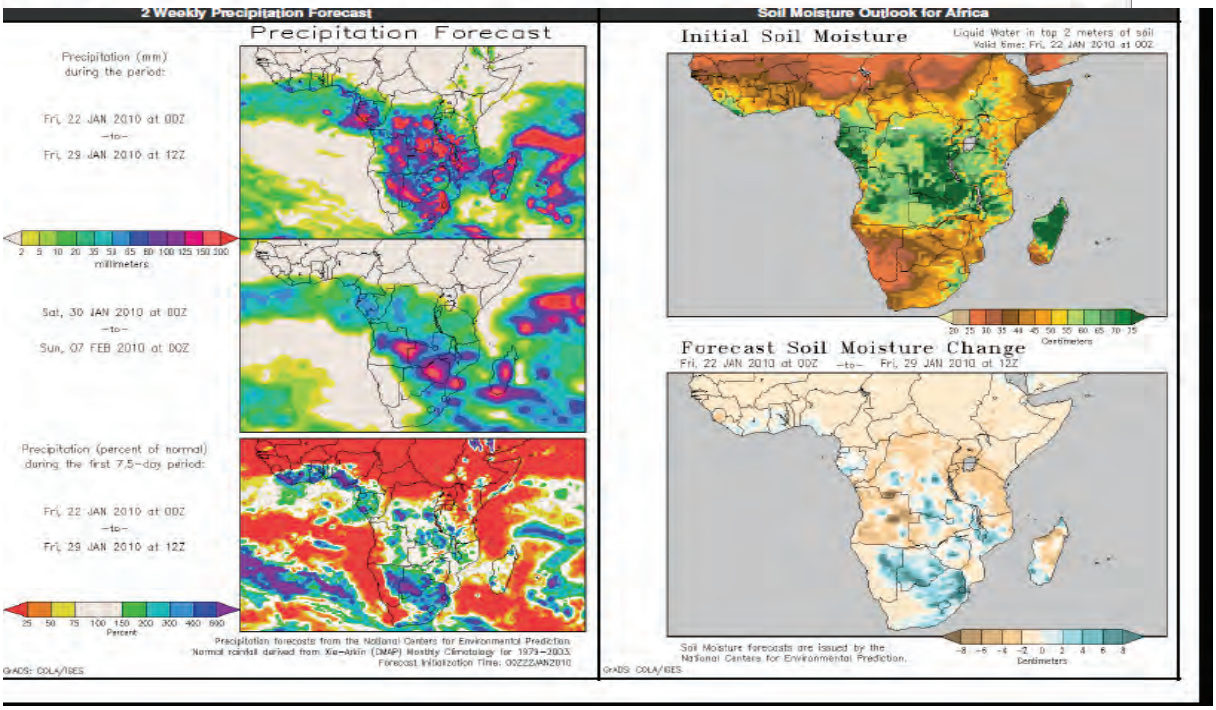
Import Parity FOR Durban Harbour to Randfontein
Basis SAFEX WHEAT

Month	Mar-10	May-10	Jul'10	Sep'10
R/ton (Afternoon)	2394	2465	2534	2630
R/ton (Morning)	2397	2469	2537	2632
Change Down/Up	-3.3	-3.4	-2.7	-2.0
SAFEX to Import Parity	285	326	353	N.A



Spot Prices

Name	Time	RP	Move
JSE Overall	12:23	27072.84	-417.01
JSE Top 40	12:23	24429.43	-393.8
JSE Gold	12:23	2290.34	-42.5
JSE Financial	12:23	19453.85	-301.84
JSE Industrial	12:23	25137.23	-326.54
JSE Indust 25	12:23	20828.39	-287.98
DJ Ind	21-Jan	10389.88	-213.27
SP 500	21-Jan	1116.48	-21.56
Nasdaq	21-Jan	2265.7	-25.55
FTSE 100	12:36	5329.09	-6.01
DAX	12:36	5723.7	-23.27
CAC40	12:36	3841.31	-20.85
Nikkei	08:39	10590.55	-277.86
Shanghai	09:22	3128.59	-30.27
Hang-Seng	10:28	20726.18	-136.49
All Ords	07:46	4771.9	-77.7
R 157	12:36	8.51	-0.02
R 204	12:36	9.18	-0.01
Brent Crude	12:36	74.17	-0.23
Rand / Dollar	12:36	7.521	-0.0781
Rand / Pound	12:36	12.2287	-0.0583
Rand / Euro	12:36	10.6811	-0.0161
Rand / NZD	12:36	5.3762	-0.0316
Rand / AUD	12:36	6.8516	-0.0084
Euro / Dollar	12:36	0.7061	-0.0034
Pound / Dollar	12:36	0.6152	-0.002



7 Marketing alternatives[6,9,10)]

A grain farmer has various alternatives that he can implement to market his products. It should be kept in mind that a different combination of alternatives will be used for a specific product. These strategies are:

- ***Sell everything at harvest time***

The farmer delivers the crop to the nearest cooperative or grain dealer right after the harvest and receives the price quoted on the day of delivery.

- ***Store the crop and sell later***

Grain prices are usually at their lowest during harvest time. After the harvest, prices then usually start to increase. For this reason farmers started to store their grains (at their own storage facilities or at local cooperatives). Most of the time grain prices increase more than the total storage costs, making storage a good option. However, it should be kept in mind that when making use of storage facilities it should be managed well to prevent losses and insect infestations.

- ***Pre-harvest forward contracts***

A pre-harvest forward contract is a contract between a farmer and a willing buyer (e.g. a stock-feed producer or a miller) at a stage were both parties are satisfied with the market price. When the

contract is signed, a farmer precisely knows what price he will get, and he is thus protected against lower prices. However, when prices rise, he will not benefit from the increasing prices since his contract is fixed on the specified price. Different forward contracts exist, namely:

- *Fixed-price contracts* - A fixed-price contract guarantees the producer a certain (fixed) price for the product. When the farmer delivers the product, the buyer must pay him the contracted price.
- *Minimum-price contracts* - A minimum-price contract is almost the same as a fixed-price contract, except that a minimum price is guaranteed. These contracts allow the farmer to benefit from rising prices, but care should be taken since the benefits are limited. Farmers should therefore make sure before contracting how the final price will be determined.
- *Forward contracts that include production finance* - When signing a forward contract that include production finance, a price for the product is usually agreed between the farmer and the buyer, while the buyer also provides some form of financing for production.

