

# Agri-Outreach

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## Agri-Outreach

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The Technical Centre for Agriculture and Rural Cooperation (CTA) was established in 1983 under the Lomé Convention between the African, Caribbean and Pacific (ACP) States and the European Union Member States. In 1985 a Question and Answer Service (QAS) was established to provide information and documentation to ACP partners to improve access to information for agricultural and rural development, and to strengthen the capacity of ACP countries to produce, acquire, exchange and utilize information in these areas.

PRAIS' purpose is to develop regional mechanisms to provide the SADC Agricultural Systems stakeholders with information services on demand, on the following priority information themes:

- Conquering Markets : Promotion of Market-Led Developments
- Production Intensification and Optimization
- Environmental Protection and Natural Resources Management
- Strengthening National Agricultural Systems (NAS)
- Mobilisation of the Civil Society

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BI-MONTHLY NEWSLETTER

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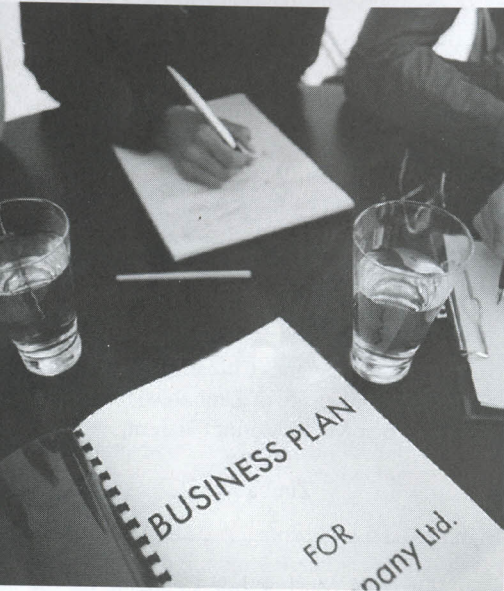
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# COOPERATIVES 16:

## Developing a Business Plan



### Introduction

In a previous edition (May 2008) the business plan was discussed, and in this edition reference will again be made to that. A business plan is the skeleton of the business, because the business will be built around your business plan.

Ask yourself the following questions:

- What makes my product or product different from any other?
- Which aspects make my business or product better than others, except for my reasonable prices?

- How am I going to start my business?
- When am I going to grow in my business and when am I going to slow down?
- Who are my customers?
- Where is the best place of location to get my business started?

It is good to remember the following sayings:

**"Beginning is half done"**  
**"Success is to focus"**

Keeping your business plan at hand will remind you of:

- What am I willing to put into my business?
- Where do I come from?
- What is my core business?
- Where am I heading?
- How will I operate?
- What are the first time limits for specific goals?

A business plan can be seen as a paved road to get to your goals or destination. It will help you to go from self-management, goal setting and implementation to evaluation of your business.

### The importance of a Business Plan

- It forces you to organise your ideas in a logical way
- It helps you to focus on the goals you put up for the business
- It helps you to look at reality and to foresee problems
- It helps you to work according to an action plan or guidance
- It is an aid when applying for financial assistance
- It helps you to reduce the potential flaws in your idea
- It makes an important tool that will help you make decisions

### Who should prepare your Business Plan?

A business plan has to be drawn up by every person who wants to run a business. Remember that a business plan is not a fixed blueprint which you cannot change. A business plan is a dynamic tool and therefore has to be adjusted regularly to reflect your growth and aspirations. It is therefore important to look at your business plan regularly to see if it should be changed.

The person or people who are going to run the business, who will have to make decisions on a daily basis and

who have to know what the end result should be, should do the business plan. Although it is the best option to keep the business plan in the business, there are people who specialise in planning and writing a business plan.

A business plan must be acceptable to any reader. It must be easy to read. It must be presented in an organised manner. Therefore much effort and time will go into the planning and construction of a business plan.

### Research

An entrepreneur needs information and knowledge in order to construct a business plan that will suit his/her business. He/she has to determine who his customers and target groups are. He/she can ask people questions, make use of questionnaires, or make a few telephone calls to see if there is a demand for his product. By looking at his/her competitors in the market and their products, he/she can collect valuable information. However, it is important not to focus too much on the competition, but to focus more on one's own strengths.

Before starting off with a business plan, it is necessary to know the economic



environment and market you want to exploit. Other aspects like your suppliers, delivery times, cash flow and the availability of credit are important factors to keep in mind.

### The use for a Business Plan

- The business plan is a reminder of the specific vision or goals that you have set for your business.
- The business plan reminds you of where you want to go with your business and will help you to make the right decisions.
- The business plan is important is getting a loan from the bank, or financial support for other means of expansion.
- The business plan helps you to arrange your ideas and helps you to get a good overview of your business.

