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MODULE **0**: **Farmer's Agribusiness Training Course Orientation**

LESSON 1: **Welcome**

TIME: **10 minutes**

AUTHOR: **Andrew Moore**

This lesson was made possible with the assistance of the following organisations:

LESSON 1

WELCOME

AUTHOR:

Andrew Moore

TIME:

5 minutes

OUTCOMES:

By completion of this lesson you will be able to:

- Best utilise the materials and resources in this Agribusiness course to suit your learning needs.

INTRODUCTION:

This Framers' Agribusiness training course has been developed to help both farmers and farmer organisations. Its intention is to provide access to additional skills and knowledge that will allow farmers to move from a 'farm' to a 'firm'. To this end academics at the United States International University (USIU) in Nairobi, Kenya, have pooled their expertise in different fields and crafted a course designed to provide farmers with insight into these essential areas:

- Agricultural sector awareness and agricultural policies.
- Sustainable agriculture practices
- Entrepreneurship
- ICT skills for agriculture
- Agribusiness management skills

MODULE & LESSON OVERVIEW

Below is a list of the twenty five lessons that make up the USIU Agshare Farmers' Agribusiness Training Course. They have been clustered into modules each containing 5 lessons. Each lesson should take approximately 1 hour 30 minutes long. They are:

MODULE 1: Structure of Agricultural Sector and Policies

1. Introduction to Agriculture
2. Management of Agricultural Resources
3. Agricultural Policies in Kenya
4. Application and Impact of Policy
5. Benefits from and Influencing Policy

MODULE 2: Sustainable Agriculture

1. Definition of Sustainable Agriculture
2. Management of Agricultural Resources
3. Benefits of Sustainable Agriculture
4. Constraining Factors
5. Sustainable Production Techniques

MODULE 3: Entrepreneurship

1. Introduction to Entrepreneurship
2. Organisation of Agricultural Enterprises
3. Enterprise Business Plan & Marketing
4. Record Keeping
5. Credit Management

MODULE 4: ICT in Support of Agriculture

1. Introduction to Computers
2. Record Keeping I (with Excel)
3. Record keeping II
4. Seeking and Retrieval of Information
5. E-Business

MODULE 5: Agribusiness Management for Farmer Organisations

1. Introduction to the Economics of the Firm
2. Basic Principles of Economics
3. Decision Making within the Firm: Explicit and Implicit Costs
4. Decision Making based on Loss Minimization & Present Value
5. Closing the Loop

MODULAR APPROACH TO YOUR STUDY

These modules can be studied in any particular order although the lessons within each module should be accessed in their correct order. The lessons are most effective if course participants access the materials working in small groups of four or five.

The intention is to allow various farmer groups and organisations the flexibility to deploy the course in a number of permutations. Groups are able to organise the course sessions in such a way to support their community's needs and availability. Below are some suggested ways of running the course:

Full Week: Option 1

Monday	Tuesday	Wednesday	Thursday	Friday
Module 1: Lessons 1-5 Venue: Large room	Module 2: Lessons 1-5 Venue: Large room	Module 3: Lessons 1-5 Venue: Large room	Module 4: Lessons 1-5 **Venue: Computer Laboratory**	Module 5: Lessons 1-5 Venue: Large room

Option 1 will work best if a facility such as a computer lab is available for only one day

Full Week: Option 2

Monday	Tuesday	Wednesday	Thursday	Friday
Module1 Lesson 1	Module 1 Lesson 2	Module 1 Lesson 3	Module 1 Lesson 4	Module 1 Lesson 5
Module 2 Lesson 1	Module 2 Lesson 2	Module 2 Lesson 3	Module 2 Lesson 4	Module 2 Lesson 5
Module 3 Lesson 1	Module 3 Lesson 2	Module 3 Lesson 3	Module 3 Lesson 4	Module 3 Lesson 5
Module 4 Lesson1	Module 4 Lesson 2	Module 4 Lesson 3	Module 4 Lesson 4	Module 4 Lesson 5
Module 5 Lesson 1	Module 5 Lesson 2	Module 5 Lesson 3	Module 5 Lesson 4	Module 5 Lesson 5

Option 2 allows skills learnt in earlier lessons to be exploited in subsequent lessons e.g. spread sheet skills taught in Module 4 Lessons 2 & 3 can be used in subsequent lessons in different modules. It also counters participant's ability to select which aspects they think they prefer and therefore skip a day if they are not interested. It is important to eliminate absenteeism as the modules dovetail with each other and build on knowledge and skills identified in earlier lessons.

Evening Classes (3 hour sessions)

Week 1

Monday	Tuesday	Wednesday	Thursday	Friday
M1 L1	M3 L1	M5 L1	M2 L2	M4 L2
M2 L1	M4 L1	M1 L2	M3 L2	M5 L2

Week 2

Monday	Tuesday	Wednesday	Thursday	Friday
M1 L3	M3 L3	M5 L3	M2 L4	M4 L4
M2 L3	M4 L3	M1 L4	M3 L4	M5 L4

Week 3

Monday	Tuesday	Wednesday
M1 L5	M3 L5	M5 L5
M2 L5	M4 L5	

The evening option will work if participants are only available in the evenings after work.

Weekend Classes (3 weekends)

Week 1

Friday PM	Saturday	Sunday PM
M1 L1	Module 4: Lessons 1-5 Venue: Computer Lab	M3 L1
M2 L1		M5 L1

Week 2

Friday PM	Saturday	Sunday PM
M1 L2	M3 L2	M3 L3
M2 L2	M5 L2	M5 L3
	M1 L3	
	M2 L3	

Week 3

Friday PM	Saturday	Sunday PM
M1 L4	M3 L4	M3 L5
M2 L4	M5 L4	M5 L5
	M1 L5	
	M2 L5	

In this permutation the farmer organisation accesses a computer facility for a single weekend day and then uses a large room for subsequent lessons. The farmers meet over 3 subsequent weekends. Sundays mornings are kept free for church and other social responsibilities.

INTERACTIVE MATERIALS ON CD ROM & INTERNET

It is also important to realise that these paper based resources are accompanied by interactive materials available on the course CD ROM and/or the OER Africa/Agshare website. Course participants will have access to video case studies around which the lessons are based, interactive tutorials necessary for the Record Keeping lessons in module 4 and also access to a repository of electronic versions of the various policy documents and reference papers referred to in modules 1 & 2.

If you have not been sent a course CD ROM or have downloaded these materials as Open Education Resources then access the interactive materials from: http://www.oerafrica.org/agshare

OPEN LICENSE

ICONS EXPLAINED

The following icons have been used throughout the Farmers' Agribusiness Training Course text materials to help participants navigate the learning process:

	**Suggested time per lesson and/or task** How much time you should spend on each lesson or a particular task
	**Outcomes** What ideally you should have learned on completion of the lesson
	**Introduction** An indication of what the content of a lesson will focus on
	**CD ROM Supplementary Resources** Indicates that required additional resources are on the course CD
	**Activity** Indicates that a group or individual task is to be performed.
	**Feedback Available** A number of the tasks have answers for you to compare your
	**Glossary** Difficult or specialised words contained within the lesson are explained.
	**Conclusion** The end of lesson identifies the main points you should have learned.
	**References** The following articles or papers have been used in the lesson.

ACKNOWLEDGEMENTS

The following organisations and individuals have played an important role in facilitating the creation of this course:

Organisations

Agshare project
www.oerafrica.org/agshare
Bill & Melinda Gates Foundation
www.gatesfoundation.org
OER Africa
www.oerafrica.org
United States International University
www.usiu.ac.ke

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MODULE **1**: **Structure of Agriculture and Agricultural Policies**

LESSON 1: **Introduction to Agriculture**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr. Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 1 INTRODUCTION TO AGRICULTURE

AUTHOR:

Dr. Maina Muniafu

TIME:

1 hour 36 minutes

OUTCOMES:

By completion of this lesson you will:

- Appreciate the role of the country's agricultural sector in the economy.
- Appreciate the role of farmers in the country's agricultural sector.
- Describe the divisions of production land in the country into agro-ecosystem zones.
- Relate soil types to various production systems.

INTRODUCTION:

Agriculture provides products that are traded at various levels of society with an exchange of money or, in rare cases nowadays, through barter trade. Such generated incomes translate into other sectors and impact on family livelihoods at one end, while on the other end governments are able to earn revenue and even foreign exchange where exports are involved. Central to all these economic activities are the individuals who are directly involved in the production. These are the farmers and this lesson will look at their role in the agricultural sector as well as what the agricultural industry means to the overall economy of the country.

Two case study videos of a farmer in Mwingi, called Simon and another in Chepsonoi called Beatrice, are presented here to illustrate various issues, as are a list of tables and maps.

See this case study video on the course CD ROM section under *Resource Index* | *Module 3* | *Lesson 1*

The Role of Agriculture in the Economy of Kenya

So just how important is agriculture to the economy and which sectors within agriculture contribute the most? Complete these activities to find out!

Activity 1

Role of agriculture (30 minutes)

1. From the figures presented in Table 1 below, write a short comment on the percentage contribution of agriculture to the overall economy.

Table 1: Agriculture and Kenya's Economy

Gross Domestic Product, 2000	***Kenya***	***Sub-Saharan Africa***
GDP in million constant 1995 US dollars	9,876	362,493
Gross National Income (PPP, in million current international dollars), 2000 {a}	30,357	994,240
Percent of GDP earned in 2000 by:		
Agriculture	20%	17%
Industry	19%	31%
Services	61%	53%

Article 1

What is GDP?

Gross domestic product (GDP) measures the total output of goods and services for final use occurring within the domestic territory of a given country, regardless of the allocation to domestic and foreign claims. Gross domestic product at purchaser values (market prices) is the sum of gross value added by all resident and non-resident producers in the economy, plus any taxes and minus any subsidies not included in the value of the products. The gross domestic product estimates at purchaser values (market prices) are in constant 1995 U.S. dollars and are the sum of GDP at purchaser values (value added in the agriculture, industry, and services sectors) and indirect taxes, less subsidies. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Value added is the net output of an industry after adding up all outputs and subtracting intermediate inputs. The industrial origin of value added is determined by the International Standard Industrial Classification (ISIC) revision 3.

(Source: extracted from Earthtrends; http://earthtrends.wri.org CC: BY NC SA 2.5)

2. From the figures presented in Table 2 below, calculate the percentage contribution of the different production systems to the total agriculture earnings and list them with the high earners at the top.

Table 2: Ranking of Kenya's agricultural products

Rank	Commodity	Production (Int $1000)	Production (MT)
1	Sugar cane	106176	5112000
2	Cow milk, whole, fresh	1061100	3990000
3	Maize	259502	2367237
4	Sweet potatoes	89916	894781
5	Cassava	54114	750964
6	Cabbages and other brassicas	89505	609292
7	Potatoes	71944	600000
8	Vegetables fresh	111651	595000
9	Bananas	84561	593370
10	Plantains	131615	593370
11	Tomatoes	132604	559680
12	Pineapples	82976	429065
13	Mangoes, mangosteens, guavas	93612	384461
14	Indigenous Cattle Meat	760048	367478
15	Tea	374331	345800
16	Wheat	43462	288642
17	Beans, dry	115452	265006
18	Onions, dry	21860	118620
19	Goat milk, whole, fresh	33158	110000
20	Fruit Fresh	15153	95000

Role of Farmers in Production Systems

It is now clear that agriculture is a crucial component of the national economy. It is also clear, however, that there are numerous farming systems and farmers face many challenges. We will investigate these systems more fully and from this information it will be possible to begin to understand the importance of policies that are beneficial to the farmers.

Activity 2

Production Systems (20 minutes)

1. From Table 3 below, consider the proportion of farmers involved in the different production systems in Kenya.

Table 3: Agricultural values per agricultural sector

Livestock	Value		Cereals Production	Value		Temp. Industrial Crops	Value
Beef Cattle	KES 25 000 000 000.00		Maize	KES 20 125 066 000.00		Sugar cane	KES 7 053 317 600.00
Dairy products	KES 23 100 000 000.00		Wheat	KES 2 933 248 500.00		Pyrethrum	KES 439 090 416.00
Pigs	KES 1 585 466 560.00		Barley	KES 1 275 009 554.00		Pineapple	KES 405 000 000.00
Goats	KES 6 493 518 500.00		Rice	KES 365 925 000.00		Tobacco	KES 129 600 000.00
Sheep	KES 4 058 634 532.00		Other	KES 23 200 000.00		Others	KES 73 400 000.00
Chicken Meat	KES 3 504 000 000.00		Sorghum	KES 599 340 060.00		Potatoes	KES 3 087 500 000.00
Chicken Eggs	KES 4 010 000 000.00		Millet	KES 515 271 791.00		Pulses	KES 5 913 557 910.00
Hides and Skins	KES 1 719 523 449.00					Cotton	KES 494 000 000.00
Rabbits	KES 150 000 000.00					Oilseeds	KES 250 305 000.00
Camels	KES 405 000 000.00					Horticulture export	KES 7 057 320 506.00
Honey	KES 305 000 000.00					Horticulture domestic	KES 12 674 718 000.00
Total Livestock	KES 70 331 143 041.00		Total Cereals	KES 25 837 060 905.00		Total Temp Indus Crops	KES 37 577 809 432.00
% of Agricultural GDP	42.34		% of Agricultural GDP	15.55		% of Agricultural GDP	22.62

Source: CBS, ASIP Support Study 0

2. Read Article 1, discuss the situation with the person sitting next to you and then list the challenges faced by farmers in each of your regions. Try to include references from article 1, but justified with real examples from your own area.

Article 1

Challenges facing small scale farmers in sub-Saharan countries like Kenya

Seventy percent of Kenya's population is involved in Agriculture either directly or indirectly. As in many other sub-Saharan countries, a large majority of these are small scale farmers who rely on rain-fed agriculture. This is a severe limiting factor together with other factors such as poor soils, pests, diseases and recurrent drought. According to Temu & Temu (2005) there has been a limited investment in irrigation and there is a lack of affordable technology to improve soil fertility, for pest and disease control, weed management and the introduction of drought tolerant crop varieties. On top of all this, farmers have limited access to capital and infrastructure, including roads, railways, airports and sea ports thus causing high costs of transport.

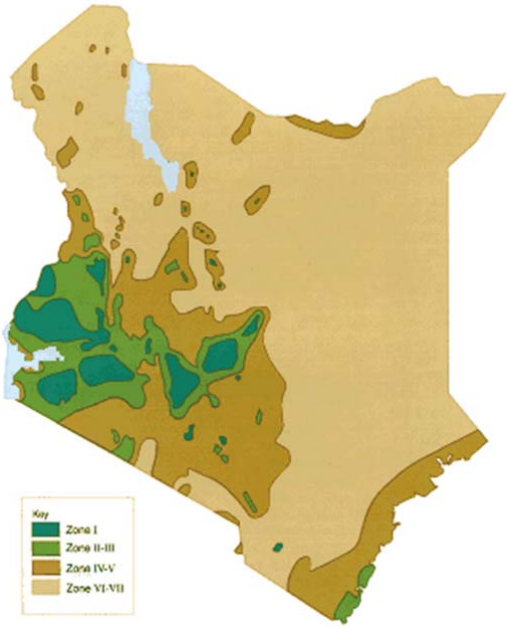
In Kenya specifically, agriculture currently contributes to over 60% of the country's GDP through exports of tea, coffee and horticultural products. Traditional crop products have been cereals like maize, wheat, millet and sorghum with tea and coffee as cash crops.Over the recent past in Kenya, there has been a move towards high value agricultural products (HVAP) since they have a higher market value than traditional products. These are products with high monetary value with emerging and expanding markets worldwide and include vegetables, fruits, flowers, houseplants, foliage, condiments, spices as well as high value livestock and fisheries products such as milk, beef, poultry, eggs and fish (Temu & Temu, 2005). They are grown mainly for cash value in the domestic and export markets.

A unique feature of Kenya (unlike other sub-Saharan countries) is that all types of farmers including poor, rich, large scale and smallholder farmers, do participate in HVAP. Small holder farmers for example produce 60% of all exported vegetables and fruits. These products, together with the traditional ones, have had a huge impact on the country's economy through income flow into rural economies, increased market efficiencies, strengthened domestic supply chains, provision of employment opportunities and institutional development (Xinshen, 2003). However, in the face of market liberalization in the agricultural sector, its overall performance has not been encouraging with stagnation and even a falling of agricultural incomes. Much agricultural policy research and advocacy work remains with the involvement of all stakeholders, so that everyone involved in agriculture will be better off in the liberalized environment. Kenyan agriculture will hence be able to be efficient enough to compete at world prices or at the levels of protection that the domestic consumers or the world trade organization (WTO) allow.

(Source Tegemeo Institute of Agricultural Policy & Development:)

Agro-Ecological Zones of Kenya

Kenya is divided into various agro-ecological zones. Each is distinctive depending on a number of climatic factors. Each zone is suitable for a specific range of crops. Study figure 1 below and read article 2 to learn more.



#	Zone	Approx. Area (km^2)	% Total
I	Agro-Alpine	800	0.1
II	High Potential	53,000	9.3
III	Medium Potential	53,000	9.3
IV	Semi-Arid	48,200	8.5
V	Arid	300,000	52.9
VI - VII	Very arid	112,000	19.8
	Water	15600	2.6

Fig. 1 Agro-ecological zones in Kenya

Article 2

AEZs: The Kenya System
(Source: www.infonet-biovision.org) CC: BY NC SA

Agro-ecological Zoning (AEZ) refers to the division of an area of land into smaller units, which have similar characteristics related to land suitability, potential production and environmental impact.

An Agro-ecological Zone is a land resource mapping unit, defined in terms of climate, landform and soils, and/or land cover, and having a specific range of potentials and constraints for land use. (FAO 1996). The essential elements in defining an agro-ecological zone are the growing period, temperature regime and soil mapping unit. There are several systems for describing Agro-ecological zones in the Tropics. In Kenya two are used:

- The FAO classification for tropics generally, and
- an older Kenya version which is only applicable in Kenya

From the above table virtually 80% of the country lies in the semi-arid to very arid Zones (ASALs), which are predominantly inhabited by the pastoralists and agro-pastoralists. Kenya's ASALs also support about seven million people and more than 50% of the country's livestock population. These areas, which are also classified as rangelands, are unsuitable for rain fed cultivation due to physical limitations such as aridity and poor vegetation.

Zone I
This zone has no direct importance in agricultural production other than being the source of rain and some rivers/streams. It is confined to mountains and immediate surrounding such as Mt. Kenya and Mt Elgon.

Zone II
This zone is generally restricted to the highlands of Kenya between 1980 and 2700 m and occurs as a forest or open grasslands. This zone is found in the surroundings of Mt Kenya (parts of Meru, Embu, Kirinyaga and Nyeri), isolated parts of the Rift Valley around Mau and Abadares mountains (e.g. around Kericho and Nyahururu respectively) and the surrounding of Mt Elgon (e.g. around Kitale and Webuye). The minimum rainfall is 1000mm. The main grasses are Pennisetum clandistenum (Kikuyu grass), Themeda triandra (Red oats), Andropogon chrysostachyus, Andropogon pralonsia, Exotheca abysinica, Digiteria scalaram, Eragrostis lascantha, Seteria sphacelata, Pennisetum catabasis and Sporobolus filipes. The legumes include Trifolium johnstoni, Medicago sativa (Alfalfa or Lucerne), Sesbania sesban and Leuceana leucusephala.

Zone III
This zone occurs mainly at elevations between 900-1800 m with a annual rainfall between 950 and 1500 mm. Trees are numerous here and are of somewhat shorter stature than in Zone II. This zone is the most significant for agricultural cultivation and several legume fodders are found here in crop-livestock systems. It is also the most resettled by humans. It occurs in the vast parts of Nyanza, Western and Central provinces, a good proportion of Central Rift-Valley,

(Nandi, Nakuru, Bomet, Eldoret, Kitale) and a small strip at the Coast province. The major grasses are Hyperenia and Cymbopogon, Themeda triandra, Panicum maximum, Seteria Sphacelata, Sporobolus pyramidalis, Bracharia brizantha (Congo signal), Bricharia siluta, Chloris gayana (Rhodes grass) and Cynodon dactylon (Star grass).

Zone IV
This zone occupies more or less the same elevation (900-1800 m) as the previous or may be at times lower. However, it has lower rainfall of about 500-1000 mm. This is typically represented in surroundings of Naivasha, vast parts of Laikipia and Machakos districts and vast parts of the central and southern Coast Province. It is the home of most Acacia trees and shrubs, including Acacia seyal, Acacia senegal, Acacia brevispica, Acacia drepanolobium and Acacia gerrardii. Euphorbia trees occur in some drier parts of this zone. Combretum and Terchonanthus spp. are also common here. Grasses found include Themeda triandra, Pennisetum mezianum, Pennisetum straminium, Pennisetum massaiense, Eragrostis spp., Hyperenia spp. Seteria spp., Digiteria spp., Bothriochloa insculpta, Cenchrus ciliaris. Rare grasses include Chloris spp. and Cynodon spp. Besides acacia, other important legumes include Indigoferra and Crotolaria.

Zone V
This zone is much drier than Zone IV and occurs at lower elevations. Annual rainfall is 300-600. This Zone is prevalent in northern Baringo, Turkana, lower Makueni and vast parts of North Eastern Province. Low trees and shrubs found here include Acacia mellifera, Acacia tortilis, Acacia horrida, Acacia reficiens, Acacia nubica, Acacia paslii, Acacia zanzibarica, Adansonia digitata, Terminalia prunioides, Dobea spp., Dioppspyros spp. and Commiphora spp. Common grasses are Eragrostis superba, Cenchrus ciliaris, Cymbopogon spp., Bothriochloa spp. and Heteropogon contortus.

Zone VI
This zone is considered as semi desert and is the driest part of Kenya. Annual rainfall is 200-400 mm and is quite unreliable. The zone is found in the Marsabit, Turkana, Mandera and Wajir Districts. Dominant in this zone are Acacia and Commiphora shrubs with scattered taller trees of Delonix elata, Acacia tortilis and Adansonia digitata. Balanites eagyptica, Boscia coriacea, Salvadora persica, Acacia mellifera and Acacia reficiens are important shrubs or low tree species. The very common and important dwarf shrubs are Indigofera spinosa and Sansevieria spp. Other important shrubs are Sericocomopsis, Barberia and Duosperma eromophylum. Being the most delicate zone both annual and perennial grasses are important here. Important grasses include Aristida adoensis, Stipagrostis hirtigluma are very characteristic and may occur as annuals or perennials. Other grasses also found here are Aristida mutabilis, Chrysopogon aucheri, Tetrapogon spp, Enneapogon cenchroides, Chloris roxburghiana.

Zone VII
This is represented by the Chalbi desert in the Marsabit district. The Chalbi is a salt desert with very sparse salt bushes as the only vegetation found. It is vast and has beautiful scenery. Pastoralists use it as a source of mineral lick for livestock, particularly during the rainy season.

Now study Table 4 below. It identifies which crops are suited to each zone.

Table 4: Crop Suitability

AGRO-ECOLOGICAL ZONES OF THE TROPICS

Belts of Z \ Main Zones	0 (perhumid)	1 (humid)	2 (subhumid)	3 (semi-humid)	4 (transitional)	5 (semi-arid)	6 (arid)	7 (perarid)
TA Tropical Alpine Zones Ann. mean 2-10° C	Mountain swamps	I. Cattle-Sheep Zone		II. Sheep Zone			High altitude deserts	
UH Upper Highland Zones Ann. mean 10-15° Seasonal night frosts		Sheep-Dairy Zone	Pyrethrum-Wheat Zone	Wheat-Barley Zone	U. Highland Ranching Zone	* U. H. Nomadism Zone 4)		
LH Lower Highl. Zones Ann. mean 15-18° M. min. 8-11° norm. no frost		Tea-Dairy Zone	Wheat/Maize 2) - Pyrethrum Zone	Wheat/(M.) 2) - Barley Zone	Cattle-Sheep-Barley Zone	L. Highland Ranching Zone	* L. H. Nomadism Zone 4)	
UM Upper Midland Zones Ann. mean 18-21° M. min. 11-14°		Coffee-Tea Zone	Main Coffee Zone	Marginal Coffee Zone	Sunflower-Maize 3) Zone	Livestock-Sorghum Zone	U. Midland Ranching Zone	U. Midland Nom. Zone 4)
LM Lower Midland Zones Ann. mean 21-24° M. min. >14°	*	L. Midl Sugarcane Zone	Marginal Sugarcane Zone	L. Midland Cotton Zone	Marginal Cotton Zone 6)	L. Midland Livestock-Millet Zone	L. Midland Ranching Zone	L. Midland Nom. Zone 4)
L Lowland Zones IL Inner Lowland Z Ann. mean >24° Mean max >31°	*	* Rice-Taro Zone	* Lowland Sugarcane Zone	* Lowland Cotton Zone	* Groundnut Zone	Lowland Livestock-Millet Zone	Lowland Ranching Zone	Lowland Nom. Zone 4)
CL Coastal Lowl Z 5) Ann. mean >24° Mean max <31°	*	* Cocoa-Citrus Zone	Lowland Sugarcane Zone	Coconut-Cassava Zone	Cashewnut-Cass. Zone	Lowland Livestock-Millet Zone	Lowland Ranching Zone	Lowland Nom. Zone 4)

1) Inner Tropics, different zonation towards the margins. The T for Tropical is left out in the thermal belts of zones (except at TA), because it is only necessary if other climates occur in the same country. The names of potentially leading crops were used to indicate the zones. Of course these crops can also be grown in some other zones, but they are then normally less profitable.
2) Wheat or maize depending on farm scale, topography, a.o.
3) Maize is a good cash crop here, but maize also in LH 1, UM 1-3, LM and L 1-4;
4) Nomadism, semi-nomadism and other forms of shifting grazing
5) An exception because of the vicinity of cold currents are the tropical cold Coastal Lowlands cCL in Peru and Namibia. Ann. mean there between 18 and 24°
6) In unimodal rainfall areas growing periods may be already too short for cotton. Then the zone could be called Lower Midland Sunflower-Maize Zone.
* Not in Kenya

Activity 3

Agro-Ecological Zones (20 minutes)

1. Consult the above resources and then fit into the slots provided in Table 5, crops that you think are suitable for the various regions indicated in the attachments.

Table 5: Activity 3.1 Answers

Zone	Suitable crop(s)	Reason
I		
II		
III		
IV		
V		
VI		
VII		

2. Review the case study video of Simon and Beatrice and comment on the suitability of the crops chosen by them. Also make suggestions on other crop types.

(Access the case study video from the CD ROM)

Soil Types and Crop Production in Kenya

Soil types also vary from location to location. The predominance of a particular type of soil can impact on whether a chosen crop is successful or not. Soil types in Kenya are classified as indicated in Fig 3. Specific information for the different soils is also provided in Article 3.

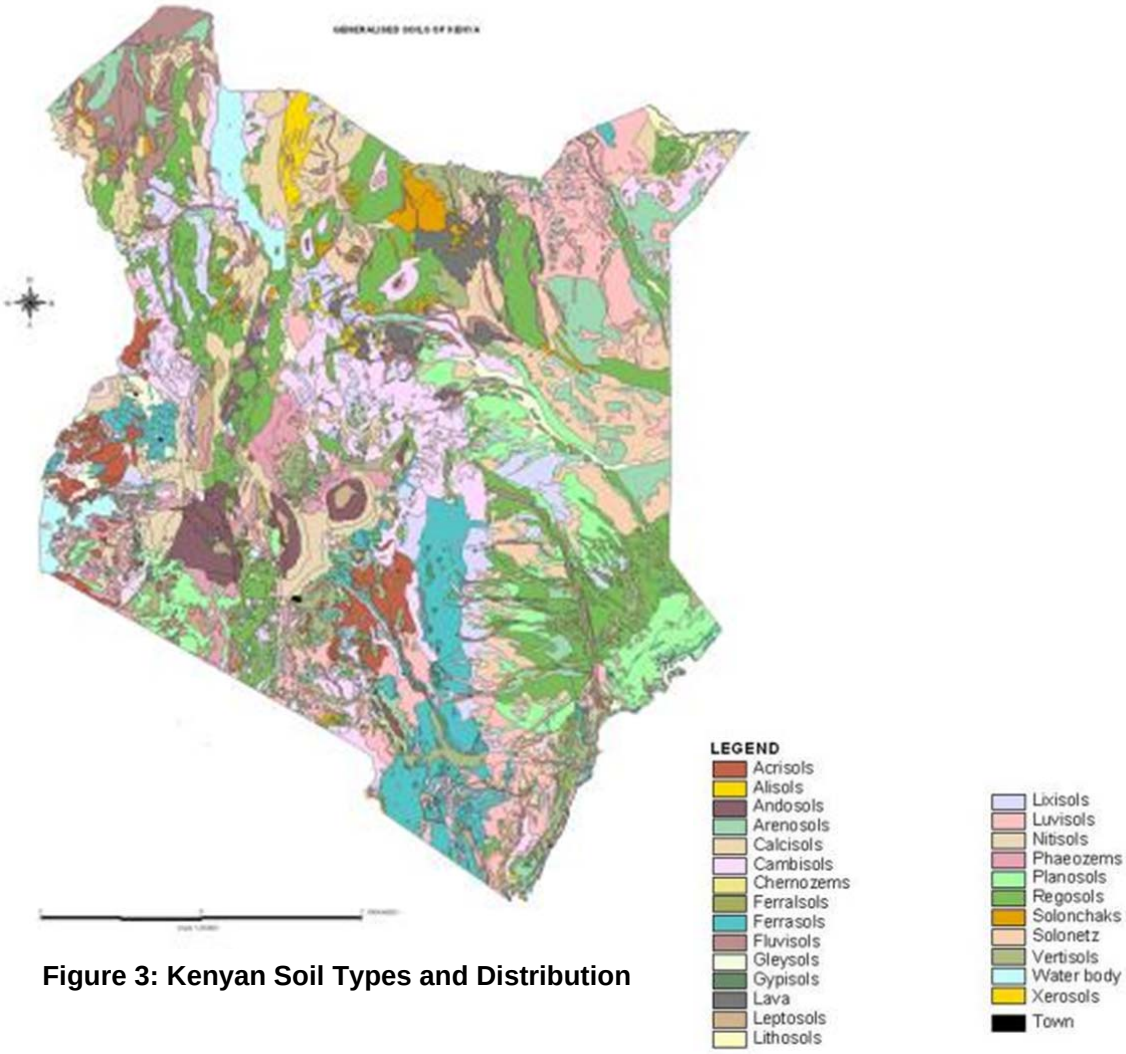


Figure 3: Kenyan Soil Types and Distribution

Soil Types Information

Andosols (young volcanic soils)

Andosols occur in areas with steep slopes and high-rainfall. By rainfall over 1000 mm per year, andosols are exposed to excessive leaching. Andosols are porous, have a high water-storage capacity and a low bulk density. They are also acidic (low pH) due to the high leaching of soluble bases and to the high levels of Aluminium (Al). These conditions favour P-fixation, making it no longer available to the plants. To improve agricultural production liming and the use of fertilizers is necessary. Andosols are highly susceptible to erosion as they mostly occur on steep slopes. In these areas, they are mainly used for tea, pyrethrum, temperate crops and dairy farming.

Nitisols

Nitisols occur in highlands and on volcanic steep slopes, for example in the central highlands of Kenya, some areas of the Ethiopian highlands and around Mts. Kenya and Kilimanjaro. They are developed from volcanic rocks and have better chemical and physical properties than other tropical soils: they have a good moisture-storage capacity and aeration; the organic matter content, the cation exchange capacity and the percentage base saturation range from low to high. Most nitisols are acidic (pH < 5.5) due to the leaching of soluble bases.
Nitisols often have a high clay content (more than 35%). They are the best agricultural soils found in the region. They are intensely used for plantation crops and food production (e.g. banana, tea and coffee).
For optimal agricultural production, nitosols need the use of manure and inorganic fertilizers. To protect these soils from erosion, soil conservations measures are essential.

Acrisols, Alisols, Lixisols and Luvisols

These kinds of soils occur in the coffee zones in the sub-humid areas, on undulating to hilly topography. They show an increase of clay content in the sub-soil (B-Horizon). The sub-soil is often not very porous, impeding root spreading. They have a relatively low water-storage capacity, compared with nitisols. Acrisols and Alisols in wet areas have a low pH (acid), Al and Mn toxicities and low levels of nutrients and nutrient reserves. These soils have poor structure and need erosion-control measures. Organic and inorganic fertilizers are needed to improve crop production. The soils respond well to fertilizers (especially N, P and K) and to the use of soil organic matter.

Article 3 continued

Ferralsols

Ferralsols occur on gently undulating to undulating topography. They are very old, highly weathered and leached soils, and therefore with a poor fertility, which is restricted to the top soil, as the subsoil has a low cation exchange capacity. Phosphorous (P) and Nitrogen (N) are always deficient. Ferralsols are rich in Aluminium (Al) and Iron (Fe). The nutrient reserves are easily disturbed by agricultural practices. Important management practices include the use of fertilizers (e.g. rock phosphate) and the maintenance of soil organic matter by using green manures, farmyard manures and mulching. Ferralsols have also good physical properties including an excellent capacity to hold moisture. Ferralsols are used to grow several annual and perennial crops, being particularly suited to tree crops such as oil palm, rubber and coffee.