- ***Hedging on the futures market***

Hedging is the process where the farmer protects himself against lower prices by taking opposite positions on the futures and spot markets. This is done *via* the Agricultural Markets Division of the South African Futures Exchange (SAFEX AMD). Trading on SAFEX is a sophisticated process, and farmers should use the expertise of a commodity trader when using this instrument. A SAFEX snap shot is provided as annexure.

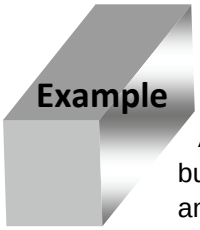
When a farmer sees an acceptable selling price on the futures market anytime before harvesting, he sells future contracts with the same value of his expected crop (by means of his trader). After harvesting, the farmer then sells the crop to the local cooperative. At the same time he also closes his position on the futures market by buying back the futures contracts. The profit or loss made on the futures market should then cancel out the profit or loss by selling his crop after harvesting to the local cooperative.

- ***Hedging on the options market***

A farmer can also ensure that he will receive a minimum price for his crop by buying a put option at a premium. A put option will enable the farmer to benefit from a higher price and also protect him against a lower (than minimum) price.

- ***Adding value***

Some farmer markets their grain to themselves by using the grain from the grain enterprise to feed his livestock. Bu using the grain as stock-feed, the producer adds value to his grain. This method is usually used at times when prices are very low and ensure that profits are made in both the grain and livestock enterprises of a particular farmer.



Example of a marketing plan for maize

A general rule of thumb is that farmers should not always wait for the highest prices, but that they should rather market their products with various alternatives. One such an example is:

- One third of his crop is sold on pre-planting contracts
- One third or the crop is sold on pre-harvest contracts (signed during the growing season, after pollination)
- One third of the crop is sold after harvesting

It should be noted that a marketing plan always depend on the specific market conditions that apply to a specific production season. For example, if the maize supply (local and international) is expected to be high and weather conditions looks favourable it is likely that maize prices will not be high (and thus favourable for the farmer). In that case, it might be better for the farmer to enter a large part of his crop into forward contract if the prices are acceptable. Another part of the crop can be hedged through futures and options, while another smaller part of the crop can be sold after harvest.

Activity 1

Individual activity

Tom Matu farms with onions, and delivers it to the green grocer. He gets a price of R6/kg for his tomatoes from the supermarket. His production cost (seed, fertilizer, irrigation, etc.) is R3.50/kg Production losses due to spoilage and transport damage are 5 percent of each kilogram of onions produced. Packaging, transport, and storage costs amount to R2.40/kg. Calculate Matu's margin.

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Activity 2

Group activity

In groups of 4-5 persons per group, compile a marketing plan by using all the components of a marketing plan as described in this module. The financial analysis component can be left out at this stage. The marketing plan must be based on the

marketing of one commodity (wheat, maize, sorghum or sunflower) under irrigation. In the marketing strategy section of your marketing plan, include strategies with respect to marketing alternatives that you intend to use as well as possible SAFEX instruments (hedging, sell on spot market, buy futures, etc).

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My notes.....

Authenticator: Dr PG Strauss

Module 9
Value adding

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- The concept of the value chain
- Important aspects of the value chain
- Why it is important in the agricultural context

Table of contents

This module provides a background of the marketing environment of the farm and is thus closely associated with marketing (Module 8)

The value chain can be thought as a set of activities, services and products that leads to a product or service that is eventually bought by the consumer. The value chain is an important aspect of farming, since it helps the farmer to understand the factors that have an impact on the profitability of his farm. This is an important module to understand, since it is closely linked with marketing, which is discussed in Module 8.

1. The concept of the value chain[3,4,5)]

The value chain consists of various businesses that are role players in the value chain. Each business in a specific value chain purchases inputs from the business one link before, uses the purchased inputs to produce a product (add value), and then self this product to the next business in the chain. The next business uses this product again as an input into another production process in order to create a product, which has even more value for the next business in the chain. This process repeats itself, until the final consumer buys the product in which all the value is captured. An example of such a value chain is provided in Figure 1.