### Components of a Business Plan

#### Phase 1: Micro and macro analysis

##### **Micro tendencies:**

Micro tendencies are things that are happening in the close environment, like in the township, on the farm or near your business. For example, if the municipality is building a new road in

front of your shop, it might prevent your customers from visiting your business and also make life difficult for your workers.

##### **Macro tendencies:**

Macro tendencies are the things that are happening in the general environment, such as economic factors, political developments, mergers that can destroy smaller businesses, or world-wide competitiveness through a new era in technology. For example, if you are selling handicrafts near the zoo, there might be a competitor who is selling the same products the Internet.

To be successful in business, one has to evaluate how positive you react to the micro or macro levels. For instance, if you do not believe in your environment or in the future of your country, you cannot be focused.

#### Phase 2: Making a SWOT analysis

A SWOT analysis stands for

- S strengths
- W weaknesses
- O opportunities
- T threats

It is of the utmost importance to be

very honest when determining all these factors. One possibility for a business plan is to weigh every decision or every expansion by using the SWOT analysis.

Often there will be a correlation between your strengths and your opportunities or a comparison between the weaknesses and the threats. Therefore, it is good practice to try to turn a weakness or a problem into an opportunity.

Do some research and try to get the view of the customer. The view that you might have is sometimes deceiving. Look at the difference between you and the competitor. A SWOT analysis can be used for different criteria, such as products, markets, areas or even the customer himself.

#### Phase 3: Vision, mission, goals and actions

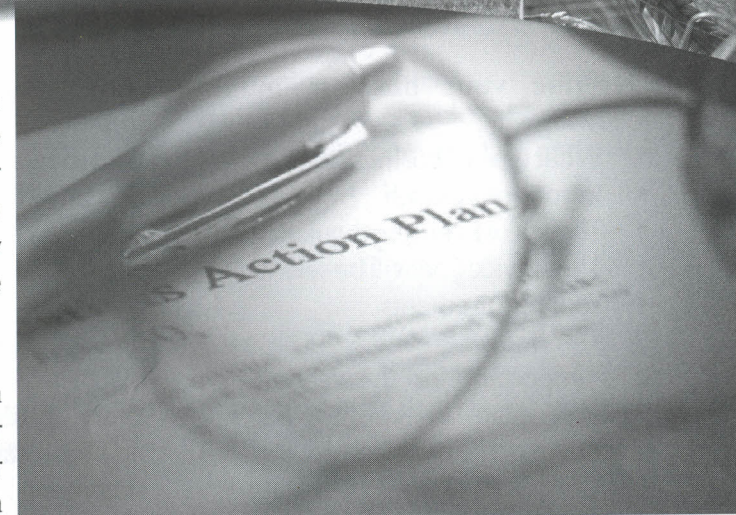
When an entrepreneur knows his/her environment and makes a SWOT analysis that will have an impact on his

business, he/she can set a vision statement. A vision is the ultimate objective towards which you are striving. A vision is to have a clear idea about your business and to commit your business plan to paper.

Missions are the boundaries within which you operate. Goals are the ideals you want to reach. Actions are what you do to achieve your goals at specific deadlines.

#### Phase 4: Definition and objectives of the business

Your definition should be short and interesting. It must state the nature of your business, the service or product that you will be selling, your long-term and short-term goals and why you think the business will be a success.





Describe your business in the following way:

- What type of business is it?
- Introduce yourself
- The tax or licensing regulations
- The service you will be selling
- Your requirements

It is important for the reader of a business plan to know what the objectives of the business are.

### Phase 5: Personnel factors

The number of employees, their job descriptions, the type of contracts they have and how you will improve their skills are major factors. A manager has to be very careful to appoint the correct number of employees to maintain the productivity level of his business. He should also consider aspects such as salaries, how much

leave the personnel may take and so forth. Each employee's job description is crucial, as it will show if all tasks can be carried out. In an entrepreneurial business, each and everyone has to earn his/her salary.

### Phase 6: Financial aspects

Every business plan will include financial statements, profit and loss statements, growth tendencies, a cash flow chart and the growing of assets. A budget plan with a detailed estimate of income and expenses is important to show your cash flow and your profit or loss for a set period.

It is important to budget and set specific goals for specific times. During this phase of planning, you will set your limits for expansion.

### Phase 7: Logistics

When considering a business plan, many banks will ask for a plan on the floor surface of offices or factories. Logistics include the premises, computers, office equipment, books, machinery and a register of assets. Logistics will help you to decide your workspace for functionality, to establish systems and to manage data efficiently.

### Phase 8: Product range

In a business plan, it is essential to list the product range. Concentrate on three major products and the specific target groups for which they are developed. It is important to try to determine the prices and the money you will make in a year's time. It is important to price for profit.

A good entrepreneur will concentrate on a variety of products. Every three years he/she will produce a new product so that there will be a constantly high selling profile with a downward curve. Therefore, if by the time the product is outdated, the next product should be in demand already.