Planosols and Vertisols

Planosols and Vertisols occur on very gently undulating to flat topography, mostly in rice growing areas e.g. Mwea in the Kirinyaga District and the Kano plains in Nyanza Province. They are found in semi-arid and sub-humid environments. Due to the high clay content in the subsoil (higher than in the top-soil), this layer in the B-horizon is impermeable resulting in a very slow, poor vertical and horizontal drainage and also in an extremely poor workability of the soils. These soils are dark coloured and strongly cracking.

(Source: infonet-biovision: http://www.infonet-biovision.org/default/ct/266/soilManagement CC: BY NC SA)

Activity 4

Soil Types (20 minutes)

Use your journal and relate crop suitability to the different soil types and make comparisons with:

1. Your own experiences in the field;
2. Your observations on the two farmers Simon and Beatrice that appear in the video case study.

Conclusion

Using a series of resources we have seen the ***crucial role*** agriculture plays in the national economy. We have also seen that livestock and cereal production make up over half of the agricultural gross domestic product. Farmers, of course, are at the heart of these activities and are vital to the wellbeing of the nation.

We have also seen that an understanding of ***agro-ecological zones*** and ***soil types*** can help us make informed decisions about what crops to plant.

References

Earthtrends. *What is GDP?* Available online at http://earthtrends.wri.org Accessed 14/02/2011 (CC: BY NC SA 2.5)

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Tab. 1. Agro-ecological Zonation of the Tropics (Method Jaetzold), adapted for Kenya.

(Source: Der Tropenlandwirt, Zeitschrift fur die Landwirtschaft in den Tropen und Subtropen 83. Jahrgang, April 1982, S.15-34.)

TABLE I: AGRO-ECOLOGICAL ZONES OF THE TROPICS [1]

Main Zones / Belts of Z	0 (perhumid)	1 (humid)	2 (subhumid)	3 (semi-humid)	4 (transitional)	5 (semi-arid)	6 (arid)	7 (perarid)
TA Tropical Alpine Zones Ann. mean 2-10° C	Glacier / Mountain swamps	I Cattle-Sheep Zone	II Sheep Zone					High altitude deserts
UH Upper Highland Zones Ann. mean 10-15° Seasonal night frosts		Sheep-Dairy Zone	Pyrethrum-Wheat Zone	Wheat-Barley Zone	U. Highland Ranching Zone	* U. H. Nomadism Zone [4]		
LH Lower Highl. Zones Ann. mean 15-18° M. min. 8-11° norm. no frost		Tea-Dairy Zone	Wheat/Maize [2] - Pyrethrum Zone	Wheat/Maize [2] - Barley Zone	Cattle-Sheep-Barley Zone	L. Highland Ranching Zone	* L. H. Nomadism Zone [4]	
UM Upper Midland Zones Ann. mean 18-21° M. min. 11-14°		Coffee-Tea Zone	Main Coffee Zone	Marginal Coffee Zone	Sunflower-Maize [3] Zone	Livestock-Sorghum Zone	U. Midland Ranching Zone	U. Midland Nom. Zone [4]
LM Lower Midland Zones Ann. mean 21-24° M. min. >14°	*	L. Mdl. Sugarcane Zone	Marginal Sugarcane Zone	L. Midland Cotton Zone	Marginal Cotton Zone [6]	L. Midland Livestock-Millet Zone	L. Midland Ranching Zone	L. Midland Nom. Zone [4]
L Lowland Zones **lL** Inner Lowland Z Ann. mean >24° Mean max >31°	*	* Rice-Taro Zone	* Lowland Sugarcane Zone	* Lowland Cotton Zone	* Groundnut Zone	Lowland Livestock-Millet Zone	Lowland Ranching Zone	Lowland Nom. Zone [4]
CL Coastal Lowl. Z [5] Ann. mean >24° Mean max <31°	*	* Cocoa-Oilpalm Zone	Lowland Sugarcane Zone	Coconut-Cassava Zone	Cashewnut-Cass. Zone	Lowland Livestock-Millet Zone	Lowland Ranching Zone	Lowland Nom. Zone [4]

1) Inner Tropics, different zonation towards the margins. The T for Tropical is left out in the thermal belts of zones (except at TA), because it is only necessary if other climates occur in the same country. The names of potentially leading crops were used to indicate the zones. Of course these crops can also be grown in some other zones, but they are then normally less profitable.
2) Wheat or maize depending on farm scale, topography, a.o.
3) Maize is a good cash crop here, but maize also in LH 1, UM 1-3, LM and L 1-4.
4) Nomadism, semi-nomadism and other forms of shifting grazing
5) An exception because of the vicinity of cold currents are the tropical cold Coastal Lowlands cCL in Peru and Namibia. Ann. mean there between 18 and 24°
6) In unimodal rainfall areas growing periods may be already too short for cotton. Then the zone could be called Lower Midland Sunflower-Maize Zone.
* Not in Kenya

2

MODULE **1**: **Structure of Agriculture and Agricultural Policies**

LESSON 2: **Management of Agricultural Resources**

TIME: **96 minutes**

AUTHOR: **Dr. Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 2 MANAGEMENT OF AGRICULTURAL RESOURCES

AUTHOR:

Dr. Maina Muniafu

TIME:

96 minutes

OUTCOMES:

By the end of this lesson you will be able to:

- Describe Kenya's agricultural set-up at all levels and general planning going forward.
- Understand the place and role of producers in the agricultural sector of Kenya.
- Differentiate between public and private sector contributions to agriculture

INTRODUCTION:

The way agriculture is managed was set up many years ago in the pre-colonial era and then evolved into a system that has the involvement of both the private and public sectors. It is important that the management strategies in place lead towards a maximization of agricultural outputs.

Two important documents developed by the Kenyan government are essential reading for this lesson. You will need to review the *Agricultural Sector Development Strategy (ASDS), Kenya (2010 – 2020)* and the *Ministry of Agriculture, The Ministry at a Glance*. A third document prepared by the African Development Bank Group entitled *Kenya, Agricultural Sector Adjustment Report II* will provide details on private sector involvement in agriculture.

These documents can be accessed from the course CD ROM under *Resources Index* | *Module 1* | *Lesson 2*

GOVERNMENT AGRICULTURE STRUCTURE AND ROLES

Perhaps predictably, the government has a large role to play in the agricultural sector. The roles government officials play vary according to where in the organizational structure they are present. For example, policy decisions are made at national level within the Ministry of Agriculture, while at provincial and district levels they are more involved with implementation of the policies. Parastatals, State Corporations and agencies have specialized tasks and are deployed at the grassroots levels. For example see *Ministry at a Glance,* p16-17 for a list of state corporations and their mandates)

Activity 1

Government (20 minutes)

Review the *Agricultural Sector Development Strategy (ASDS), Kenya (2010 – 2020)* document. Pay special attention to Chapter 8.1 (p84-87) on *Organizational and Implementation Structures*. From your review use your journal to:

1. Trace the structure of agriculture from the national to the lower levels.
2. Pick out officials that you interact with at your level of production.

Also review the Ministry's vision (p28) and study *Subsector Strategic Focus* (Crops & Land Development p29, Livestock p35, Fisheries p43, Cooperatives p47) and

3. Comment on the general direction of Agriculture in Kenya. Do you agree with the direction chosen by the government? (Hint: Also see *ASDS* p3-5)

PLACE AND ROLE OF PRODUCERS IN AGRICULTURE

We need to examine what contribution farmers' play in the agricultural chain in order to assess their role in the industry.

Activity 2

Producers (20 minutes)

Review the three documents again. Using your journal:

1. List the activities of farmers in Kenya that contribute to the products in the country's agriculture. (Hint: *ASDS* p1-3)
2. Write a one page report indicating the extent to which the activities of small scale farmers contribute to each of the indicated products. (Hint: *ASDS* p1-3 & 29-30)

PRIVATE SECTOR INTERACTION WITH AGRICULTURE

This part of the lesson describes the multinationals involved in agriculture as well as farmer organizations, co-operatives and other emerging groups. Review the section on *Private Sector Participation* in the *ASDS* document, p52 and also the *Kenya, Agricultural Sector Adjustment Report II* (p1-2).

Activity 3

Private Section

Work in groups of five and after perusing the documents and discussing the questions with the group record in your journal:

1. List multinationals that are involved in agriculture in Kenya.
2. Make a comparison of the contribution of small scale farmers and that by the multinationals.
3. Fill in the names of farmer organizations, co-operatives and any other farmer groups in your region as well as the roles that they play in the spaces provided.
4. Make a *one* page report suggesting how farmer organization can strengthen small scale farmers' contribution to agricultural production in Kenya.

Conclusion

There is a clearly defined structure to the agricultural sector. Government has an important role to play in both directing and supporting producer and private sector activities. Their vision and directives are available in their various policy documents. Small scale producers are a vital component of the industry but government wants these stakeholders to strive to be profitable, commercially orientated and internationally and regionally competitive. They also want agriculture to offer gainful employment to Kenyans. (*ASDS* p3)

Consequently, they want more farms to move towards being firms. (See Module 5)

References

African Development Bank Group. (2001). *Kenya, Agricultural Sector Adjustment Operation II: Project Performance Evaluation Report*. Available online: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Evaluation-Reports/00684454-EN-KENYA-AGRICULTURAL-SECTOR-ADJUSTMENT-OPERATION-II-PPER01.PDF . Accessed 18/02/2011.

Government of Kenya. (2010). *Agricultural Sector Development Strategy 2010-2020*. Available online: www.kilimo.go.ke/kilimo_docs/pdf/ASDS_Final.pdf. Accessed 18/02/2011.

Ministry of Agriculture. (2008). *The Ministry at a Glance*. Available online: http://www.kilimo.go.ke/kilimo_docs/pdf/moa_at_glance.pdf Accessed 18/02/2011.

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MODULE **1**: **Structure of Agriculture and Agricultural Policies**

LESSON 3: **Agricultural Policies in Kenya**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr. Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 3 AGRICULTURAL POLICIES IN KENYA

AUTHOR:

Dr. Maina Muniafu

TIME:

1 hour 36 minutes

OUTCOMES:

By completion of this this lesson you will

- Identify various types of agricultural policies in Kenya.
- Understand the rationale behind credit, production, marketing and the extension policies of Kenya

INTRODUCTION:

Policies in agriculture set the framework for action and thus provide guidance to the whole system. They are generated from laws of the country from which the acts of parliament come. The biggest challenge for policies, however, is how effectively they are implemented.

The lesson will look at the case study videos of a Mwingi farmer called Simon as well as Beatrice, a farmer in Chepsonoi, Kapsabet as well as four documents related to agricultural policy including the *Agricultural Sector Development Strategy (ASDS), Kenya (2010 – 2020, Agricultural Policy-Making in Sub Saharan Africa: Kenya's Past Policies*, *Agricultural Policy in Kenya* and the *Kenya Agricultural Marketing* and *Policy Analysis Project*.

These policy documents can be accessed from the course CD ROM under Resources Index | Module 1 | Lesson 3

TYPES OF AGRICULTURAL POLICIES IN KENYA

First let us consider policies on agriculture in a general way. There are various policies, acts and session papers that guide food production in Kenya. Since 2003, there been much activity in an attempt to revitalize Kenyan agriculture. Here is a selective list of just some of the agricultural policies recently generated or under consideration. (Source: Gitau R et al.,2008. http://www.tegemeo.org/documents/work/Wp34-Agricultural-Policy-Making-Africa-Kenya-Past-Policies.pdf)

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National Potato Industry Policy 2005
The objectives of this policy were to raise productivity in the industry through the provision of appropriate technology and services; develop and implement processes that will lead to increased empowerment of growers and other stakeholders; and develop and promote the use of standard packaging and weight measures which was put at 100 kgs per bag. However, the Kenya Potato Farmers Association (KENAPOFA) successfully lobbied and persuaded the Ministry of Local Government to stand behind the Gazette Notice and have the Minister stipulate in Legal Notice No. 113, the maximum size of bags in which potatoes can be bought. KENAPOFA officials are now also recognized enforcement officers. The Legal Notice requires all Local Authorities to enforce the maximum size (110 kgs) standard bag for potatoes.

Sessional Paper on Soil Fertility and a Bill on Fertilizers and Soil Conditioners, 2006.
This was to regulate of the importation, exportation, manufacture and sale of fertilizers and soil conditioners. The Policy on soil fertility and Bill, 2006, were subjected to stakeholders' analysis.

The National Biotechnology and Development Policy, 2006
The policy addresses various issues with regards to capacity building and resource mobilization, financial and business support, public protection and support, public education awareness and access to information with regards to biotechnology, regional and international collaboration and ethical issues.

Dairy Development Policy 2006
The objective was to correct previous government policies which were unsupportive of small-scale farmers, traders and consumers who constituted a large proportion of the market. The new dairy policy now openly acknowledges the role of informal milk markets in the development of the sector and will help to legitimize small-scale milk traders, subject to them being trained and certified in milk hygiene.

Sessional Paper and Bill to Amend the National Cereals and Produce Board (NCPB) Act,
Cap 338
Sessional paper and Bill to amend the National Cereals and Produce Board was developed in 2007. The paper and Bill develops a comprehensive policy and legal framework that clearly outline the role of government in ensuring food security.

Cassava Policy
The policy is aimed at promotion and development of traditional food crops. This process is being led by ASARECA and the policy is in the process of being developed.

Nut Crops Development Policy and Bill
The purpose is to provide a legal and regulatory framework for the nut industry in a liberalized regime. A draft policy and bill were finalized and included in the performance contract for 2007/8.

Kenya Plant and Health Inspectorate Services (KEPHIS) Bill
This bill aimed at incorporating KEPHIS under an Act of parliament. The draft bill was included in the 2007/8 performance contract.

Also consult the ASDS document from the course CD ROM under Resources Index | Module 1 | Lesson 3

Activity 1

Policy types

1. List the objectives of all the policies in order to make comparisons and to identify their scope.
2. Place into the same group, policies that have a similar purpose.
3. Make a one page report on your general impressions on the policies.

CREDIT, PRODUCTION, MARKETING AND EXTENSION POLICIES

This part of the lesson looks at the four policies in more detail, namely *Rural Financial Services in Kenya: What is Working and Why?, Trends in Regional Agricultural Productivity in Kenya*, *Kenya Agricultural Marketing* and *Policy Analysis Project,* and will allow for a better feel of the policies in how they are translated into various actions. These include financing, production, marketing and general assistance from agricultural officials in the field.

Activity 2

Policy support for farmers

Consult these 4 policy documents from the course CD ROM under Resources Index | Module 1 | Lesson 3

1. Identify crucial areas in the policies that you feel have the most impact on farmers
2. Document the assistance from extension officers in your region of production.

Conclusion

From the review of agricultural policies, you should have seen that they are designed to improve production across the board. Many of them identify support structures to farmers. Support ranges from organizing credit for farmers, aiding production, marketing as well as setting up extension officers whose task it is to provide help and advice at grass roots levels

References

African Development Bank Group. (2001). *Kenya, Agricultural Sector Adjustment Operation II: Project Performance Evaluation Report.* Available online: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Evaluation-Reports/00684454-EN-KENYA-AGRICULTURAL-SECTOR-ADJUSTMENT-OPERATION-II-PPER01.PDF Accessed 18/02/2011

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Kasina, M and Nderitu, J.H. (2010). *Policy Implementation and its Economic Impact on Potato Marketing Value Chain in Kenya*. Available online at: (http://www.kari.org/biennialconference/conference12/docs/POLICY%20IMPLEMENTATION%20AND%20ITS%20ECONOMIC%20IMPACT%20ON%20POTATO%20MARKETING%20VALUE%20CHAIN%20IN%20KENYA.pdf Accessed 03/06/2011.

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MODULE **1**: **Structure of Agriculture and Agricultural Policies**

LESSON 4: **Specific Applications and Impacts of Agricultural Policies**

TIME: **1 HR 36 minutes**

AUTHOR: **Dr. Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 4

SPECIFIC APPLICATIONS AND IMPACTS OF AGRICULTURAL POLICIES

AUTHOR:

Dr. Maina Muniafu

TIME:

1 HR 36 minutes

OUTCOMES:

By the end of this lesson you will:

- Be aware of policy implementation at various levels.
- Describe the strengths and any shortcomings of policies at the production level.

INTRODUCTION:

It is important for those involved in agricultural production to increase their awareness of specific policies related to their production systems. From the experiences of two farmers, Simon in Mwingi and Beatrice in Chepsonoi, it will be possible to identify the effectiveness of policies.

IDENTIFICATION OF POLICY IMPLEMENTATION SPECIFIC TO PRODUCTION SYSTEMS

This part of the lesson relies on information in the two case study videos. Attention should be paid to the words of each farmer in interviews with regard to how agricultural policies affect the ways in which they finance the farming activities, market their produce and assistance available to them from extension agricultural officers.

Simon's and Beatrice's case studies can be accessed from the course CD ROM. See *Resources Index* | *Module 1* | *Case Study.*

It will also be necessary to look at the *Agricultural Sector Development Strategy (ASDS), Kenya (2010 –2020)* document again. This can be accessed under *Resources Index* | *Module 1*| *ASDS*

Activity 1

Policy on the Ground

1. After reviewing Simon's case study identify areas where policy impacts on his daily operations.
2. Review farmer Beatrice's' activities and then pair up her activities with any policy provisions of which you are aware.

IMPACTS OF POLICIES

Policies should normally enhance production and act as a motivating tool for farmers. The lesson segment will examine the two farmers and identify positive impacts of any of the policies learnt so far and point out any shortcomings.

Activity 2

Positive Impacts of Policy

1. Describe any impacts that the policies have on the farming activities of the two farmers.
2. Identify any policy shortcomings for the farming activities of the two farmers.
3. Relate the policy issues discussed to your own farming experience.

Conclusion

After a comparison between Simon's, Beatrice's and your own experiences you will notice that while the intention of the policy is to support agriculture and farmers in general, it also wants to steer or direct activities to support national priorities. It does not always support you fully nor unconditionally. Policy imposes various structures and processes on the way you need to operate. We do, however, need to appreciate that while the intention is good on a national level policy is not designed to support you unreservedly. It will on occasion impose certain restrictions on you.

References

Government of Kenya. (2010). *Agricultural Sector Development Strategy 2010-2020*. Available online: www.kilimo.go.ke/kilimo_docs/pdf/ASDS_Final.pdf. Accessed 18/02/2011.

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MODULE **1**: **Structure of Agriculture and Agricultural Policies**

LESSON 5: **Maximizing Benefits from and influencing Agricultural Policies**

TIME: **96 minutes**

AUTHOR: **Dr. Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 5

MAXIMIZING BENEFITS FROM AND INFLUENCING AGRICULTURAL POLICIES

AUTHOR:

Dr. Maina Muniafu

TIME:

96 minutes

OUTCOMES:

By completion of this lesson you will be able to:

- Identify policies from which you can benefit.
- Describe ways in which you could influence policies.

INTRODUCTION:

Within the farmers' production systems, an awareness of agricultural policies enables them to take advantage of maximizing their output. It also puts them into a situation where they can influence the direction of policy formulation since they are the ones on the ground.

IDENTIFICATION OF BENEFICIAL POLICIES

Once again we will study the two case study videos to assist in the identification of policies that the two farmers, Simon and Beatrice, could have taken advantage of. We need to identify the limitations or barriers to success that they are facing and then consider how they could have surmounted them through a proper application of the policies.

Access the case study video from the course CD ROM under Resources Index | Module 1 | Lesson 5 | Case Study

Activity 1

Benefits (30 minutes)

Review the case study video and also consider the policy documents you have already discussed in Lesson 4 and then:

1. Identify possible beneficial policies for farmers Simon and Beatrice.
2. Point out ways in which ways the policies might either enhance or limit production.

INFLUENCING OF AGRICULTURAL POLICIES

Agricultural policy development is not done in a vacuum. Policy writers within the various ministries need information, ideas and strategies that reflect the reality of the sector and then consider how these strategies might support national priorities. They get this data from sector stakeholders of which one group, farmers, is of considerable significance. Consequently, farmers who gain prominence through their excellence in farming activities have a chance to influence agricultural policies.

Activity 2

Influencing Policy (30 minutes)

Work as a group and discuss these issues:

1. In what ways might Simon and Beatrice influence policies in their regions?
2. How might the members of the group put themselves in a position to influence policy?

Conclusion

Perhaps you can now see that policy development is dynamic and ever changing according to the needs of the country and particularly the needs of agricultural stakeholders. However, there are always competing interests in the sector, so it is important that farmers act proactively to ensure that their voice is heard. The methods mentioned here should give you some ideas of how this might be achieved in your region.

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MODULE 2: **Sustainable Agriculture**

LESSON 1: **Definition and Impact of Sustainable Agriculture**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 1 DEFINITION AND IMPACT OF SUSTAINABLE AGRICULTURE

TIME:

1 hour 36 minutes

AUTHOR:

Dr Maina Muniafu

OUTCOMES:

On completion you will be able to:

- Provide a definition of sustainable agriculture.
- Understand the impacts of various agricultural practices.
- Identify various sustainability practices.

INTRODUCTION:

Agriculture is a vital sector of the economy, mainly for the life sustaining products that it provides. On the other hand, it is a high-resource demand venture especially if it is carried out with an entrepreneurial approach. Its impact on the environment is wide and varied and call for specific measures, some of which attempt to strike a balance between production output and limiting environmental impact.

Definition and Aims of Sustainable Agriculture

As a group, we already have some idea of what the concept sustainable agriculture is! It is possible that your understanding is derived from your aim within agriculture. Let us see if we can develop our own definition.

Activity 1

Defining Sustainable Agriculture (10 minutes)

Working in groups of four:

1. Identify key words that help you understand the concept ‘Sustainable’ and insert them in the table below:

Sustainable (Key words)

2. Now do the same for the concept, ‘Agriculture’

Agriculture (Key words)

3. Now insert the words in both tables to construct a definition for the concept ‘Sustainable Agriculture’

Combined definition:

See the Feedback section at the end of this lesson to see a definition that can be compared to the definition your group developed.

IMPACT OF AGRICULTURAL PRACTICES

Farming can have an enormous impact on the environment and the availability of resources, and if not monitored and controlled the impact is not often good. If we want to enjoy the environment and have access to natural resources in the future, we will need to think of ways to ensure our activities have minimal impact. But first, what are these potential impacts?

Activity 2

Environmental Impact (20 minutes)

1. Read the following article:

Environmental impacts of agriculture

a. Land clearing for cultivation purposes leading to
- Loss of biodiversity
- Loss of natural habitats and potential human/wildlife conflicts
- Disruption of ecosystem balances and their functions

b. Changes in regions reflectance and water balances
- Loss of forest cover leads to heat build ups
- Lack of vegetation, especially trees, means that less water is held underground

c. Tillage of cropland
- Loosening of soil exposes it to erosion agents (water, wind)
- Loss of nutrients such as nitrogen from evaporative processes
- Creation of hard pan in ploughing

d. Input demands for large scale/mechanized/entrepreneurial farming
- Pressure on natural resources such water (depletion of ground and surface reservoirs) and fossil fuels (petrol for machines)
- High input of inorganic fertilizers and application of chemicals such as pesticides and herbicides among others

e. Negative impacts on soils including:
- Loss of nutrients/fertility especially from reducing soil organic matter additions
- Changes in soil structure and soil chemistry
- Salination and alkalization from irrigation and inorganic fertilizers respectively

f. Eutrophication of water bodies from:
- Inorganic fertilizer run-offs
- Excess manure run-offs

g. Negative effect of applied chemicals including:
- Loss of useful insects such as the pollinators
- Possible impacts on human health
- Impact of chemical residuals in the ecosystem

h. Narrowing of crop/animal diversity in favour of high yield varieties

i. Potential for overgrazing and trampling of land in livestock areas

2. Use the table below and match activities described above with various resource and environmental impacts. The second row has been done for you to illustrate

Exercise on impact of agriculture

Agricultural activity	**Resource Impact**	**Environmental impact**
Tilling		
Land clearing	Natural vegetation, wild animals (small and large)	Loss of biodiversity, changes in heat and water balances, human-wildlife conflicts
Chemical applications to crops and animals		
Addition of inorganic fertilizers		
Rearing high livestock numbers in limited open space		
Irrigation		
Rearing high livestock numbers in limited closed space		
Intensive crop/animal production		

See the Feedback section at the end of this lesson to see the model answer for this activity

SUSTAINABILITY PRACTICES IN AGRICULTURE

We can, however, limit our impact on resources and the environment by emulating known agricultural practices that are environment friendly and thus sustainable. Some of these practices are known to you.

Activity 3

Sustainable Practices (30 minutes)

Work in a group of four members and see if you can brainstorm some of these sustainable measures. Fill in the table below based on the group discussions that should identify both the shortcomings and advantages of each method.

Agricultural activity	Sustainable measures	Advantage(s)	Disadvantage(s)
Tilling			
Land clearing			
Chemical applications to crops and animals			
Addition of inorganic fertilizers			
Rearing high livestock numbers in limited open space			
Irrigation			
Rearing high livestock numbers in limited closed space			
Intensive crop/animal production			

See the Feedback section at the end of this lesson to see the model answer for this activity

Conclusion

Farming without thought of the impact of various methods we employ is short sighted. In many ways we farmers have much to lose if we work destructively. Our livelihood is dependent on natural resources and the environment. We need to be sensitive to the potential impact we wield.

Enrichment Resources

Wikipedia. (2011). *Sustainable Agriculture*. Available online: http://en.wikipedia.org/wiki/Sustainable_agriculture Accessed 02/03/2011 CC: BY-SA

Sustainable Table. (2011). *What is Sustainable Agriculture?* Available online: http://www.sustainabletable.org/intro/whatis/ ©

Feedback

Feedback Activity 1

Sustainable Agriculture definition:

Sustainable Agriculture refers to a production process that utilizes resources in a manner that reduces negative impact on the surroundings and ensures that such resources are available for use by future generations

Feedback Activity 2

Exercise on impact of agriculture

Agricultural activity	Resource Impact	Environmental impact
Tilling	Soil	Soil erosion
Land clearing	Natural vegetation, wild animals (small and large)	Loss of biodiversity, changes in heat and water balances, human-wildlife conflicts
Chemical applications to crops and animals	General ecosystem	Loss of useful insects, chemical residuals and accumulation in food chains, health effects on humans
Addition of inorganic fertilizers	Soil, water bodies	Changes in soil chemistry, eutrophication of water bodies
Rearing high livestock numbers in limited open space	Soil, vegetation	Soil erosion and soil compaction
Irrigation	Soil, water reservoirs	Salination, depletion of water
Rearing high livestock numbers in limited closed space	Water bodies	Manure run-offs that cause eutrophication
Intensive crop/animal production	Energy, water, nutrients	Fossil fuel, water and soil nutrient depletion, loss of crop/animal diversity

Feedback Activity 3

Exercise on impact of agriculture

Agricultural activity	Sustainable measures	Advantage(s)	Disadvantage(s)
Tilling	Minimum tillage	Lower soil erosion	Higher pest incidences
Land clearing	Reduced cultivation expansion, over seeding to reduce exposure of soil, soil conservation measures	Reduced soil erosion	Lower food outputs
Chemical applications to crops and animals	Integrated pest management	Less reliance on chemicals, promotion of alternative pest control	Maybe less effective on large scale applications
Addition of inorganic fertilizers	Fertilizer mixes of organic and inorganic	Better soil structure, lower nutrient run-offs	Reduced maximal outputs in the short-term
Rearing high livestock numbers in limited open space	Controlled livestock numbers	Lower land degradation	Lower pastoral incomes
Irrigation	Appropriate irrigation techniques	Reduced water losses in aquifers	Higher costs of irrigation equipment
Rearing high livestock numbers in limited closed space	Alternative manure usages	Lowered additions of manure run-offs into water	Lack of alternative manure usages
Intensive crop/animal production	Diverse crop/livestock varieties including polycultures	Biodiversity conservation	Resistance from large scale farmers

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MODULE 2: **Sustainable Agriculture**

LESSON 2: **Management of Agricultural Resources**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 2 MANAGEMENT OF AGRICULTURAL RESOURCES

AUTHOR:

Dr Maina Muniafu

TIME:

1 hour 36 minutes

OUTCOMES:

By the end of this lesson you will be able to:

- Describe vital agricultural inputs and resources.
- Balance out agricultural outputs with input requirements.
- Understand improvement measures for agricultural resources available to them.

INTRODUCTION:

In Kenya's agricultural regions, there is a certain range of resource options available for use by the farmers. Some regions have more abundant resources than others but what is more critical to production is how these resources are managed. If this is done in a sustainable manner, there is both a short and long-term impact on a number of variables in the production system.

Three case studies are presented for farmers in Mwingi, Athi River and in Chepsonoi.

These case studies can be accessed from the course CD ROM under *Resources Index* | *Module 2* | *Lesson 2* | *Case Study*

Agricultural inputs and resources

Each farming activity has vital inputs and resources that are crucial to its production systems. Before we can consider sustainable management practices we need to identify what these vital items are.

Activity 1

Inputs & Resources (20 Minutes)

Work in groups of four and complete table 1 based on your discussions.

Table 1: Inputs and resources for agriculture

Agricultural activity	Inputs	Resources
Sugar cane farming		
Poultry rearing		
Potato growing		
Maize (large scale)		
Maize (subsistence)		
Tea growing		
Commercial livestock		
Horticulture (vegetables)		

See the Feedback section at the end of this lesson to see a completed table.

Agricultural Outputs Versus Input Requirements

Even a cursory glance at the online encyclopaedia, *Wikipedia*, reveals that the environmental impact of agriculture is of global significance.

Article 1: Agriculture, Environmental Impact

Agriculture imposes external costs upon society through pesticides, nutrient run-off, excessive water usage, and assorted other problems.

Water Usage

Agriculture accounts for 70 per cent of withdrawals from freshwater resources. However, increasing pressure being placed on water resources by industry, cities and the involving biofuels industry, means that water scarcity is increasing and agriculture is facing the challenge of producing more food for the world's growing population with fewer water resources.

Livestock

Senior UN official and co-author of a UN report detailing livestock issues, Henning Steinfeld, said "Livestock are one of the most significant contributors to today's most serious environmental problems". Livestock production occupies 70% of all land used for agriculture, or 30% of the land surface of the planet. It is one of the largest sources of greenhouse gases, responsible for 18% of the world's greenhouse gas emissions as measured in CO^2 equivalents. By comparison, all transportation emits 13.5% of the CO^2. It produces 65% of human-related nitrous oxide (which has 296 times the global warming potential of CO^2,) and 37% of all human-induced methane (which is 23 times as warming as CO^2. It also generates 64% of the ammonia, which contributes to acid rain and acidification of ecosystems.

Land Transformation

Land transformation, the use of land to yield goods and services, is the most substantial way humans alter the Earth's ecosystems, and is considered the driving force in the loss of biodiversity. Estimates of the amount of land transformed by humans vary from 39–50%. Land degradation, the long-term decline in ecosystem function and productivity, is estimated to be occurring on 24% of land worldwide, with cropland over-represented. The UN-FAO report cites land management as the driving factor behind degradation and reports that 1.5 billion people rely upon the degrading land. Degradation can be deforestation, desertification, soil erosion, mineral depletion, or chemical degradation (acidification and salinization.)

Article 1: Agriculture, Environmental Impact continued

Pesticides

Pesticide use has increased since 1950 to 2.5 million tons annually worldwide, yet crop loss from pests has remained relatively constant. The World Health Organization estimated in 1992 that 3 million pesticide poisonings occur annually, causing 220,000 deaths. Pesticides select for pesticide resistance in the pest population, leading to a condition termed the 'pesticide treadmill' in which pest resistance warrants the development of a new pesticide.

An alternative argument is that the way to 'save the environment' and prevent famine is by using pesticides and intensive high yield farming, a view exemplified by a quote heading the Center for Global Food Issues website: 'Growing more per acre leaves more land for nature'. However, critics argue that a trade-off between the environment and a need for food is not inevitable, and that pesticides simply replace good agronomic practices such as crop rotation.

Wikipedia http://en.wikipedia.org/wiki/Agriculture CC: BY SA

Activity 2

Costs (20 minutes)

1. Identify input/output economic costs in columns 2 & 3 in Table 2 below. Use the information your group generated in Table 1 above as an aid.
2. Do the same for the environmental costs column.

Economic and environmental costs of agricultural activities

Agricultural activity	Economic Cost		Environmental Cost
	Input	Output	
Sugar cane farming			
Poultry rearing			
Potato growing			
Maize (large scale)			
Maize (subsistence)			
Tea growing			
Commercial livestock			
Horticulture (vegetables)			

3. Select one agricultural activity and make a one page report on your impressions of economic versus environmental costs of the activity.

See the Feedback section at the end of this lesson to see a completed table.

IMPROVEMENT MEASURES FOR AGRICULTURAL RESOURCES

There are ways improvements can be made at an individual and community level. These are always a challenge due to the attitudes of people that may be motivated solely by short term interests to the detriment of the environment.

Activity 3

Improvement measures (20 minutes)

1. Work in groups of 4, consult your competed version of Table 1 above and suggest improvement practices in terms of soil, water and energy conservation. Record these practices in the table below.

Exercise on impact of agriculture

Agricultural activity	Sustainability improvements
Sugar cane farming	
Poultry rearing	
Potato growing	
Maize (large scale)	
Maize (subsistence)	
Tea growing	
Commercial livestock	
Horticulture (vegetables)	

Need some help? Check out the wikiHow site on *How to Practice Sustainable Agriculture* for some ideas:
http://www.wikihow.com/Practice-Sustainable-Agriculture

2. Pick out sustainability measures that you can observe in the presented case studies.

Conclusion

To ignore sustainable farming practices is irresponsible and affects your family, the community, not to mention future generations. With a bit of effort, though, it is possible to start implementing environmentally friendly practices. The trick though is to integrate these practices into your everyday practices.