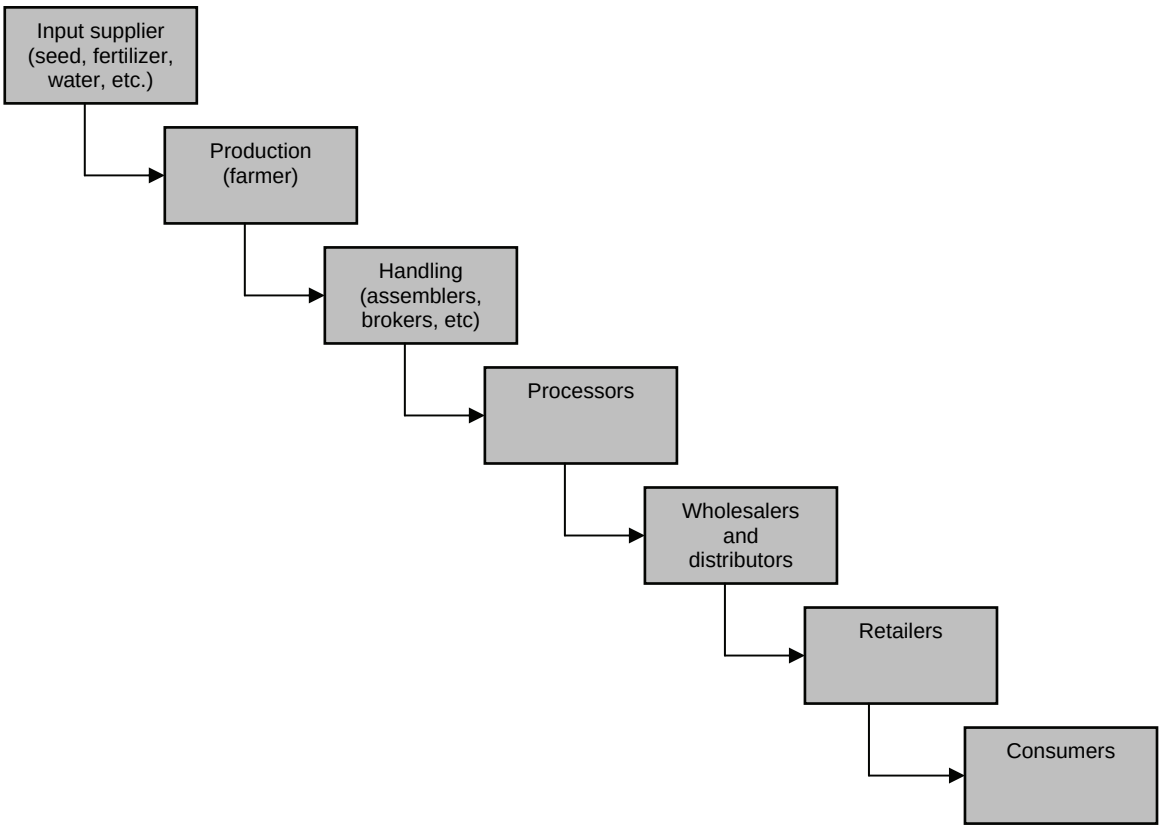

Figure 1. The agricultural value chain[5)]

In order to explain the value chain concept further, the value chain for maize is used as an example by means of Figure 2.

Firstly, the input supplier companies produce their various inputs such as seed, fertilizer, pesticides, fuel, machinery, etc. Secondly, the farmer buys these different inputs from the different input companies and uses these inputs to produce maize. As soon as the maize is harvested, the farmer has one of three choices, namely to consumer the maize on his farm (e.g. animal feed), sell the apples directly to consumers in the area (e.g. sell maize to neighbouring livestock farms for feed) or sell it to a grain trader (broker or assembler). The grain trader then either export the maize (e.g. to Zimbabwe), sell it to livestock farmers, or sell the maize to processors to be processed further (e.g. Westar). The processor then processes the maize (e.g. maize meal) and sells the maize meal to the wholesaler or distributor, who in turn distributes the maize meal to retail companies (e.g. Pick ‘n Pay). In the end, the consumer will eventually buy the maize meal at the grocery store (e.g. Pick ‘n Pay), buy mealy pap and meat (“pap en vleis”) at the tavern or restaurant. This example shows thus how each business added value in terms of using inputs to create a product that has more value for the consumer.

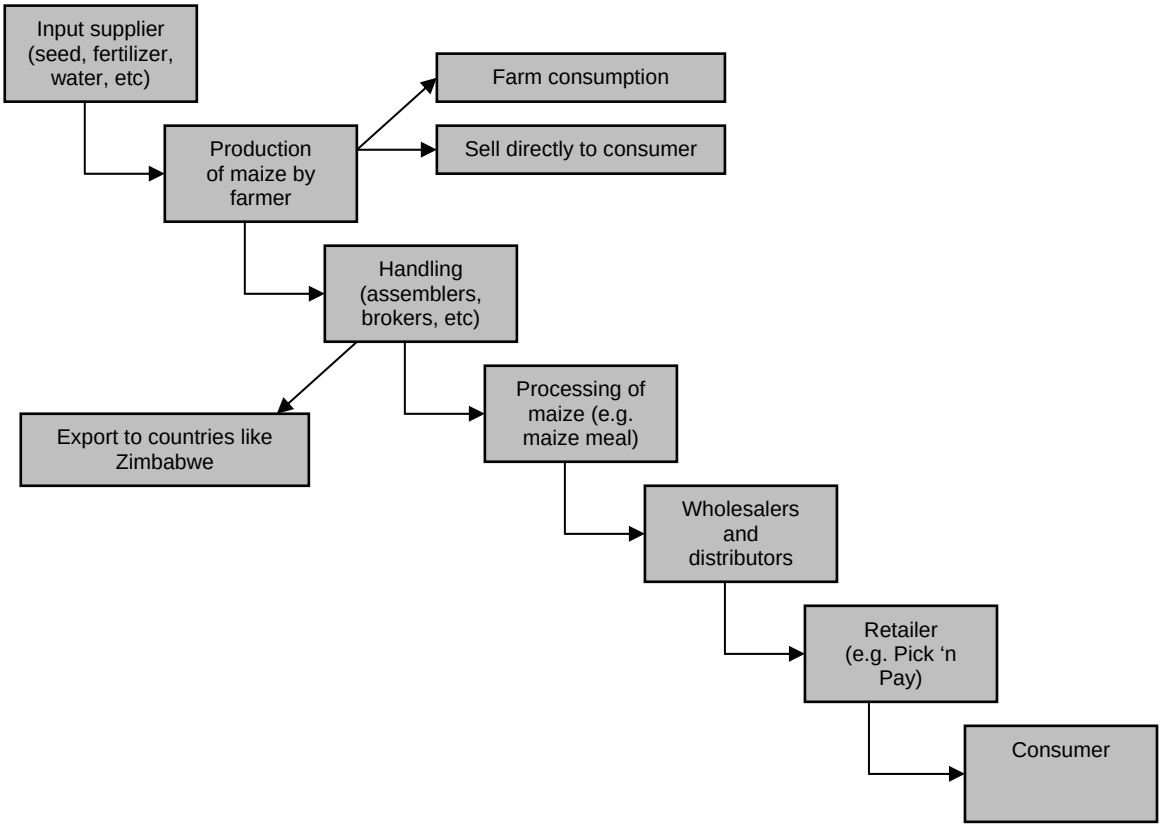

Figure 2. Value chain of maize[4,5)]

2. Important aspects of the value chain to keep in mind

There are some important points of a value chain that should be kept in mind:

- The farm business is one link within the whole chain, which means that the farmer has to "share" some of the profit in the chain with the other players in the chain. This implies that if the consumer pays R8 for a kilogram of maize meal, the grocer, transport company, farmer and the input provider each get a share of R8 in order to cover their costs and also to make a profit.
- Thus, the more players in the value chain, the more there is to share the costs and profits made when selling the final product. This means the farmer's share becomes smaller in terms of profit.
- If a farmer decides to increase his share of the profit, he has to take over the role of some of the other players in the value chain. For example, he has to set up a processing plant with, or transport business where he process, pack and transport his products to the market. In this way, he does not have to pay somebody else to do it, and hence he can get that profit as well on top of the profit made by producing the product. The downside of this approach (also called **integration**) is that the farmer must invest money on buying the necessary equipment to fulfil the additional function, and he also need to employ and train staff to do the job properly. He will need more money (and time), which need to be borrowed. It is important to calculate first whether it will be profitable to implement

integration, that the borrowed money can be paid back and that the risks involved are acceptable (see section on risk management).