The process works in a curve. When one product reaches its peak, it will

start going downhill. As soon as this happens, you should already have launched the next product on its way to the top.

### Phase 9: Strategies

It is important to have a global strategy. A business plan has to include a marketing plan that covers products, target groups, distribution and prices. An image building plan as a second strategy will determine the variety of verbal and visual images. Each and every company's business plan should have a strategy for training workers as well as middle and top management, in compliance with your country's Skills Development Act.

### Phase 10: Conclusion

You should say why you think your business will succeed. Your conclusion should be positive and motivating.

After you have compiled the business plan you should ask yourself: "Will I lend myself the money to start a business on the basis of this plan?" If the answer is "yes", then you have successfully compiled a business plan.

Source: South Africa. National Department of Agriculture. 2000. Pretoria. Book 7  
Next issue: Managing your business





# RIFT VALLEY FEVER IS NO MINOR AILMENT!

The recent outbreaks of Rift Valley Fever (RVF) caused only minor media interest – but the farmers and animals affected may not agree that the impact was “minor”!

RVF (or *Slenkdalkoors*) is caused by a virus that is primarily transmitted by mosquitoes. *Culex therileria* is the most common and widespread culprit. Epidemics often follow above-average rainfall, which results in an increase in the number of mosquitoes. RVF is also an important zoonosis (it can infect and affect humans). Its biggest impact on agriculture is abortion storms in sheep and cattle, and heavy mortalities in very young animals.

The perception that the major impact is felt among small stock is true, but interestingly, two outbreaks in 2008 in South Africa were in dairy herds. These herds experienced significant calf mortalities as well as abortions in cows and heifers.

So what should you look out for? The initial signs are fever, lack of appetite,

weakness and occasionally smelly, bloody diarrhoea. As the virus attacks the liver primarily, jaundice is a common symptom. Mortality among calves may reach 70%, but mortality rates of 30-40% are more common. Among adult cattle abortion rates may reach 90-100% in certain herds, but in an epidemic the average abortion rate is 20-40%. The abortions can also take place at any stage of pregnancy.

While RVF is less common than diseases such as Lumpy Skin Disease, it is far more unpredictable. Sometimes 10-20 years pass between outbreaks. When this is the case, one or two generations of cattle would have been born and died on the farm, leaving the remaining cattle very vulnerable. So why do RVF “disappear” for years and then reappear with a vengeance?

The current research suggests that it does not disappear, but the cycle is



in other, possibly less susceptible animals such as bats, rats, antelope and even possibly in the mosquitoes themselves.

What should you do about it? Since you cannot move your farm or control the factors that cause RVF, Dr Coates believes it is best to vaccinate against RVF. The inactivated (dead) vaccine at drying off or steaming up is the best option in his opinion. By using the dead vaccine close to calving, you give the cow/heifer the opportunity to pass on antibodies through the colostrum. The live

version of the vaccine will protect the cow sufficiently, but the immunity passed on to the calf is not good enough.

Which farmers in what areas should vaccinate? Because Dr Coates is aware of what this disease is capable of, even if it is only once a decade, he would vaccinate all cows every year regardless where he lived. But if that sort of advice is too broad, then he would suggest that if RVF has EVER occurred in your area, vaccination should be non-negotiable. The vaccine is cheap and safe. However, availability is a problem, so get your vaccine before spring.

Source: Coates, B. **Rift Valley Fever is no minor ailment!** In *The Dairy Mail*, 15(6). June 2008. p 85.





# EVALUATION OF MEAT QUALITY

By Raymond E Zvavanyange

Meat is all parts of the dressed carcass of an animal or can be regarded as the muscle from animals. This includes connective tissue, fat, edible organs like heart, liver, kidneys, intestines, tongue, and brain. Meat differs from one animal to another, for example meat in chicken meat would include the skin.

Meat quality can be defined in terms of nutritional value and "eating quality" which encompasses consumer acceptability, palatability, tenderness, juiciness, flavour, aroma, and tastiness. Food safety can also be used in defining meat quality since the meat is primarily for human consumption. The meat has to be safe to eat and meets the required hygienic and health standards.

## Post-Mortem Changes

When an animal is slaughtered the muscle is converted into meat. The glycogen in the muscle is converted into lactic acid causing a fall in pH

from an initial value of 6.8-7.3 to about 5.4-5.8 at *rigor mortis*. *Rigor mortis* is the hardening of muscles, shortening and loss of elasticity (stiff) and transparency. The meat would be extremely tough when cooked while still in *rigor mortis*.

Animals should not be stressed prior or during slaughter. If animals are stressed, muscle glycogen is released into bloodstream, rapidly broken down into lactic acid while the carcass is still warm. This results in partial breakdown of muscle structure. Meat then loses its water binding capacities a characteristic important in certain types of meat processing. In pigs, the muscle structure turns to a pale, soft and exudative meat (PSE).