Enrichment Resources

NSAIS. (2005). *Sustainable Agriculture: An Introduction*. Available online: http://attra.ncat.org/attra-pub/sustagintro.html. Accessed 03/03/2011 ©

University of California. (2011). *What is sustainable agriculture?* Available online: http://www.sarep.ucdavis.edu/concept.htm. Accessed 03/03/2011 ©

wikiHow. (2010). *How to Practice Sustainable Agriculture*. Available online: http://www.wikihow.com/Practice-Sustainable-Agriculture. Accessed 03/03/2011 CC: BY NC SA

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Feedback

Feedback Activity 1

Table 1: Inputs and Resources for Agriculture

Agricultural activity	Inputs	Resources
Sugar cane farming	Seed, human labour, petrol for machinery, pesticides, fertilizer	Land, water (rainfall), soil nutrients, energy (fossil fuels)
Poultry rearing	Chicks (day old), human labour, energy for heaters, vaccines, water, feed	Energy (electricity), water, nutrients,
Potato growing	Machinery, human labour, pesticides, fertilizer, water, seed	Land, water, nutrients
Maize (large scale)	Hybrid seed, water by irrigation, human labour, petrol for machinery, pesticides, herbicides, fertilizer	Land, energy (fossil fuels), water (rainfall), soil nutrients
Maize (subsistence)	Seeds, human labour, fertilizer, farming tools	Land, water (rainfall)
Tea growing	Seedlings, human labour, petrol for transportation, pesticides, fertilizer	Land, water (rainfall), nutrients
Commercial livestock	Fodder, human labour, pesticides, water, transport, vet services	Land, fodder, water
Horticulture (vegetables)	Seed, water, fertilizer, pesticides	Water, nutrients

Feedback Activity 2

Table 2: Environmental costs of agricultural activities

Agricultural activity	Environmental Cost
Sugar cane farming	Erosion from land clearing, pesticide and fertilizer run-offs, impacts of tractors and trucks
Poultry rearing	Manure run-offs, nutrient demands
Potato growing	Loss of soil fertility (monocropping), depletion of water resources, pesticide runoffs, soil erosion
Maize (large scale)	Erosion from land clearing, pesticide and fertilizer run-offs, soil physical structure changes
Maize (subsistence)	Erosion from land clearing, depletion of soil nutrients.
Tea growing	Erosion from land clearing, pesticide and fertilizer run-offs, depletion of soil nutrients, increased soil acidity
Commercial livestock	Manure run-offs, devegetation from trampling and overgrazing, soil erosion
Horticulture (vegetables)	Pesticide run-offs

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MODULE 2: **Sustainable Agriculture**

LESSON 3: **Benefits of Sustainable Agriculture**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 3 BENEFITS OF SUSTAINABLE AGRICULTURE

AUTHOR:

Dr Maina Muniafu

TIME:

1 hour 36 minutes

OUTCOMES:

By the end of this lesson you will be able to:

- Name value factors for various agricultural products.
- Describe methods of sustaining or improving yield.
- Identify the economic value change due to yield improvements.
- Understand the impact of value addition to agricultural products

INTRODUCTION:

In many regions of the world, yield levels of agricultural products invariably decline over production time. A clear example is when virgin land is first used for the cultivation of crops. Soil nutrients and soil organic matter will be at a high level and initial crops will need little or no external inputs of fertilizers. However, the levels in the soil will decline rapidly over succeeding growing seasons and they will be kept at a steady level at an increasing cost of inputs and to the detriment of the environmental resources. The sustainability challenge is therefore to select agronomic factors that are of benefit to the environment so as to reduce the degradation of the environment.

Importance of Quality Products in Agriculture

The lesson looks at quality factors in various agricultural products. In some cases the quality factors are specified by a standards control body which in Kenya is the Kenya Bureau of Standards (KEBS). However, consumers are able to judge the quality of products on the basis of factors such as appearance, colour, taste, size and shape.

Activity 1

Value Factors (20 Minutes)

Work in groups of four and complete table 1 based on your discussions.

1. From the list of products in Table 1 identify the *ideal quality* factors and insert them in the slots in column 2.
2. Fill in the reality of the quality status in your region in column 3.
3. What do you believe are the constraining quality factors? Insert these into column 4.

Table 1: Quality parameters for Agricultural products

Product	Ideal quality parameters	Current quality status in your region	Constraining quality factors
Maize			
Milk			
Vegetables			
Eggs			
Beef			
Potatoes			
Poultry			
Beans			
Tomatoes			

See the Feedback section at the end of this lesson to see a completed table.

Methods of Sustaining Agricultural Yields

We can attempt to formulate simple strategies that would allow farmers to maintain yield in a sustainable manner. There are a number of ways of doing this.

Activity 2

Methods (20 minutes)

1. Fill in the yield information in Table 2
2. Indicate simple strategies for yield maintenance in the same table.

Table 2: Exercise on yield constraints and improvements

Product	Yield in your region	Yield constraints	Yield improvements
Maize			
Milk			
Vegetables			
Eggs			
Beef			
Potatoes			
Poultry			
Beans			
Tomatoes			

See the Feedback section at the end of this lesson to see a completed table.

Value Addition in Agricultural Products

There are ways in which value can be added to agricultural products and the subsequent improvements of earnings from this. Working sustainably can sometimes work in your favour and should not always be seen as a hindrance.

Activity 3

Value Addition (20 minutes)

1. Indicate possible value additions for the different agricultural products in Table 3 as well as any impact on the environment that these may have.
2. Indicate any improvements to earnings from their sale

Table 3: Value addition to agricultural products

Product	Value addition	Environmental impact	Economic improvements
Maize			
Milk			
Vegetables			
Eggs			
Beef			
Potatoes			
Poultry			
Beans			
Tomatoes			

Conclusion

It is, therefore, clear that while farmers seek better prices through quality products, there is a challenge in ensuring environmental sustainability. Some of the actions that will lead to higher profits have the potential to harm the environment over the long-term. This means that economic evaluations need to be done together with environmental costs and only those with an overall benefit in both areas over the long term should be selected.

Enrichment Resources

1. Food & Agriculture Organisation: Available at www.fao.org
2. Ministry of Agriculture, Kenya: Available at www.kilimo.go.ke
3. Fresh Plaza (Africa News): Available at http://www.freshplaza.com/index_region.asp?region=1#SlideFrame_1

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1. Katungi, E, A. Farrow, J.Chianu, L.Sperling & S.Beebe, (2009). *Common Bean in Eastern and Southern Africa: a situation and outlook analysis*, International Centre for Tropical Agriculture. Available at www.icrisat.org/what-we-do/impi/projects/tl2-publications/regional-situation-outlook-reports/rso-common-bean-esa.pdf

Feedback Activity 1

Table 1: Quality parameters for agricultural products

Product	Ideal quality parameters	Current quality status in your region	Constraining quality factors
Maize	White maize, aflatoxin free, weevil free, low moisture content	Information from participant (IFP)	Water stress from rain shortfalls during growth, insect infestations, poor drying and storage
Milk	Creamy, appropriate specific gravity, acidity pH not less than 5.8, good smell and taste	IFP	Low water and fodder availability, milk adulterations
Vegetables	Fresh in appearance and feel, good size, right colour, disease free	IFP	Poor seed, poor watering during growth, pest infestations
Eggs	Large size, correct colour and texture,	IFP	Low feed availability, poor poultry breeds,
Beef	Fresh and succulent, red colour, lean, good smell	IFP	Poor forage quality, unsuitable cattle breeds

Product	Ideal quality parameters	Current quality status in your region	Constraining quality factors
Potatoes	Large size, correct colour, turgid, disease free	IFP	Poor seed, low water and soil nutrients availability, poor soils, fungal and viral infestations, poor storage
Poultry	Fresh, large to medium size, white, lean,	IFP	Low feed availability, poor poultry breeds,
Beans	Good colour, unbroken, disease and insect free, clean	IFP	Inadequate water, fungal and insect infestations during growth, poor storage
Tomatoes	Large size, correct colour, turgid, disease free, fresh and ripe	IFP	Low nutrient and water availability, fungal infestations, poor seed

Feedback Activity 2

Table 2: Exercise on yield constraints and improvements

Product	Yield in your region	Yield constraints	Yield improvements
Maize	600 – 1,500 kg per hectare	Water, soil nutrients, seed varieties	Appropriate seed varieties, timing of rainfall, fertilizer mixes
Milk	3 – 15 litres per cow per day	Inadequate/low quality feed and water, unreliable market outlets, limited access to veterinary and A.I services	Better quality/quantity feed, improved transportation and marketing,
Vegetables	Variable	Water, space, pest infestations, soil nutrients	Watering facilities, Integrated pest control, appropriate fertilizers
Eggs	Variable	Production costs (chicks, feed and energy for warmth/light), market access, disease, poultry breeds	Production strategies (enclosure type, poultry mixes and feed types) and disease control

Table 2: Exercise on yield constraints and improvements

Product	Yield in your region	Yield constraints	Yield improvements
Beef	I00 cows per hectare	Cattle breeds, fodder quality, water availability, diseases	Pasture control, fodder quality, beef breeds,
Potatoes	7 – 10 tonnes per hectare	Soil nutrients, water availability, seed quality, space, disease control (viruses and fungi)	Good spacing, adequate watering, IPM, appropriate fertilizers, disease and virus free seed
Poultry	Variable	Production costs (chicks, feed and energy for warmth/light)	Production strategies (enclosure type, poultry mixes and feed types)
Beans	200 – 600 kg per hectare	Seed quality and variety, water availability, fungal and pest infestations, space	Appropriate seed quality and variety for region, disease control, increased plant numbers per hectare
Tomatoes	10 - 60 kg per plant per year	Variety, water availability, disease and frost incidences, limited plant production times	Controlled conditions (greenhouses), grafting for disease control and longer growth, growing appropriate varieties

Feedback

Feedback Activity 3

Table 3: Value addition to agricultural products

Product	Value addition	Environmental impact	Economic improvements
Maize	1. High yielding hybrid varieties 2. Selected local varieties	1. Dangers of GMO's, higher resource uptake (water and soil nutrients) 2. Reduced negative impacts	1. Higher yields may mean better profits in the short term 2. Limited profits
Milk	High nutrient fodders, more watering of cows	Increased intensity of cultivation for fodder with degradation possibilities	Higher profits from larger milk sales
Vegetables	Better seed, greenhouses, processing and packaging	Higher demand for water, soil nutrients and pesticides (fertilizer and pesticide residues)	Higher profits from vegetable sales
Eggs	Improved poultry breeds	Higher production of poultry waste, greater demand for resources (water and energy)	Higher egg production which may translate into profit with market access

Table 3: Value addition to agricultural products

Product	Value addition	Environmental impact	Economic improvements
Beef	Breed selection, diversified meat products, disease free zones	Better use of pasture hence rangeland conservation but dangers from pesticide use	Better markets for beef products (including exports)
Potatoes	Better seed varieties, diversified potato products, storage facilities	Higher energy use in storage (refrigeration)	Consistent earnings over the year
Poultry	Improved poultry breeds	Higher production of poultry waste, greater demand for resources (water and energy)	Higher egg production which may translate into profit with market access
Beans	Appropriate cultivars, disease control, crop monocultures	Greater soil fertility losses, pesticide residues	Higher profits from sales
Tomatoes	Greenhouses, marketable varieties, disease control	Impact of pesticide residues	Higher earnings from sales

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MODULE 2: **Sustainable Agriculture**

LESSON 4: **Constraining Factors to sustainable Agriculture**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 4 CONSTRAINING FACTORS TO SUSTAINABLE AGRICULTURE

AUTHOR:

Dr Maina Muniafu

TIME:

1 hour 36 minutes

INTRODUCTION:

There are some factors that prevent farmers from practicing sustainable agriculture. These range from lack of knowledge, finances or even support systems. It is important to understand such factors as a way of finding solutions that are affordable, appropriate and effective in such production systems.

OUTCOMES:

By the end of this lesson you will be able to:

- Name factors that are constraining to production in their regions.
- Relate production to the impact of natural factors.
- Understand the impacts of land divisions.

Access the case study from the course CD ROM.
See Resource Index | Module 2 | Lesson 4 | Case Study

Identification of Constraining Factors

A number of factors constrain our efforts to carry out sustainable agriculture. Various factors are vital to achieving sustainability and these include the adoption of suitable cultivation practices such as crop rotation, retaining vegetative cover through reforestation programs, agroforestry, use of certified seed, improving cultural practices, clear land ownership, reduction of local fees and improving the financing policy of agricultural schemes. Constraining factors to all these include ignorance, lack of resources, poor policy formulation and implementation, absence of credit finances, attitudes, insufficient technology and information. There are also regional realities in the production systems that limit sustainable practices. These can vary from region to region.

Activity 1

Constraining Factors (20 Minutes)

Work in groups of four and discussions the issues below

1. Refer to the constraints box below and relate the contribution of each term to possible consequences of unsustainability in the environment. Record your discussions.

Constraints Box

Ignorance, lack of resources, poor policy formulation and implementation, absence of credit finances, attitudes, insufficient technology and information, inadequate water, declining soil nutrients, insufficient fodder, lack of agricultural extension services, wrong attitudes, animal diseases, pests, plant diseases, lack of electricity, poor roads, no communication facilities, poor market accessibility, high transportation costs,

Agricultural Activities

Cereals (maize, wheat, rice, barley), pulses (beans, peas, cow peas, pigeon peas, green grams, etc.) tubers (potatoes, sweet potatoes, cassava), dairy, beef cattle, goat herding, sheep farming, vegetables (cabbages, indigenous, kales, tomatoes, French beans, etc.), flowers, fruits (mangoes, citrus fruits, bananas, pineapples, etc.) oil seeds, aquaculture, poultry, sugar cane, etc.

2. For each region in Kenya, match agricultural activities with predominant constraint factors.

Regions of Kenya: North-eastern, Central, Rift valley, Western, Nyanza, Coast, Eastern, Nairobi

Region	Agricultural activity	Constraints to sustainability
North-Eastern		
Central		
Rift Valley		
Western		
Nyanza		
Eastern		
Nairobi		

See the Feedback section at the end of this lesson to see a completed table.

Impacts of Population Dynamics and Land Divisions on Sustainability Practices

We also need to look at how land sub-divisions affect production and sustainability practices. As the population grows and the availability of arable land comes under pressure, traditional practices of land division no longer make sense. In fact they can work against us.

Activity 2

Land Division (20 minutes)

Work in groups of four and discuss:

1. How might population dynamics and land sub-divisions limit sustainable production?
2. How might land sub-divisions enhance sustainable production?

See the Feedback section at the end of this lesson to see a completed table.

Conclusion

It is evident that constraints to sustainable agriculture are influenced by a number of factors. The level of poverty is a strong influencing factor and economic disadvantage, that, for example will result in a lower investment in conservation practices if they are not set within an affordable range. An important factor for sustainability will therefore be attitudes and affordable cultural practices.

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Abu Baker Elsiddig Ahmed Eltohami. (2000). Constraints of sustainable Agriculture in Mechanized rain fed schemes of Sudan case study of Dali Mechanized Schemes. Available online http://www.ses-sudan.org/Abu%20Baker%20Elsiddig%20Ahmed%20Eltohami.pdf

Duvel, D.H and Botha A.J. (1999). Human constraints to sustainable agriculture in the arid regions of South Africa. The Journal of Agricultural Education and Extension. Vol. 6 Issue 1, pgs 47 – 60.

Kamoni P.T. and S. N. Makokha; Influence of land use practices and socio economic factors on land degradation and environmental sustainability in Gucha District, Kenya. Available online at www.kari.org/biennialconference/conference12/docs/Contents.htm

Feedback Activity 1

Regions of Kenya: North-eastern, Central, Rift valley, Western, Nyanza, Coast, Eastern, Nairobi

Region	Agricultural activity	Constraints to sustainability
North-Eastern	Beef cattle, goat herding	Poor policy formulation and implementation, ignorance, inadequate water, absence of credit finances, attitudes, insufficient technology and information
Central	Cereals (maize, rice, barley), pulses, vegetables, tubers (potatoes, sweet potatoes), dairy cows, poultry, pigs, sheep, aquaculture.	Poor policy formulation and implementation, ignorance insufficient fodder, animal diseases, pests, plant diseases
Rift Valley	Cereals (maize, wheat, rice, barley), pulses (beans, peas, cow peas, pigeon peas, green grams, etc.) tubers (potatoes, sweet potatoes, cassava), dairy, beef cattle, goat herding, sheep farming, vegetables (cabbages, indigenous, kales, tomatoes, French beans, etc.), flowers, poultry, sugar cane	Poor policy formulation and implementation, ignorance, lack of agricultural extension services, lack of credit finances, wrong attitudes, insufficient technology and information, animal diseases, pests, plant diseases communication, poor market accessibility, high transportation costs

Region	Agricultural activity	Constraints to sustainability
Nyanza	Cereals (maize, rice), pulses (beans, peas, cow peas, green grams, etc.) tubers (potatoes, sweet potatoes, cassava), vegetables (cabbages, indigenous, kales, tomatoes poultry, sugar cane, aquaculture	Poor policy formulation and implementation, ignorance, lack of agricultural extension services, lack of credit finances, wrong attitudes, insufficient technology and information, animal diseases, pests, plant diseases communication, poor market accessibility, high transportation costs, poor roads
Western	Cereals (maize, rice), pulses (beans, peas, cow peas, green grams, etc.) tubers (potatoes, sweet potatoes, cassava), vegetables (cabbages, indigenous, kales, tomatoes poultry, sugar cane, aquaculture	Poor policy formulation and implementation, ignorance, lack of agricultural extension services, lack of credit finances, wrong attitudes, insufficient technology and information, animal diseases, pests, plant diseases communication, poor market accessibility, high transportation costs, poor roads
Eastern	Cereals (maize, wheat, rice, barley), pulses (beans, peas, cow peas, pigeon peas, green grams, etc.), beef cattle, goat herding vegetables (cabbages, indigenous, kales, tomatoes	Poor policy formulation and implementation, ignorance, inadequate water, absence of credit finances, attitudes, insufficient technology and information
Nairobi	Vegetables, dairy cows, poultry, pigs,	Land, attitudes, insufficient technology and information

Feedback Activity 2

	Impact	Consequence
Population increase	Land subdivisions	Continuous cultivation leading to soil erosion and hence land degradation
Farm-Yard Manure + fertilizer mix	Soil properties and nutrients improved	Reduced erosion and higher yields
Intercropping	Soil nutrient levels maintained	Food variety and reduced soil erosion
Greenhouses for vegetable varieties	Lowered impact on land	High productivity
Zero-grazing	Demand for fodder shifted elsewhere	High milk outputs
Soil and Water conservation practices (ridging, Napier grass ridges, drains, cover crops, improved crop seeds)	Reduced soil erosion, high soil moisture content	Higher productivity
High value agricultural products	Lower pressure on land	High economic earnings

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MODULE 2: **Sustainable Agriculture**

LESSON 5: **Novel Sustainable Production Techniques**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr Maina Muniafu**

This lesson was made possible with the assistance of the following organisations:

LESSON 5 Novel Sustainable Production Techniques

AUTHOR:

Dr Maina Muniafu

TIME:

1 hour 36 minutes

OUTCOMES:

By the end of this lesson you will be able to:

- Describe novel technologies for adoption into their production systems
- Understand the various options in the drive for sustainable agriculture

INTRODUCTION:

The move into an agribusiness concept of production calls for an infusion of novel, sustainable, production techniques into local practice as part of practical strategies for sustainable agriculture. An underlying rationale is affordability and sustainability to ensure that such strategies are appropriate for the various production systems.

Access the case study from the course CD ROM.
See Resource Index | Module 2 | Lesson 4 | Case Study

Novel Technologies in Agriculture

The lesson looks at various novel technologies in the field of agriculture in a variety of production systems.

Activity 1

Novelty (20 Minutes)

Work in groups of four and discuss the issues below:

1. Identify at least three strategies that you consider to be novel to your production system.
2. Calculate in groups of three the cost (financial as well as environmental) and resource comparison between your current production system and the novel technology.

Technological Options in Production

Let us formulate simple techniques that would allow farmers to apply novel technologies in a sustainable manner.

Activity 2

Technology Plans (20 minutes)

Work in groups of four and discuss:

1. Create a simple application system for the techniques you selected.

Conclusion

In order for sustainable agriculture to become a reality in today's world, you can see that we, as farmers, literally need to think out of the box. Many techniques exist that we can learn and borrow and this requires us to be courageous in the choices that we make. Within your farming region, it is important to hold consultations with fellow farmers so as to keep on improving on whatever novel techniques you select.

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MODULE 3: **Entrepreneurship**

LESSON 1: **Development of Entrepreneurial Mind Set**

TIME: **1 hour 36 minutes**

AUTHOR: **Gidraph J Nduati**

This lesson was made possible with the assistance of the following organisations:

LESSON 1 DEVELOPMENT OF ENTREPRENEURIAL MIND SET

TIME:

1 hour 36 minutes

AUTHOR:

Gidraph J Nduati

OUTCOMES:

- Understanding the entrepreneurial perspective.
- Understand the role of entrepreneurship in economic development.
- Identifying sources of ideas for new agricultural ventures.
- Understanding methods for generating new agricultural venture ideas

INTRODUCTION:

Kenya is a developing country and like most developing countries it is faced with a high rate of unemployment. Engaging in small scale enterprises has been seen as the best way to create more jobs and thus create more employment. Starting a business requires an enterprising mind, a mind that is able to notice business opportunities and exploit them. Mwalimu Njuguna's case demonstrates how an individual can develop an entrepreneurial mind set.

See this case study video on the course CD ROM section under *Resource Index* | *Module 3* | *Lesson 1*

The Entrepreneurial Perspective

Entrepreneurs take ideas and convert them into business ventures. What one requires to be an entrepreneur is courage and passion. Anyone who wants to become an entrepreneur should consider the following:

- Why he/she wants to start his or her own business.
- How starting the business is likely to affect one's personal life.
- The psychological and physical health preparedness needed, for example ability to work for long hours without harming one's health.
- Aspects of the business that one sees as obstacles to business success, for example having enough capital, skills and qualified employees

.

Activity 1

Group Discussion (15 minutes)

For this activity, you will work in groups of five. Discuss the factors that might influence people to start their own business.

1. Make a list of at least 7 factors that the group believe motivate entrepreneurs to start up new businesses.
2. Then consider if you are motivated by any of these factors.
3. Use this check list to determine your readiness to start a new venture.

#	Consider	Yes	No
1	Will starting a business impact on your personal life and family members?		
2	Will working long and irregular hours impact on your health?		
3	Do you have the mental tenacity to work long and irregular hours?		
4	Do you have sufficient capital to start on a limited scale?		
5	Do you have sufficient knowledge about the business to start a new venture?		
6	Do you have sufficient skills to start this new venture?		
7	Are there sufficient numbers of skilled people, potential staff, to support you?		

The Role of Entrepreneurship in Economic Development

Small scale businesses play a big role in economic development. They support the economy in these ways:

- Creation of employment: the economic activities of small scale businesses require people, hence the entrepreneur will create work for other people.
- Raising living standards: the entrepreneur, as well as his/her management and workers, will receive income generated from the economic activities and thus will be able to enjoy more goods and services.
- Provision of goods and services: the entrepreneur will produce agricultural products such as milk, produced by Mwalimu Njuguna; he/she will also provide services to the customers such as delivering milk to them.
- Contribution to savings for further investment: the economic activities will create higher incomes and hence the entrepreneur will save some money and the savings will be available for investment.

Activity 2

Case Analysis (10 minutes)

In reference to Mwalimu Njuguna's case, outline the ways in which the small scale dairy farm has contributed to economic development.

1. Review the case study video.
2. In your journal, record in what ways Mwalimu has contributed to each of the four economic development areas mentioned above.

See Feedback section at the end of this lesson for answers and comments about Activity 2

Sources of Ideas for New Agricultural Ventures

Ideas are the building blocks in the establishment of new small scale agricultural ventures. Ideas rarely just pop into your head. You need to cultivate the skill of developing them. There are various strategies and sources you can use to develop entrepreneurial ideas:

- Keep an idea files or a note book: record any new business idea that comes to your mind as and when you encounter it.
- Newspapers and Magazines: read newspapers and magazines regularly and cut out and keep any interesting business ideas.
- Trade journals: identify business journals to which you can subscribe.
- Friends, family members and relatives: discuss your business ideas with them and allow their perspective to develop the idea further.
- Interact with other entrepreneurs: evaluate their businesses to see which ideas could work in your case.

Activity 3

Group Discussions (10 minutes)

Work in groups of five and brainstorm around these issues:

1. Outline the types of ideas you can get from other entrepreneurs, family and friends, trade journals and magazines.
2. What other source has each of the group used in the past to source ideas?
3. Just from your conversations with the group, have you thought of any new ideas?

Methods for Generating New Agricultural Ideas

Ideas are abstract and need to be converted into reality. One needs to use specific methods to walk the dream. You also require details. The next steps once you have identified a good idea are:

- Read widely on your idea. Seek out as much background knowledge you can.
- Discuss your idea with friends and family. What impact will it have on them and on you?
- Research the details on your idea. What needs to be done to get it off the ground?
- Test ideas on a limited scale.

Activity 4

Case Analysis (5 minutes)

Review the case study again and reflect on these issues in your journal

1. In reference to Mwalimu Njuguna's case, identify how he converted his ideas into reality.
2. In your own experience, have you ever 'walked the dream'? Reflect how your journey was different from the way as suggested above.

See Feedback section at the end of this lesson for answers and comments about Activity 4

Conclusion

In this lesson we have discussed how you can develop an entrepreneurial mind and we have learnt how Mwalimu Njuguna developed the ideas to start his small scale dairy farm. Some say entrepreneurs are born and this is true to an extent. Some people identify new business opportunities almost innately. It is, however, possible to coach yourself with a little guidance to become entrepreneurial. Hopefully, the following lessons will help in this regard.

Summary

In this lesson we have learnt that entrepreneurship plays an important role in economic development. Namely:

- creating employment;
- raising living standards;
- increasing national savings reserves and
- the provision of goods and services.

We have also seen that the following strategies and sources are good when identifying a business idea:

- Keep an idea files or note book.
- Read newspapers and magazines.
- Subscribe to trade journals.
- Talk to friends, family members.
- Interact with other entrepreneurs.

To develop the idea further it was advised that you,

- Read widely on your idea.
- Discuss your idea with friends and family.
- Research the details on your idea.
- Test ideas on a limited scale.

Glossary

Entrepreneur
An entrepreneur is a person who has possession of a new enterprise, venture or idea and is accountable for the inherent risks and the outcome.
http://en.wikipedia.org/wiki/Entrepreneur

Entrepreneurial venture
A business idea that has evolved into a real business

Entrepreneurial opportunities
These are potential areas within the economy that with some resources, insight and effort could develop into a profitable business.

Venture capital
Venture capital (VC) is financial capital provided to early-stage, high-potential, growth startup companies.
http://en.wikipedia.org/wiki/Venture_capital

Feedback

Feedback Activity 2

Employment: Njuguna requires support at the dairy

Living Standards: He earns considerably more than he was earning as a teacher and he pays also pays his staff.

Goods & Services: Milk, insemination services, teaching dairy skills.

Savings: Not discussed directly but he possibly does save some of his earnings.

Feedback Activity 4

Njuguna started small supplying milk to colleagues and it was once he had seen the market expand that he began to increase production. He has steered away from large loans and today boasts he is completely self-financed. He has made extensive use of extension services and programmes in order to learn new things and modern techniques. As a consequence of one of these programmes he has learnt to breed selectively to increase yields and decrease the number of cattle he must maintain.

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MODULE 3: **Entrepreneurship**

LESSON 2: **Organisation of Agricultural Enterprises**

TIME: **1 hour**

AUTHOR: **Gidraph J Nduati**

This lesson was made possible with the assistance of the following organisations:

LESSON 2

ORGANISATION OF AGRICULTURAL ENTERPRISES

TIME:

1 hour

AUTHOR:

Gidraph J Nduati

OUTCOMES:

- Understand the importance of formal and informal organization.
- Understand the process of establishing an agricultural enterprise.
- Understand the different legal requirements of organizing a new agricultural venture.

INTRODUCTION:

It is important that every new business enterprise should be registered under one of the legal forms of business ownership. The entrepreneur should therefore decide the form of business ownership that would be appropriate for his/her new business venture. Mwalimu Njuguna operates his dairy farm on his quarter acre plot and has operated the venture since 1982.

FORMAL AND INFORMAL ORGANISATION

A *formal* entrepreneurial venture or enterprise is registered under the law while an *informal* venture is unregistered. If your venture or operation is to grow, then you will need to register it in order to access various support mechanisms, such as small business loans. There are, however, different types of formal and informal organizations.

Activity 1

Group Discussion

In a group of five students discuss what the group believes are the differences between formal and informal organizations. See if you can identify the positives and negatives of both formal and informal enterprises.

PROCESS OF ESTABLISHING AN AGRICULTURAL ENTERPRISE

One of the key activities that an entrepreneur should undertake is to establish the enterprise. There are specific requirements that the entrepreneur should follow in order to be allowed to operate.

The law requires that every venture should be licensed. To get the license the entrepreneur should follow the following procedure:

- Identify business premises
- Select the business name
- Have the business name registered
- Obtain a health license
- Obtain a trade license

Activity 2

Case Analysis

Read Mwalimu Njuguna's case and show whether the business has followed the licensing procedures. Explain the advantages and disadvantages of licensing.

FORMS OF LEGAL BUSINESS OWNERSHIP

There are different forms of business ownership from which an entrepreneur can choose from:

Sole Proprietorship
A sole proprietorship, also known as a sole trader or simply a proprietorship, is a type of business entity that is owned and run by one individual and in which there is no legal distinction between the owner and the business. The owner receives all profits (subject to taxation specific to the business) and has unlimited responsibility for all losses and debts. Every asset of the business is owned by the proprietor and all debts of the business are the proprietor's. This means that the owner has no less liability than if they were acting as an individual instead of as a business. It is a "sole" proprietorship in contrast with partnerships.
Wikipedia: http://en.wikipedia.org/wiki/Sole_proprietorship CC: BY-SA

Partnerships
A partnership is an arrangement where entities and/or individuals agree to cooperate to advance their interests. In the most frequent instance, a partnership is formed between one or more businesses in which partners (owners) co-labour to achieve and share profits or losses… Partnerships have widely varying results and can present partners with special challenges. Levels of give-and-take, areas of responsibility, lines of authority, and overarching goals of the partnership must all be negotiated. While partnerships stand to amplify mutual interests and success, some are considered ethically problematic, or at least debatable.
Wikipedia: http://en.wikipedia.org/wiki/Partnership CC: BY-SA

Company
A company is a form of business organization. It is a collection of individuals and physical assets with a common focus and an aim of gaining profits. This collection exists in Law and therefore a company is considered a "Legal Person"… In English law, and therefore in the Commonwealth realms, a company is a form of body corporate or corporation, generally registered under the Companies Acts or similar legislation. It does not include a partnership or any other unincorporated group of persons.
Wikipedia: http://en.wikipedia.org/wiki/Company CC: BY-SA

Cooperative
A cooperative (also co-operative; often referred to as a co-op) is a business organization owned and operated by a group of individuals for their mutual benefit. Cooperatives are defined by the International Cooperative Alliance's Statement on the Cooperative Identity as autonomous associations of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through jointly owned and democratically controlled enterprises. A cooperative may also be defined as a business owned and controlled equally by the people who use its services or by the people who work there. Cooperative enterprises are the focus of study in the field of cooperative economics.
Wikipedia: http://en.wikipedia.org/wiki/Cooperative CC: BY-SA

In Kenya the formation of cooperatives is governed by the *Co-operative Societies Act* (1997) amended (2004)

The Co-operative Societies Act (No.12 of 1997, amended 2004) can be accessed from the course CD ROM. See *Resource Index* | *Module 3* | *Lesson 2* | *Cooperative Societies Act*

Activity 3

Group Discussion

In groups of five people discuss the advantages and disadvantages of each of the following:

- Sole proprietorship
- Partnership
- Company
- Cooperative

Conclusion

In this lesson we have learnt the different forms of business ownership that you can adopt when establishing your small business. The first distinction is between formal and informal. However, as it is required by law that all ventures should be licensed, there are a number of different forms of legal businesses that you can adopt. These include sole proprietorship, partnership, company and cooperative.

Glossary

Business Partner
Business partner is a term used to denote a commercial entity with which another commercial entity has some form of alliance. This relationship may be a highly contractual, exclusive bond in which both entities commit not to ally with third parties. Alternatively, it may be a very loose arrangement designed largely to impress customers and competitors with the size of the network the business partners belong to.

Wikipedia: http://en.wikipedia.org/wiki/Business_partner CC: BY-SA

Cooperative Societies Act

Legislation that shapes the formation of cooperative societies in Kenya. It came into law in 1997 and was amended in 2004.

References

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Wikipedia. (2011). *Cooperative*. Available online: http://en.wikipedia.org/wiki/Cooperative Accessed 04/03/2011. CC: BY-SA

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MODULE 3: **Entrepreneurship**

LESSON 3: **Agricultural Enterprise Business Plan and Marketing**

TIME: **1 hour 36 minutes**

AUTHOR: **Gidraph J Nduati**

This lesson was made possible with the assistance of the following organisations:

LESSON 3

Agricultural Enterprise Business Plan and Marketing

TIME:

1 hour 36 minutes

AUTHOR:

Gidraph J Nduati

OUTCOMES:

- Understanding the scope of a business plan.
- Identifying the resources of information for each part of a business plan.
- Identifying the components of a business plan.
- Marketing of agricultural products

INTRODUCTION:

A business plan is a formal written document that explains what a business is and how it will be operated. The business plan also expresses the vision of the enterprise and describes the strategy and operations of the enterprise.

