UNIT
2

Land Acquisition

LEARNING / FACILITATING MATERIALS

CITRUS PRODUCTION
NATIONAL CERTIFICATE I

COTVET

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Introduction

Land acquisition in citrus farming is very important in order to avoid land litigation. In Ghana for instance, there are several ways of acquiring a land. This learning material is therefore, designed to help learners have basic knowledge on ways of acquiring "litigation free" land.

This learning material covers all the Learning Outcomes for land acquisition requirements for the **Certificate I programme**

Table of Content

Demonstrate knowledge of site selection

In this LO, you will learn to determine the suitability of land, conduct market survey of potential area, explain the importance of conducting market survey and identify factors to consider in selecting site.

PC (a) Determine the suitability of the land

Setting up a citrus crop that will be profitable in the long term requires careful planning and the right site. The following information will help you determine if your site has the right land and climate for growing citrus:

Soil
Citrus trees require a minimum of 60 cm of well-drained topsoil; a depth of 1 m is preferable. Use an auger to check that there is no barrier to drainage within 1.5 m of the surface. Loams and sandy loams are preferred. Very sandy soils require expert management as they have a low water-holding capacity and nutrients are readily leached. Wetter clay soils can cause collar and root rot and the risk of tree death. A soil pH between 6.0 and 6.5 is required. Avoid soils with pH above 8.

Slope
Land should be a gentle slope to minimize soil erosion. Steeper slopes present a major erosion risk and make it difficult to operate machinery safely.

Climate
Citrus will tolerate high temperatures provided the trees are well supplied with soil moisture. Trees are sensitive to frost, but this varies with variety, tree age and health. Drier coastal or inland areas are preferred for citrus to reduce the risk of pest and disease problems.

Water
Irrigation is essential for regular cropping in areas where rainfall is below 700 mm per year. Correct water management is critical in the tropics for high yields, as citrus is sensitive to water stress.

However, waterlogging for as little as three days, in high temperature conditions, can result in significant root die-back and leaf loss.

1 hectare of mature trees will need 8 to 9 mega-litres of irrigation (1 mega-litre (ML) = 1 million litres). Citrus trees are highly sensitive to salt. Avoid waters with an electrical conductivity above 1800 micro Siemens per centimetre (µ/cm) or a chloride level above 450 parts per million

PC (b) Conduct market survey of potential area.

Market survey for citrus

Market survey plays a very important role in citrus farming. As a result, the study of the spending characteristics and purchasing power of consumers who are within your business area and a research method for defining the market parameters of a business is therefore paramount. In market survey, you actually speak to your target audience. These are some of the reasons why one needs to conduct citrus market survey:

- To learn about competition
- To know the demand and supply
- To identify consumer preference
- To price correctly
- To understand which product to use as a boost.

The following are the steps and information required to conduct market survey of citrus:

1. **Define and determine the nature, extent, and size of market.**

   Before conducting a survey in a given market, one needs to know what market to target.

   Choose geographic and demographic parameters, identify customers by types of product, and get an idea of how many people there are in the market.

   Narrow the market research to a short list of desired data (for example buying habits and average income)

2. **Determine what aspects of the market to investigate.**

   Find out where and when one can reach consumers in the market. Choose a sample site; sample size should be as large as possible to maximize the accuracy of the result.

3. **Find out where and when to reach customers in the market.**

   A survey can be conducted at the mall or on the street, via telephone, online or through the mail. The results may change based on the time of day and year. Choose a method and time that best suit the research.

4. **Choose a sample size.**

   It is difficult to reach out to the entire population for the survey. It is therefore necessary to select a sample size which represents the total population.

5. **Prepare a list of questions that will provide the data needed for the market survey.**

   The questions should be relevant and specific. Developed questions that can easily be responded to. Do not ask the same thing in two different ways (avoid ambiguity). Try to use as few words as possible.

6. **Devise a way of quantifying the answers received.**

   If asking about preferences, ask respondents to rank their responses numerically or using keywords. When asking about money, use ranges of values. If answers will be descriptive, decide how to group these responses after the survey is completed so that they can be grouped in categories

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7. **Identify variables that might affect the results.**

8. **Set a time period and location for the survey that is likely to result in large sample size.**

9. **Prepare survey forms.**

10. **Conduct survey, maximizing sample size and accuracy of responses.**

PC (c) Explain the importance of conducting market survey

Importance of market survey, to:

1. Learn about competition
2. Know the demand and supply
3. Determine consumer preference
4. Price correctly
5. Understand which product to use as a boost

PC (d) Identify factors to consider in selecting site.