Long term stress or starvation also results in an abnormal muscle condition. The meat would remain dark-purplish red on exposure to air instead of a bright red colour. This is termed "dark, firm and dry, (DFD) in

pigs and "dark cutting" in beef. However, the PSE and DFD meat are perfectly safe to eat though they have a pH above 6.0 and tend to spoil since the low acidity favours bacterial growth.

## Refrigeration

Carcasses are usually refrigerated immediately after slaughter. Chilling is done for 12 to 24 hours at a temperature of -2 degrees Celsius to 0 degrees Celsius in order to remove animal heat. The meat should not be chilled too rapidly; otherwise extreme contraction of muscle takes place, a condition known as "cold shortening". In such cases, the meat would be tough when cooked. Chilling helps to ensure better keeping quality and to enable more attractive cutting. Chilling should be performed in rooms or enclosures that are free of undesirable odours, insects and rats.

## Factors affecting Meat Quality

- Feeding and Management
- Disease
- Sex and age of animal
- Breed
- Genetics
- Exercise of the animal
- Stress
- Transport
- Slaughter procedure
- Cooking

## Food safety

Meat should be safe for human consumption and this demands controls, standards that are aimed at minimizing contamination of the meat. Handling and storage facilities, equipment, and operations should be done in hygienic conditions at all times. The meat should be inspected, before during and after slaughter.

References available from author. E-mail: [zvavanyanger3@gmail.com](mailto:zvavanyanger3@gmail.com)

# PRODUCE YOUR OWN EGGS

**Eggs are a very valuable source of protein. It is especially good for children, as it contains the protein and vitamins necessary for normal growth.**

It is not so difficult to build and manage your own affordable egg production unit. You can start small to feed your family first. Later you can increase the size of your production



unit. This will allow you to sell eggs to your neighbours and community, or you can even sell your eggs on the local market.

**Good reasons to keep hens**

- By keeping 9 to 12 hens, you can provide your family with eggs, without having to buy them.
- One hen will lay up to 6 eggs per week.
- If you have 10 hens, they will lay between 8 and 10 eggs per day. You can sell 5 eggs to pay for the hens' feed, while the other eggs can be used for your household.

**What hens should you buy?**

You can buy day-old chicks and rear them yourself, but this is expensive and chicks die easily. It is better to buy young hens. These are around 18 to 19 weeks old and are called point-of-lay pullets. This means they are ready to start laying eggs.

Buy good quality hens that are vaccinated against the known poultry diseases. The best layer breeds are Amberlink or Hy-line hens. They will start laying within two weeks after you have bought them. The first eggs, known as pullet eggs, will be small, but they will become larger after about two months.

Later in the year (after around six or seven months) egg production can go down and your hens will start laying less eggs. These hens will then give you fewer eggs, but will cost you the same to feed, and will therefore become less economical. Keep your hens only for a year, and then you can slaughter them for meat, or sell them. But before you slaughter your hens or sell them, remember to order your new pullets. This must be done around four months before slaughtering your hens. In other words, if you bought your first set of pullets in January they should be start laying eggs in March.

Their best production would be just after the middle of the year in July. Then their production will decline and you will probably slaughter or sell them in December or January. This means that you will have to order your new pullets in August or September, depending on when you plan to slaughter or sell your hens.

It will be a great help if you noted everything on a calendar, so that you can do proper planning to keep your business going.

Source: *Ubisi Mail*. Vol. 4 (2). June 2008. p 31.

**IRRIGATION WATER MANAGEMENT:  
IRRIGATION METHODS**

An adequate water supply is important for plant growth. When rainfall is not sufficient, the plants must receive additional water from irrigation. Various methods can be used to supply irrigation water to the plants. Each method has its advantages and disadvantages. These should be taken into account when choosing the method which is best suited to the local circumstances.

A simple irrigation method is to bring water from the source of supply, e.g. a well, to each plant with a bucket or a watering can (see Figure 1).



Figure 1 Watering plants with a can

This can be a very time-consuming method and involves very heavy work. However, it can be used successfully to irrigate very small plots of land, such as vegetable gardens, that are close to the water source.

More sophisticated methods of water application are used when larger areas require irrigation. There are three commonly used methods: surface irrigation, sprinkler irrigation and drip irrigation.

Surface irrigation:	basin irrigation
	furrow irrigation
	border irrigation
Sprinkler irrigation	
Drip irrigation	

**1.1 SURFACE IRRIGATION**

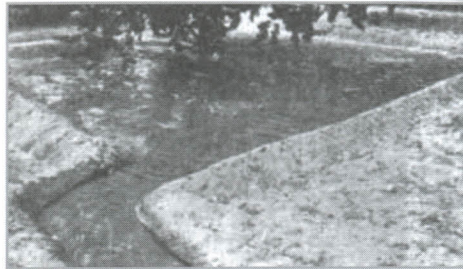
Surface irrigation is the application of water by gravity flow to the surface of the field. Either the entire field is flooded (basin irrigation) or the water



is fed into small channels (furrows) or strips of land (borders).