A business plan is like a road map which tells the entrepreneur how to start and operate a business. It is an important document to help you make strategic decisions.

Scope of a Business Plan

What exactly should the business plan contain? A business plan should:

- Show exactly what the business offers in terms of products or services to customers.
- Show how the business will be managed i.e. show the organization structure.
- Describe the goals of the business, basically what the entrepreneur hopes to achieve with the business.
- Describe the market, focusing mainly on the existing competition.
- Show sales estimates.
- Estimate costs, revenue and profits.
- Identify customer needs.
- Provide information on what makes the business different from others.

Activity 1

Case Study Analysis (10 minutes)

Refer to the Mwalimu Njuguna case study and list in your journal:

1. The products that Mwalimu offered to the market.
2. Mwalimu Njuguna's customers.
3. What Mwalimu hoped to achieve with the business.
4. The scope of Mwalimu's market.

Njuguna's video case study can be accessed from the course CD ROM,
Resource Index | *Module 3* | *Lesson 3* | *Case Study*

Sources of Information

Information in the business plan should be as accurate as possible. It is important that the entrepreneur should get information from appropriate sources. The information should be based on the business plan scope.

Product information can be obtained from:

- Customer needs analysis
- Competitors
- Product distributors
- Suppliers

Business goals information can be obtained from:

- Your vision and mission statements

Market information can be obtained from:

- Customers
- Other players in the market
- Research on markets e.g. online research

Statements on costs, revenue and profits information can be obtained from:

- Business plans of other entrepreneurs who could be in similar businesses.

Customer needs information can be obtained from:

- Survey of customers in the target market

Information on what makes the business different can be obtained from:

- A comparative analysis of a similar business

Activity 2

(10 minutes)

Make reference to Mwalimu Njuguna's case study and identify the sources of information for his business plan.

Components of a Business Plan

When composing the business plan document an entrepreneur should structure the plan as follows:

- Cover page
- Name of the enterprise
- Contact Details
    - Address and telephone numbers
- Date
- Executive Summary
- Business Title
    - Write the name of the business as authorized by the business Registrar's office.
- Business opportunity
    - Describe the product to be offered to the market.
    - Describe the business location.
    - Describe the market need to be addressed by the business.
    - Describe the target market.
- Competitive Environment
    - Identify the existing competitors.
    - Describe the barriers of entry to the industry.
    - Describe how the product can be differentiated from that of the competitors.
- Business viability
    - Describe the level of investment required to start and operate the business.
    - Describe the sources of funds.
    - Analyze the estimated costs.
- Entrepreneur experience and commitment
    - Describe the education background and training relevant to the business.
    - Describe relevant experience.
- Business Description
    - Describe the nature of business.
    - Describe the industry structure.
- Market Analysis
    - Describe the customer characteristics.
    - Describe market size.
    - Describe major competitors.
    - Describe market entry barriers.
    - Describe market shares and sales projections.
- Management
    - Draw an organization structure.
    - Identify the key management personnel.
- Financial Projections
    - Outline the projected income for three years.
    - Projected cash flows for three years.

Activity 3

Financial Planning (40 minutes)

To help with the financial projects, use the following tables to do a financial analysis. Work in groups of five to complete the following tables. Discuss with the group members items in the plans that don't make sense to you. You can also consult the course facilitator.

1. Production Plan

2.1 Projected Production and Sales

No.	Item	Total Quantity per year	Sales Revenue per year	Capacity / Utilization
1				
2				
3				

Machinery/Equipment Requirement

No	Type	Unit Price	Total (Kshs)	Maintenance Costs
1				
2				
3				
4				
	Total:			

Raw Material Requirement

No.	Item	Quantity	Total Annual Requirement	
			Ksh	Supplier
1				
2				
3				
	Total:			

Utilities / Infrastructure

No.	Item	Annual Requirement	Total Annual Costs	Maintenance Costs
1	Electricity			
2	Gas			
3	Water			
4	Rent			
5	Other			
	Total:			

Labour Requirements

No.	Type	No. of Staff	Annual wages/ Salaries	Training needs
1	Skilled			
2	Semi-skilled			
3	Unskilled			
4	Owner's salary			
	Total:			

Administrative and Selling Costs

No.	Item	Quantity	Amount
Total:			

3. Cost Calculation

Fixed Capital

No.	Item	Kshs		
		Initial	Depreciation	Actual
1	Land/Building			
2	Machinery/Equipment			
3	Furniture and Fixtures			
	Total:			

Working Capital

No.	Item	Duration	Quantity	Kshs
1	Raw materials stock			
2	Semi-finished goods stock			
3	Finished goods stock			
4	One year production expenses (utilities, administration, wages, salaries)			
5	Preliminary and pre-operative expenses			
	Total:			

2. Financing Plan

Financing

No.	Item	Kshs	Remarks
	Own funds		
	Fixed capital loan		
	Working capital loan		
	Other		
	Total		

SCHEDULE A: PERSONAL LIVING EXPENSES

Family Income	***Month 1***	***Month 2***	***Month 3***	***Total***
	Ks	Ks	Ks	Ks
Wages (take-home)				
Wages (take-home)—Spouse				
Interest and dividends				
Miscellaneous				
Total Income				
Family Expense Budget	***Month 1***	***Month 2***	***Month 3***	***Total***
	Ks	Ks	Ks	Ks
Vehicle expenses (petrol, maintenance, etc.)				
Vehicle insurance				
Vehicle down payment				
Beauty shop & barber				
Cable TV				
Child care				
Clothing				
Credit card payments				
Electricity				
Entertainment and gifts				
Groceries & outside meals				
Health/ Life insurance				
Home repairs				
Homeowner’s insurance				
Income tax (additional)				
Laundry and dry cleaning				
Medical				
Mortgage payments				
Other debt payments				
Rent				
School expenses				
Telephone bill				
Vacations				
Water, sewer, trash collection				
Other (miscellaneous)				
Total Expenses				
Net Cash Remaining (Needed) Total Schedule A				

Marketing of Agricultural Products

A majority of the agricultural products are perishable and bulky in nature. Agricultural products are also seasonal. Consequently, they need to be sold and dispersed quickly and will need an effective marketing to ensure a ready market. This highlights the importance of planning your marketing strategy in advance. Let us use Mwalimu Njuguna's case to illustrate this point.

Activity 4

Marketing (15 minutes)

Once again think back to the case study and in your journal record:

- The nature of the product *marketed* by Mwalimu Njuguna.
- How in your opinion Mwalimu Njuguna could improve on the product.
- The strategies that Mwalimu Njuguna uses to promote the product and how the strategies can be improved.
- The pricing strategies used by Mwalimu.
- The ways methods that Mwalimu can use to improve the distribution of the product.

Finally, reflect on how you might improve the marketing of your own produce.

Conclusion

In this lesson we have discussed how to develop a business plan and we have learnt how Mwalimu Njuguna could have improved his own business by having a business plan and using a better marketing strategy. Business plans are crucial because they provide you with a detailed *map* of how to move forward. It is critical in helping you make future strategic decisions.

Summary

In this lesson we have seen that a business plan has the following content. Namely,

- Products and/or services to customers.
- Organization structure.
- Goals.
- Identification of existing competition.
- Sales estimates.
- Estimate costs, revenue and profits.
- Identification of customer needs.
- What makes the business different from other businesses?

We also looked at the components of a plan document. The business plan contains the following sections:

- Cover page
- Name of the enterprise
- Contact Details
- Date
- Executive Summary
- Business Title
- Business opportunity
- Competitive Environment
- Business viability
- Entrepreneur experience and commitment
- Business Description
- Market Analysis
- Management
- Financial Projections

Glossary

Business plan
A business plan is a formal statement of a set of business goals, the reasons why they are believed attainable, and the plan for reaching those goals. It may also contain background information about the organization or team attempting to reach those goals. Business plans may also target changes in perception and branding by the customer, client, tax-payer, or larger community. When the existing business is to assume a major change or when planning a new venture - a 3 to 5 year business plan is essential.
http://en.wikipedia.org/wiki/Business_plan

Cash flow
This is the movement of cash into or out of a business, project, or financial product. It is usually measured during a specified, finite period of time. Measurement of cash flow can be used for calculating other parameters that give information on the companies' value and situation.
http://en.wikipedia.org/wiki/Cash_flow

Promotion
Promotion is one of the four elements of marketing mix (product, price, promotion, distribution). It is the communication link between sellers and buyers for the purpose of influencing, informing, or persuading a potential buyer's purchasing decision.
http://en.wikipedia.org/wiki/Promotion_(marketing)

Pricing
Pricing is the process of determining what a company will receive in exchange for its products. Pricing factors are manufacturing cost, market place, competition, market condition, and quality of product. Pricing is also a key variable in microeconomic price allocation theory. Pricing is a fundamental aspect of financial modelling and is one of the four P's of the marketing mix. The other three aspects are product, promotion, and place. Price is the only revenue generating element amongst the four P's, the rest being cost ceners.

Distribution
Product distribution (or place) is one of the four elements of the marketing mix. An organization or set of organizations (go-betweens) involved in the process of making a product or service available for use or consumption by a consumer or business user.
http://en.wikipedia.org/wiki/Distribution_(business)

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MODULE 3: **Entrepreneurship**

LESSON 4: **Record Keeping**

TIME: **1 hour 30 minutes**

AUTHOR: **Gidraph J Nduati**

This lesson was made possible with the assistance of the following organisations:

LESSON 4 RECORD KEEPING

TIME:

1 hour 30 mins

AUTHOR:

Gidraph J Nduati

OUTCOMES:

On completion of this lesson you should understand:

- The importance of keeping records in a business.
- The types of records that an entrepreneur should keep.
- The process of keeping the records.

INTRODUCTION:

Record keeping is important in a business for it is the only way to inform the entrepreneur how the business is doing. In order to analyze the 'health' of your business you need data! Therefore, a systematic process of gathering data and recording it should be set up. The following documents should be kept:

- Production records;
- Operation records such as labour, farm inputs, tools and equipment costs;
- Cash transactions.

Importance of Record Keeping

You might be thinking just how critical is the keeping of records? It is important to keep records for the following reasons:

- Future reference;
- Keeping track of business transactions;
- Filing of taxes;
- Compiling final accounts.

In order to fulfil the needs identified above you will need different sets of records. An entrepreneur should maintain records to meet his or her business requirements. The following are examples of records that can be maintained:

- Credit records
- Debtors records
- Production records
- Cash book
- Purchases records
- Stock records
- Assets records

Process of keeping of records

An entrepreneur should entrust record keeping to a knowledgeable person. We will read the case below to understand the importance of record keeping.

JOHN ENTERPRISES

John operated a small scale business which dealt in selling fruits of all varieties, such as pineapples, oranges, passion fruit, bananas, watermelons, grapes and many others. He received his supplies directly from the farmers. To ensure good operation of the business he tried very hard to keep good records. He maintained a supplies book where he recorded all the supplies from each supplier. In the supplier book he recorded the quantities supplied and the amount of money the supplies were worth. He also maintained a cash book where he recorded the cash sales. He also recorded any credit given to his customers on small pieces of paper. He also recorded all the business expenses in a hard cover book.

John was very happy with the record keeping but one day the pieces of paper on which he recorded the creditors disappeared and subsequently, he was not able to tell how much he was owed by his creditors. John found it difficult to reconstruct the credit from his memory.

In 2008, the Kenya Revenue Authority staff visited John's business and demanded to see John's records. John was surprised to hear that he was required to maintain records for inspection by the Kenya Revenue Authority staff. The KRA staff gave him one month to prepare the records. John did not know where to begin.

Activity 1

John Enterprises (20 minutes)

Gather into groups of five and discuss this case. In your journals record:

1. How effective in your opinion was John at record keeping?
2. Identify the records that John should maintain to meet the requirements of the KRA.
3. In the group's opinion, what methods could John employ to improve his system?

Conclusion

We have learned the importance of business records and the different types of records that an entrepreneur should maintain. We have used the John enterprises case to understand how to maintain records.

Summary

Records are a legal requirement. Records help an entrepreneur keep track of business transactions, aid in the filing of taxes, compile final accounts and act as a future reference. Record types include: Credit records, Debtors records, Production records, Cash book, Purchases records, Stock records and Assets records. As the business becomes more sophisticated it will be necessary to hire a knowledgeable book keeper or accountant.

Glossary

Credit
Credit is the trust which allows one party to provide resources to another party where that second party does not reimburse the first party immediately (thereby generating a debt), but instead arranges either to repay or return those resources (or other materials of equal value) at a later date. The resources provided may be financial (e.g. granting a loan), or they may consist of goods or services (e.g. consumer credit). Credit encompasses any form of deferred payment. Credit is extended by a creditor, also known as a lender, to a debtor, also known as a borrower.
Wikipedia: http://en.wikipedia.org/wiki/Credit_(finance) CC: BY-SA

Debtors
A debtor is an entity that owes a debt to someone else. The entity may be an individual, a firm, a government, a company or other legal person. The counterparty is called a creditor. When the counterpart of this debt arrangement is a bank, the debtor is more often referred to as a borrower.
Wikipedia: http://en.wikipedia.org/wiki/Debtor CC: BY-SA

Cash book
A double-entry bookkeeping system is a set of rules for recording financial information in a financial accounting system in which every transaction or event changes at least two different nominal ledger accounts. The name derives from the fact that financial information used to be recorded in books - hence "bookkeeping" (whereas now it's recorded mainly in computer systems) and that these books were called ledgers (hence nominal ledger, etc.) - and that each transaction was recorded twice (hence "double-entry"), with the two transactions being called a "debit" and a "credit".
Wikipedia: http://en.wikipedia.org/wiki/Cash_book,_Journal CC: BY-SA

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MODULE 3: **Entrepreneurship**

LESSON 5: **Credit Management**

TIME: **1 hour 30 minutes**

AUTHOR: **Gidraph J Nduati**

This lesson was made possible with the assistance of the following organisations:

LESSON 5

CREDIT MANAGEMENT

TIME:

1 hour 30 mins

AUTHOR:

Gidraph J Nduati

OUTCOMES:

By completion of this lesson you will be able to:

- Identify sources of funds;
- Understand the process of sourcing for funds;
- Understand the measures that should be taken to ensure effective utilization of funds;
- Understand repayment procedures.

INTRODUCTION:

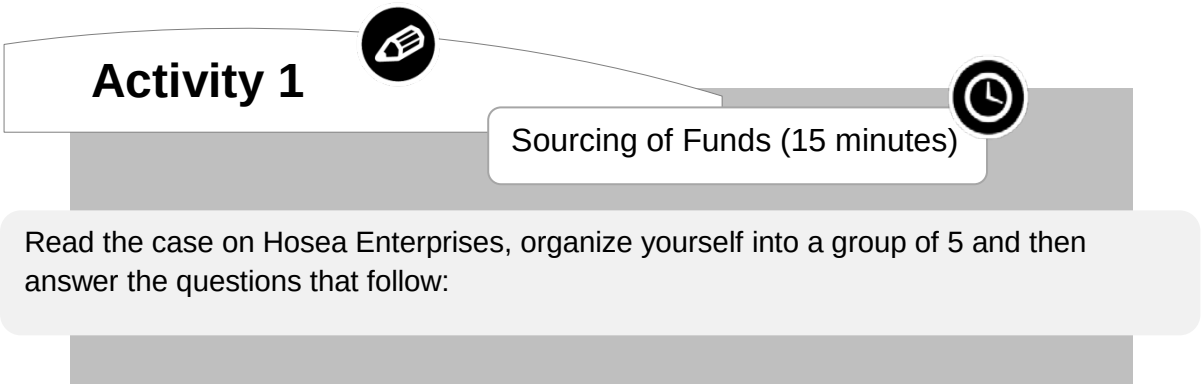
Credit is important in a business because it helps to finance business transactions when the business is short of funds. This lesson aims at providing knowledge on how to manage credit given to small scale enterprises to enhance their performance. We will use the case of Hosea Enterprises to understand the sources of funds, process of sourcing for funds, effective utilization of borrowed funds and the repayment process.

Sources of Funds

An entrepreneur can obtain funds to start up his business from various sources, some of which include:

- Family savings/personal savings: This is what an entrepreneur has been able to put aside to start the business. However, it is typically a limited source since most people are not able to save large amounts.
- Banks: This is main source of finance for business organizations but usury banks have stringent conditions that make it difficult for small scale businesses to access funds. Banks, for example, might require collateral which most businesses do not have.
- Savings and credit cooperatives (SACCOS): This is a source of funds that is cheap and also easily accessible. However, one has to be a member of the SACCO.
- Donations: This is money that one can be given by friends or relatives to enable him/her to start the business. This is not a very reliable source.
- Community based groups: Most people come together to save together and then they extend credit to one another. It is a cheap and convenient source but individuals may not have sufficient funds to meet the needs.
- Micro finance Institutions: These have become very popular sources of funds because the funds are easily accessible and they usually target small scale enterprises.

Let us see how one entrepreneur went about accessing sufficient funds to start up his business:



Hosea Enterprises

Hosea graduated from a technical college in the year 2003. He was not able to get a stable job but worked on small part time jobs. He struggled but he was very determined. Hosea was able to save 20,000 Kenyan shillings from the part time jobs. He decided that it would be worthwhile to start his own business which could give him a stable income. He therefore set out to survey on the type of business that he could start. Hosea was advised by friends that he should start a hardware shop because he had technical skills which could help him in operating the business. He accepted the advice and within two months he had obtained a good location for the business.

The biggest challenge for Hosea was the start-up capital because the 20,000 Kenyan shillings which he had saved was not sufficient to start the business. He therefore approached his father who lent him shs.80, 0000. Now, with 100,000 shillings he was ready to start the business. He rented the business premises for shs.15, 000 per month and was required to pay a down payment of shs. 15,000 so in total he paid shs. 30,000 and he used the balance to purchase the opening stock. The business did very well and he had many customers. He therefore felt that there was a need to expand the business but he was constrained by the lack of funds.

One day a credit officer from one of the local banks came to Hosea's business to buy some tires. He was very impressed by Hosea's business and he had a discussion with Hosea on the growth of the business. Hosea explained to him the problem of the lack of funds. The credit officer invited him to the bank for a further discussion. The following day, Hosea went to the bank and met the credit officer and had a very fruitful discussion and the credit officer agreed to lend Hosea 2,000,000 for business expansion provided he could bring a land title deed to secure the loan. Hosea was in a dilemma because he did not have a title deed. He promised the credit officer that he would be back within a week.

Hosea approached his father to see whether he would allow him to use the family land title deed to secure the loan. His father was very reluctant but Hosea was able to convince him. Hosea promised to work hard and repay the loan without failure. The two agreed to go to the bank to meet the credit officer.

The following day they went to the bank and they were well received. The credit officer accepted Hosea's father's title deed and the family and the family land were mortgaged to secure Hosea's loan. The bank gave Hosea a cheque of 2,000,000. Hosea was over joyed and he promptly started planning how he could expand the business. His father talked to him about the various consequences in case he failed to repay the loan. Hosea promised his father that he would never default on the loan repayment.

When the money was ready and credited to Hosea's Bank account, Hosea was ready to begin the business expansion. However, before the expansion plan was fully conceived, Hosea had a discussion with his friends and was advised that it was important to get married first so that his wife could help him in managing the business.

This idea appeared to be very good to Hosea. He therefore started plans to marry his long term girlfriend. All the wedding plans went well, he used the bank loan to pay dowry and for financing the wedding. They had a very big wedding, people ate and drank. He spent 1,500,000 shillings on the wedding.

Hosea now had only 500,000 to expand the business. This was too little, given the costs of the things he needed to stock the business. The business income was too low to finance the loan repayment and meet the household expenses. Hosea started lagging behind in loan repayments. Within the first year, their first baby came and the family demands increased. The loan repayment was proving hard to meet.

One morning the credit officer came to see Hosea's business and was shocked to see the low stock. He therefore gave Hosea two months to improve on the loan repayment otherwise the bank would sell his father's land to recover the money. At the end of the two months the loan repayment was even worse, and the bank had no option other than to sell the family land.

Today Hosea's family has no land and they are squatters.

Discussion Questions

1. How did Hosea get the capital to start the business?
2. Do you think Hosea needed extra funds to expand the business or should he have continued with the small business?
3. Should Hosea's father have refused to give the title to the family land to secure the loan?
4. What do you think went wrong in Hosea's plan?
5. Was it wrong for Hosea to get married?
6. Was the bank wrong to sell the land?
7. If you were Hosea, what would you have done?

Funds Application Process

The process of application depends on the source of funds. The banks have the most complex process. This entails completion of application forms and submission of all the documents required by the bank. The SACCOS and micro finance institutions have a simpler process although applicants have to complete forms and provide any other information required. The other sources are informal and hence do not have too many complications.

Activity 2

Application (10 minutes)

Refer to Hosea's case and describe the process that Hosea used to get the funds to start his business. Comment on the problems that he encountered and show whether he was able to solve the problems effectively.

Effective Utilization of Funds

Loan utilization is critical because it affects the loan repayment. It is important that a loan is utilized for the intended purpose, if the loanee diverts the funds to other purposes it means that he/she will not generate sufficient revenue to repay the loan.

Activity 3

Utilization (15 minutes)

Work in your group again, refer to Hosea's case and discuss his problems in loan repayment. Did he utilize his funds as he had stipulated?

Repayment Procedures

The loan repayment procedure defers from one financier to another and the repayment agreement contract between the borrower and the lender. Some of the key aspects agreed upon are:

- Loan repayment period
- Number of instalments
- Interest rate in percentage
- Penalty on default

Activity 4

Repayment (20 minutes)

In your group refer to Hosea's case once more and discuss the process that he was supposed to follow to repay the Ksh.2, 000,000 loan.

Conclusion

This course unit has discussed the credit management by entrepreneurs and has specifically explained the sources of funds, application procedure for funds, loan repayment process and effective utilization of funds. The Hosea case was used to show how an entrepreneur can manage credit.

Summary

The main points covered in this lesson include:

- Sources of funds for entrepreneurs
- Application process
- Loan repayment process
- Utilization of funds

Enrichment

Kenya SACCO Net: http://www.kenyasacconet.org/

Glossary

Technical words used in this lesson include:

Credit
Credit is the trust which allows one party to provide resources to another party where that second party does not reimburse the first party immediately (thereby generating a debt), but instead arranges either to repay or return those resources (or other materials of equal value) at a later date. The resources provided may be financial (e.g. granting a loan), or they may consist of goods or services (e.g. consumer credit). Credit encompasses any form of deferred payment. Credit is extended by a creditor, also known as a lender, to a debtor, also known as a borrower.
Wikipedia: http://en.wikipedia.org/wiki/Credit_(finance) CC: BY SA

Loan
A loan is a type of debt. Like all debt instruments, a loan entails the redistribution of financial assets over time, between the lender and the borrower. In a loan, the borrower initially receives or borrows an amount of money, called the principal, from the lender, and is obligated to pay back or repay an equal amount of money to the lender at a later time. Typically, the money is paid back in regular instalments, or partial repayments; in an annuity, each instalment is the same amount. The loan is generally provided at a cost, referred to as interest on the debt, which provides an incentive for the lender to engage in the loan. In a legal loan, each of these obligations and restrictions is enforced by contract, which can also place the borrower under additional restrictions known as loan covenants.
Wikipedia: http://en.wikipedia.org/wiki/Loan

Collateral
In lending agreements, collateral is a borrower's pledge of specific property to a lender, to secure repayment of a loan. The collateral serves as protection for a lender against a borrower's default - that is, any borrower failing to pay the principal and interest under the terms of a loan obligation. If a borrower does default on a loan (due to insolvency or other event), that borrower forfeits (gives up) the property pledged as collateral - and the lender then becomes the owner of the collateral. In a typical mortgage loan transaction, for instance, the real estate being acquired with the help of the loan serves as collateral. Should the buyer fail to pay the loan under the mortgage loan agreement, the ownership of the real estate is transferred to the bank. The bank uses a legal process called foreclosure to obtain real estate from a borrower who defaults on a mortgage loan obligation.
Wikipedia: http://en.wikipedia.org/wiki/Collateral_(finance)

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MODULE 4: **ICT in Support of Farming**

LESSON 1: **Introduction to Computers**

TIME: **1 hour 36 minutes**

AUTHOR: **Dalton Ndirangu**

This lesson was made possible with the assistance of the following organisations:

LESSON 1 INTRODUCTION TO COMPUTERS

TIME:

1 hour 36 minutes

AUTHOR:

Dalton Ndirangu

OUTCOMES:

By the end of this lesson participants will:

- Have an understanding of the basics of computer hardware and software systems.
- Understand different storage devices.
- Appreciate the importance of using ICT tools in their daily agricultural operations.
- Appreciate the importance of sharing farm information using modern technology as a medium of communication.

INTRODUCTION:

Welcome! This sub module introduces computers and their role in agriculture. Computers have become a very important tool in our daily lives and can play a significant role in agriculture. We will learn the basics of computer hardware and software systems, the importance of using information and communication technology (ICT) in our daily operations and moreover, the importance of sharing agricultural information using modern technology. The module includes a case study drawn from a reputable farm in Nakuru County, which might provide ideas on how you might use ICTs.

Activity

Experience (5 minutes)

Introduce yourselves briefly by sharing the type of farm activities that you are engaged in and whether you have used a computer before.

Basic Computer Hardware and Software Systems

Many farmers shun using ICT because they believe it is complicated and overly expensive but in reality, there are many benefits to be derived from using such systems. Let us investigate.

What is a computer?

A computer is a tool for processing **data**. Processed data is called **information**. Thus a computer is a tool that enables us to input agricultural data such as farm records or financial records and it outputs relevant information such as yield information or profits to support us in our business and daily lives.

A computer can also be viewed as an automatic electronic device, that process and stores data. Figure 1 shows the components that make up a typical personal computer (PC) or desktop system.

Figure1: A desktop computer or PC

What is a System?

A system is a set of interrelated functional parts working together for a common goal / purpose.

What is a Computer System?

Yes, because it consists of functional parts that work together to produce vital information. In simple terms we could say that it consists of only three components, *hardware*, *software* and *org-ware.* Let us look at hardware first. Below is a diagram that shows you some of the most common hardware components.

Figure 2: examples of computer equipment

Computer hardware consists of input devices, output devices and a central processing unit (CPU)

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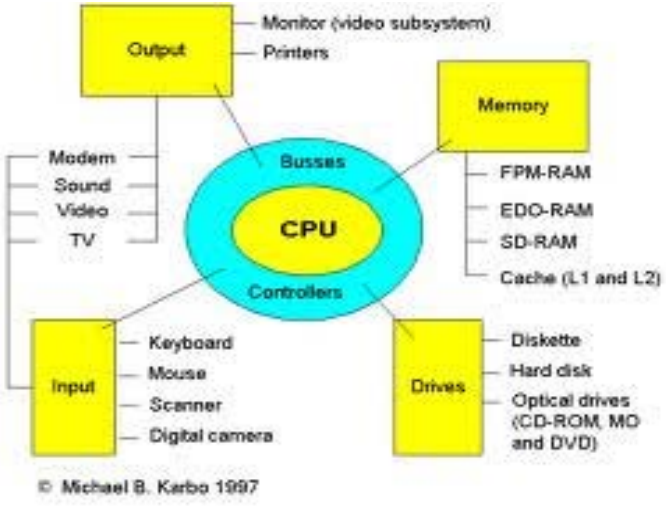

Figure 3:computer hardware devices

http://video.google.com/videoplay?docid=8914665199219621055#docid=1894217510864817533

Software Systems

These are computer programs that instruct the computer how and when to perform certain functions or achieve a desired result. The Software System consists mainly of System Software and Application Software.

Software Systems

These are the programs that control and coordinate the operations of a computer. They consist of operating systems like Windows XP, Vista or Windows 7, Linux, Apple Macintosh etc. and include utility programs like an antivirus program

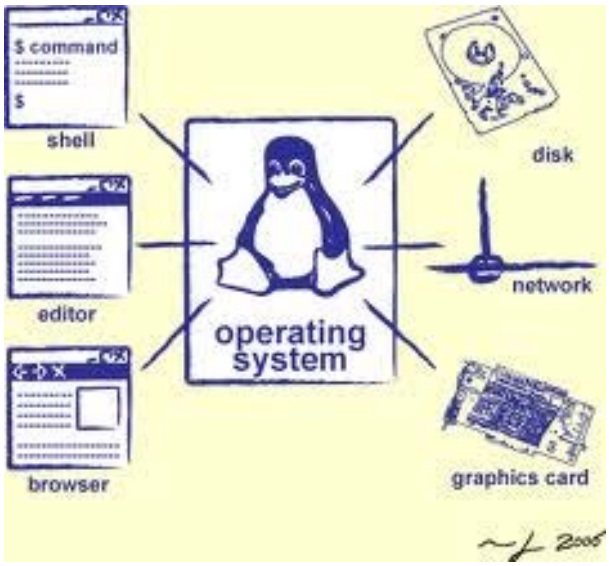

Figure 4: Illustration of how operating systems control and coordinate other computer resources

Application Software

These are programs designed to accomplish a given task. Examples include **word processors** for producing documents like letters, memos and reports, **spreadsheets** for tabulation (an automatic worksheet), and **database** programs for advanced data storage and analysis.

If you are reading this document on a computer use the blue link below to access introductory lessons on the Microsoft Windows Operating System. You will need an Internet connection:
http://www.functionx.com/windows/index.htm

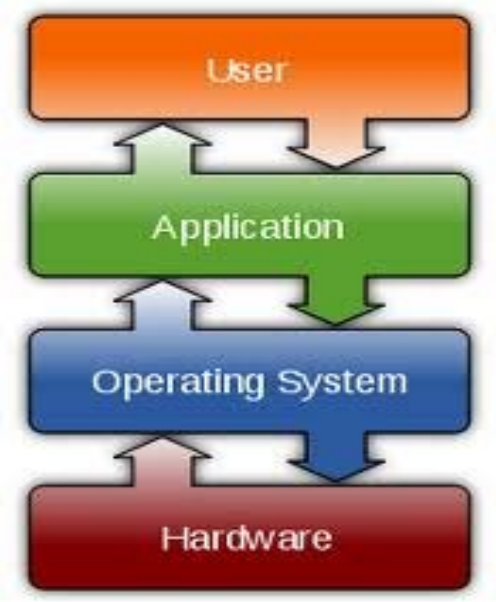

Figure 5: Diagram showing how operating system controls hardware, application programs and indirectly, users

Basic Computer Navigation (Windows OS)

Enough theory! Let us boot up a computer and navigate our way around the operating system for ourselves. You will need to have computer access for these tasks.

Activity 2

Identifying parts of a computer (5 minutes)

Take 5 minutes to identify the following computer hardware parts provided and group them according to the following categories: input devices, output devices and processing devices:

1. Keyboard
2. Monitor
3. Printer
4. Mouse
5. Speakers
6. CPU tower or case

Refer to the Feedback section at the end of this lesson for comments and answers

Activity 3

Booting (starting) the computer (2 minutes)

Find the power button and boot up your machine. Look for this symbol on the power button.

1. Switch on your computer and wait until you can see the Login screen
2. Type in your **username** and **password** accordingly

The course facilitator will provide you with these details if you do not already have yours

Activity 4

All program menu (2 minutes)

Now identify the popular application software, MS Word, a word processor program**.** Follow these steps.

1. Click Start
2. Select All Program menu
3. Select Microsoft Office
4. Identify applications under Microsoft Office

Alternatively, the course facilitator will demonstrate this procedure

Activity 5

Using paint program (8 minutes)

Now look for the drawing software program Paint. Follow these steps.

1. Click the Start Button
2. Select All Program Menu
3. Select Accessories
4. Select Paint
5. Click on Select Icon
6. Click on Pencil Icon
7. Draw a face that has an expression that reflects how you are feeling! (Hint: Excited? Apprehensive?)

Alternatively, the course facilitator will demonstrate this procedure

Activity 6

Control Panel (5 minutes)

Now open the computer's control panel. Follow these steps.

1. Click *Start*
2. Select *Control Panel*
3. Select *Hardware and Sound*
4. Create a list that identify devices installed in your computer

Alternatively, the course facilitator will demonstrate this procedure

Activity 7

Network Connectivity (3 minutes)

1. Click the double computer Icons on the extreme bottom right of task bar
2. Identify where the connection is OK (The computer is OK if the Duration numbers are changing)

Storage Devices

Storage devices store data. The computer has many types of data storage devices. Some of them can be classified as the **removable data storage devices** and the others as the **non-removable data storage devices**. Data storage devices come in many sizes and shapes. The technology used for the storage of the data can be altogether different. Storage devices are some of the most important components of the computer system.

Memory comes in two variations. P**rimary memory** is **volatile** and **secondary memory** is **non-volatile**. Volatile memory is the kind of the memory that is easily erased. Typically, this happens when the electricity is turned off. Primary memory, however, is fast. Information can be retrieved quickly so it is preferred by the processor when performing its operations. Non-volatile memory is the type where the contents cannot be so easily erased but is slower in retrieving data. It is therefore used for long term storage. So when we talk about data storage *devices* it is generally assumed to be those devices that employ secondary memory. These devices include:

Hard disk drives – This drive is large and is located inside the computer system. It is a permanent component of the computer. It is the most common type of storage device and is found in almost all computer systems.