- An important function of the value chain is that it links the consumer indirectly to the farmer via “messages” that are passed on from the consumer to the grocer, and form the grocer to the farmer in terms of what the consumer wants. This message is not a message in the true sense of the word, but rather an indirect communication to let the farmer or grocer know that if the consumer is not happy with the product, he will not buy it. This is also known as the **flow of information**. The grocer will realise this, and then inform the farmer that the consumer does not want to buy the product due to a variety of reasons, such as the product is too expensive, does not taste good (poor quality) or the product does not appear tasty and attractive to eat (e.g. green oranges). It is therefore important for the farmer to communicate on a regular basis to the grocer or business to which he delivers his product. This way he will have a better understanding of the consumer’s needs and preferences. This will help the farmer to adjust his production processes, handling and packaging of products in order to make sure the farm products remains attractive for the consumer. Hence, by talking to the grocery store owner or the broker, the farmer will better understand what product quality and quantity the consumer prefers and at what price. Information on what the consumer is willing to pay for a product will help the farmer to manage the costs of producing that product so that his farming business will be profitable.
- The farmer has many options to sell his products, since a lot of value chains exist. The farmer thus needs to do his homework and identify where the best profits can be made in the short and long term. The farmer therefore needs to have access to market information in order to understand which channel is likely to be the most profitable during a specific season, so that the farmer can ensure that his products are sol through that specific channel.
- In order to produce a product of which the quality, price and other aspects of the product are what the consumer prefers, the farmer need to make sure that the correct type of inputs as well as production processes are followed. For example, if the farmer decides to export the product to Europe, he must make sure that the product adheres to export standards so that the product will be allowed into Europe. This also applies to the local market. If the product does not meet the standards and needs of the local consumer, the farm business will not be able to sell its products, and hence it will make a loss and eventually go out of business.
- Since the farm business is part of a chain, it is important for the farmer to negotiate with the input suppliers as well as the clients to whom the farmer sell his product to ensure that the input costs to produce the product is not too high, and also that the price that is obtained for the product is high enough so that the business can make a profit.

Activity

Individual activity

1. Construct a value chain for a farming product of your choice. Give examples of the role players in your value chain, for example, All Gold as processor. Describe the movement of your product through the value chain from the input provider to the consumer.

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My notes.....

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Authenticator:

- Mr S van Zyl

Module 10

Human resource Management

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- Typical organisational structure on a farm
- Identification of skills and knowledge required for various positions
- Identify and appoint the right person for the job and also manage his staff effectively to optimise farming activities.

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Staff that are skilled knowledgeable in their respective fields will contribute to a prosperous farming business. When these people are managed and empowered efficiently, they will also be more productive and thus ensure that the farm is operated productively and efficiently. The following sections describe the most important factors for good human resource management.

1. Identifying and appointing the correct person[1)]

In order to identify how many people and what type of person will b e needed, it is important for the business owners to set up a plan in terms of what work needs to be done in the business to ensure that the business is profitable and sustainable. This means that for each position on the farm a job description needs to be written e.g. for the farm manager, the mechanic and the tractor driver. The

owner must write the job descriptions down in order to understand what type of skills and knowledge are needed for each post. The job descriptions can then be used in job advertisements what skills and knowledge are required. This will ensure that the most suitable person can be selected for the job.

Important aspects to keep in mind with the recruitment, selection and contracting of staff……

1. Task of the farmer/owner/manager/board/committee is to:
   - Understand what it means to be an employer and the responsibilities.
   - Administrative and legal aspects
2. *Labour Relations Act*
3. *Basic Conditions of Employment Act, etc.*
   - Policies and procedures

     Union mandates

     Employment equity

Table 1 illustrates the typical organisational structure for a wine farm in Lutzville, while Table 2 shows the skills and knowledge requirements for the various posts identified on a typical wine farm in Lutzville.

Table 1. Typical organisational structure of labour found on a wine farm in Lutzville[1)]

Post	Job description
Owner/manager	General management of farm or enterprise
General worker	General assignments on the farm as required
Tractor driver	Driving of tractor where required Responsible for spraying against diseases and pests Responsible for chemical weed Transport of grapes to local cellar General cultivation in the vineyard
Irrigation manager	Responsible for irrigation in a specific block of vineyard or on the whole farm
Supervisor	Supervising and controlling of assignments Reporting to general manager of owner

Table 2. Skills and knowledge requirements for the various posts identified on a typical wine farming operation in Lutzville[1)]

Post	Skills and knowledge requirements
Owner/manager	Advanced formal training at tertiary institution like Agricultural College
General worker	Basic knowledge and skills in wine production
Tractor driver	Basic knowledge and skills in tractor driving, maintenance of tractor and implements used on the farm, safe usage of pesticides and other chemicals used on the farm, general knowledge in wine grape production
Irrigation manager	Basic knowledge of irrigation practices, maintenance of irrigation system and ability to troubleshoot where required
Supervisor	Advanced knowledge and skills in wine grape production

Figure 1 illustrates a typical structure for staff employment on a farm [5)]