**Basin irrigation**

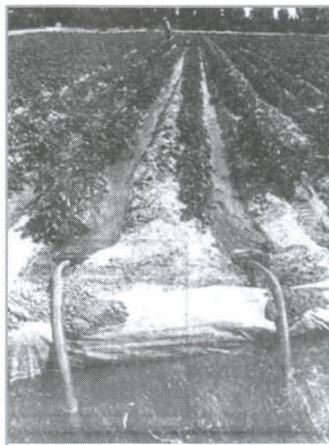
Basins are flat areas of land, surrounded by low bunds (see section 2.2.2). The bunds prevent the water from flowing to the adjacent fields. Basin irrigation is commonly used for rice grown on flat lands or in terraces on hillsides (see Figure 2a). Trees can also be grown in basins, where one tree is usually located in the middle of a small basin (Figure 2b). In general, the basin method is suitable for crops that are unaffected by standing in water for long periods (e.g. 12-24 hours).



**Figure 2b Basin irrigation for trees**

**FURROW IRRIGATION**

Furrows are small channels, which carry water down the land slope between the crop rows. Water infiltrates into the soil as it moves along the slope. The crop is usually grown on the ridges between the furrows (see Figure 3). This method is suitable for all row crops and for crops that cannot stand in water for long periods (e.g. 12-24 hours).



**Figure 2a Basin irrigation on the hillside**

Irrigation water flows from the field channel into the furrows by opening up the bank of the channel, or by means of siphons or spiles

**Border irrigation**

Borders are long, sloping strips of land separated by bunds. They are sometimes called border strips.

Irrigation water can be fed to the border in several ways: opening up the channel bank, using small outlets or gates or by means of siphons or spiles. A sheet of water flows down the slope of the border, guided by the bunds on either side. (see Figure 4).



**Figure 4 Border irrigation, using siphons**

**1.2 Sprinkler Irrigation**

Sprinkler irrigation is similar to natural rainfall. Water is pumped through a pipe system and then sprayed onto the crops through rotating sprinkler heads.



**Figure 5 Sprinkler irrigation**

**1.3 Drip Irrigation**

With drip irrigation, water is conveyed under pressure through a pipe system to the fields, where it drips slowly onto the soil through emitters or drippers which are located close to the plants. Only the immediate root zone of each plant is wetted. Therefore this can be a very efficient method of irrigation (Figure 6). Drip irrigation is sometimes called trickle irrigation.



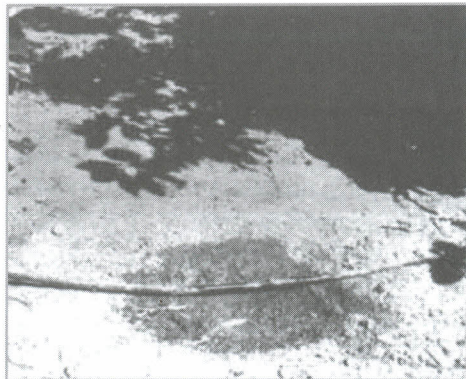


Figure 6 Drip irrigation (A)

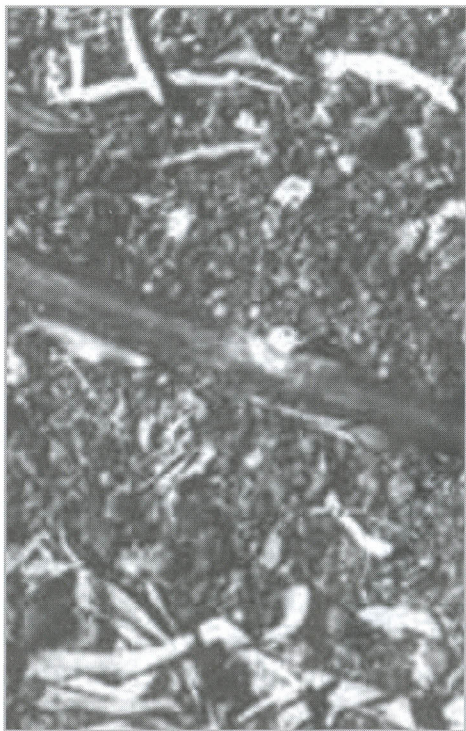


Figure 6 Drip irrigation (B)