Other types of memory include the **CD ROM** and the **DVD ROM** (sometimes referred collectively as optical drives), and **flash memory** more commonly called the **USB data card** amongst other types of specialist drives. The advantage of these memory devices is that they can be easily removed from a computer system.

Storage devices record data over their storage surface. The data may be stored in different ways according to the device. These include: optical optical data storage memory, magnetic media storage and mechanical storage media etc. Flash memory devices use yet another method. Storage devices are actually defined as the peripheral unit which holds data like the tape, disk, or flash memory card etc.

Figure 6: different types of computer storage devices

Most drives that are used for the purpose of data storage are fragile and the data can be easily corrupted. The data storage devices are also used to **backup and archive data.** The data storage devices used to be costly and expensive. But these days the data storage devices are becoming cheaper day by day. Hence the data storage devices price is falling. So, we are in a position to get a storage device quite cheaply.

The data in the storage devices can be in the form of **files, data bases, digital video** and **audio** files. Non volatile storage devices can store data permanently until erased purposely. This is true in the case of the hard disk drives or the floppy disk drives.

Other kinds of storage media, for example the **CD** and the **DVD,** can be categorized into two types of storage; firstly where data once written cannot be erased. It is stored permanently. While the second type of CDs or the DVDs are called rewritable; where the data that is written can be erased completely and the same storage device can be used again for storing the different data.

Computer Storage video:
http://www.youtube.com/watch?v=elvnhMOUvfM

Activity 8

Group Discussion (10 minutes)

Form groups of two people and discuss the following:

1. Discuss the difference between a hard disk and a removable disk. Name two types of removable disks.
2. Why is a flash disk a very popular storage device with many farmers?
3. What is the importance of backing up farm information stored in a computer?

Refer to the feedback section at the end of this lesson for comments and answers

Farm Records

Computers can be used to store farm records on all the activities taking place including employee's records. The computers can also be used to perform analysis of the farm data stored in a spreadsheet or database. Computers can be used to automate some of the processes taking place in the farm. Once the computers have been networked together, resources such as files, printers, fax, scanner, etc. can easily be shared. For example fig 7 below illustrates manual record keeping which can be improved by use of computer below:

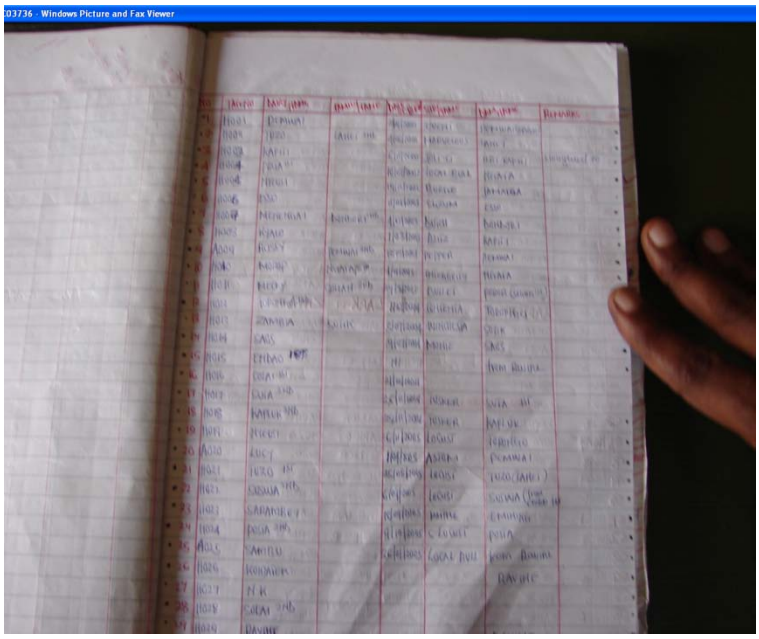

Fig 7: Manual record keeping from case in Nakuru Communication:

Communication

Computer systems can place powerful communication tools in your hands. They can be used to communicate with individuals cheaply (e-mail, VOIP telephone services such as Skype etc.) and collect information on numerous subjects (Internet). Even outside of the internet services, those computers on the network can communicate with each other via Instant Messaging. When connected to the internet, network users can communicate with people around the world via the network.

Flexible Access

Networks allow their users to access files from computers throughout the network. This means that a user can begin work on a project on one computer and finish up on another. Multiple users can also collaborate on the same project through the networks

Workgroup Computing

Different farmers can collaborate and share information via small simple networks. They can exchange information regarding best farming practice including how to market their products locally and abroad. Unlike the diagram below the farmers don't have to be in the same room but could link their machines over a certain distance

Activity 9

Discussion (4 minutes)

Form groups of 4 people and discuss the following:

1. Discuss the importance of farmers using computers to share information.
2. If a farm has only three computers located in different offices, is it important to network the computers?
3. What benefits can farmers gain when they collaborate with each other using modern technology?
4. List the advantages of creating a website for a farm.

Refer to the feedback section at the end of this lesson for comments and answers

Activity 10

Group Discussion (4 minutes)

Access the case study of Henry at Winsor Farm, Nakuru. You can access the video off the course CD ROM located at *Resource Index* | *Module 4* | *Lesson 1* | *Case Study* and then discuss with the group the following:

- List the various information sharing activities used in the above case study
- How has technology assisted the farm in the information gathering and sharing?

Refer to the feedback section at the end of this lesson for comments and answers

Conclusion

We have seen from this lesson that farmers can derive benefit from using computers in their daily business. The case study demonstrated a number of possible opportunities. Also in this lesson we switched on the computer which for some of us was the first time! A simple orientation to the computer components and user interface followed. In the next lesson we will start putting the computer to use by investigating ways to use it to store farm records using a spread sheet program.

Summary

In this lesson we covered these items:

Computer systems are divided into **hardware** and **software**.

Hardware includes the items you can touch (monitor, CD ROM Drive, mouse etc.) while software includes the programs that run on the system (e.g. Paint). Hardware is used either for **input** of data (e.g. keyboard), **output** of information (e.g. printer), **processing** of data (e.g. processor) or **storage** of data (e.g. hard drive).

Software includes **system** programs (e.g. operating system, such as Windows, that coordinates the computer) and **application** programs (that do specific tasks, such as Ms Word that is a word Processor).

You also learnt that an important component of the system is the various **storage devices**. (e.g. CD ROM or flash drives)

Also, don't forget your **username** and **password** which you need to **login** as well as the brief exploration of the Windows environment. You will need these skills and knowledge in Lesson 2.

We finished off by having a look at the importance of using and sharing ICT tools in farming activities either for the keeping of records, communication or retrieving information.

Glossary

ICT : ICT (information and communications technology - or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as video conferencing and distance learning.

Computer network: A computer network is a system in which computers are connected to share information and resources. The connection can be done as peer-to-peer or client/server.

Enrichment

Introduction to Computers Lessons: http://www.fayette.k12.il.us/99/Intro2Comp/introduction_to_computers.html (Accessed on 9th December, 2010)

Microsoft International: Parts of Computers; http://windows.microsoft.com/en-US/windows-vista/Parts-of-a-computer (Accessed on 9th December 2010)

Microsoft International: windows tutorials; http://www.functionx.com/windows/index.htm (Accessed 9th December 2010)

Storage Devices; http://www.google.com/images?hl=en&q=computer+storage+device&psj=1&um=1&ie=UTF-8&source=univ&ei=UbfXTNa-BI-RjAfH5PTbCQ&sa=X&oi=image_result_group&ct=title&resnum=3&ved=0CDQQsAQwAg&biw=1432&bih=674 (Accessed on 9th December 2010)

http://www.youtube.com/watch?v=elvnhMOUvfM

David Hest and Karen McMahon; "The Wireless Farm", http://farmindustrynews.com/wireless-farm (Accessed on 9th December 2010)

Video on Introduction to computers: http://video.google.com/videoplay?docid=8914665199219621055#docid=1894217510864817533(Accessed on 9th December 2010)

Feedback

Feedback Activity 2

1. Keyboard (input)
2. Monitor (output)
3. Printer (output)
4. Mouse (input)
5. Speakers Output)
6. CPU tower or case (Processing)

Feedback Activity 8

1. Hard disks are permanently fixed in the computer whereas removable disks are not permanently fixed in the computer. Two types of removable disks are flash-disk and floppy disk
2. Flash disk is a very popular storage device because it is small portable and can hold a lot of data.
3. Computers can malfunction hence the need to backup data. In the event that computers malfunction, we can use the backup data to restore the data

Feedback Activity 9

1. Computers can help farmers exchange information, share ideas, speed up decision making, etc
2. No, the cost of networking outweighs the benefits that can be gained. Farmers should be encouraged to build websites and then use Broad-Band Modems to access internet and websites.
   - Advantages of creating websites for a farm are
   - **A website provides your company history.**
   - **A website can be viewed at leisure.**
   - **A website advertises 24/7, 365.**
   - **A website can showcase your products.**
   - **A website can cross geographical boundaries.**
   - **A website can attract new suppliers.**
   - **Add related help articles to your website.**

Feedback Activity 10

1. Use ICT to Establish agriculture related knowledge network & knowledge delivery mechanism.
   Use ICT to foster Knowledge Sharing
2. Use ICT to enhance agricultural production
3. Use ICT to improve market access
4. Use ICT to access relevant agricultural information
5. Use ICT to access timely information in different formats
6. Use mobile to communicate with other farmers
7. Use mobile to disseminate marketing related information
8. Use mobile to monitor progress of the farming activities

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MODULE 4: **ICT in Support of Farming**

LESSON 2: **Record Keeping**

TIME: **1 hour 36 minutes**

AUTHOR: **Andrew Moore**

This lesson was made possible with the assistance of the following organisations:

LESSON 2 RECORD KEEPING

TIME:

1 hour 36 minutes

AUTHOR:

Andrew Moore

OUTCOMES:

By the completion of this lesson participants will:

- Appreciate why keeping farm records is essential.
- Be familiar with how the *Enterprise Record Keeping System* is organised and why it is beneficial for farmers.
- Be able to set up a simple spread sheet program (MS Excel) to start collecting farm data.

INTRODUCTION:

We all keep records of some type. If for no other reason, farmers want to track the amounts of a crop harvested or sold. In this lesson we want to encourage you to keep more comprehensive records so that you can use them to gain insight into the well-being, possible future growth and direction your farming 'enterprise' could take.

Records can be used as *decision-aids.* Records can supply you with data needed to make informed decisions about future machinery purchases, profitability of certain crops and changes in market trends. Also, as you begin to grow from a farm to a firm you will need records to support your application for bank loans, tax references and other institutional requirements.

In this lesson we will also begin to show you how to keep a simple set of records using a spread sheet program that takes a lot of the complicated 'Maths' out of compiling statistical data.

Production and Financial Record Keeping

There are at least two types of records that farmers should keep, production and financial, each has its own distinct purpose.

Production records track the yield of a particular crop or produce, or perhaps the number of calves born (with weaning weights) versus the number of deaths in a herd.

Financial records, as the name suggests, track money. Usually, a farmer would record *Income* (such as product sales) against *expenditure* (operating costs, equipment and feed purchases etc.). The more sophisticated your farm, the more likely it will be necessary to also track financial items such as inventory, depreciation records, loan balances etc.

So what is the best way to record and track all this data? There is no one way to do this and your context will determine which method is most suitable. Whatever method you choose, it must be *accurate* and be in a format that allows you to *analyse* the data in order to make decisions. Below is a comparison of two common systems used:

Hand (with calculator & journal)	**Computer (spread sheet/accounting program)**
Low initial cost to implement	High initial cost to implement
Easy to learn	Requires time and effort to learn
Is labour intensive (time consuming)	Fast
Many opportunities to make mistakes	Accurate
Limited ability to use data for analysis	Powerful analysis tool

Of course as this lesson is part of the ICT module we are going to advise that you use a digital system so that you can exploit the processing power of a computer to help you record and analyse your data! Ultimately, however, you need to choose what is best for you.

Activity 1

Record systems (10 minutes)

Do you remember the Windsor Farm Case study previewed earlier? (Review the last 45 seconds of the case study on the record system favoured by Windsor). Note that in the case study the narrator is critical of the record system used at Windsor farms.

Access the video case study from the course CD ROM:
See *Resource Index* | *Module 4* | *Lesson 2* | *Case Study*

Questions:
(In your journal record the answers to these questions)

1. What system did the management of Windsor farms use to record production records? Describe their record keeping system.
2. What, according to the narrator, was inadequate about their system? See if you can identify a specific problem.
3. How, in your opinion, might the farm management overcome this problem?
4. What system do you currently employ and have you identified any inadequacies in your system. How might it be improved?

See the Feedback section at the end of this lesson to see a model answer or comments about this activity

ENTERPRISE RECORD KEEPING

Once you have chosen a record system you will first need to record the data accurately before any analysis can take place. So how should you capture the data? There are numerous ways and there are a number of accounting programs written for computer systems you might want to investigate but for this lesson we will explore a simple solution for a farmer who has a number of operations running simultaneously on his farm: *Enterprise Record Keeping*. Study Table 1 below:

	Income			**Expense**			**Enterprise**			
Date / Description	Calves	Cull Cows	Maize	Feed	Supplies	Fuel	*Cattle*		*Maize*	
							Income	Expense	Income	Expense
12/06/2011 Sold 10 calves @ 50kg/nd	322,000						322,000			
+13/06/2011 Purchased additional feed (1 ton)				38,237				38,237		
22/06/2011 Sold 2 Cows at 1050 lbs./hd		100,624					100,624			
25/06/2011 Hardware supplies (Fencing materials)					13,282			10,282		3,000
26/06/2011 Diesel (x litres)						112, 100		60,000		52,000
28/06/2011 Sold 2000 bu of maize			370,299						370,299	
Total	322,000	100.624	370,299	38,237	13,282	112,100	422,624	108, 519	370,299	55,000
								314,105		**315,299**

The enterprise columns allow you to split income and expenditure across different farming activities. In the example above these activities include rearing cattle and growing maize. The advantage of this approach is that besides tracking cash flow, you can also see how profitable various activities are in relation to each other.

Activity 2

Group work (20 minutes)

Gather into groups of four and discuss how each member tracks income and expenditure. How is the Enterprise example above different or similar? See if any of your group has ways to improve on the simple Enterprise Record Keeping System described above. Record the group's ideas.

See the Feedback section at the end of this lesson to see a model answer or comments about this activity

Using ICT to Help you Track Expenditure

Ok, before we go any further let's look at one way that a computer loaded with a spread sheet program can help you store your records and use the data to analyse the financial well-being of your 'farm firm'. For this lesson, we will be using a popular spread sheet program called MS Excel. We will also be using a number of small videos to guide you in setting up the program to support your record keeping. The course facilitator will guide you through these steps

Activity 3a

Access the spread sheet program (4 minutes)

If you are reading these notes from the Course CD ROM then the computer is already on! Your first task then is to locate the spread sheet program called Excel. To do this follow the instructions described in this video clip. If you get stuck call the facilitator over to help you.

Access the video case study from the course CD ROM: See *Resource Index* | *Module 4* | *Lesson 2* | *Excel: Getting started*

Activity 3b

Access the spread sheet program (4 minutes)

Right, the programme is open in front of you! But how does it work? Watch this orientation video that describes how the spread sheet grid is organised. Pay attention to the explanation about columns, rows and grid references. Also note the differences between labels and values.

Access the video case study from the course CD ROM: See *Resource Index* | *Module 4* | *Lesson 2* | *Excel: Orientation*

Activity 3c

Layout typical “enterprise Worksheet (30 minutes)

As before, follow the explanation in the video. This time, however, we want you to follow the video instructions and create the Enterprise record keeping grid using the Excel program installed on the computer you are using. You can play, stop and rewind the video as you need as it will take a while to create the grid. Also, if you get frustrated remember to call the facilitator over to help you.

Access the video case study from the course CD ROM: See *Resource Index* | *Module 4* | *Lesson 2* | *Excel: Enterprise Worksheet*

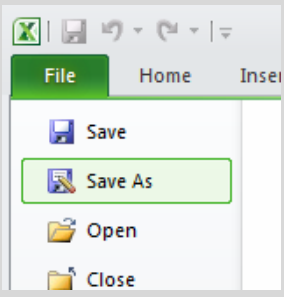
Activity 3d

Save your Grid (5 minutes)

So far, we have done a lot of preparatory work and have yet to see the power of the computer at work. That comes in the next lesson where we will create totals and work out averages. We will, however, need the grid again so it is now time to save your work. Follow these steps.

1. Select the green ‘File’ tab from the top left hand side of the Excel program.
2. Select ‘Save As’. (See Fig 1)
3. In the window that opens look for the ‘File name’ field towards the bottom of the window and replace the text ‘Book1’ with this text, *AndrewEnterpriseGrid* (use your name not mine).
4. Click on the ‘Save’ button located in the bottom right hand side of the window.

Great! It’s done. You have saved your spread sheet.



Conclusion

Let us take stock of progress. We have discussed the importance of having a record keeping system and compared the different versions which each of us use. We looked at one system, the Enterprise Record keeping system, which can exist in either a hand or computer based format. To investigate computer based systems we have started to build an 'Enterprise' spread sheet grid and in the next lesson we will populate our spread sheet with records and analyse the data.

Summary

The main points of this lesson you need to be familiar with before you continue include:

- It is necessary to have a record keeping system so that a farmer can track both production and financial activities.
- Any record system needs to be *accurate* if it is to support a farmer in tracking and analysing his data.
- The Enterprise Record Keeping system can be kept in either a hand or computer based formats. A computer format is useful because it allows a farmer to organise expenditure and income against various agricultural activities.
- In terms of computer systems there are many commercial accounting packages but a popular, simple tool used to keep records is a spread sheet program. An example of a spread sheet program is MS Excel.

Enrichment Resources

Information about software accounting packages

- Intuit QuickBooks: www.quickbooks.com
- Pastel Accounting: www.pastel.com
- TurboCASH (Free): www.turbocash.net

Information about spread sheet programs

- Wikipedia's Comparison of Spread sheet programs: http://en.wikipedia.org/wiki/Comparison_of_spreadsheet_software
- Open Office's Calc (Free): http://www.openoffice.org/product/calc.html

Glossary

Specialist words with definitions:
Enterprise Accounting: Enterprise accounting requires that income and expense information be assigned to the farm enterprise that generated that income or expense. “Enterprise,” refers to the different kinds of farm production.

Expenses: In common usage, an expense or expenditure is an outflow of money to another person or group to pay for an item or service, or for a category of costs. For a tenant, rent is an expense. For students or parents, tuition is an expense. Buying food, clothing, furniture or an automobile is often referred to as an expense. An expense is a cost that is "paid" or "remitted", usually in exchange for something of value. (Wikipedia: http://en.wikipedia.org/wiki/Expenses). Expenses include direct production expenses, fixed or overhead expenses, capital expenditures and personal and family living expenses. Basically, expenses refer to any and all money spent. (Gerloff)

Income: The consumption and savings opportunity gained by an entity within a specified time frame, which is generally expressed in monetary terms. However, for households and individuals, "income is the sum of all the wages, salaries, profits, interests payments, rents and other forms of earnings received... in a given period of time." For firms, income generally refers to net-profit: what remains of revenue after expenses have been subtracted (Wikipedia: http://en.wikipedia.org/wiki/Income) Income is money received for selling product or service(s). It includes sales of purchased, breeding or raised livestock. It also includes sales of crops, government program proceeds and proceeds from cost-share projects. Custom work by the farm owner and family members would also be included as income. In short, all income that is generated by the farm or farm family is included as income. (Gerloff)

Spread Sheet: A spread sheet is a computer application that simulates a paper, accounting worksheet. It displays multiple cells that together make up a grid consisting of rows and columns, each cell containing alphanumeric text, numeric values or formulas. A formula defines how the content of that cell is to be calculated from the contents of any other cell (or combination of cells) each time any cell is updated. Spread sheets are frequently used for financial information because of their ability to re-calculate the entire sheet automatically after a change to a single cell is made. (Wikipedia: http://en.wikipedia.org/wiki/Spreadsheet)

References

1. Network for Sustainable Agriculture. (2004). Record Keeping. Available online: http://www.aglearn.net/resources/introIPM/recordKeeping.pdf Accessed: 09/02/2011.
2. Gerloff, D.C et al. (2006). Establishing and Using a Farm Financial Record Keeping System. University of Tennessee Agricultural Extension Office. Available online: www.nou.edu.ng/noun/NOUN_OCL/pdf/pdf2/AEM%20306.pdf Accessed 09/02/2011.
3. Wikipedia. (2011). Expense. Available online: http://en.wikipedia.org/wiki/Expenses Accessed 09/02/11 (CC: BY SA)
4. Wikipedia. (2011). Income. Available online: http://en.wikipedia.org/wiki/Income Accessed 09/02/11 (CC: BY SA)
5. Wikipedia. (2011).Spreadsheet. Available online: http://en.wikipedia.org/wiki/Spreadsheet Accessed 09/02/11 (CC: BY SA)

Feedback

Feedback Activity 1

1. They used a system whereby entries were kept in a hand written journal.
2. The narrator mentioned that it was difficult to create copies of the records which were needed by various 3rd party stakeholders.
3. Keeping records digitally (on a computer) would allow for multiple copies to be generated at any time, for example at the end of each month, if a printer was installed with the computer.

Feedback Activity 2

There is no correct answer here. Everyone will have a different system yet what is important is to see what the strengths of each system are and to determine if you could incorporate these strengths into your system.

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MODULE 4: **ICT in Support of Farming**

LESSON 3: **Record Keeping II**

TIME: **1 hour 36 minutes**

AUTHOR: **Andrew Moore**

This lesson was made possible with the assistance of the following organisations:

LESSON 3 RECORD KEEPING II

TIME:

1 hour 36 minutes

AUTHOR:

Andrew Moore

OUTCOMES:

By the completion of this lesson you will:

- Be aware of what farming activities could be considered ‘Enterprises’ and should be incorporated into an Enterprise Accounting spread sheet.
- Use functions to calculate totals and averages within the spread sheet program.
- Create a customised formula using a spread sheet program.
- Have customised the Enterprise Accounting template to better reflect actual farming enterprises.

INTRODUCTION:

This lesson continues on from Lesson 2 with an investigation into ways ICT can support farmers with record keeping. In the previous lesson we showed you the Enterprise Accounting system and also introduced you to a spread sheet program called Excel. The intention of this lesson is to spend more time working with Excel so that you can evaluate whether spread sheets add value to your farming operations.

ENTERPRISE ACCOUNTING USING A SPREAD SHEET

In the previous lesson we introduced Enterprise Accounting but did not spend much time considering what exactly an enterprise was. We used maize production and cattle rearing as two examples of an enterprise. A farming enterprise, however, can be any activity identified according to receipts and expenses. Castle and Becker (1987) have defined three classifications:

1. *Production Enterprises*. Typically, activities that produce marketable commodities and include crops such as plantain, cassava, coffee, tea, maize etc. It would also include livestock of any description; chickens, cattle, goats etc.
2. *Service Enterprises*. Perhaps you have not considered machinery and equipment services or your own on-farm shop? These also constitute an enterprise and should be tracked.
3. *Holding Enterprise*. Elsewhere in this course, you have been encouraged to think about storing your produce to capitalise on times of shortage when prices are higher. The activity of storing and protecting your produce is in itself an enterprise with its own expenses.

So you can see that the spread sheet grid we developed previously, which has only two enterprises, might be inadequate for your own operations.

Activity 1

Farming Enterprises at Windsor and at Home (15 minutes)

Watch the Windsor Farm Case study again. This time identify the enterprises that are currently running at the farm according to the video. If they were to use the Enterprise Accounting systems how many enterprise columns would they need?

Access the video case study from the course CD ROM:
See *Resource Index* | *Module 4* | *Lesson 3* | *Case Study*

Questions:
(In your journal record the answers to these questions)

1. List the activities at Windsor that could be considered farming enterprises.
2. Next to each item in your list categorise it according to 'Production', 'Services' and 'Holding'.
3. Now consider your own farming operations and see if you can create a similar list.
4. Categorise your list using the same enterprise descriptions.

See the Feedback section at the end of this lesson to see a model answer or comments about this activity

Additional Spread Sheet Skills

Let us use enterprise categorisation to fine tune our spread sheet skills. In lesson 2 we asked you to create and save an empty Enterprise Accounting spread sheet. Retrieve this file.

Activity 2

Retrieving a spread sheet file (4 minutes)

Watch the video clip that shows you how to retrieve files. Otherwise, follow the instructions below. A word of warning, you need to be sitting at the same computer on which you created the spread sheet as you were instructed to save it on the local drive.

Access the video demonstration from the course CD ROM: See *Resource Index* | *Module 4* | *Lesson 3* | *Excel: Retrieving Files*

Steps:

1. Click on the 'Start' button in the bottom left hand corner of the screen.
2. Select 'All Programs' from the menu
3. Scroll down the new menu until you identify the Microsoft Office folder. Click it to reveal the sub menu items.
4. Click 'Microsoft Excel 2010'. The spread sheet program should open with a blank sheet.
5. Now click on the green 'File' tab and select 'Open'.
6. Look for the file called, *YourNameEnterpriseGrid,* and double click it. The program should open your file.

You should have a grid that looks like this:

	Income			Expense			Enterprise			
Date / Description	Calves	Cull Cows	Maize	Feed	Supplies	Fuel	*Cattle*		*Maize*	
							Income	Expense	Income	Expense
Total										

Fig 1: Empty Grid

Activity 3

Inserting data and new columns (15 minutes)

This worksheet, (a spreadsheet is made up many worksheets), has two enterprises; Cattle and Maize. Edit the worksheet so that the enterprise column reflects activities on your farm. Also add in new enterprises identified in activity 1. Then load data into the other fields (cells) in the worksheet. To guide you in completing these tasks watch the video on, 'Inserting Data and New Columns'.

Access the video demonstration from the course CD ROM: See *Resource Index* | *Module 4* | *Lesson 3* | *Excel: Inserting Data*

Sum and Average Functions

It is time to get the spread sheet program to show off its power. Up until now, we the users have done all the work! We are going to get the program to add a column of figures and also show you how to get the machine to painlessly calculate averages.

Functions are ready made formulas that have a particular… function! Click the' Formula' menu tab at the top of the screen and you will see the program has an AutoSum button. Click the ˇsection of this button to reveal other functions that are regularly used. They include Sum, Average, Count Numbers, Max and Min.

Access the video case study from the course CD ROM:
See *Resource Index* | *Module 4* | *Lesson 3* | *Excel: Sum Function*

Activity 4

Sum (15 minutes)

To find the sum (total) of a column of figures there are two popular ways to do this. The easiest is to select the column of figures and include a blank cell where you want the answer to appear and then click the *Σ Auto Sum* button. The second way is to construct the sum formula in the cell where the answer should appear.

For example type *=SUM(A2:A10).*

Watch the video, 'Sum', to see how to do this and then add up all the columns in your worksheet. Your answers should appear in the pink cells entitled 'Total' at the foot of each column.

Activity 5

Average (10 minutes)

Watch the video, ‘Average’, to see how to command the computer to calculate the average of rows, columns or selected cells.

The average formula that needs to be inserted in the answer cell looks something like this; *=AVERAGE(A2:A10).*

Although not strictly required for Enterprise Accounting, calculate the average expenditure on ‘Supplies’.

Access the video case study from the course CD ROM:
See *Resource Index* | *Module 4* | *Lesson 3* | *Excel: Average Function*

Create a Formula

While functions are very handy the developers of this program cannot anticipate everything you might want to do. They therefore expect you to be able to develop your own formulas as and when you need them. As long as you are aware of the available formula operators this is simpler to do than it sounds. Here are the principal operators:

Operator Symbol	Description	Example of Use
=	means what follows is a formula	**=**AVERAGE(A2:A10)
+	ADD values in certain cells.	=(A2)**+**(A13)
-	SUBTRACT values in certain cells.	=(B3)**-**(C3)
/	DIVIDE values in certain cells.	=(C7)***/***(B2)
*****	MULTIPLY values in certain cells	=(C7)*****(A3)

Table 1: Spread Sheet Operators

In the cell where you want the answer to appear construct your formula starting with an = symbol. Your formula can be quite sophisticated including a number of operators in one formula. If you do mix your operators, you need to use 'BODMAS' to ensure your calculation is accurate:

B Brackets first,
O Orders (Powers or Square Roots),
DM Division and Multiplication (working from left to right),
AS Addition and Subtraction (working from left to right).

An example of a formula mixing operators:

=(A2)*((B2)+(C2))

Here it is necessary to add the values in B2 and C2 before multiplying the sum by the value in A2. If you write the formula including the brackets the computer will calculate the answer correctly, otherwise it will simply work from left to right multiplying A2 and B2 first before adding C2 to the product. This would give you a very different answer.

Activity 6

Create a formula (15 minutes)

Let's see if you can devise the correct formula to work out the difference between Income and Expense in the Enterprise columns of the worksheet. In the pink row below the 'Totals' row and in the Enterprise Cattle column, insert a formula that works out the difference between Income and Expense. This is important because it will indicate to what extent the enterprise has been profitable. In the example table we inserted the formula twice, once for Cattle and again for Maize. Copy the formula into as many Enterprise columns as you have created to find their profitability.

Conclusion

Excel spread sheets get easier the more you use them and to be honest we have only scratched the surface. There is so much more you can do with them. We would recommend you spend some more time on the Internet looking at some of the online tutorials that will show you how to really exploit their power. These tutorials are listed in the Enrichment Resources section below. This lesson also showed a simple way to assess profitability of various farming activities. Think about what this data is telling you about which activities are adding value and which ones should be dropped.

Summary

The main points of this lesson are:

Record Keeping

- A farming enterprise is any activity that generates receipts and expenses.
- Farming 'enterprises' can be categorised as either Production, Service or Holding enterprises.

Spread Sheets

- It is important that Excel users are familiar with cell references, inputting of data and can adapt cell widths and formatting.
- Popular functions include: SUM and AVERAGE as well as COUNT, MAX and MIN.
- Formulas are used when no function is appropriate.
- Formulas are created using operators and cell references. Operators include:
  = (formula),
  + (ADD),
  - (SUBTRACT),
  / (DIVIDE) and
  * (MULTIPLY)

Enrichment Resources

A] Excel Video Tutorials

- About - The Auto Sum Function: http://video.about.com/spreadsheets/Autosum.htm
- About - How to Make Charts in Excel: http://video.about.com/spreadsheets/Charts-in-Excel.htm
- About - How to Sort Information: http://video.about.com/spreadsheets/Sorting.htm
- Baycon - Basic Excel 2007 Tutorial: http://www.baycongroup.com/excel2007/01_excel.htm
- Excel Internet Library: http://www.businessbookmall.com/microsoft_excel_directions_for_beginners.htm
- Microsoft - Excel Tutorials for versions 2003, 2007 and 2010: http://office.microsoft.com/en-gb/excel-help/
- Barak Sofer – Microsoft Excel Training: http://www.free-training-tutorial.com/

B] More on Enterprise Accounting

- Frank, G. (1997). *Enterprise Accounting*. Available online: http://cdp.wisc.edu/Resources/crop/general/enteracc.pdf Accessed: 02/12/2010
- Free Enterprise Accounting Software: BS1 Enterprise Accounting (2009): http://download.cnet.com/BS1-Enterprise-Accounting-Free-Edition/3000-2067_4-10657637.html

Glossary

Specialist words with definitions:

Enterprise Accounting: Enterprise accounting requires that income and expense information be assigned to the farm enterprise that generated that income or expense.

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Income: **T**he consumption and savings opportunity gained by an entity within a specified time frame, which is generally expressed in monetary terms. However, for households and individuals, "income is the sum of all the wages, salaries, profits, interests payments, rents and other forms of earnings received... in a given period of time." For firms, income generally refers to net-profit: what remains of revenue after expenses have been subtracted (Wikipedia: http://en.wikipedia.org/wiki/Income)

Spread Sheet: A spread sheet is a computer application that simulates a paper, accounting worksheet. It displays multiple cells that together make up a grid consisting of rows and columns, each cell containing alphanumeric text, numeric values or formulas. A formula defines how the content of that cell is to be calculated from the contents of any other cell (or combination of cells) each time any cell is updated. Spread sheets are frequently used for financial information because of their ability to re-calculate the entire sheet automatically after a change to a single cell is made. (Wikipedia: http://en.wikipedia.org/wiki/Spreadsheet)

Work Sheet: A worksheet is a single page or sheet in an Excel spread sheet. By default, there are three worksheets per file. Switching between worksheets is done by clicking on the sheet tab at the bottom of the screen.
(About.com: http://spreadsheets.about.com/od/uvw/g/worksheet_def.htm)

Glossary (continued...)

Operators: A mathematical operator is the symbol or sign that represents an arithmetic operation in an Excel spreadsheet formula. The mathematical operators used in Excel formulas are similar to the ones we use in math class: Subtraction - minus sign (-), Addition - plus sign (+), Division - forward slash (/), Multiplication - asterisk (*), Exponentiation - caret (^).
(About.com: http://spreadsheets.about.com/od/glossary/g/math_operator.htm)

BODMAS: In mathematics and computer programming, the order of operations (more formally precedence rule) is a rule used to unambiguously clarify which procedures should be performed first in a given mathematical expression. For example, in mathematics and most computer languages multiplication is done first; in the expression 2 + 3 × 4, the correct answer is 14. Parentheses, which have their own rules, may be used to avoid confusion, thus the above expression may also be rendered 2 + (3 × 4).
(Wikipedia: http://en.wikipedia.org/wiki/BODMAS)

References

1. Carkner, RW. (2000). *Farm Business Records*. Cooperative Extension Washington State University. Available online: http://cru.cahe.wsu.edu/CEPublications/eb1904/eb1904.pdf Accessed 02/12/2010.
2. Castle, Becker & Nelson. (1987). *Farm Business Management: The Decision Making Process*. 3rd Edition. MacMillan.