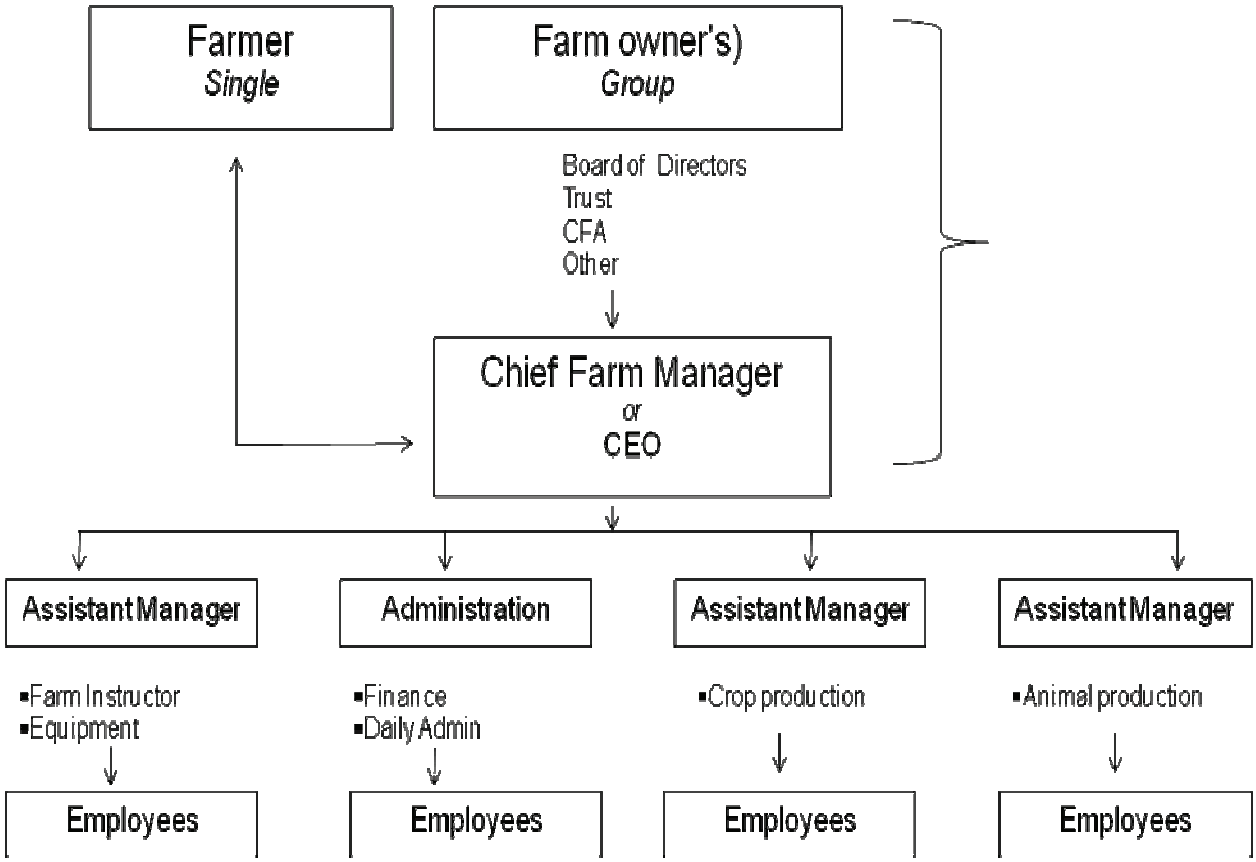

Figure 1. Example of a personnel structure for a farm [1)]

2. Managing people[1)]

Managing people correctly means to empower them. This means the employees should be told what end result is expected, while the employee decide how it should be done. This implies the employee has a responsibility to do the job correctly. This approach builds capacity of staff members, since they feel they have a choice and having a choice makes them feel important and part of the business.

However, by following this approach, the employees should be well trained and supported effectively with the necessary tools and skill to be able to do the job properly. It also means that when the requirements are explained to employees, they should be clearly informed on the end results expected from them. This will help employees to have a clear vision of the goals set for a specific job. Without spending time on this aspect of staff management, it will be difficult to monitor and evaluate progress.

Activity

Small group activity

You are the owner of an irrigation farm that produces cabbage and carrots under irrigation.

1. Use your irrigation farming knowledge to identify the various posts (and job descriptions) that need to be filled. In other words, construct an organisational structure for the labour required on your farm.

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2. Compile a table of the required skills and knowledge for each post.

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3. How will you identify the correct person for each post? How will you manage them?

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References

1. Stevens, J.B. and Strauss, P.G., 2009. *Farm Business Management*. Unpublished report.

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Authenticator:

- Mr SF van Zyl

Module 11

Risk Management

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- The risk environment under which farmers operate and the importance of risk management in farming
- Types of risks and uncertainty
- Sources of risk
- How to manage risk
- Risk management strategies to counter the effects of risk

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As the manager and decision-maker on the farm, the farmer has to make decisions in a risky and constantly changing environment. When making decisions, a farmer does not always know what the outcome will be. The outcome of his decisions can be better or worse than expected, thereby having a direct impact on farm profits. Prices decrease or increase constantly, rainfall, hail storms or disease outbreaks can cause havoc on yields, and so the list goes on. Risk is a given factor in the farming industry that requires careful management. It is therefore important to know what risk is, what types of

risk exist and how to manage them in order to maximise profits and ensure that the farm's objectives can be achieved.

1. What is risk?[6,7,3)]

There several factors farmer are not sure about, namely weather conditions, prices for their products, consumers, government actions etc. For instance, a farmer knows that a hailstorm might occur and damages his crops, but he does not know what the chance is that it might happen. This is known as *uncertainty*. *Risk*, on the other hand suggests that a farmer does not know what the consequences of his decisions or external factors might be, especially if it is unfavourable consequences. For example, if a farmer decides to store his maize to sell at a later date instead of selling it immediately after harvest, he faces the *risk* that maize prices might decrease at a later stage and thus reduce his profit.

The most important factor that a farmer therefore should consider is to manage the risks so that the chances of less favourable outcomes (e.g. lower maize prices) are reduced, or at least their effects softened. The first step in risk management is to identify the type of risk that a farmer faces. The different types of risks are discussed in the section that follows.

2. Types of risks[3)]

a. Production and technical risk

Although a farmer never knows what weather conditions will be in the future, he still has to apply inputs such as seed, fertilizer and irrigation water in order to produce crops. Weather has a huge impact on the yields, and when the weather is not the day favourable the farmer can incur huge losses. This is an example of *production risk*. Another example of production risk is the introduction of a new technology. New technology is often expensive to acquire, and when it does not perform as expected it could also leads to huge losses for the farmer.

b. Marketing or price risk

There are various factors that can have an impact on the price farmers receive for their products, such as supply and demand for the specific product (if consumers do not want the product or their income levels are too low to pay for it, demand for that product will decline and its price will decrease). Lower prices for their products will result in lower profits. In addition, prices farmers pay for their inputs also varies and thus affect cost of production and consequently profit levels.

c. Financial risk

Farmers usually borrow money to finance their farming operations. Finance risk occur when their exists uncertainty about future interest rates, the lender's willingness to still lend the money and the ability of the farm to generate enough cash flow to repay its debt.

d. Institutional risk

Institutional risk is the risk of an institution (e.g. Government, organisations that are suppose to provide a certain service, et.) that do not fulfil their responsibilities. An example of institutional risk is uncertainties about the Government to support prices or to provide support in terms of subsidies.

e. Human or personal risk

Human risk is problems of personal nature like health, dead, accidents, personal relationships etc. that can have an impact on farm performance. For example, if a worker that is skilled in the operation of a specific machine that no other worker can operate suddenly gets ill, then nobody is available to operate that specific machine. This will lead to a loss in productivity.