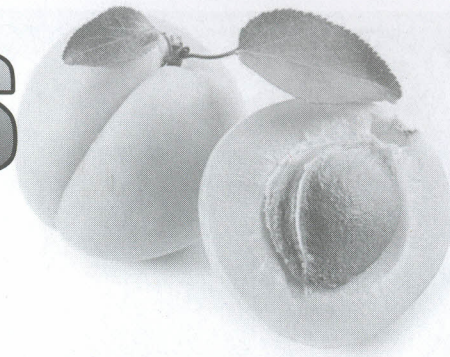
#### 1.4 Functioning of Irrigation Systems

Whatever irrigation method is being chosen, its purpose is always to attain a better crop and a higher yield. Therefore proper design, construction and irrigation practice are of utmost importance. Maintenance, the after-care of the system to keep it functioning as well as possible, is often neglected. This always results in a lower irrigation efficiency (see also Volume 4), and thus less benefit from the irrigation system.

It is recommended to give canals, structures and methods a regular check-up and to repair damage immediately. Maintenance of canals and structures is dealt with in the Volumes concerning these subjects; maintenance of surface methods is discussed in the appropriate sections (2.5, 3.6, 4.4). Maintenance of sprinkler and drip systems is usually described in handbooks supplied by the manufacturers of the systems.

Source: Brouwer, C, Prins, K, Kay, M & Heibloem, M. Water Management: Irrigation Methods **Training manual no 5** FAO Land and Water Development Division.  
<http://www.fao.org/docrep/S8684E/s8684e00.htm>

# APRICOTS



#### Background

Apricots originate from the North-east of China from where it was distributed throughout central Asia and Asia Minor, and have been cultivated for thousands of years. The Romans introduced apricots to Europe, Greece and Italy in 70 BC. The first apricot trees imported into South Africa arrived during the 17<sup>th</sup> century and were planted almost exclusively in the Western Cape under winter rainfall conditions.

#### Climatic and soil requirements

The apricot tree is deciduous and needs a relatively cold winter for proper dormancy and flower bud development (400–600 hours below 7,2 °C during winter). The cultivation of apricots is not suitable in areas with a subtropical climate. Annual rainfall should be taken into consideration in planning an apricot orchard. Irrigation is essential for apricot trees. Apricot trees need sufficient water for survival and are very susceptible to waterlogged soil. The trees thrive on

well-drained loam soils. A minimum soil depth of about 1,5 m is recommended.

#### Uses

Apricots are used both as a fresh fruit, juice and dried fruit. Some apricots are used for making 'jam' and sweets. The leaves, flowers and seeds were used as a treatment for cancer in Mexico.

#### Cultivation practices

##### Planting

After ploughing, a disc harrow will give a relatively smooth and well-prepared surface. The planting holes should be about 300 x 300 mm wide and 500 mm deep. The roots of the young trees should not be exposed to fertilisers, that is, fertiliser should not be applied in the planting hole. The right time to plant is when the trees are in the deepest dormancy (usually from 15





June to 15 July) to avoid shock. Later planting results in unsatisfactory growth later in the season. The recommended planting distance is 5 to 6m between rows and 4m between trees, depending on the soil type and implements to be used.

### Fertilisation

The best way to monitor nutrient levels in both foliage and soil is to do leaf analysis and soil testing. Leaf analysis enables a grower to determine if the tree has obtained the necessary nutrients from the soil. If the elements are low, this can be corrected by appropriate measures. If no soil samples are analysed, fertilisation of

fruit trees should be dictated by the soil pH.

### Irrigation

Certain important factors should be taken into consideration in deciding on the volume and frequency of irrigation of apricot trees. Such factors include soil type,

water quality, climate, season, type of fruit, the age and size of trees, growth phase of the trees, the type of irrigation system used as well as mulching with organic material such as straw. Sandy soils have low water-holding capacities. It is therefore essential to apply small volumes of water at relatively short intervals. Clayey soils have higher water-holding capacities. Larger volumes of water should therefore be applied with longer intervals between irrigations. The climate also determines the frequency and intensity of irrigation.

### Weed control

Grass and weeds absorb considerable quantities of nitrogen and water to the



detriment of trees. The drip areas of the trees must always be kept clean because most of the feeding roots of the trees are in these areas. Regular slashing between the rows will in due course eradicate all aggressive annual weed and grass species, and the more acceptable

perennial grasses will form a cover between rows. Keeping this cover short (mowing) assist in preserving moisture in the soil and in preventing erosion.

### Pest and disease control

The Mediterranean fruit fly (*Ceratitis capitata*) and Natal fruit fly (*Pterandrus rosa*) can attack the fruit. The symptoms are numerous cream-coloured maggots inside the fruit. The false codling moth (*Cryptophlebia leucotreta*) is a larger reddish-white worm (usually one) and dark brown frasis found around the pip of the fruit. Freckle spot (*Fusicladium carpophilum*), bacterial canker (*Pseudomonas syringae*), dieback

(*Eutypa armeniaca*) and crown gall (*Agrobacterium tumefaciens*) are the most frequent diseases in the summer rainfall areas. Very little can be done to control these once they occur in the orchard, except for freckle spot on the fruit (which in wet seasons can spoil the exterior of the fruit).