Feedback

Feedback Activity 1

1. Pigs, Cattle, Chickens, Slaughtering, Feed Creation were mentioned. We did not hear about refrigeration or packaging which might happen if they have to supply merchandise to various restaurant chains in Nairobi. These activities could also be considered separate enterprises.
2. Possible categorization:
    a. Pigs (Production)
    b. Cattle (Production)
    c. Chickens (Production)
    d. Slaughtering (Services)
    e. Creation of Nutritious Feed (Services)

Feedback Activity 6

The formula required is a simple subtraction. For our sample worksheet the formula was =(H10)/(I10) or Total Cattle Income subtract Total Cattle Expenses. A positive answer indicates a profit while a negative answer shows a loss.

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MODULE 4: **ICT in Support of Farming**

LESSON 4: **Seeking and Retrieval of Information**

TIME: **1 hour 36 minutes**

AUTHOR: **Walter Wanyama / Dalton Ndirangu**

This lesson was made possible with the assistance of the following organisations:

LESSON 4 SEEKING AND RETRIEVAL OF INFORMATION

TIME:

1 hour 36 minutes

AUTHOR:

Walter Wanyama / Dalton Ndirangu

OUTCOMES:

At the end of this module, the participants will be able to:

- Understand the technique of searching information using internet and mobile devices.
- Appreciate the importance of agribusiness call centres.
- Understand important aspects of information seeking behavior.
- Understand how people interact with information professionals and information systems when seeking information.

INTRODUCTION:

This module is an introduction to the theory and practice of information seeking and retrieval. Emphasis is placed on the roles played by information professionals to assist navigation of the user-system interface, including question negotiation, the formulation of effective search strategies for information retrieval, and the evaluation of information sources and services.

This course supports the four themes: ***research, reflection, learning,*** and ***leading***. The ultimate goal is to produce leaders who work together to improve service and learning among diverse populations in farmer organizations.

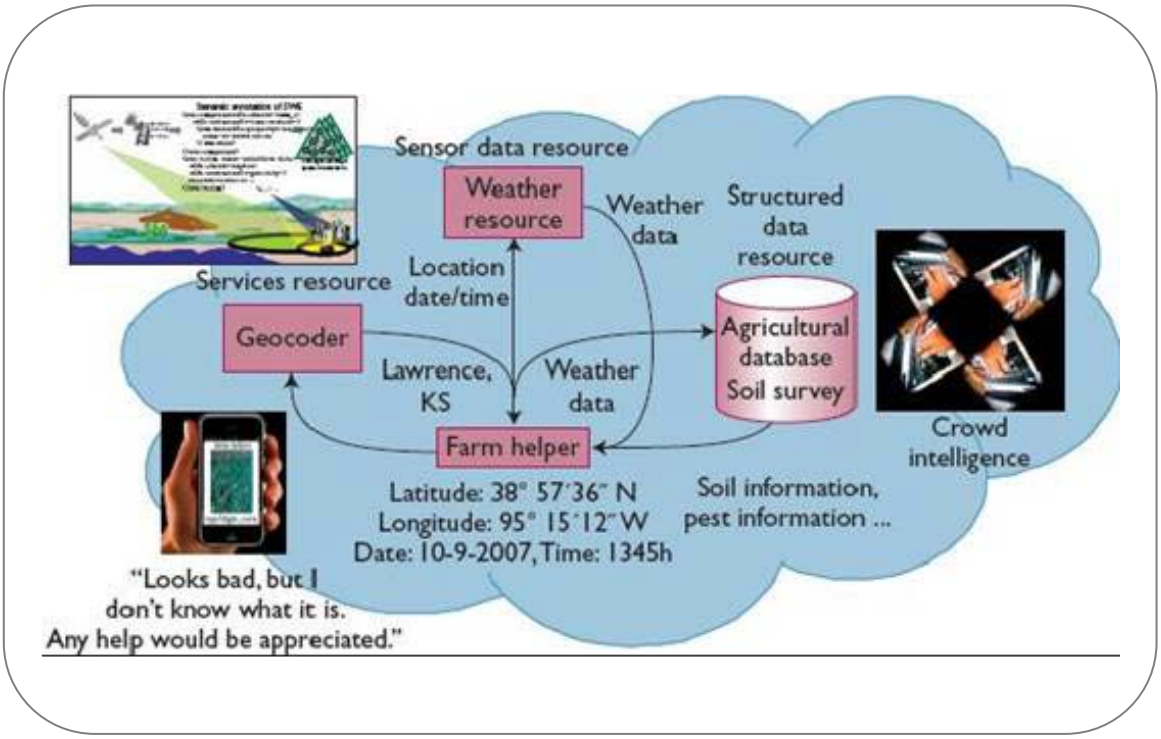
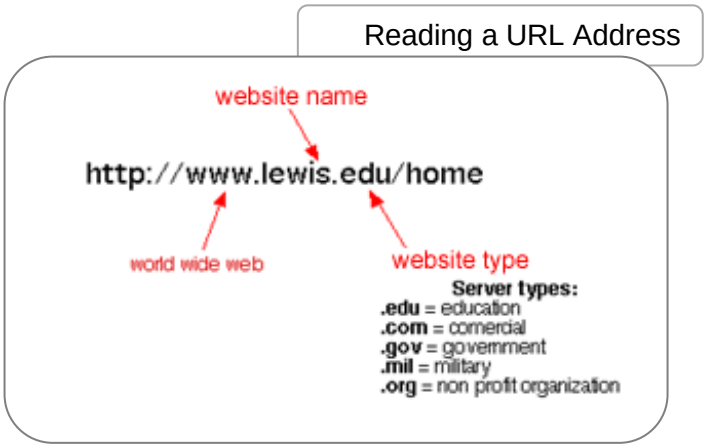


Figure 1: Farmers retrieving information seeking and retrieval on several storage devices.

Figure 1 above illustrates that more and more information is collected from several sources for utilization by the farmers during agricultural activities. Such information could be: to find out about the weather patterns for the next several weeks through the metrological department in Kenya; soil types in a particular location; retrieving pictures of vegetation through the mobile devices, for example, Google maps; pest information and more information from other sources.

Internet Search Techniques

1. What is the internet? The Internet is a global system of interconnected computer networks. The Internet includes communication capabilities and many high level applications. For example, the Internet includes the World Wide Web, your e-mail clients, list servers, and many other services. The existing connectivity of the Internet makes it possible for users and servers all over the world to participate in various activities. Below is an example of a typical World Wide Web address or Universal Resource Locator, URL:-



2. Internet search tools and techniques

Search Tools

What is a search engine: A **web search engine** is designed to search for information on the World Wide Web; below are examples of six different search engines each with different search strategies and services.

Google www.google.com

Currently the most well-known search engine. It has risen to prominence because it ranks sites according to popularity. It uses the number of links to a site to determine how important the site is relative to others and places these linked to sites high up in the returned search results. Google also has specialised searches for blogs, images, news, scholarly journals, patents and books. Its interface is also extremely simple and easy to use.

Yahoo www.google.com

This is the 'grandpa' of search engines and has over the years built up a loyal community around it. The search facility appears at the top of the page and a portal filled with numerous services and content appears on the same page. Noteworthy features include shortcuts to dictionary, synonyms, patents, traffic, stocks, and an encyclopaedia.

Ask www.yahoo.com

Ask uses a system called Subject-Specific Popularity™ ranking that allows you to suggest a broader or narrower search thereby filtering your search results. It too has an encyclopaedia that is very useful.

MSN Search www.ask.com

This is a popular search facility for those people who use the Microsoft Network portal, MSN. In the USA, MSN search accounts for about 10% of all Internet searches.

Monster Crawler http://www.msn.com/

Monster Crawler is an example of a meta-search engine that coordinates searches using all of the top 5 US search engines: Google, Yahoo, MSN, Ask and AOL. While it might make sense that more heads are better than one there are some academics that believe that the results returned by meta-search engines are no better than those sites using one system. Try it out and see for yourself.

Note: For more example visit the following URL Link http://www.internettutorials.net/engines.asp

Search Techniques

Whenever you receive important information about which you are uncertain, there are several ways you can try to verify what you've received. Here are a few key techniques you can use to verify information and find the best sources:

- Pick out key words that identify the topic you are searching for. For example in figure 3 below the keywords are “What is a e-marketplace”.
- Type them into the search field within a search engine. Below in figure 3 this has been done in Google.

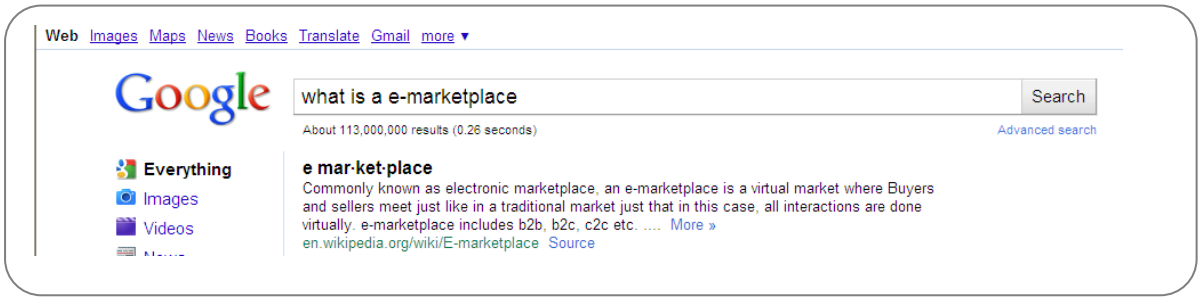


Figure 3: Search Field in Google

On the results list, scan the URLs written in green at the bottom of each search result entry:

- Look for the most reliable source listed.
- Use different search engines such as Google and Yahoo, or any other, as results often differ.

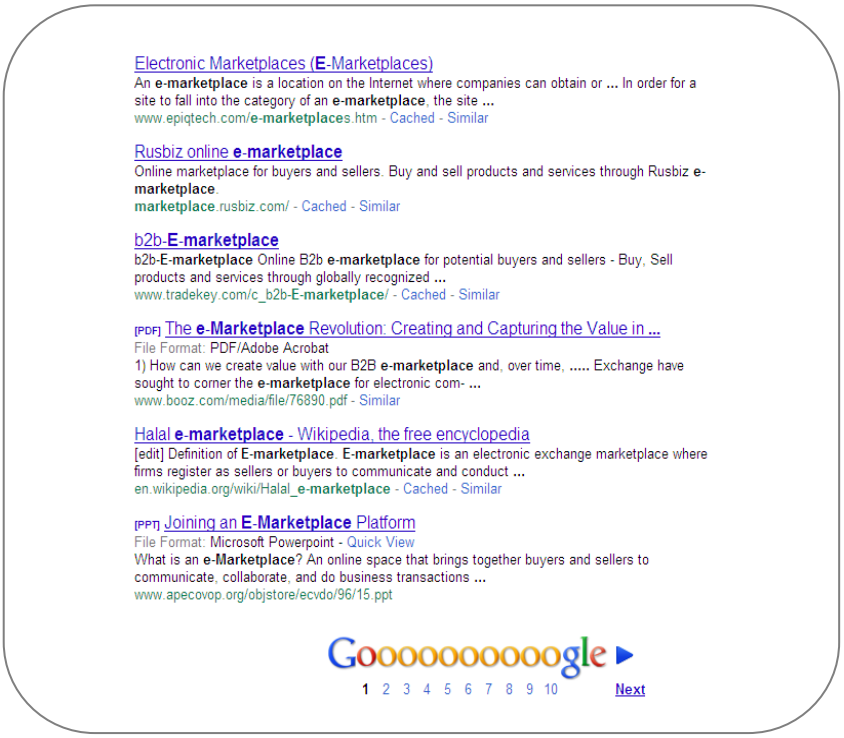


Figure 4: Google Search

If you find the message ‘repeat the search with the omitted results included’ it may be worthwhile to click it to find more results.

If you don't immediately find a good source, search both on the search engine's regular search page and its news search page. The news search can be found in the string of links at the very top left of the page on Google or in the dropdown ‘more’ menu on Yahoo. The regular search is more complete, but often has many entries from non-reliable sources.

Activity 1

Internet Search Exercise

- Open the computer’s Internet browser program.
  In figure 5, below, the user has opened the program, Internet Explorer.

Figure 5: Windows menu used to access an internet browser to launch the internet Results

- In the browser, navigate to your preferred search engine. To do this type the URL in the browser's address bar. Open any search engine and perform the following exercise. In the example in figure 6 the user has typed in the URL www.yahoo.com

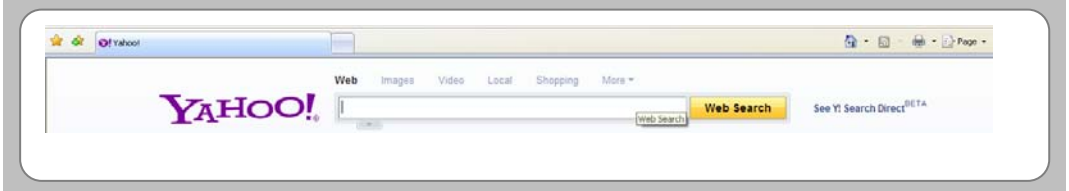


Figure 6: Yahoo!

- In the Search Engine's search field, type in your key words e.g. 'Kenya Meteorological Department website'
- From the results displayed, open the Kenya Meteorological Department website. Write on a piece of paper the features that are included in this website. Identify and list other links to this website.

Mobile Information Search Techniques

Mobile devices can also be used to access information. In recent times this technology has become effective in supporting access to real time information. Farmers should know how to retrieve information using mobile devices and how to exchanges information with other farmers or potential buyers.

Figure 7: Display of information search using mobile device

Figure 8: Mobile based agro advisory services; depicting how mobile phone can be used access information from agro based information to guide farmers on farm activities. The example shown here can be accessed at http://www.kissankerala.net/mobile/index.jsp

Activity 2

Individual work

If your mobile phone has a Safaricom (Kenya) SIM card, locate the **Get-it 411** service using the SIM tool kit and access Agricultural related information. The following services are available.

- Latest commodity prices
- Latest and updated news
- Latest stock prices
- Sports scores

Get-it 411 is an innovative information service that allows you to request information by sending an SMS message. The information that you request is instantly sent back to you by return SMS. All Safaricom subscribers have access to this service.

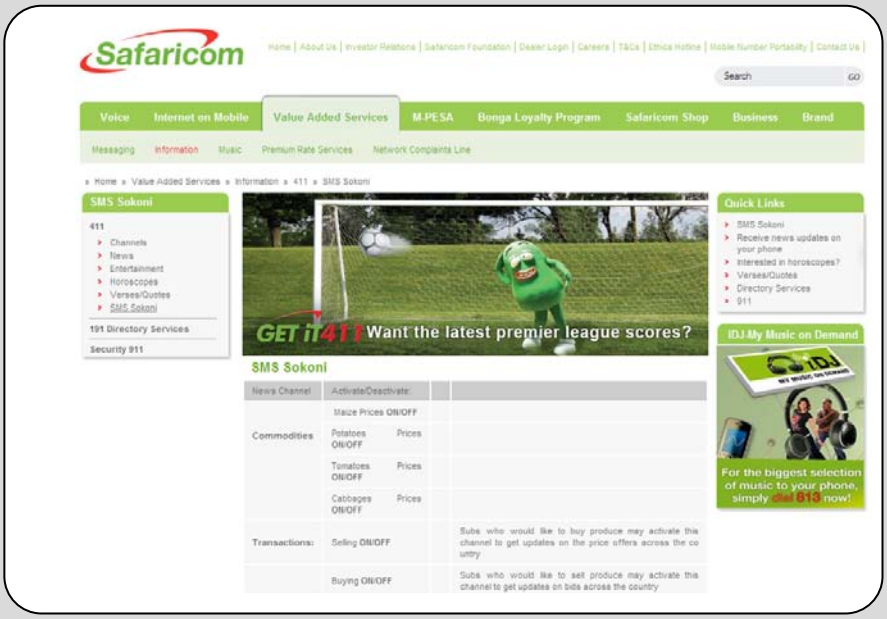


Figure 9: Safaricom (Kenya) website showing SMS Sokoni where farmers have access to market commodities prices.

Agribusiness Call Centres

A call center is an office where a company's inbound calls are received or outbound calls are made. Call centers are increasingly popular in today's society, where many companies have centralized customer service and support functions. Call centers employ many staff in customer service, sales, and support functions.

Call centers are often large offices staffed with representatives who either make or receive phone calls. Depending on the size of the call center, a single office could have anywhere from a few dozen to hundreds of telephone staff. Depending on the needs of the company, call centers can make either incoming or outgoing calls.

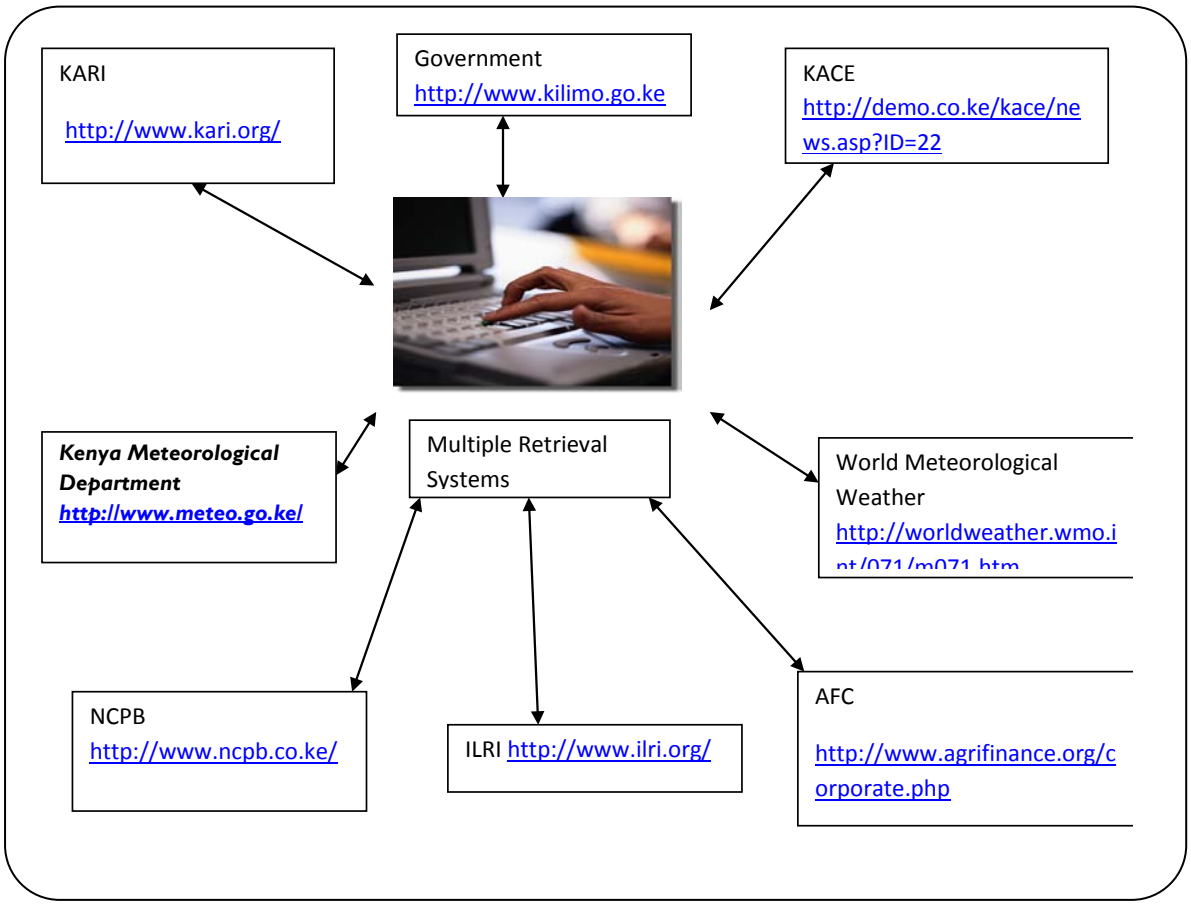
Benefits of Call Centre

- Farmers can speak to a person directly.
- Many Call Center representatives are multilingual.
- Calls to these centers are often free or subsidized.
- Call Center services can free up your time allowing you to focus on the work and provide more time for marketing and advertising and less time solving issues.
- Call center representatives answer calls professionally and answer queries with intelligence and detailed product knowledge.

Figure 10: People working at an agricultural call centre

Information Retrieval from Agricultural Based Organisations and Government Agencies

The graphic below identifies a number of important web sites that have important information on various issues that impact on agriculture. Three of the services identified below have additional ways for farmers to access the information.



Activity 3

Web / Individual Activity

- Open KARI Website, http://www.kari.org, and investigate. Then visit links of other organizations with which KARI has linkages.
- Open ILRI Website, http://www.ilri.org. Investigate the ILRI website, open information concerning *People, Livestock and the Environment*, copy the information to Microsoft Word, and save on the computer's desktop.

Conclusion

In this lesson you have been introduced to the importance of information seeking and retrieval in the agricultural setup through modern technologies. More and more data is collected from several sources and stored in a database to be accessed by farmers for their agricultural activities. Such information includes weather information, agricultural commodities prices, fertiliser, soil types and many other types of information. If the farmers are equipped with this knowledge, there is a greater possibility of success in agricultural activities.

Summary

The main points of this lesson are:

- For successful farming activities to be carried out, farmers should know how to access crucial information. There is much agricultural information online stored and distributed through several agricultural organizations
- The lesson provides insights on how online (both internet and mobile devices) have revolutionized information seeking and retrieval. For example, Get-It 411, where farmers are able to access commodity exchange prices on agricultural products.

Enrichment Resources

- Read more on search engines http://www.internettutorials.net/engines.asp
- Watch video on using search engines: http://www.youtube.com/watch?v=5h9E6B9Emgk and http://www.youtube.com/watch?v=iRU9iNlqV0E
- Agricultural production video: http://www.youtube.com/watch?v=55CVAtK6v7s
- ICT and Agriculture video: http://www.youtube.com/watch?v=BS01QnQ57KI
- Agriculture, Technology & the Developing World: http://www.youtube.com/watch?v=GKfWT_O9DKs
- Use of ICT by smallholder farmers in Kabale, Uganda: http://www.youtube.com/watch?v=824KA38hvDI
- The World Bank - Towards 2020: ICT in Action in Rwanda: http://www.youtube.com/watch?v=8UYBw0nSr1o

20

MODULE 4: **ICT in Support of Farming**

LESSON 5: **e-Business**

TIME: **1 hour 36 minutes**

AUTHOR: **Walter Wanyama / Dalton Ndirangu**

This lesson was made possible with the assistance of the following organisations:

LESSON 5 e-Business

TIME:

1 hour 36 minutes

AUTHOR:

Walter Wanyama / Dalton Ndirangu

OUTCOMES:

On completion participants will:

1. Have had a first look at online businesses, specifically

- Value proposition,
- Dealings with suppliers,
- Operations differences,
- Customer acquisition issues.

2. Be able to determine if any of the firm's advantages are sustainable.

INTRODUCTION:

Technology:

Several years ago e-business was hampered by a lack of hardware, software and poor connectivity. But now African capitals have more than adequate connectivity and there is no shortage of capable ICT companies able to provide the hardware, software and hosting required. The entry level costs, however, remain high in terms of computer equipment, but not in trained and capable staff. It looks like the technical buildings blocks are in place but what is now needed are more entrepreneurs to exploit the possibilities.

Payment:

If you're entering the e-Commerce arena some kind of payment has to take place. If you're merely migrating existing business to the Internet, then you will most likely continue with the old payment mechanisms that you have been using offline. If, however, your business is going to rely on taking payments over the Internet, then you have some thinking to do. For the e-commerce amateur there are a variety of solutions such as PayPal or NoChex that allow for 'members' of the service to take and receive payments between each other.

Marketing:

Part of the expectations of e-Business is that the producers were going to be able to trade directly with customers, cutting out all the middle men and liberating huge amounts of money. So far things haven't quite turned out like that. One of the first things we have to do is to define what we mean by 'middle men'. Although they are often touted as exploiters, in fact 'middle-men' also offer valuable services such as ensuring quality or expediting sales in other locations. They are 'middle men' but they are also valuable links in the chain. We also have to face the fact that there are 'middle men' who do exploit – and who block business happening until they get their share. They're not going to give up just because of new technology so, e-Business or not, they have to be factored into the supply chains.

Shipping and trade barriers:

If you're lucky enough to be selling an electronic product, delivery is easier that physical products. If not you need to consider how you will distribute your products. For small products there are a choice of couriers – unfortunately, they're expensive, especially in relation to African economies. It is not uncommon for the shipping for an eShopAfrica order to cost more than the products and they lose orders because of this. There are also the options of air freight and sea freight but all of us who have had experience with these sectors know that they are not exactly 'click and go'. They are labour intensive and very costly time wise – and there are a lot of 'middle men'! All these things have to be factored into the price of your product.

In Kenya, individual organizations have been trying to undertake e-Business activities: m-Transactions are taking place. If we can make use of m-Payments, then why can't we transform agriculture and make e-Farming?

Are businesses any better with the introduction of technology driven businesses? In the past, only the big players could afford to invest the time and strategic resources needed to localize their websites, and even they didn't always invest enough to do it well. But today, more and more companies and farmer organizations are harnessing the power of the internet to globalize their businesses and tap revenue streams from across the world. The stakes have changed since the early days of e-business. In this age of global business, engaging only one nation's consumer base is a sure way to plateau your organization's revenue and growth.

The Agricultural producer / farmer cannot be left behind in terms of embracing technology for revenue growth. We refer to the Winsor Farm case study where the owners have opened about eleven (11) shop outlets for their products and a farm to manage using technology. Fig 1 below illustrates possible technologies for value addition in farming activities (E-Farming Activities).

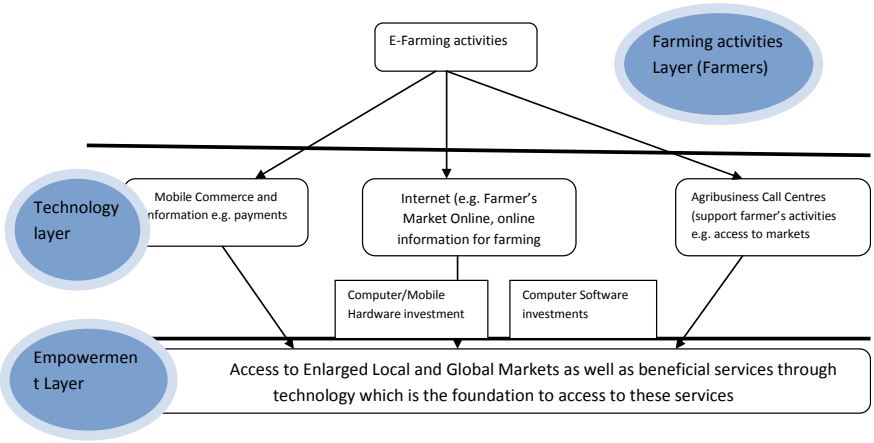


Fig 1: ICT forms the basis of farmer empowerment

An obvious example, see Diagram 1 below: How farmers are benefiting by investing time and resources in Information and Communication Technology is the 'Farmer's Market Online web page' which provides vital information on how farmers can use ICT to advance the marketing activities of their products.

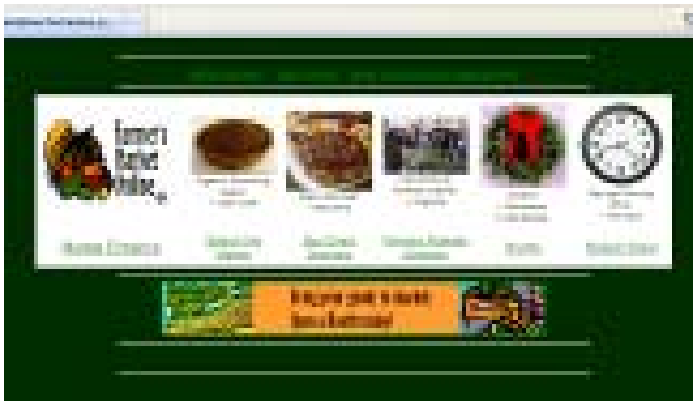


Diagram 1: Farmer's Market Online (http://www.farmersmarketonline.com/index.htm)

What is e-Business?

What is **e-Business**? e-Business (electronic business), derived from such terms as "e-mail" “e-commerce” and "e-marketing," is the conducting of business using technology(computers, mobile phone or the Internet (the web)), not only buying and selling, but also servicing customers, downloading information from available web sources and collaborating with business partners.

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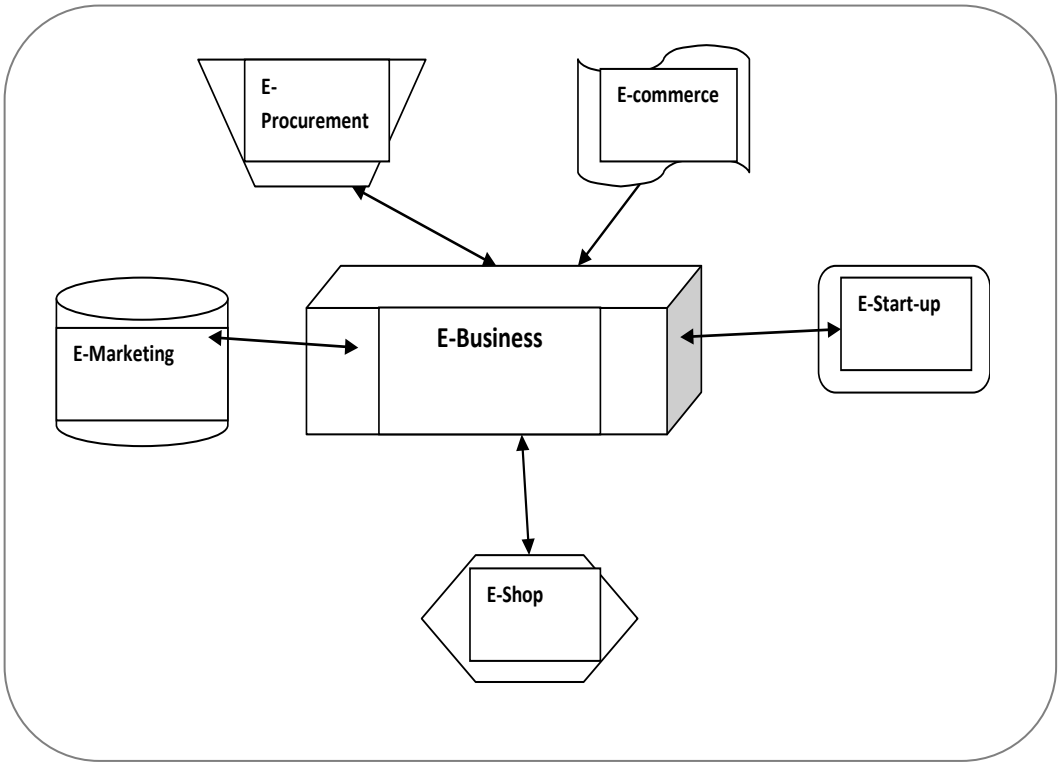


Figure 2: Branches of e-Business

e-Mail Marketing, Short Messaging Marketing (SMS) and Electronic Commerce

e-Mail marketing (e-Marketing) and Electronic Commerce (e-Commerce) have grown rapidly among value-added businesses focusing on marketing directly to consumers. Internet marketing offers a low cost method of reaching a wide variety of consumers. Although special care is needed for marketing perishable food products, e-Marketing and e-Commerce are something you may want to consider for your business. Study the following images and tables to see a number of different services and strategies.