3. How to deal with risk: Risk management strategies[6,7,8)]

As we have learned this far, it is obvious that a farmer must make decisions today, not knowing what might happen in the future. These decisions have severe impacts on his business and can be the difference between success and failure. The trick here is thus to manage his risk in order to reduce the chance that a bad event will occur, or if it occur, to soften the effect of that bad event. The steps in the process to manage risks are represented by Figure 1 as follows:

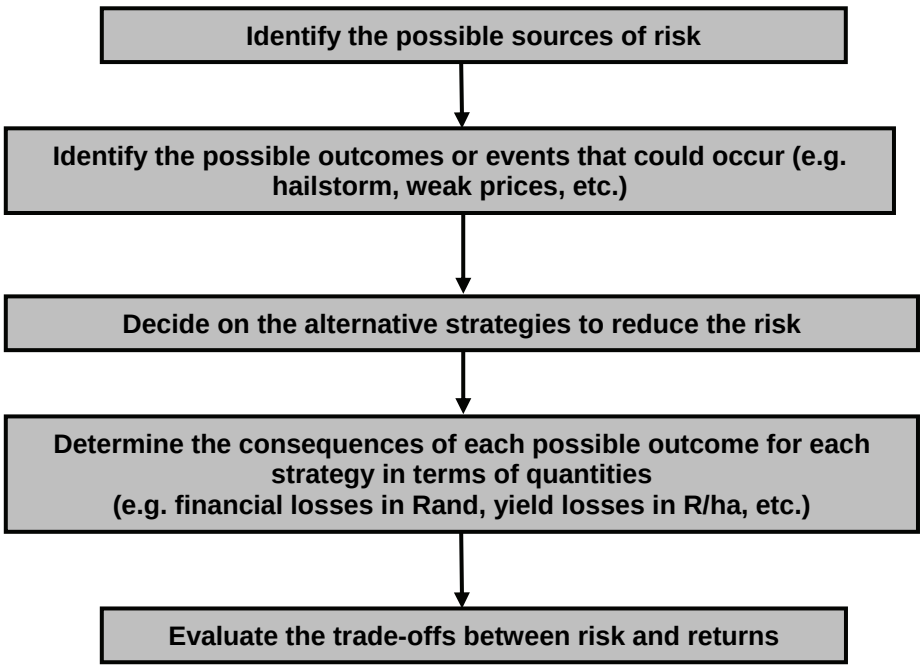

Figure 1. The risk management process[7,8)]

In order to soften the effect of risk on farm performance, farmers can implement several responses. Risk responses can commonly be grouped into *production*, *marketing* and *financial* responses.

Farmers often use a combination of these responses to compile a risk management strategy. An example of a risk management strategy is provided by Table 1 at the end of this module.

3.1 Production responses

Production strategies that can be followed to reduce risk include the following:

- ***Choosing low risk enterprises***

Some farm enterprises are more stable than others; therefore farmers should select enterprises or crop varieties that are reliable. This means that a farmer should select crops that would not be variable between one year and the next, or crops that can get diseases very easy as this will influence his yields and profits largely.

- ***Having a variety of enterprises – diversification***

Diversification means to avoid "putting all your eggs in one basket". Several different crops can be grown with the expectation that all of them will not fail simultaneously. If one crop does not well, the other crops can make up for its failure. This strategy ensures that farmers will not be dependent on the production and price of one single enterprise. When one enterprise fails, the income from the other enterprises will help the farmer.

- ***Growing crops on different fields***

By growing crops in different locations on the farm, the farmer can avoid the spreading of diseases as well as the effect of micro-climatic factors. However, this is not always possible in irrigation farming, since irrigation farmers are dependable on a water source.

- ***Improving production practices***

In order to reduce risk, farmers can ensure that they do not get weaker yields by buying inputs and materials that control crop diseases, pests and water use. For example, seeds that are resistant to diseases and water shortages can also be used in order to increase yields. These inputs are generally more expensive, therefore the improved yields should be weighted against higher input costs as it can have a hug impact on profits.

- ***Maintaining flexibility***

Flexibility in farming means that a farmer can easily change from one cropping pattern to another without any negative effects on farm profitability. For example, a farmer can change the area of land under cultivation according to the market prices of the products he intends to plant – if farmer knows he will get a good price for maize then he can increase maize production. Another example is where a farmer, after proper planning and budgeting, sees that he will make a bigger profit when he plant his fields with barley instead of wheat during the winter months.

3.2 Market-related responses

Variability of prices in the market place put the farmer at a great risk. It is important for the farmer to anticipate what price he will get for his product in order to make sure that he can produce without

making a loss. It is therefore important for farmers to have the necessary marketing skills so that they can produce a product in demand at the best possible price. Some marketing responses include:

- ***Obtaining market information***

Risk can be reduced by collecting information about market prices as well as anticipated costs and returns of alternatives that a farmer can implement. Better information about price movements can assist the farmer in planning for the market.

- ***Spreading sales***

At harvest time, prices are usually at their lowest. Risk of low prices can be reduced by spreading the sales or storage of the products (if possible). For example, maize can be stored during harvest time and sold at a later stage when prices are higher.

- ***Contract farming***

Farmers never knew what prices they will get for their products. This is called *price uncertainty*. Price uncertainty can be reduced by entering into contracts in advance with the buyer of the products, and the seller of the inputs. This way a farmer already knows what prices he will get and he can plan according to it if he is satisfied with the gross margin he will obtain. Contract farming also reduces the risk of decreasing (for output) or increasing (for input) prices and key inputs that are not available at critical times. However, if favourable prices changes occur, a farmer who already entered into contracts will not be able to benefit from the positive price changes since his prices are fixed.

- ***Price contracts and hedging***

In order to secure greater price flexibility and more risk management alternatives, farmers can hedge on SAFEX. As already discussed in the module on marketing, a farmer can offset unfavourable price movements by hedging on the futures market. Another option is to enter into minimum price contracts that give the farmer price insurance.