Factors to consider in site selection

1. Soil
2. Climate
3. Slope of the land
4. water

Self-assessment

PC (a)

1. Explain three (3) reasons for acquiring knowledge in site selection before setting up a citrus farm.

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PC (b)

1. State and explain the steps involved in market survey

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2. Conduct a market survey using the following guidelines.

i. Identify size of market.
ii. identify aspects of the market to investigate
iii. Find out where and when to reach customers in the market.
iv. Choose a sample size
v. Prepare a list of questions
vi. Record responses received making sure to avoid variables that might affect the results.
vii. Set a time period and location for the survey
viii. Prepare survey forms.
ix. Conduct the survey.
x. Write a summary report and disseminate the information.

PC (c)

1. List four (4) areas you can conduct market survey

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PC (d)

1. Explain three (3) factors to consider when selecting a site for citrus farming.

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LEARNING OUTCOME **2**

Demonstrate understanding of nature of soil.

In this LO, you will learn to identify types of soil, conduct appropriate soil tests and measure the depth of the top soil.

PC (a) Identify types of soil.

Soil is a thin layer of material on the earth's surface in which plants have their roots. It is made up of many things, such as weathered rock and decayed plant and animal matter. Soil is formed over a long period of time.

Soil formation takes place when many things interact, such as air, water, plant life, animal life, rocks and chemicals.

Types of Soil

The type of suitable soil for citrus cultivation is loamy to sandy loam soil.

PC (b) Conduct appropriate soil tests

Conducting appropriate soil tests

Soil Test 1: The Squeeze Test

To determine the soil type, take a handful of moist (but not wet) soil from the farm and give it a firm squeeze. Then open your hand to observe which one of these three things will happen:

1. It will hold its shape, and when poked it crumbles; this means you have loam soil.
2. It will hold its shape and when poked, sits stubbornly in your hand. This means you have clay soil.
3. It will fall apart as soon as you open your hand. This means you have sandy soil.

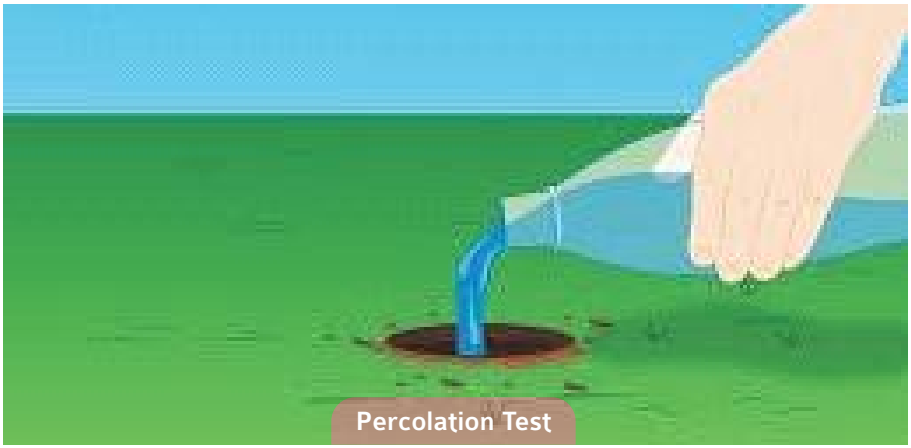
Squeeze Test

Soil Test 2: The Percolation Test

In carrying out percolation test, the drainage pattern of the soil is tested. It is also important to determine whether there are drainage problems or not.

To test the soil drainage the following steps should be performed:

1. Dig a hole about six inches wide and one foot deep.
2. Fill the hole with water and let it drain completely.
3. 3. Fill it with water again.
4. Keep track of how long it takes for the water to drain.
5. If the water takes more than four hours to drain then the soil has a poor drainage.



Percolation Test

Soil Test 3: The Worm Test

Worms are great indicators of the overall health of the soil, especially in terms of biological activity. If there are earthworms, chances are the soil has beneficial microbes and bacteria that make for healthy soil for strong plants.

How to perform the worm test:

1. Be sure the soil is at least 55 degrees and that it is somewhat moist but not soaking wet.
2. Dig a hole one foot across and one foot deep.
3. Place the soil on a piece of cardboard.
4. Sift through the soil with the hands.
5. Place the soil back into the hole, counting the earthworms as you go.

If at least ten worms are found then the soil is in pretty good. Less than that indicates that there may not be enough organic matter in the soil to support a healthy worm population or that the soil is too acidic or alkaline.