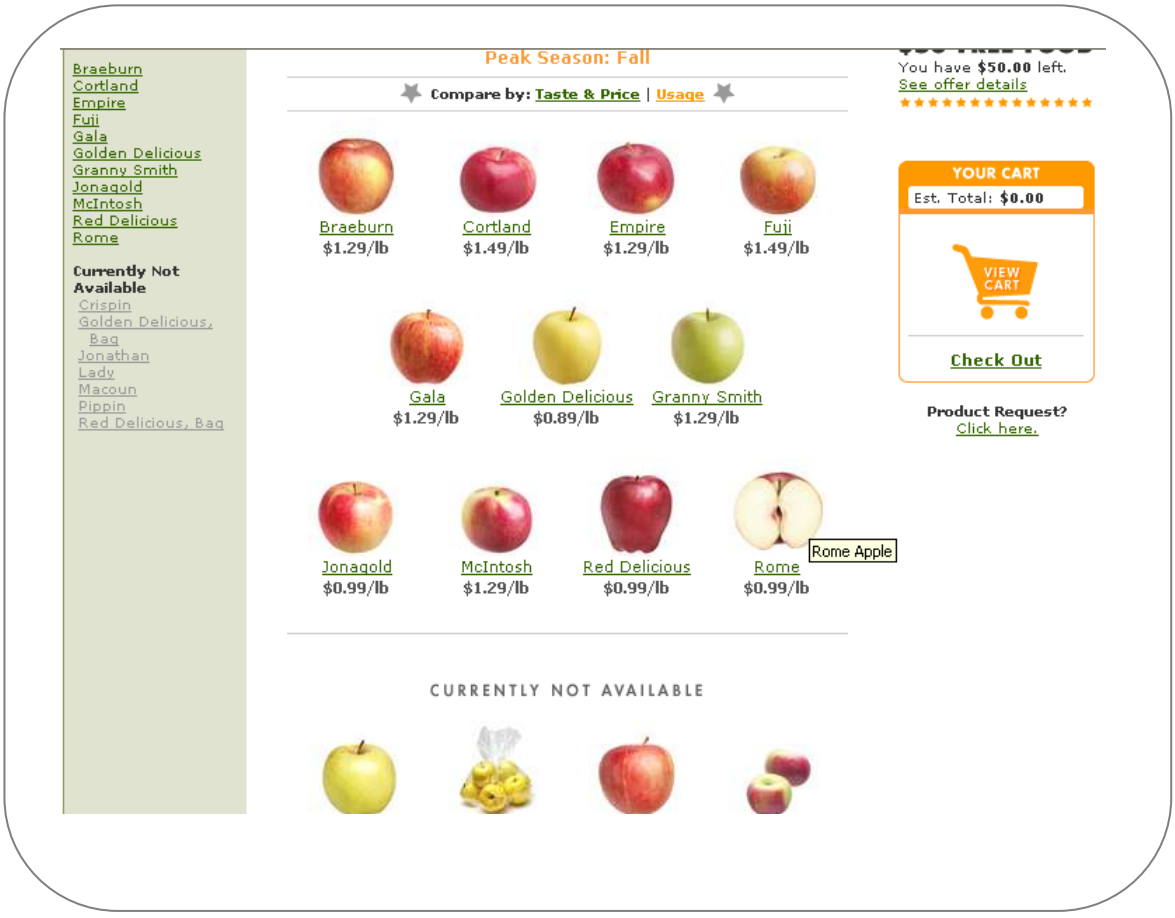
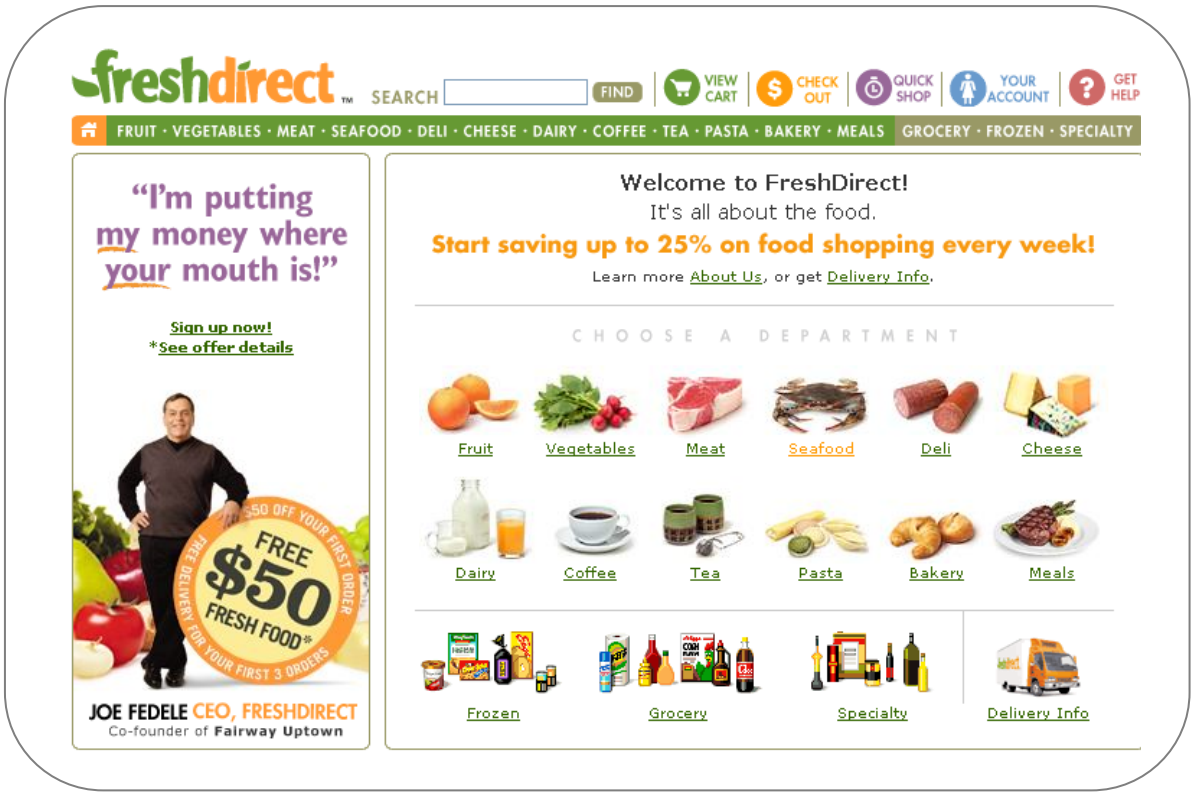


Diagram 2: FreshDirect Agricultural online business operator with prices; Farmers example of Winsor Ltd have a high potential of success of placing the products online for the wider market going beyond the 11 outlet shops.

Diagram 3: Production line, with value addition on farm produce; prices are set through the computer software to increase efficiencies on the production. This means with using technology, internal processes can be computerised.



4: Discounting production online to attract the buyers (consumers); just like on face to face business transaction, buyers have the possibility of bargaining for the products online

e-Marketing Tools

Marketing on the Internet	The most commonly used Internet marketing tools are e-mail and the World Wide Web. But mobile marketing is becoming popular.
Effective On-line Marketing	With new sites on the World Wide Web popping up daily, it's hard to stand out in the crowd. This article on 'Small Business Notes' website provides some excellent tips to get you started.
Email Marketing 'Return On Investment' Calculator	www.Bplans.com - Use this calculator to determine the ROI (return on investment) for your email campaigns. Based on your marketing campaign, results and expected results, your ROI will automatically be calculated. Use this tool to test different scenarios and see results.
Farmer's Market Online	This Web site offers a place in cyberspace for producers who are marketing directly to consumers. It is a platform for marketing your products online to consumers at a small fee.
Marketing without Spam	NOLO Law for All – e-Mail marketing can be an effective marketing tool or an incredible annoyance. This resource shows you how to do it right.
Articles on E-Mail Marketing	www.SalesVantage.com has a variety of topics on how to market with e-mail.
e-Marketing	e-Mail marketing is one of the most effective ways to keep in touch with customers. Use this link to US Small Business Administration's (SBA) website to learn more about e-Marketing.

e-Commerce Tools

e-Commerce	Should you sell your products and services on the Internet? Use this resource at Small Business Notes to assess whether your business would benefit.
Doing Business on the World Wide Web	Many businesses want to get into online business, and, certainly, some companies are scoring big sales on the World Wide Web.
Market Analysis for Your Online Business	www.bplans.com - Market analysis is the foundation of the Web plan.
Website Conversion Rate Calculator	www.bplans.com - This calculator allows you to see the impact improving your website conversion rate has on your total online sales. Enter your visitors and total orders, and you can see what an increase in conversion can do.
Adding E-business to your Agri-business	Agriculture, Food and Rural Development, Alberta, Canada - This document provides general information and links to sources of e-business information.
E-commerce and Internet Resources	Should a small business get on the Web?
E-commerce FAQ	www.business.gov – Answer to questions commonly asked about E-commerce
National Information Clearinghouse	E-commerce guide
Doing Business on the Internet FAQ	www.lawyers.com - What laws govern business on the Internet? What kind of lawyer do I need for a legal problem involving the Internet? What are the legal requirements for creating a Web page?
E-commerce Basics	Cisco SBA Internet Business Fundamentals – Educational video.
Articles on E-Commerce	www.salesvantage.com - A variety of topics relating to e-commerce.

Activity 1

2-Business web investigation (15 Minutes)

Using any search engine (e.g., www.google.com, www.yahoo.com or www.AltaVista.com etc.) search the Internet for information on the following:

I. Web promotion good practice

II. Tips for designing your website for e-business

III. How to start an e-commerce website

Procedure to follow:

I. Start the computer

II. Select the 'Start' button on the bottom left side of the computer

III. From the Start Menu open an Internet browser programme (e.g. FireFox or Internet Explorer, see diagram 5 below)

IV. Navigate to Google by typing www.google.com in the browser's URL field.

V. In Google type topics listed on activity 1 (e.g. Web promotion good practice, Tips for designing your website for e-business or How to start an e-commerce website. See diagram 6)

VI. Note: Exercise -- write a short paragraph on each of the topics listed on activity 1 (i., ii., and iii.,) using information from the websites you have visited.

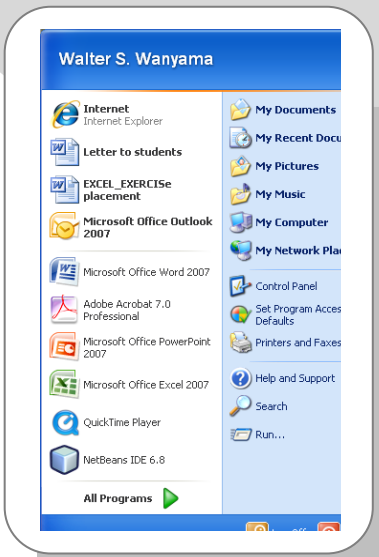


Diagram 5: Start Menu

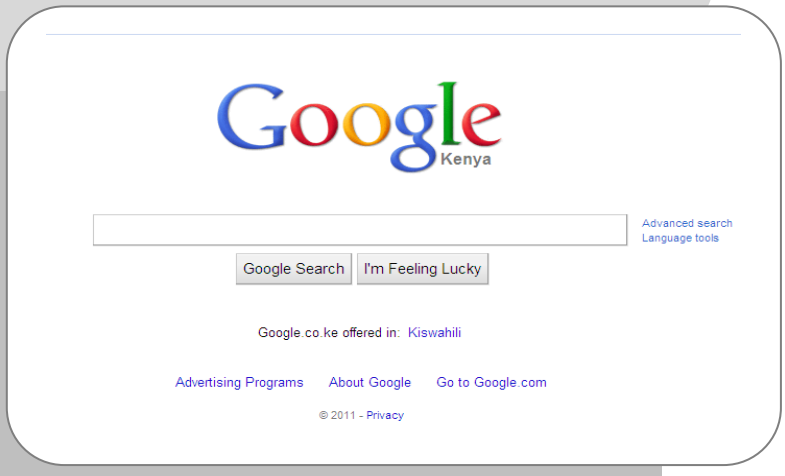


Diagram 6: Google Search engine

Activity 2

Mobile Tasks (25 Minutes)

Students should perform the following mobile commerce demos (using Safaricom line)

I. Sending money to other persons

You can send or transfer money to any other mobile phone user, even if they are not a Safaricom subscriber. To send money you must first deposit cash into your own M-PESA account.

- To send money, go to the 'Safaricom' menu and select 'M-PESA'.
- Select 'Send Money'.
- Enter your recipient's phone number, the amount you wish to send and your PIN.
- You will receive a screen with the information you have entered above, (e.g. Send money to 0721 108631, Ksh2000) confirm that it is correct then Press Ok.
- You and the recipient will receive an SMS confirming the transaction.

II. Buying Airtime

As an M-PESA customer, you will be able to purchase airtime of Ksh20 – 10,000 for your phone or another Safaricom subscriber. M-PESA value is separate from your airtime account.

- Go to 'Buy airtime' on your M-PESA menu.
- Enter mobile phone number of the phone you are buying airtime for.
- Enter amount of airtime you wish to buy.
- Enter your M-PESA PIN and then confirm the details. The confirmation message will read "Buy airtime 0721 108631 Ksh120", complete transaction by pressing OK.
- You will receive a confirmation SMS from M-PESA.
- Safaricom Post Pay customers can also use M-PESA to buy airtime for prepaid phones.

III. Enquiring about bills

- Select "show balance".
- Enter your secret PIN.
- Wait for SMS confirmation message with your balance.

IV. Paying bills

- You need to be an M-PESA registered customer.
- Select Pay Bill from your M-PESA menu.
- Enter 'business number' of the company you are paying to*.
- Enter the 'account number' of the bill you wish to pay*.
- Enter the amount you wish to pay (between Ksh100 – 35,000).
- Enter your M-PESA PIN.
- Confirm details are correct and press OK.

V. Switching on the alert messages

- Help is at hand with Get-it!!! Get-it 411 is an innovative information service that allows you to request information by sending an SMS message. The information that you request is instantly sent back to you by return SMS. All Safaricom subscribers have access to this service.
- You can access Get It 411 services through the SIM tool kit on your mobile phone.

Money transfers

Money can be transferred easily these days using web services. One way to simply send money is to use Western Union's online services (see diagram 7). They also have a service which works using mobile technology. http://www.westernunionmobile.com/howmobile.aspx. A way to receive payments is to set up a PayPal account (see diagram 8) which makes it safe and easy for people to send you money. http://www.paypal.com/ke

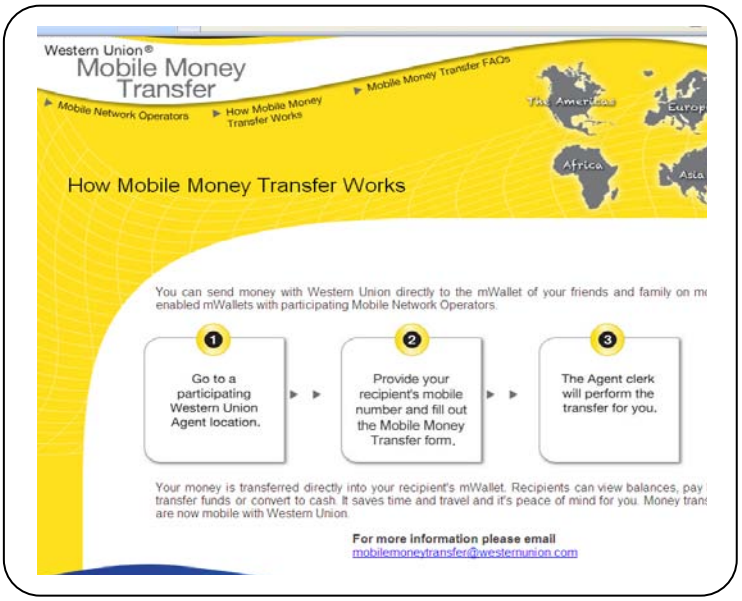


Diagram 7: Mobile Money transfer through western union, services available with Safaricom; this demonstrates that payments can be made beyond the regions where farming takes place.

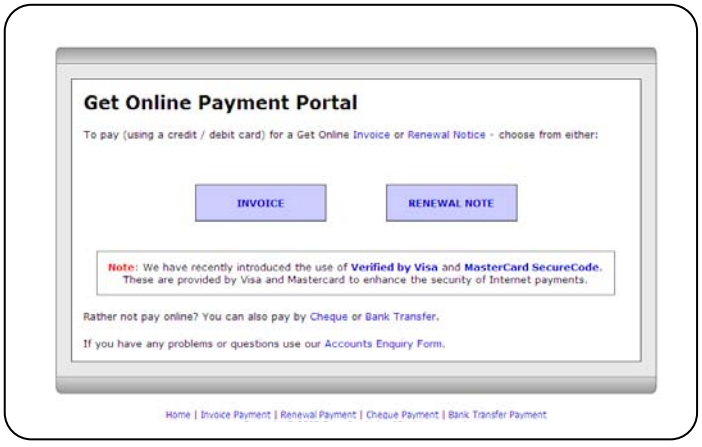


Diagram 8: Online payment portal; in case sellers and buyers want to pay each other using known payment companies e.g. PayPal

Extract Case Study from Winsor Ltd

Technology Investment for information gathering

The directors have invested in technology, mobile phones, computers hardware, telephone landlines, software, manual information storage and diary technology. Most of the communication between the farm employees is done through mobile communication with visits to the farm more frequently.

At Winsor Meat Ltd, communication and information transfer is done through the internet, e-mail, mails, catalogues etc. Storage of information is done through filling of 'hard' or paper copies of the business reports. The company also stores 'soft' copies on the computer's storage devices. Unlike Winsor Meat Ltd, at Winsor Farm, records are still kept manually and sent to the directors through hand mail or catalogues. Therefore, the storage and retrieval of information is manual.

Even though the documents enhance decision making and tracking of the performance of the farm the directors feel that this doesn't provide instant information for real time decision making. It also makes storage, retrieval, transmission and reconciliation of records difficult. The directors of the farm believe that investing in information gathering and disseminating tools is the way forward for the growth of both the farm and Winsor Meat Ltd to achieve efficiency.

Activity 3

Case study (20 minutes)

Read the extract or view the video of the case study of Winsor Farm and note how they have used technology. Suggest possible ways that the company can use e-Business to enhance their farming business.

You can access the case study from the Course CD ROM: Course Resources | Module 4 | Lesson 4 | Case Study: Winsor Farm

Conclusion

In this lesson we have been introduced to the idea that knowledge of e-Business can open wide opportunities for farmers to sell their produce beyond borders. Therefore, technology is an enabling factor for farmers to move away from being a normal entrepreneur and becoming e-famers or e-entrepreneurs. In the case of Winsor Farm, they have enhanced their venture by exploiting the e-business model

Summary

The main points of this lesson are:

To build successful e-business venture, organizations must invest in technology (for example: hardware, software, internet connectivity), payments systems, marketing of the products through e-marketplaces, delivery systems such as shipping and trade barriers. This would help to revolutionize the farming activities and encourage farmers to transform to becoming e-farmers.

Activity 1 provided hints on how we can utilise available technology on the web to market products, create relationships, transact by paying and selling our products online, and create business communities to disseminate farming information/searching information.

Activity 2 looked at using the mobile devices to do payments, send money to others, receiving information and purchasing items using a mobile.

Enrichment Resources

Include here any additional materials/resources that supplement the lesson.

a) AGNRC: http://www.agmrc.org/business_development/operating_a_business/direct_marketing/email_marketing_and_electronic_commerce.cfm

b) Farmer's Market: http://www.farmersmarketonline.com/

c) NTC: http://www.ntclimited.com/

d) Afrigoods: http://www.afrigoods.org/

Advertising on the Internet

Advertising and Marketing on the Internet – Federal Trade Commission -- If you're thinking about advertising on the internet, remember that many of the same rules apply to electronic marketing.

Dot Com Disclosures: Information about On-Line Advertising – Federal Trade Commission -- Many of the general principles of advertising law apply to Internet ads, but new issues arise almost as fast as technology develops.

Legal and Tax Issues

Tax on Internet Sales – NOLO Law for All -- Here's the skinny on Internet sales tax: who pays it, who doesn't and why it makes a difference to state governments and brick-and-mortar retailers.

When is an ISP Liable for the Acts of Its Subscribers? – NOLO Law for All -- In the United States, two federal laws provide a powerful shield for ISPs that follow the rules. Here's how they work.

Cybersquatting: What It is and What Can be Done About It – NOLO Law for All -- A 1999 law and an international arbitration procedure crack down on people looking to profit from other people's trademarks.

Internet Business Method Patents – NOLO Law for All -- A company that develops a new way of conducting e-commerce may be able to prevent others from using it for almost two decades.

Selling on the Internet: Prompt Delivery Rules – Federal Trade Commission -- Ground rules for making promises about shipments, notifying customers about unexpected delays, and refunding consumers' money.

BBB On-line Privacy Seal – Better Business Bureau -- For consumers shopping on the Internet, privacy is a major concern.

Libel On-line – Lawyers.com -- As defamation law slowly invades the Internet, more and more people are learning the hard way that expressions of free speech may not be free at all.

Digital Signature Guidelines – American Bar Association -- In today's commercial environment, establishing a framework for the authentication of computer-based information requires a familiarity with concepts and professional skills from both the legal and computer security fields.

Electronic Commerce: Legal Issues – U.S. Department of Justice -- Overview of the legal issues related to Electronic Commerce and the Department of Justice's response to these issues.

e) Legal Issues - Entrepreneur.com -- A series of articles on legal issues.

Glossary

List specialist words and provide simplified definitions.

i. **M-pesa**:
(M for mobile, pesa is Swahili for money) is the product name of a mobile-phone based money transfer service for Vodafone. Department for International Development [DFID]. (2008, May 9). *Mobile phone banking in Africa* [Video]. Retrieved 10th, April, 2011, from http://www.youtube.com/watch?v=TNrDv4PQdCc

ii. E-Business
E-business (electronic business) is a term used to describe businesses run on the Internet, or utilizing Internet technologies to improve the productivity or profitability of a business.

iii. E-marketing
e-Marketing is a subset of e-Business that utilises the electronic medium to perform marketing activities and achieve desired marketing objectives for an organisation. Internet Marketing, Interactive Marketing and Mobile Marketing for example, are all a form of e-Marketing.

iv. Search Engines
A search engine is a set of programs which are used to search for information within a specific realm and collate that information in a database. People often use this term in reference to an Internet search engine, a search engine which is specifically designed to search the Internet, but search engines can also be devised for offline content, such as a library catalog, the contents of a personal hard drive, or a catalog of museum collections. Search engines help people to organize and display information in a way which makes it readily accessible.

v. E-Commerce
E-commerce (electronic commerce or EC) is the buying and selling of goods and services on the Internet, especially the World Wide Web.

vi. Portals
A portal is a central place for making all types of information accessible to an audience of varying range.

vii. E-Marketplaces
E-Marketplace Is an internet based trading community that includes many suppliers, manufacturers, their channels of distribution, support services that deliver finished goods and other value-added services

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MODULE 5: **Agribusiness Management for Farmer Organisations**

LESSON 1: **Introduction to Economics of the Firm**

TIME: **1 hour 15 minutes**

AUTHOR: **Prof. Francis Wambalaba**

This lesson was made possible with the assistance of the following organisations:

LESSON 1 Introduction to Economics of the Firm

TIME:

1 hour 15 minutes

AUTHOR:

Prof. Francis Wambalaba

OUTCOMES:

By the end of this sub-module, you will be able to:

- Explain the meaning of economics and the basis for allocation of resources.
- Contrast the role of farming as a social livelihood from that of farming as a business enterprise from your own experience.
- Identify and explain the meaning of a market structure and how each can improve profits and strategize to manage farming as an enterprise.

INTRODUCTION:

The study of economics is all about the allocation of scarce resources among the unlimited wants in society. It requires constant interrogation, experimentation, intervention and diversification of practices. However, for the majority of small scale farmers, farming is a way of life that is unchanging and has often never been interrogated deeply enough. More so, it tends to be tradition bound and therefore does not allow frequent experimentation with other types of farming. Unfortunately, over time, as the land has become more and more scarce, this traditional approach to farming has continued to result in less and less productivity.

The goal of this module is therefore to transform the traditional farmer's mind set from that of a *farm* owner to that of a *firm* manager. To do so, several pertinent economic fundamentals of a firm will be covered in the context of farming and in contrast to traditional approaches, so as to demonstrate the need for a paradigm shift.

This sub-module defines the concept of economics, provides an overview of the concept of a firm and explores the centrality of profit in its models.

DEFINITION OF ECONOMICS AND OPPORTUNITY COST (50 Minutes)

Activity 1

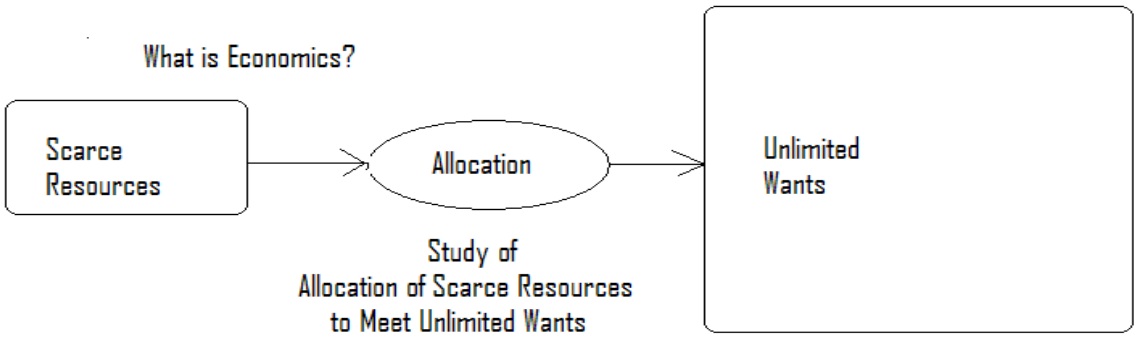
Discussion (5 minutes)

Work in groups of five. Discuss if everyone believes they have enough resources (i.e. land, workers and equipment) to sufficiently provide for all they ***want*** in life. Keep in mind these are ***wants*** as opposed to ***needs*** (*wants* are for meeting a desired life style while *needs* are for meeting basic survival). Next, consider if access to resources was doubled, would things be different?

See the feedback section at the end of this lesson to see a model answer or comments about this activity

What is economics?

Economics is the study of how societies allocate scarce resources (*which are?*) in an attempt to meet the virtually limitless wants/needs of consumers (Figure 1.1).



What is Economics

No matter how many resources we gain, they will always remain insufficient to meet our wants which will forever remain unlimited. *Scarcity* is defined as a situation when wants are more than the resources available. Hence, the study of economics is about how one goes about allocating these limited (scarce) resources to unlimited wants.

However, to do so, choices have to be made to allocate resources towards certain alternative wants and not others. Since before the choice was made, all alternatives were available opportunities, the alternatives that were not selected (or forgone) are opportunities lost. This situation is called opportunity cost.

Opportunity Cost

Activity 2

Discussion by examples (5 minutes)

1. Consider this scenario. If you had 200 shillings and chapatti flour (Unga) was 200 shillings while a hoe (Jembe) was also 200 shillings, you would only buy Unga or a Jembe but not both. To buy Unga, you have to give up a Jembe. Your opportunity cost is the Jembe you gave up to buy Unga.
2. Can you think of similar examples of opportunity cost that affect your business?

So to sum up consider these four points.

- First is that two fundamental facts emerge, i.e.:
  - A society's economic wants (for individuals and firms) are unlimited and insatiable (cannot be completely satisfied).
  - These wants cannot be met by the limited resources (the means for producing goods and services are scarce).
- Secondly, scarcity imposes choices on individuals or society
- Thirdly, choices result in sacrifices or opportunity cost.
- And finally, opportunity cost is the next best forgone alternative (*not all forgone alternatives*)

Activity 3

Group Work – Opportunity Cost (10 minutes)

- If you were given 50,000 shillings in the situation of chapatti flour and Jembes above, but now the price of Jembes is 500 shillings each while Unga is still 200 shillings. How would you allocate the 50,000 towards Jembes or Unga or a combination of both if you MUST spend all the 50 000 shillings?
- In your discussions, ensure that *all* the money is spent. Try to ascertain how many combinations are possible.

See the feedback section at the end of this lesson to see a model answer or comments about this activity

Production Possibility Curve (PPC)

Opportunity cost can be represented by a production possibility curve (PPC) as shown in Figure 1.2 below with Unga represented by Consumer Goods and Jembes by Capital Goods.

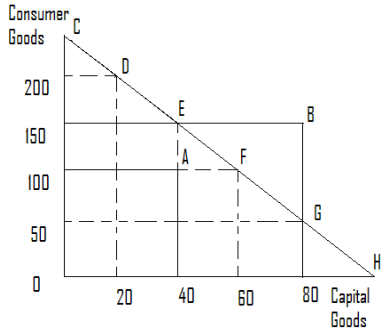


Fig. 1.2: Production Possibility Curve (PPC).

A PPC joins all different combinations of goods and services that can be purchased (consumed or produced) using all available resources and efficient techniques.

In your opinion, is it possible to purchase a combination at point B on the graph? Notice that this is not possible because resources are scarce.

However, the amounts of resources do change. Sometimes they increase, while at other times they decline. We experience economic decline when resources decrease and an economic growth when resources increase. A decrease in resources shifts the PPC curve inwards (to the left). An increase shifts outward (to the right).

We can also buy less of each item when resources decline and more of each when resources increase as shown in figure 1.3 below (see points C - H)

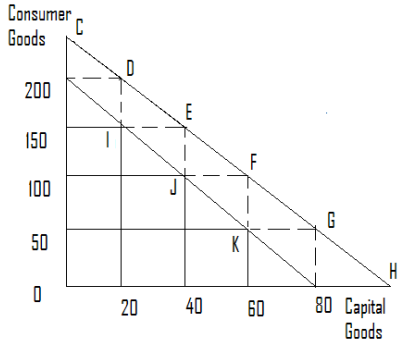


Fig. 1.3: Shifts in Production Possibility Curve

The PPC shifts with changes in resources. For examples an economic decline (40,000) leads to shift inwards (I, J, K etc.)

TRANSFORMATION OF FARMS INTO FIRMS (10 minutes)

Farms and Firms

A **farm** is land set aside for the production of crops, livestock, birds and other food and cash generating products. A **firm** is an organized combination of production resources of land, labour and capital by an entrepreneur to produce a product or a combination of products.

Some farms are informally organized for the purpose of simply sustaining life at subsistence levels. These practices constitute "**farming as a social livelihood**". Other farms are formally organized for the purpose of producing surplus products for sale, value addition and growth. These practices constitute "**farming as a business**" (or they transform a farm into a firm).

Other key characteristics of a firm may include;

1. Consideration of production as an investment,
2. Specialization in the production process,
3. Return on every factor of production including the entrepreneur, and ultimately,
4. Profit making as the key objective for production.

Environment of the Firm

In general, firms participate in two distinct markets. One from which they buy their inputs called a **resource market** or **factor market**. The other is in which they sell their produce called the **product market** or **goods market**.

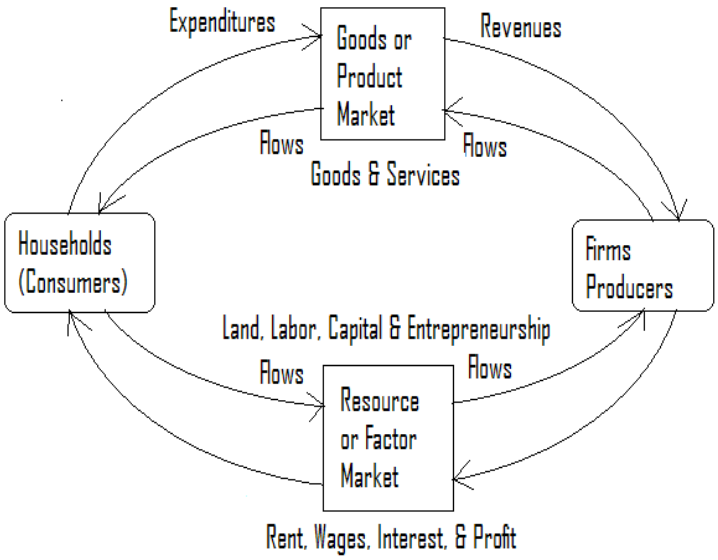


Fig. 1.4: The Firm's Goods and Factor Markets.

Farmer firms go to the factor markets to buy inputs such as land, labour and capital with which they combine to produce products. They then take their products to sell in the goods market. The primary goal of farmer firms is to maximize their revenues called **profits**. This means earning revenues enough to pay for the land, labour, capital and themselves as entrepreneurs, and possibly a surplus for future expansion.

On the other end of the equation are households who supply resources to the factor market and buy products from the goods market. The primary goal for consumers is to maximize their satisfaction called **utility**.

Therefore, a farm that desires to transform itself into a firm must, at the minimum, focus on customer satisfaction and profit making. To do so, the farmer must understand the market environment around them, especially the competition.

THE MARKET STRUCTURE (30 minutes)

Features of Market Structure (10 minutes)

The competitive relationship among firms in the marketplace constitutes a market structure. The four main relationships include;

1. Competitive market,
2. Monopoly market,
3. Monopolistic competition market, and
4. Oligopoly market.

The key differentiating factors are the number and relative size of firms in the industry, the degree of product differentiation, the degree of interdependency or independence in decision making, and conditions for entry and exit. Let us investigate further.

a) Competitive Market

The key characteristics of a competitive market include the following:

- This is a market structure comprising many buyers & sellers, each selling small proportions and therefore not able to influence the market price. Each firm is a price taker
- All firms produce a homogeneous product and therefore there is no product differentiation.
- There is complete knowledge of all relevant market information.
- There is free entry and exit since there are minimal barriers to enter and exit.

b) Monopoly Market

- In a monopoly situation, there is only one firm producing a specific product in a specific market, there are no close substitutes (no cross elasticity), and no interdependence with other competitors in the relevant market.
- The demand curve for the firm is the demand curve for the industry, since the firm is the industry.
- Typically, there are substantial barriers to entry, including absolute cost advantage of the established firms due to large capital requirements as well as scale economies. The product is differentiated for loyalty purposes, and in some cases, there is a legal exclusion of potential competitors through patented technology, trade secrets and natural monopolies

c) Monopolistic Competition

This concept was coined by Chamberlin and Robinson to describe industries with few dominant firms but with a large number of competitive fringe firms. Secondly, they exhibit highly differentiated products (real, perceived or imagined). Thirdly, they face independent decision making process unlike oligopolies that tend to be dependent. On one hand, they have monopoly characteristics such as engaging in product differentiation, while on the other hand they exhibit competitive characteristics of many firms in the industry.