Source <http://www.nda.agric.za/docs/apricot.pdf>



# SOIL POTENTIAL

Soil potential only becomes a meaningful term if it is specified in terms of a specific crop. A soil type which is not suitable for the production of dryland maize can, for example, be ideal for pastures.

## Factors determining soil potential

### Soil colour

**Red:** good drainage

**Yellow:** less dry than red soils

**Grey:** waterlogged soils

**Black:** high humus content

**Brown (usually the topsoil):** presence of organic matter

**Mottling in the subsoil:** varying water table.

### Soil texture

Soil texture is the proportion of sand, silt and clay particles.

- Sandy soils have a rapid infiltration rate but poor water retention capacity.
- Clayey soils have a slow infiltration rate but a good water retention capacity.

clay content in the form of blocks or prisms and a low to marginal agricultural potential.

### Rainfall

Various soils react in different ways to rain.

- Sandy soils absorb water quickly, but dry out soon.
- Clayey soils take long to absorb water but retain moisture for a longer period.
- Shallow soils store less water and waterlogging could be a problem. Deep soils store greater quantities of water.

### Position and inclination

The inclination or position in the landscape determines if the water will move in the direction of the soil or

away from it. Land on summit areas will receive less runoff than lands at the lower end of an incline. Soil erosion can result if steep inclines are cultivated.

## General guidelines

- Soil classification is recommended when determining the potential of a specific soil type.
- Cultivate crops which are adapted to the soil type.
- Crop requirements should be considered.
- Using soils for the wrong purpose can cause irreparable deterioration.

### Soil fertility

Soil fertility refers to the capacity of the soil to provide plant nutrients to actively growing plants.

### Nutrients

Plants require certain nutrients to ensure optimum growth and production.

**Carbon, oxygen and hydrogen** are readily available in the air and water.

**Nitrogen** promotes optimum growth and is needed for good colour

development.

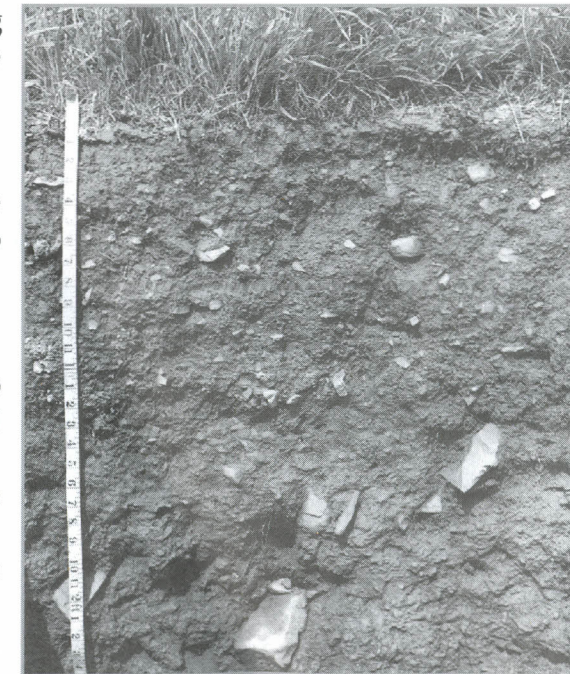
**Phosphorus** promotes root development.

**Potassium** influences quality, vigour and firmness of the plant.

**Calcium** promotes protein formation and cell growth (general plant vigour).

### Soil acidity

- The pH of a soil is an indication of soil acidity.
- Acid soils have a pH of below 7.
- Most plants grow optimally at a pH (water) of 5,5 to 7,0 and a pH (KCl) of 4,5 to 6,0.







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- Acid soils have a pH of below 7. Most plants grow optimally at a pH (water) of 5,5 to 7,0 and a pH (KCl) of 4,5 to 6,0.
- If the crop's soil acidity requirements are not known, a pH (KCl) of 4,7 to 5,0 should be the goal.
- If the soil pH is unfavourable the quantity of available plant nutrients is limited, resulting in ultimate yield loss.
- Lime is applied to increase the pH of the soil.

### **Fertilisation**

#### **Organic fertilisation**

Organic fertilisers, such as cow dung, poultry manure and guano contain all the nutrients needed for plant growth. Poultry manure contains the highest proportion of plant nutrients, followed by sheep and horse manure, cow dung and lastly pig manure.

### **Chemical fertilisation**

Chemical fertilisers contain a high percentage of nitrogen, phosphorus and potassium. Injudicious use of these fertilisers can cause damage to plants as well as the soil. Soil analyses give a reliable indication of nutrient deficiencies.