Soil Test 4: pH Test

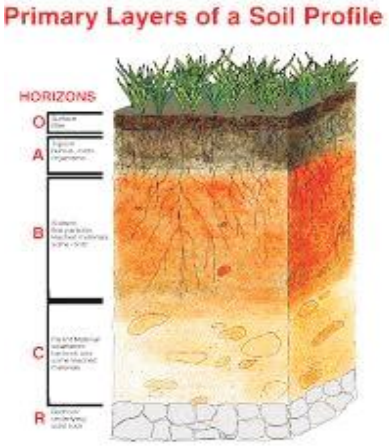
The pH (acidity level) of the soil has a large part to do with how well the plants grow. pH is tested on a scale of zero to fourteen, with zero being very acidic and fourteen being very alkaline. Most plants grow best in soil with a fairly neutral pH between six and seven. When the pH level is lower than five or higher than eight, plants just won't grow as well as they should.

PC (c) Measure the depth of the top soil

Measuring the soil depth

Soil depth is measured using simple tool such as soil auger or digging a soil profile.

O Horizon - The top, organic layer of soil, made up mostly of leaf litter and humus (decomposed organic matter).



A Horizon - The layer called topsoil. Seeds germinate and plant roots grow in this dark-colour layer. It is made up of humus (decomposed organic matter) mixed with mineral particles.

E Horizon - This eluviation (leaching) layer is light in colour. It is made up mostly of sand and silt, having lost most of its minerals and clay as water drips through the soil (in the process of eluviation).

B Horizon - Also called the subsoil. It contains clay and mineral deposits (like iron, aluminium oxides, and calcium carbonate) that it receives from layers above it when mineralized water drips

from the soil above.

C Horizon - Also called regolith. It consists of slightly broken-up bedrock. Plant roots do not penetrate into this layer; very little organic material is found in this layer.

R Horizon - The unweathered rock (bedrock) layer that is beneath all the other layers.

Self-assessment

PC (b)

1. Perform any two of the soil tests described above and record your findings.

PC (c)

1. Create a soil profile of an area by digging a hole and measure the various layers using the appropriate tools. Record your findings

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LEARNING OUTCOME 3

Demonstrate knowledge of the land tenure system.

In this LO, you will learn about different types of land tenure systems, basic requirements of land tenure agreements, the importance of land registration and the procedure for land registration.

PC (a) Explain the different types of land tenure systems

Land tenure is the relationship legally or customarily defined among people as individuals or groups with respect to land. It defines how access is granted to rights to use, control and transfer land as well as associated responsibilities and restraints. Land tenure is an aspect of land administration governed by the national land policy of Ghana.

Land tenure is an important part of social, political and economic structures. It is multidimensional bringing into play social, technical, economic, institutional, legal and political aspects that are often ignored but must be taken into account. Land tenure relationships may be well-defined and enforceable in a formal court of law or through customary structures in a community.

There are three major types of agricultural land tenure agreements practiced in Ghana. These are:

1. **Leasehold or rental:**

   Under both common law and civil law, land may be leased or rented by its owner to another party; a wide range of arrangements are possible, ranging from very short terms to the 99-year leases.

2. **Share cropping:**

   Under this condition agricultural land owned by a person is given for cultivation to another person and the produce shared according to agreed terms and conditions.

3. **Life estate:**

   Under common law this is an interest in real property that ends at death. The holder has the use of the land for life but typically no ability to transfer that interest or to use it to secure a mortgage loan.

Types of land ownership

The current Constitution of Ghana identifies 4 main categories of land ownership. These are:

1. Public/State lands
2. Vested lands
3. Stool/Skin lands
4. Private/family lands

Major processes in Land Administration

Processes of land administration include:

1. Deeds Registration
2. Title Registration
3. Concurrence
4. Consent

PC (b) Explain the basic requirements of land tenure agreements.

Basic requirements of land tenure agreements

Now that you have discussed the basic land tenure systems, it will be necessary to also have some basic knowledge of land agreements. Find below some important information required for land tenure agreements.

Purpose of Landowner Agreement

The purpose of this agreement is to identify and confirm the terms, conditions and obligations agreed upon between the Grantee, who is undertaking a project and the Landowner, who owns the property on which the project will take place.

PC (c) Explain the procedure for land registration.