3.3 Financial responses

Several strategies exist that can be applied on the financial side of the farm. These strategies include:

- ***Increase non-farm income***

By increasing non-farm income, a farmer can ensure that he is less dependable on farm income, especially in the case of a bad harvest year. This can also be classified as diversification, or “not having all the eggs in one basket”.

- ***Maintaining liquidity***

By maintaining healthy liquidity levels (cash flow), a farmer can protect himself against the risk of not being able to have enough cash to repay his short term debt. It also provides a safety margin in case something goes wrong, providing extra cash to keep the farmer out of financial trouble.

- ***Maintaining cash or credit reserve***

A farmer can reduce financial risk by putting funds aside during good years, thereby making provision for the bad years (increasing his buffer capacity). Also a farmer can create a credit reserve by not using the whole loan amount being awarded by a financing institution (e.g. a bank). Such a credit reserve will help the farmer to exploit an opportunities (e.g. land or equipment that are sold at a bargain price) that might arise and provides flexibility.

- ***Sale of assets***

The sale of assets can be a defensive strategy of the farmer in times when he needs more cash. It is important to know that different assets have different liquidity values, which could affect the value of a farm. For example, maize in silos can easily be sold and will not affect the value of the farm. On the other hand, if a sprinkler system of an irrigation farm is sold, it might negatively affect the value of the farm since the absence of the sprinkler system place the harvest at risk.

- ***Limiting debt***

By not making too much debt than he can repay, a farmer can reduce financial risk. If a farmer has too much debt, he also has to pay interest on the debt which further places a burden on the cash position of the farm and leading to financial trouble.

Table 1. An example of risk management strategies for an irrigation farm

Risk management		
Area of farm management	Reducing chances of occurrence	Protecting farm against bad consequences
Production	• Choosing low-risk activities • Diversifying enterprises • Dispersing production geographically	• Selecting and diversifying production practices • Maintaining flexibility • Varying production capability
Marketing	• Obtaining market information • Spreading sales • Contract farming	• Hedging on futures market – SAFEX • Minimum price contracts
Financial	• Increase non-farm income • Maintaining liquidity • Maintaining cash or credit reserves • Sale of assets • Limiting debt	• Insurance

ACTIVITY 1

Small group activity

Warner is a new vegetable farmer and is very concerned about the current agricultural environment. He asked you to explain the following to him:

1. The concept of risk and uncertainty and what it means.

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2. Since Warner is not very experienced in the field of agriculture, he also asked you to list all the possible sources of risk he can expect in irrigation farming.

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3. Warrant requested you to explain the risk management process (by means of a schematic illustration) that he should follow in order to manage his risk.

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4. Lastly, Warren asked you to help him implement risk management strategies. Construct a table with your proposed strategies. Divide the proposed strategies in *production*, *marketing* and *activities* sections.

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Authenticator: Dr PG Strauss

Module 12

The Business Plan

Study objective

After completion of this module, the learner should be able to have a basic understanding of:

- What a business plan is
- How to draft a business plan
- How to use it to obtain finance
- How to use it to run the farming business successfully

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This module aims to combine all the previous modules (Modules 1 to 11) into a business plan. Several reasons exist why farm businesses fail: It could be due to a lack of long term vision, not setting clear goals and objectives, inadequate financial planning, ineffective procedures and systems, and so the list goes on. It is true that sometimes factors out of the farmer's control contribute to this failure, but mostly these pitfalls could have been avoided if the farmer had a properly prepared business plan.

1. What is a business plan?

The business plan is the resume of the farm, providing the roadmap of where the farm is going, what it has to do to get there and how it will look once it gets there. The business plan is an essential management tool and its uses include:

- **Setting goals and objectives**

The farmer must use the business plan to determine the future direction for the farm by setting goals and objectives for the farm. A business plan will not guarantee that problems will not arise, but when it does, the farmer is in a better position to anticipate the problems and manage it in an efficient way.

- **Testing whether a farming idea will work**

The business plan assists farmers to test whether their farm business or particular farming activities will succeed. It is like engineers testing an airplane before its flight to make sure that the plane will safely reach its destination. Will you attempt to board a plane you know was not inspected?

- **Measuring farm performance**

The business plan is a useful tool to determine whether the farm is still on the right track to arrive at the destination (the set goals and objectives). If you the track is lost, the business plan is the compass to get the farm back on track.

- **Obtaining finance**

The business plan is extremely important in ensuring that a farmer can obtain loans or attract investors. The business plan can show the financier that the farm is profitable, making it able to pay repay debt or paying out dividends.

- **Communicating to stakeholders in the farm**

The business plan tells the farm story to all the role players. It tells potential investors that the farm is worth investing in. It shows financiers that the farm's very capable to pay back their money, thereby making it easier to obtain finance.

This module takes all the previous ones into account and projects it into a business plan. All the principles learned in the previous modules provided valuable insight on how to successfully manage a farm. The business plan is the "grand finale" of this course in equipping students for this task.

2. Preparing the business plan[4,5)]

When preparing a business plan, there are several issues that must be addressed.

a. Identify objectives

The following questions should be asked:

- Who will read the plan?
- What do they already know about the farm?
- What do they want to know about the farm?

- How do they want to use the information?

It is important to know for who the business plan is intended so that the business plan can be constructed specifically for that person. An example is a business plan prepared for a medium-term loan at a commercial bank. The person in this case will then probably be a credit manager, bank manager or loan officer. A farmer should make sure that everything that person want to know is included, as well as what the farmer wants him to know.

b. Outline and review the business plan[5)]

When the objectives are identified an outline of the business plan can be prepared, based on these objectives. The outline should be review to ensure that everything of importance is pointed out to the potential investor or financier, keeping the objectives in mind.

c. Writing the business plan[5)]

When writing the business plan, make sure that the following questions are answered properly, especially if the business plan is intended for a banker, potential investor or financier:

- Who is the farmer or owner?
- Why is the business workable?
- How much money is exactly need and why?
- Where will the money go?
- What will the owner contribute?
- When and how will the loan be paid back?
- What if the farm fails?
- Can this farm afford its owner?

d. Review of the business plan by an outsider

The farmer must have his business plan be reviewed by a person, preferably someone that knows business management and planning to review the business plan. This person must check that the business plan is objective, logic, well-presented and effective in providing important information. The feedback and comments received from this person should then be taken into account.

e. Update the business plan

A business plan that is constructed once and left in the drawer is a useless document. It should be updated on a regular basis as the farmer's environment and objectives change.