### **Soil sampling**

A soil sample indicates:

- The quantity of plant nutrients needed in the soil as well as the type of nutrients.
- Which type of fertiliser to apply.
- The quantity of fertiliser.
- Area where fertiliser has to be applied.

### **Soil sample**

A soil sample consists of several subsamples. Subsamples are obtained from various localities in a land. A topsoil subsample contains soil from the upper 250 mm of soil at a specific locality in the land unit. All the subsamples are added and mixed to form a representative sample for analysis.

### **Land unit**

If large areas of a land differ in colour, depth and texture, each land unit should be sampled separately. If these differences comprise only a small area

these areas can be ignored during sampling.

General guidelines for taking samples

- Use a clean bag (not a used fertiliser, lime or salt bag or pesticide containers).
- A sample should consist of at least 1 kg of soil.
- Mark the sample clearly.
- Fresh soil samples should be taken after 3 years.

This publication is available on the web at: [www.nda.agric.za/publications](http://www.nda.agric.za/publications)





## READERS' PHOTO GALLERY



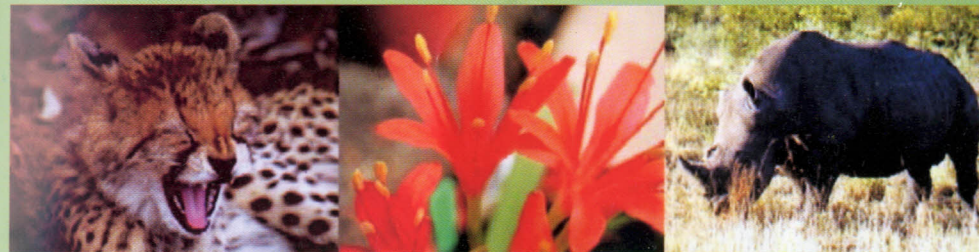
Mr Raphael Kachalema showing his good crops.  
His son is with him. They are from Zambia

We want to invite our readers to tell us about their success stories as a result of information received from PRAIS

## DEPARTMENT OF GENETICS UNIVERSITY OF THE FREE STATE

Genetics is the study of all aspects of heredity. In the Department of Genetics heredity is studied on molecular level (DNA and gene expression), cellular level (studies of chromosomes) and organism level (population genetics). At undergraduate level Genetics forms part of the introductory biology at first year level and is presented as a complete subject from the second year. At post graduate level students may specialize in Forensic Genetics, Conservation Genetics, Population Genetics, Cytotaxonomy, Molecular Systematics, Behavioural Genetics or combinations of these fields.

Research is very important to the Department and the post-graduate specialization fields form the basis of various research projects on plants, animals and humans. The Department has a high publication output and research is done in collaboration with various research groups in South-Africa and the USA.



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# PORCUPINE



## Physical Characteristics

The crested porcupine is the largest and heaviest of African rodents. The head is roundish and rather domed, with a blunt muzzle and small eyes and ears. The legs are short and sturdy, and each foot has five toes, all equipped with powerful claws. It is easily recognized by its quills. Quill length on different parts of the body varies, from 2.5 cm up to 30cm on the back. Usually the quills lie flat against the body, but if danger threatens, the porcupine raises and spreads them. Scales on quill tips lodge in the skin like fishhooks and are difficult to pull out. New quills grow in to replace lost ones.

## Habitat

Porcupines are most common in hilly, rocky country, but they can adapt to most habitats. Excessively moist forests and the most barren of deserts seem to be the only exceptions. They have even been found on Mt. Kilimanjaro, as high up as 11,480 feet. (146.304 m)

## Behaviour

Natural shelters among roots and rocks are modified by porcupines to suit their needs. They will inhabit holes made by other animals but also dig their own. These burrows are most commonly occupied in family units.

The porcupine warns potential enemies of its defence system when alarmed. It will stamp its feet, click its teeth and growl or hiss while vibrating specialized quills that produce a characteristic rattle. If an enemy persists, the porcupine runs backward until it rams its attacker. The reverse charge is most effective because the hindquarters are the most heavily armed and the quills are directed to the rear.

Between one and four young are born in a grass-lined burrow. They are well-developed and have their eyes open at birth. The young leave home for the first time at about 2 weeks of age as their quills, soft at birth, begin to harden. The young are suckled for 6 to 8 weeks, when they begin to eat vegetable matter.

## Diet

Porcupines primarily eat roots, tubers, bark and fallen fruit but have a fondness, too, for cultivated root crops such as cassava, potatoes and carrots. Sometimes porcupines will take carrion back to the burrow to nibble on.

## Predators and Threats

Especially in heavily settled areas, porcupines can be serious agricultural threats and porcupines can do a lot of crop damage in a single night. They are hunted using dogs, spears or nets, or smoked out of their burrows.

<http://www.awf.org/content/wildlife/detail/porcupine>

Did you know?