Procedure for acquiring public/State lands & Vested lands

- Apply to Lands Commisssion
- Indicate name, occupation, and evidence to pay
- Indicate nature of Use.
- Lands Commission to considered request
- Offer letter from land commission

- Payments to land commision
- Lease preparation
- Execution & Indexing
- Stamp Duty (Land Valuation Board or Land Valuation Department)
- Advertisement by Land Title Registry

Stool/Skin lands – according to the constitution of Ghana Law Article 266 – Desposition of stool land must be with development plan Concurrence/Concent

To acquire stool and skin lands, the following procedures must be followed:

- Contract between Parties (Indenture with approved site plan LI 1144)
- Presentation at Lands Commission
- Check on records and capacity of grantor/stool
- Letter to appropraite Metropolitan, Municipal and District Assemblies.
- Signing of Concurrence and plotting

To acquire Private/family lands, the following procedures must be followed-

- Sign contract between parties (indenture with approved site plan li 1144)
- Pay stamp duty at the land commission
- Undertake the following at the Land title registry/division: lodgement card, survey (cadestre), lands commission search, publication in papers, execution of certificate or adjudication committee (for greater accra region and parts of ashanti region)
- Deeds registry in all other regions – present at lands commission, plotted, forwarded to deeds registry for registration

Land ownership comes along with the right to use land as wanted based on the consent of the planning department of the district, municipal and metropolitan assemblies.

PC (d) Procedure for land registration:

To be able to register a land, the steps below shall be followed:

1.Seller obtains the Title transfer form at the Land Title Registry

The search at the Land Registry is conducted to confirm rightful ownership. An attorney prepares the transfer document (transfer deed) which is signed by both the vendor and the purchaser and their witnesses. The Title Transfer form is duly executed and presented at the Land Registry.

2. Assessment of the property value and payment of a stamp duty

The stamp duty is assessed and paid at the Land Valuation Board. The buyer presents the deed of assignment to the Land Valuation Board.

The property is inspected to ascertain its current open market value. The buyer pays Stamp Duty to the Land Valuation Board.

The Stamp Duty Act of 2005 (Act 6S9). This Act states that for the conveyance or transfer on the sale of a property, the stamp duty is 0.25% where the property value is less than GHC 10,000. For properties valued between 10,000 and 50,000 GHC, stamp duty is 0.5%, and for properties valued above GHC 50,000, stamp duty is 1%.

Agency: Land Valuation Division of the Lands Commission is expected to take 3-14 days and 55 GH Processing fee + 1% of property value (stamp duty). (Source: World Bank, 2014 http://www.doingbusiness.org/data/exploreeconomies /ghana/registeringproperty/)

3. Submit application for the title certificate at the Land Title Registry

The submission of the application form for Title Certificate and payment of processing fee at Land Title Registry

The documentation shall include:

(i) Application form
(ii) Original and one copy of the deed of assignment, duly completed
(iii) Land Certificate
(iv) Company's certificate of incorporation.

4.Publication of transaction in the national weekly newspaper

The transaction must be published in the national weekly newspaper in order to issue Land Title Certificate. Where the Land Certificate is urgently required, the applicant has the option to choose what is known as "special publication"

5.Issuance of the title certificate

The title certificate is issued by the Land Title Registry. The transaction is recorded on the Land Certificate, which is returned to the owner. The original of the deed of assignment, having been stamped to show that it has been registered, is also returned to the applicant. The Registry keeps a duplicate. The folio of the Register is filed and the transaction document is placed in the land parcel file. The owner will use the property after the title is issued by Land Title (in areas covered by Land

Title Registration) or when the Deed has been registered under the Deeds Registration Act and Development Permit granted by the Assembly. Most often, property owners do not wait to go through these processes before making use of the land.

Self-assessment

PC (c)

1. You have been given a piece of land to cultivate. State the procedure involved in registering the land.

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2. State three (3) challenges you will go through when the land is not registered

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LEARNING OUTCOME 4

Demonstrate knowledge of the climate of the area.

In this LO, you will learn about various climatic factors that contribute to citrus farming, determine the rainfall pattern and volume for citrus production and the temperature ranges for citrus production and the duration of rainy and dry season of the production area.

PC (a) Explain the various climatic factors that contribute to citrus farming.

Climate: Is a measure of the average pattern of variation in temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological variables in a given region over long periods of time (usually 30 years).

Note: The climatic factors affecting citrus production cannot be determined from just one measurement. It must be conducted for a long period of time (usually 30 years). Rainfall is the most common form of precipitation. The amount and regularity of rainfall vary with location and climate types and thus, affect the dominance of certain types of vegetation as well as crop growth and yield.

The soil moisture reservoir is depleted by plant use and evaporation from the soil surface, both of which are dependent on season and prevailing weather. Most plants do not use much water in the cooler months because weather conditions are not too favorable for their growth and do not favour evaporation.