3. Framework for a business plan

The various sections that should be included in the business plan are listed :

a. Cover page

- Full name and address of the farm
- Postal address
- Telephone numbers, fax, e-mail etc.

- Contact person
- Date of plan

b. Statement of purpose

The goals and objectives of the farmer are included here as well as the purpose of the business plan, e.g. application for a loan, investment opportunity, etc.

c. Table of contents

In this section a list of headings is included, together with a list of all the graphs and tables in the business plan.

d. Executive summary

This section consists normally no more than two pages and is usually completed after the business plan has been completed. The executive summary highlights the most important aspects of the business plan. The purpose of the business plan must also be included here.

e. Introduction

Background on the farm should be briefly described in this section. For example, what type of farming and enterprises, who is the owner, where is the farm located, size of farm, etc. The purpose of the business plan is included here. This information should be provided with the target reader (e.g. financier) in mind. Other important information that should be included here is:

- Business environment – Provide a summary of the environment in which the farmer finds himself. The industry in which the farm operates can be described and all relevant information that is related to the industry can be included.
- Market analysis – What are the target market and its size? Who are the customers and what are their needs? Is this market shrinking or growing? Who are the competitors?
- SWOT analysis – What are the strengths and weaknesses of the farm? What opportunities and threats exist?

f. Product and service plan

The main products that the farmer is selling should be described here, as well as their uses and unique characteristics. The purpose is to explain to the reader how the market works and how the farmer intends to exploit opportunities by selling his specific products. If the farmer can convince the reader that he has the right products and market to farm successfully, he will have a better chance to obtain finance, for example.

g. Production and operational plan

In this section the farmer should explain how he intends to use the land available to production. The facilities, logistics and equipment should be described as well as the production processes that are used. The purpose thereof is to show the reader that the farmer has the required system in place in order to produce and operate his farm successful. The farmer must convince the reader that the farm

is capable of producing and operating the specific product. For example, a potato farmer can describe his irrigation system (pivot with nearby river as water source), tractor and implements for producing potatoes, potato wash facilities, accurate weight and packing equipment, transport vehicles, etc. The concepts covered in the production economics module should be included here.

h. Marketing plan

The module on marketing is applicable here. All the issues covered in this module should be included here, namely:

- The marketing mix (product, price, promotion, place and people)
- Competitive advantages – what advantages do the farmer have above other farmers (e.g. organic production)
- Consumers and how their needs are addressed
- Contracts that with buyers of buyers, names of buyers and conditions of contracts
- Pricing strategy – This is not always possible, because farmers are traditionally "price-takers". However, if a farmer can produce a product with special and unique characteristics, he can claim a premium on his product.

i. Management

All the relevant persons that are part of the farm's management must be included here. For example, the farmer who is also the owner, the farm managers, advisors etc. should be included. A short CV of each can also be included in the annexure.

j. Financial plan

All the issues discussed in the financial management module are applicable in this section. Items that should be included are:

- Projected financial statements (balance sheet, income statement and cash-flow statement)
- Projected financial statements
- Projected capital budgets (capital purchases, debt repayment schedules, etc.)

k. Risk management plan

The issues covered in the risk management module are important in this section of the business plan. The focus should be on:

- Identification of risk sources (price risk, production risk, financial risk, etc.)
- Impact of risk on farm (e.g. impact on yields, prices, input costs, etc.)
- Risk mitigation strategies (hedging, diversification, etc.)
- Sensitivity and "what if" analysis

l. Action plan

This section explains to the reader of the business plan how the farmer is going to implement all the plans listed in the business plan, and that he is committed and realistic of achieving his objectives. An action plan usually consists of components as explained in Table 1.

Table 1. Implementation of the business plan – the action plan[1,2,5)]

Activity/operation	Person responsible for carrying out	Date or period to be completed	Costs involved	Risks associated with activity or operation

m. Annexure

In the annexure of the business plan, all the supporting documentation is included. Examples of items to be included in the annexure are:

- CV's
- tables of cash flow, budgets, etc.
- figures
- brochures
- maps
- informative articles

4. Implementation of a business plan to obtain finance[3,4,5)]

After the business plan has been drafted, potential financiers that will be interested in either lending money to the business or buying shares in the business should be identified. As soon as these potential financiers have been identified, meetings should be scheduled with each of them. As soon as meeting dates have been identified, a written copy of the business plan needs to be submitted to the potential financier ahead of the meeting so that the potential financier can prepare for the meeting. This farm business plan will facilitate as smoother communication process during the meeting and also prevent any misunderstandings. During the meeting, a professional presentation needs to be done of the business plan. It is important to keep the presentation short and concise, but also to enlighten the potential financier in terms of the key aspects of the planned business. It is especially important to inform the potential financier about the potential profitability and risk of the business, as well as how these risks will be managed and mitigated.

5. Making a business work[5)]

After finance is obtained successfully, the farm business is set up according to the business plan. The following guidelines should be followed in order to ensure that the business runs smoothly and reach its intended goals as presented in the business plan:

- Every role player in the farm business should take full responsibility for his role in the business. If somebody in the business observes a problem or opportunity but does not respond to it, the business cannot succeed.
- A farm business needs to be run as a business, and not as a social project. If an employee of the farm does not do his job, he needs to be replaced.

- Every role player should have a clear understanding of the goals of the business as well as the contents of the business plan that show how to achieve those goals.
- Every person involved with the business must have appropriate skills, training, support and necessary equipment to ensure that the job as good as possible.
- People involved with the business MUST have a passion for what they are doing. This will keep them enthusiastic and motivated to "walk the extra mile" that will ensure a successful business.

ACTIVITY 1

Group activity

In groups consisting of 4 or 5 persons, you are required to compile a business plan for an irrigation farm of your choice. Use all the components of a business plan as discussed in this module to compile your business plan. You may choose any type of farming business as long as it is an irrigation farm. This business plan must be handed in as a document, while the business plan must also be presented to the class.

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References

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Authenticator:

- Mr S van Zyl