Irrigation with too little water does not completely replenish the soil reservoir but excess water percolates down through the soil and may not be readily available for plant use (depending on soil type). Because it is not practical to replace soil moisture at the same time and rate as it is being used, watering is scheduled periodically to refill the soil reservoir.

Temperature: the degree of hotness or coldness of a substance is called temperature. It is commonly expressed in degree Celsius (0C). This climatic factor influences all plant growth processes such as photosynthesis, respiration, transpiration, breaking of seed dormancy, seed germination, protein synthesis, and translocation. At high temperatures the translocation of photosynthetic (a sugar or other substance made by photosynthesis) is faster so that plants tend to mature earlier.

In general, plants survive within a temperature range of 0 to 500C (Poincelot, 1980). Enzyme activity and the rate of most chemical reactions generally increase with rise in temperature.

Excessively low temperatures can also cause limiting effects on plant growth and development. For example, water absorption is subdued when the soil temperature is low.

Relative humidity (RH) is the amount of water vapour in the air, expressed as the proportion (in percent) of the maximum amount of water vapour it can hold at certain temperature. The amount of water vapour that the air can hold depends on its temperature; warm air has the capacity to hold more water vapour than cold air. High relative humidity means that the air is moist while air with minimal content of moisture is described as dry air. Compared to dry air, moist air has a higher relative humidity with relatively large amounts of water vapour.

The relative humidity affects the opening and closing of the stomata which regulates loss of water from the plant through transpiration as well as photosynthesis. A substantial understanding of this climatic factor is likewise important in plant propagation.

PC (b) Determine the rainfall pattern and volume for citrus production

Calibrated cylinder with a funnel

In Ghana, there are two types of rainfall patterns; Bimodal and unimodal. Bimodal means two raining seasons (the major and minor) whiles unimodal is a one season rainfall. Citrus producing areas in Ghana such as Kade, Asuansi, Obuasi etc. have a bimodal rainfall pattern.

Rainfall is essential for regular cropping. Rainfall volume needed for citrus production in Ghana ranges between 700 – 1800 mm per annum. In areas where rainfall is below 700 mm per year, 1 hectare of mature trees will need 8 to 9 million litres of irrigation.

In determining the volume of rainfall, follow the procedure below;

- have a funnel opening into a calibrated cylinder gauge
- Put cylinder gauge in a hole or on the surface
- Read water level in the cylinder

Note: when using an ordinary cup being placed in the opening to collect rainfall then, calculate the rainfall (in mm) by dividing the volume of water collected by the area of the opening of the cup.

PC (c) Determine the temperature ranges for citrus production

Citrus plants survive within a temperature range of 13°C to 380C. The optimum mean daily temperature for growth is 23 to 30°C. Growth is markedly reduced above 38°C (maximum) and below 13°C (minimum). Active root growth occurs when soil temperatures are higher than 12°C Temperature is measured with a thermometer usually made of a glass tube with colored alcohol. As the air gets hotter, the level of the liquid rises and, as the air gets cooler, the level falls.

Note: one day temperature measurement of an area cannot be used to determine the climate of that area but rather the weather at that current time.

Procedure for determining temperature are as follows;

1. Go outside and wait two minutes before you take a reading. This is to allow the thermometer to adjust to the outside air temperature.

2. When recording the temperature, please keep the following in mind
i. Take outdoor reading away from the building.
ii. Take the reading out of direct sunlight (in the shade if possible).
iii. Hold the thermometer close to eye level; it should never be on the ground.
iv. Do not allow rain to fall on the thermometer.

PC (d) Describe the duration of the rainy and dry season of the production area.

In Ghana, the citrus producing areas are characterized by two seasons; namely rainy and dry seasons. In the rainy season, two rains are recorded; the major and minor seasons. The major season expands from April to July whiles the minor rainy season starts from September to December.

The dry season starts from around November to March of the following year. During the dry season the juice content and formation of new branches are affected.

Self-assessment

PC (a)
State three (3) factors each of the humidity and temperature as they contribute to citrus production.

HUMIDITY	TEMPERATURE

2. There has been a reduction in the amount of rainfall during the cropping seasons. State the effects this will have on citrus farming.

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PC (b)

1. Perform the following activities;

i. Set up instruments used to measure volume of rainfall on school farm

ii. After every rainfall for two conservative times, record the volumes of rain water.

iii. Find average volume of rainfall.

PC (c)

1. Your area is prone to high temperatures. State the effects of these on your citrus farm.

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PC (d)

1. Explain the effect of rainy season on citrus plants during the flowering stage.
2. Explain why the juice content in citrus is affected during the dry season.

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