The other characteristics include independent decision making and ease of entry and exit but with substantial barriers by leading brands.

d) Oligopolistic Competition

Finally, the oligopolistic market is characterized by having a few closely related firms with a high degree of interdependence. Hence, actions of one to change price, output, product style, quality, terms of sale etc., have perceptible impact on sales of other firms. In some cases, they may be homogeneous such as cash products producers of sugar cane, coffee, tea, timber, animal hides etc., while in other cases, they may produce differentiated products such as small scale consumer product producers of vegetables, fruits, milk etc.

Conclusion

In this lesson we have been introduced to the idea that the study of economics and management can help us better understand the environment farming businesses are required to operate in. We will take this further in the next lesson.

Summary

At a very simplistic level we can see individuals and their businesses responding to **needs**, **wants**, and the **allocation of scare resources**. Any allocation of resources will, however, invoke **opportunity cost** because there are insufficient resources. We have seen that we can in some ways anticipate the impact of shifts in the availability of resources by using a **production possibility curve** (PPC) to map opportunity cost.

Farmers and their businesses operate in two markets. Inputs are bought from the **resource** (**factor**) **market** while their outputs are sold in the **product** (**goods**) **market**. In order to be successful and generate a profit, farmers need to understand the market to be **competitive**.

Markets can, however, have different characteristics. There are at least four variations: **competitive, monopoly, monopolistic** or **oligopolistic**. Each market type dictates how profits can be generated.

Glossary

Profit
In economics, the term ***profit*** has two related but distinct meanings. **Normal profit** represents the total opportunity costs (both explicit and implicit) of a venture to an entrepreneur or investor. Whilst **economic profit** (is, the difference between a firm's total revenue and all costs, including normal profit (Perkin,1997) and http://en.wikipedia.org/wiki/Profit_(economics)

Market
A **market** is any one of a variety of systems, institutions, procedures, social relations and infrastructures whereby businesses sell their goods, services and labour to people in exchange for money. (Perkin,1997) and http://en.wikipedia.org/wiki/Market

Opportunity Cost
Opportunity cost is the cost related to the next-best choice available to someone who has picked among several mutually exclusive choices. It is a key concept in **economics**. It has been described as expressing "the basic relationship between **scarcity** and **choice**." The notion of opportunity cost plays a crucial part in ensuring that scarce resources are used efficiently. Thus, opportunity costs are not restricted to monetary or financial costs: the real cost of output forgone, lost time, pleasure or any other benefit that provides utility should also be considered opportunity costs (Perkin, 1997) and http://en.wikipedia.org/wiki/Opportunity_cost

Production Possibility Curve (PPC)
In economics … a **production-possibility curve** or product transformation curve, is a graph that shows the different rates of production of two goods and/or services that an economy or individual can produce *efficiently* during a specified period of time with a *limited quantity of productive resources*, or factors of production. The PPC shows the maximum amount of one commodity that can be obtained for any specified production level of the other commodity (or composite of all other commodities), given the society's technology and the number of factors of production available (Perkin, 1997) and http://en.wikipedia.org/wiki/Production_Possibility_Curve

Feedback Activity 1

Sadly it is human nature that even if we had better access to resources we would still not be satisfied. Basically, there are insufficient resources in the world! There would never be enough to satisfy everyone's wants.

Feedback Activity 3

Production Possibility Table

Combinations	C	D	E	F	G	H	B
Chapati Flour	250	200	150	100	50	0	150
Jembes	0	20	40	60	80	100	80

Above are the possible combinations but each point contains opportunity costs.

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MODULE 5: **Agribusiness Management for Farmer Organisations**

LESSON 2: **Basic Principles of Economics**

TIME: **1 hour 36 minutes**

AUTHOR: **Prof. Francis Wambalaba**

This lesson was made possible with the assistance of the following organisations:

LESSON 2

BASIC PRINCIPLES OF ECONOMICS

TIME:

1 hour 36 minutes

AUTHOR:

Prof. Francis Wambalaba

OUTCOMES:

By the end of this segment, the learner should be able to:

- Explain the meaning of the four factors of production from an economic perspective in the context of farming (production inputs).
- Identify the type of market structure that they belong to and make appropriate decisions depending on their type of market structure and interpret the role of prices as signals of communication in their context.
- Describe the central questions that govern economic thinking.
- Discuss the principles governing efficient allocation of resources including concepts of supply and demand, competitive market, market equilibrium and competitive strategies.

INTRODUCTION:

This lesson will cover the basic governing principles of economic thinking including the key economic questions, factors of production, efficiency and the market structure.

Factors of Production

As the term implies, the issues relating to factors of production relate to the ***production process*** side of a farmer's practices as a firm. There are four traditional factors (land, labour, capital and entrepreneurs).

Land / Natural Resources

This first factor is defined as land resources and includes all natural resources on the ground (such as vegetation, animals, insects, soil, water etc.), those underground (such as minerals, rocks, soil, water, etc.) and those above ground (such as air, clouds, air space and also climate). Issues that impact on this factor of production can include land size, distribution, influence of culture on land uses, etc. Competition between farming activities and urbanization is another contentious issue. Value addition per acre/hectre (or plot size) increases as the urban areas spread into rural areas because the value for urban uses of similar land is higher. While competition for land is economic, it can lead to political competition and therefore conflicts.

Capital Resources

Capital resources are any man-made products that are used in the production of other products. They include items such as machinery, tools and equipment, infrastructures such as housing, transport and communication, and other types such as money and human capital. It should be emphasized that these resources directly affect the ability of the farmer to be competitive in the market place.

Labour

Labour resources such as human energy and skills used in the production process are the third factor of production. It should be emphasized that unemployment is not about finding a job but about a person not using their energy and skills to produce.

Entrepreneurship

Fourthly, entrepreneurship can be defined as human resources with ability to take risks and invest in ideas (business farming activities especially in value addition). Access to capital (money) and other inputs in the factor markets, access to consumers in the goods market and manufacturers in the factor market are issues related to this factor of production.

Finally, allow for discussion on any ***other resources issues*** that come up, such as importance of time, access to information, role of technology, human capital development etc.

Activity 1

Group Discussion (15 minutes)

Work in groups of 5, consider and record experiences from the group on how local issues have impacted on each of the four factors described above. (e.g. Describe your access to land, urbanization pressures, access to capital, your competitiveness at markets, access to skilled labour, and of course, your entrepreneurial skills.) Be prepared to present your findings to the whole class.

Market Structure (10 Minutes)

In general, issues relating to market structure impact on the ***marketing process*** side of the farmer's practices as a firm. We mentioned these in the previous lesson so here is a brief revision:

Perfect competition is the extreme situation where products are exact, there are very many producers/sellers, very many consumers/buyers, and therefore no seller or buyer can dominate the market. Perfect competition can lead to sellers undercutting each other.

Secondly, ***perfect monopoly*** is the extreme opposite to perfect competition where products are unique; there is only one producer/seller who therefore dominates the market. If there is only one consumer/buyer, they are called a ***monopsony***. In farming, however, this rarely exists and farmers find themselves almost always in a competitive environment rather than in a monopoly.

Thirdly, ***monopolistic competition*** is a situation where there are many competitors and it is closer to perfect competition market. This is realistic of what we typically call competition in our markets, but for purposes of this course, we will combine it with perfect competition and simply refer to the environment as ***competitive market*.**

Finally, an ***oligopoly*** is a situation where there are few competitors and is closer to the monopoly market. It is the most realistic of what we typically call monopoly in our markets, but for purposes of this course, we will combine it with perfect monopoly and simply refer to the environment as ***monopoly market*.**

Activity 2

Shifting from competition to Monopoly (10 minutes)

Work in the same group as before.

1. List the advantages and disadvantages of operating in a competitive market.
2. List the advantages and disadvantages one would face if they belonged in a monopoly market.
3. Determine which market the group would prefer and provide reasons why.
4. What actions could you take to move closer to a monopoly situation and gain from economies of scale?

Economics of Scale (5 Minutes)

This concept refers to the cost advantages that a business obtains due to expansion or collaboration. There are factors that cause a producer's average cost per unit to fall as the scale of output is increased. Farmer organizations, for example, can leverage this type of advantage. Economies of scale include product specific economies, plant specific economies and firm specific economies.

Product specific economies are related to output of one product which may allow for greater specialization in use of labour and capital.

Plant specific economies are related to total output of one plant (with multiple products). For example, an investment in a larger pipeline may cost almost the same but have more capacity, or an overhead of one supervisor managing many people, or the use of existing spare parts and personnel on various activities.

Specific economies are related to total output of a firm's operations from different regions and can benefit from production and distribution from various plants with capacity, discounts and fixed costs for marketing and sales promotions spots, or even technological innovations using in-house resources.

Key Questions of Economic Thinking (10 minutes)

Five fundamental Economic Questions

The five key fundamental economic questions include; ***What*** goods and services are produced and ***what*** quantities; ***How*** are goods and services produced; ***When*** are goods and services produced; ***Where*** are goods and services produced; ***Who*** consumes the goods and services produced.

Activity 3

The 5 Fundamental Questions

Answer these questions but keep in mind the concept of ***consumer sovereignty*** - the buyer's needs nearly always dictate the answers to these questions.

What to Produce?

- What determines whether we build more homes or make more VCRs?
- How do these choices change over time?
- How are they affected by changes in technology?

How to Produce?

- Why do we use machines in some places and people in others?
- Does technology destroy jobs?

When to Produce?

- How do seasons affect production?
- What makes production rise and fall?

Where to Produce?

- What determines where goods and services are produced?
- How do changing patterns of production location affect types and wages of jobs we have?

For whom to Produce?

- What constitutes demand?
- Why do doctors earn more than nurses?

See the Feedback section at the end of this lesson to see a model answer or comments about this activity

Economic Ways of Thinking

Economic theory can be applied at both the personal level as well as at a regional or national level. However, the perspective is different according to your involvement. Contrast these two perspectives:

From a ***Microeconomic*** Perspective:

- A choice is a tradeoff (opportunity cost)
- Choices are made at the margin (additional benefit from an additional cost instead of total benefits from total cost)
- Exchange is voluntary (& markets are an efficient way of exchange)
- Markets can and do fail.

From a ***Macroeconomic*** Perspective:

- For the economy as a whole, *Expenditure = Income = Value of Production*
- *Productivity* improves standards of living
- *Inflation* occurs when the quantity of money increases faster than production
- *Unemployment* can result from market failure but some unemployment is productive.

Market Forces of Supply and Demand

The forces of supply and demand help us not only to appreciate the significance of the customer (demand) but also from a farmers' perspective, how unwise competition can be destructive. In this section, we define and discuss demand and supply and the role that price plays as a signal and communication for action.

What is demand?

Demand exists only when there is **willingness and ability to buy** a product (goods or service) or resource. It is a relationship between the quantity demanded and price of a product or resource. To have a demand for an item means: you want it; you can afford it; and you have made a definite plan to buy it.

Determinants of Demand include; Price of the good (x); Price of related/substitute goods (y) and complementary goods (z); Income (Normal goods or abnormal or given goods); Population; Tastes & preferences; and Future expectations (on all of the above)

a) Deriving an ***Individual Demand Curve*** (Due to changes in price of good x)

Price	Quantity Demanded
10	70
12	57
15	50
17	45
21	10

Fig. 1: Individual Demand Schedule

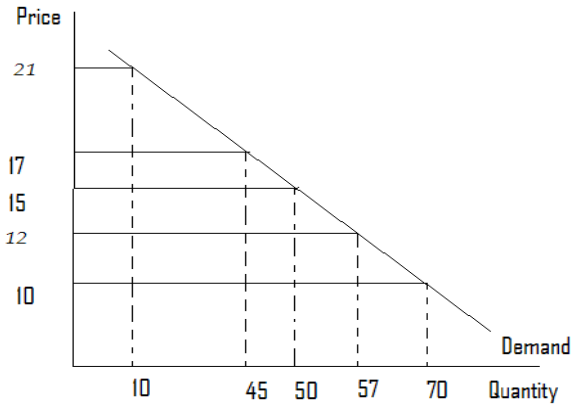


Fig. 2: Individual Demand Curve

The slope of the demand curve is *only* influenced by changes in price of the commodity in question(x). In fig 1 and 2 above, the demand schedule provides changes in quantity demanded in response to changes in price. From fig. 1, we notice that the lower the price the greater the number of goods purchased. When we plot these combinations we get the demand curve in fig. 2. This results in a movement along the demand curve referred to as ***change in quantity demanded***.

b) Deriving a ***Market Demand Curve***

The market demand curve is a horizontal addition of the individual demand curves as shown in fig. 3 below. For example, when the price is 6 shillings, consumer one (left) purchases 30 units while consumer two (middle) purchases 60 units. The total market (right) demand is 90 units.

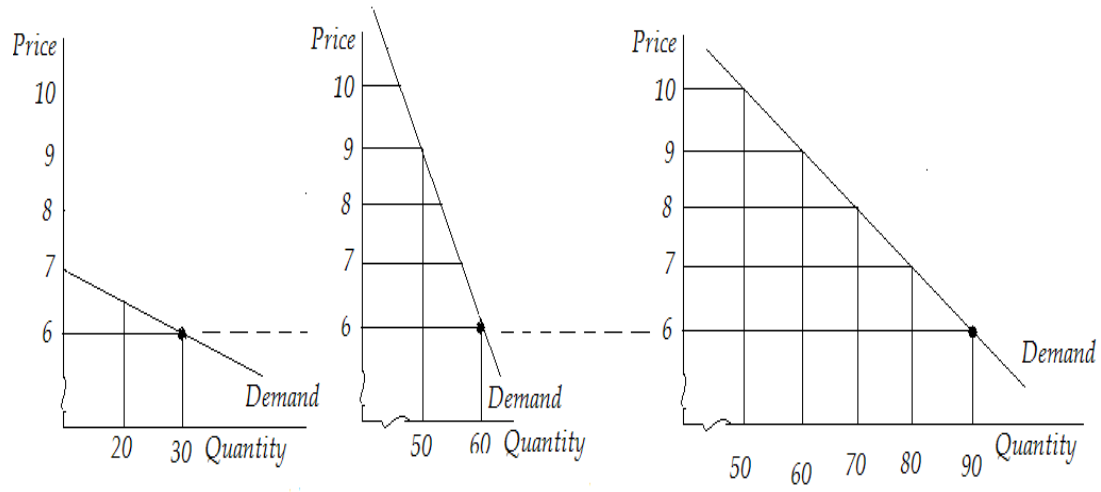


Fig. 3: Market Demand

c) ***Change in Demand*** – shifts (due to change in other factors)

As we noted in lesson 1 with respect to the PPC, similarly, an increase in demand shifts the demand curve to the right while a decrease in demand shifts the demand curve to the left. Usually, this is simply referred to as ***change in demand***. Shifts usually result from changes in other factors (other than price of good x). One way of testing this is to ask, why would anyone buy more (or less) when the price of x is held constant?

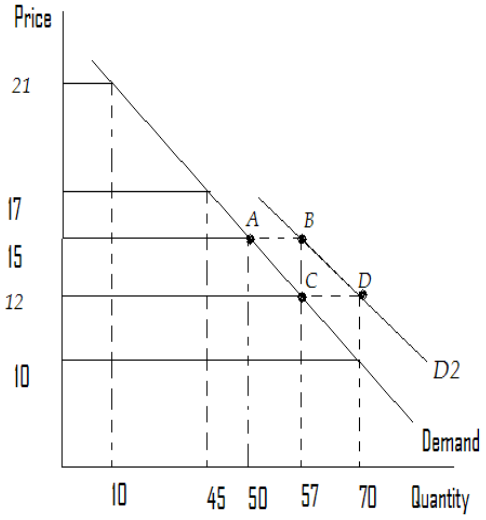


Fig. 4: Shifts in Demand Curve

A summary of the effects from changes in price (change in quantity demanded) and changes from other factors (change in demand) is presented below.

- Quantity demanded decrease↓ if there is an:
  ↑ in price of x
- Demand decrease ↓ if there is a:
  ↓ in price of substitute
  ↑ in price of complement
  ↓ in income
  ↓ tastes & preferences
  ↓ in population
  ↓ Time
  Expect above change

What is supply?

Supply exists only when there is ***willingness and ability to produce and sell*** a product (good or service) or resource. It is a relationship between the quantity supplied and price of a product or resource. To be able to supply an item means one has; resources and technology to produce it; can profit from producing it; has made a definite plan to produce and sell it.

Determinants of Supply are; Price of the good (x); Price of related goods such as substitute goods (share inputs, e.g., plot of land) or complementary goods (jointly produced, e.g., beef & hides); Price of resources used to produce it such as land, labour, capital & entrepreneurship; Number of suppliers; Technology; and future expectations (on above)

a) Deriving an ***Individual Supply Curve*** (due to changes in price of good x)
The slope of the supply curve is *only* influenced by changes in price of the commodity in question (good x). In fig 5 and 6 below, the supply schedule provides changes in quantity supplied in response to changes in price. From fig. 5, we notice that the lower the price, the lower the goods sold. When we plot these combinations we get the supply curve in fig. 6. This results in a movement along the supply curve referred to as ***change in quantity supplied***.

Price	Quantity Demanded
10	10
12	45
15	50
17	57
21	70

Fig. 5: Individual Supply Schedule

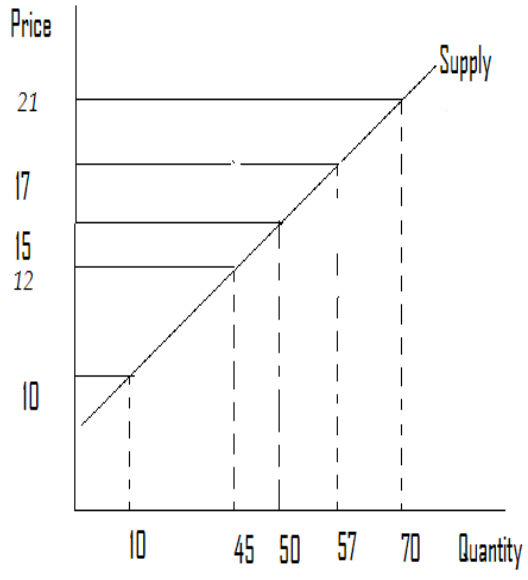
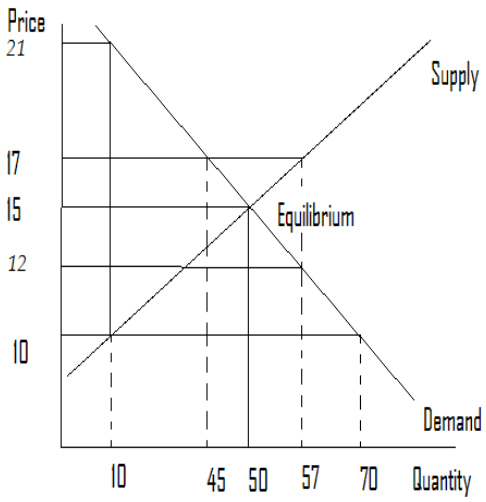


Fig. 6: Individual Supply Curve

Just as in the case of the market demand curve, the market supply curve too is a horizontal addition of the individual supply curves at a given price.

b) Forces of ***Supply and Demand*** (***Surplus***)



When the supply curve and demand curve are overlapped on each other, they reveal either a disequilibrium or equilibrium. Fig. 7 on the left reveals a ***surplus disequilibrium***. For example;

At P = 17,
Quantity demanded = 45 while
Quantity supplied = 57

A surplus of 12 results (or 45-57)

With a surplus, suppliers undercut each other pushing prices down towards equilibrium.

Fig. 7: Surplus Disequilibrium

c) Forces of ***Supply and Demand (Shortage)***

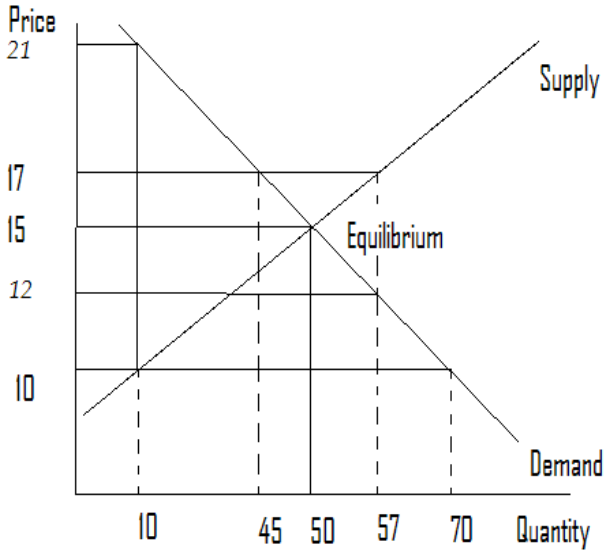


Fig. 8: Surplus Disequilibrium

When the supply curve and demand curve are again overlapped on each other, they again reveal either a disequilibrium or equilibrium. However, in this case in fig. 8 on the left reveals a **shortage disequilibrium**. For example;

At P = 10,
Quantity demanded = 70 while
Quantity supplied = 10

A shortage of 60 results (or 10-70)

With a shortage, consumers outbid each other pushing prices up towards equilibrium.

d) ***Market Equilibrium***

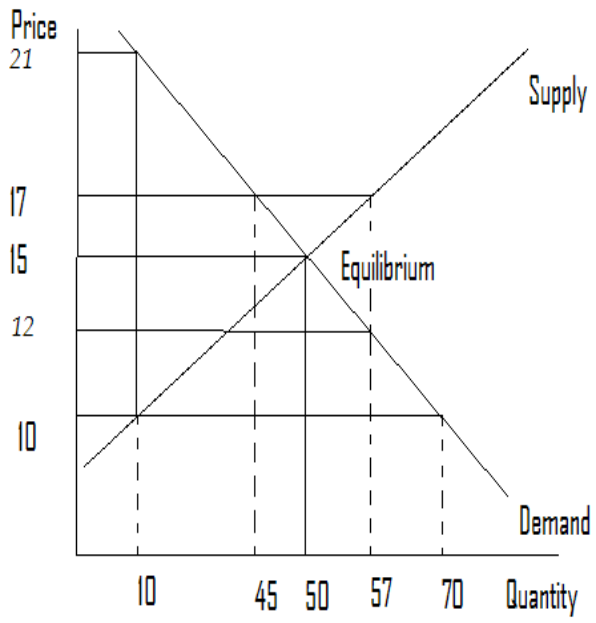


Fig. 7: Surplus Disequilibrium

Finally, when the supply curve and demand curve are once more overlapped on each other, they again reveal either a disequilibrium or equilibrium. However, in this case as shown in Fig. 9 on the left reveals equilibrium.

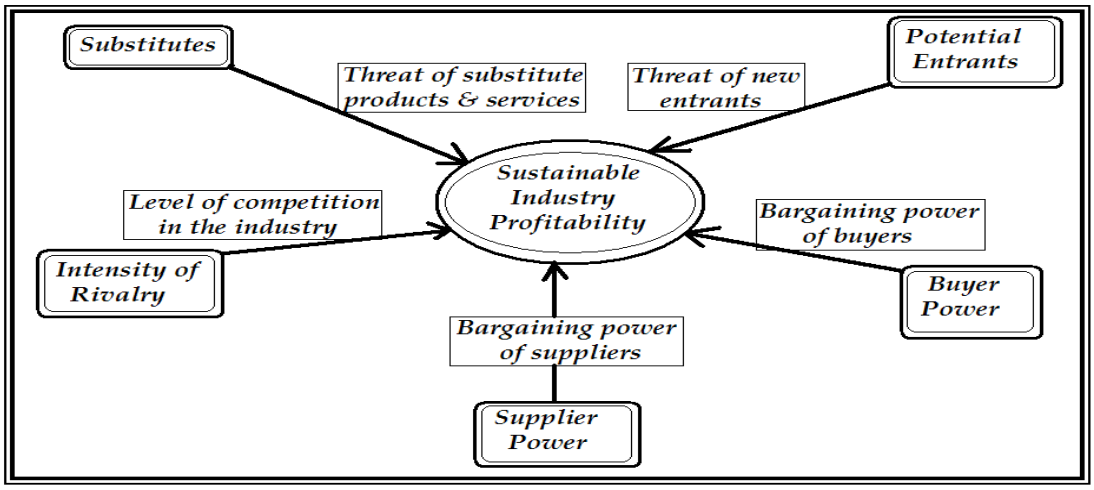
For example;
At P = 15,
Quantity demanded = 50 and
Quantity supplied = 50

Therefore at P = 15, there is an equilibrium (i.e., Qs = Qd = 50).

Neither surplus nor shortage results so the market clears and is stable

Porter's Competitive Strategy (5 minutes)

In each of these cases, the farmer who intends to transform into a firm should anticipate and plan for five key challenges as envisioned by Michael Porter. These include substitutes, potential entrants, buyer power, supplier power and intensity of rivalry as shown in figure 10 below.



Substitutes
In this case, the farmer must expect that others will produce substitute goods (similar but not exact) that will compete with the farmer's products in the market place and should therefore have a plan on how to compete with competitors.

Potential Entrants
Even where there is no competition, the farmer must always anticipate new competitors. This may mean satisfying customers even when there is no competition.

Buyer Power
In cases such as farming, buyers in the ***goods market*** tend to have power to dictate the prices. This is especially true with middlemen. In other cases, there tend to be too many producers that give buyers more power to dictate prices. These and many other similar challenges should be anticipated.

Supplier Power
This is where suppliers in the ***factor market*** and ***product market*** may have power over the farmer and thus dictate prices of land, labour, capital and other raw materials.

Intensity of Rivalry
Typically, this occurs in the competitive market where others produce exact products, such as in farming where there are very many producers of the same product. This may mean fighting each other by cutting prices while improving quality and increasing amounts per unit price.

Conclusion

Hopefully, you can now see that an understanding of the basic principles of economics can be an advantage when involved with agricultural enterprises. These principles can provide you with an understanding of how the market operates but can also provide you with a set of strategies to respond to changes in the market. It can also provide you with ideas on how to make yourself more competitive within that same market.

Summary

In this lesson we studied…

- Four factors of production: ***land / natural resources, capital resources, labour and entrepreneurship***.
- Market structures: ***competitive, monopoly, monopolistic*** and ***oligopoly***.
- Central questions that govern economic thinking, namely the five fundamental questions: ***What*** goods and services are produced and ***what*** quantities?; ***How*** are goods and services produced?; ***When*** are goods and services produced?; ***Where*** are goods and services produced?; ***Who*** consumes the goods and services produced?
- The principles governing efficient allocation of resources including concepts of ***supply*** and ***demand*** and ***market equilibrium or disequilibrium with shortages or surpluses***.
- Competitive strategies as defined by Porter. These include being aware of and responding to the existence of ***substitutes***, ***potential entrants***, ***buyer's power***, ***supplier's power*** and competitive ***rivalry***.

Glossary

Demand
In economics, demand is the desire to own anything, the ability to pay for it, and the willingness to pay. The term demand signifies the ability or the willingness to buy a particular commodity at a given point of time. (Perkin, 1997) or
http://en.wikipedia.org/wiki/Demand

Economies of Scale
Economies of scale, in economics, refers to the cost advantages that a business obtains due to expansion. There are factors that cause a producer's average cost per unit to fall as the scale of output is increased. "Economies of scale" is a long run concept and refers to reductions in unit cost as the size of a facility and the usage levels of other inputs increase. (Perkin, 1997) or
http://en.wikipedia.org/wiki/Economies_of_Scale

Factors of Production
Factors of production… refer(s) specifically to the primary factors, which are stocks including land, labour (the ability to work), and capital goods applied to production. The primary factors facilitate production but neither become part of the product (as with raw materials) nor become significantly transformed by the production process (as with fuel used to power machinery). (Perkin, 1997) or
http://en.wikipedia.org/wiki/Factors_of_production

Supply
In economics, supply is the amount of some product producers are willing and able to sell at a given price all other factors being held constant. Usually, supply is plotted as a supply curve showing the relationship of price to the amount of product businesses are willing to sell. (Perkin, 1997) or
http://en.wikipedia.org/wiki/Supply_(economics)

Feedback Activity 3

(What to produce?)

- Consumer demand
- Tastes and preferences change over time
- Resources available and potential

(How to produce?)

- Resource endowment and the need to meet the consumer's budget.
- In reality, it restructures them and in many instances reinvents new ones.

(When to produce?)

- While each product has a season for production, strategic farmers focus on season for demand.
- Changes in consumer demand.

(Where to produce?)

- Access to customers.
- Location of the consumers.

(For whom to produce?)

- Willingness (tastes & preferences) and ability to pay (income and prices).
- Forces of supply & consumer demand.

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MODULE 5: **Agribusiness Management for Farmer Organisations**

LESSON 3: **Decision Making – Explicit and Implicit Costs**

TIME: **1 hour 36 minutes**

AUTHOR: **Prof. Francis Wambalaba**

This lesson was made possible with the assistance of the following organisations:

LESSON 3

DECISION MAKING – EXPLICIT AND IMPLICIT COSTS

AUTHOR:

Prof. Francis Wambalaba

TIME:

1 hour 36 minutes

OUTCOMES:

By the end of this lesson you will be able to:

- Differentiate between economic costs and accounting costs.
- Make decisions based on the economic logic and explain the rationale for each decision.

INTRODUCTION:

This lesson will focus on building skills and economic rationales for decision making under given farming scenarios that may have multiple options. We will spend some time looking specifically at Economic versus Accounting Costs & Relevant Cost Analysis.

Economic vs. Accounting Costs

While in many cases, economists talk the same vernacular of numbers that lend to measurement of profit, in a few cases, the two appear to speak about the same numbers in foreign languages. Some of these incidences are covered here.

Activity 1

Class Discussion (5 minutes)

Work in groups of four and discuss: “What, do you think, are the objectives of a farmer?”

While the various objectives identified by each member are valid, notice the centrality of the concept of profit in each viewpoint, especially those that desire their farm to be a firm. For example, firms need market share so we can eventually earn profits; they need to satisfy employees or customers so that they can stay in business to make a profit. In other words, unless they are a charity or government receiving revenues from other sources, they will go out of business eventually if their revenues remain below costs.

The profit model’s objective is to maximize economic profits:

Economic Profit = TR - TC

Where:

TR = Total Revenue (Sales receipts - or price x quantity)

TC = Total Cost (Opportunity cost of resources land, labour, capital and entrepreneurs)

Accounting Profit is the difference between total revenue and explicit costs. Explicit costs constitute every expense that is referred to as a direct cost. A direct cost can be accounted for with receipts from a market transaction such as leased land, purchased fertilizer, hired labour, purchased equipment etc. In fact, an explicit cost is the opportunity cost of using resources owned by others and thus, money is exchanged and is typically used in accounting cost.

Economic Profit is the difference between total revenue and economic costs. Economic costs include both direct and indirect (implicit) costs. An indirect or implicit cost is an expense that might not be accounted for with a receipt from a market transaction (such as using your own time, plot, house, children etc.). In fact, an implicit cost is the opportunity cost of using resources owned by the entrepreneur (or the firm) and thus, no money is exchanged.

Accounting Profit (AP) = TR – Explicit Costs

Economic Profit (EP) = TR – (Explicit + Implicit Costs)

Normal Profit is usually equal to zero but includes implicit cost of owner supplied resources.
Abnormal profit occurs when total explicit and implicit costs are less than total revenue.
Economic loss occurs when total explicit and implicit costs are more than total revenue.

Activity 1

(20 minutes)

Suppose a contract is offered at KES 10 per egg to supply 10,000 eggs to a restaurant, the employee you hire will cost you 20,000 per year and chicken feed costs 50,000 per year. Suppose also that your son, who can work equally as well as your employee is also helping with the chicken work for half of his working time. Also, you have informed your employer to cut your salary from 40,000 to 20,000 so you can work half time and spend the other half on your chicken business, would you take the contract?

Work in groups of four and discuss your decision by calculating the revenues below

1. What would the annual total revenue for this business be?
2. What would the annual total supplies or materials cost for this business be?
3. What would the annual total labour cost for this business be?
4. What would the annual total managerial cost for this business be?
5. What would the annual total cost for this business be?
6. What would the annual accounting profit for this business be?
7. What would the annual economic profit for this business be?
8. What would the annual normal profit for this business be?

See the feedback section at the end of this lesson to see a completed table

As alluded to above, a firm's objectives would typically include business growth, quality product, job satisfaction, market share etc. But the firm's underlying objective is **profit maximization**.

What constraints limit profit maximization?
These would typically be markets and technology.

> *Market constraints* are conditions under which a firm buys input and sells output. On the input side, limited supply of resources means higher prices for additional units. On the output side, limited demand for goods & services means lower prices for additional units.
>
> *Technology constraints* are limits to the quantity of output that can be produced using given quantities of inputs.

Therefore, to maximize profits, a firm must be technologically efficient, i.e., not using more inputs than necessary to produce a given output and economically efficient, i.e., producing a given output at the lowest possible cost.

The Production Side of the Analysis Process
Production is the creation of goods or services with economic value to consumers or other producers. This includes physical processing or manufacturing of material goods or production of services such as transportation, legal, teaching, etc. The goal is how to produce the desired output by combining input efficiently, given existing constraints (budget, technology etc.)

There are typically two types of variables in the production process. Variable inputs vary with output while fixed inputs are those that do not change with output (at least in the short run). A **short run** is a period of time when the quantities of some inputs are fixed (typically capital) while the quantities of others are variable (typically labour & raw materials). A **long run** is a period of time when all input quantities may be varied, such as an increase in plant size. In the long run, all inputs are variable (need to change plant size) as illustrated in Table 3.1 and Figure 3.1 below.

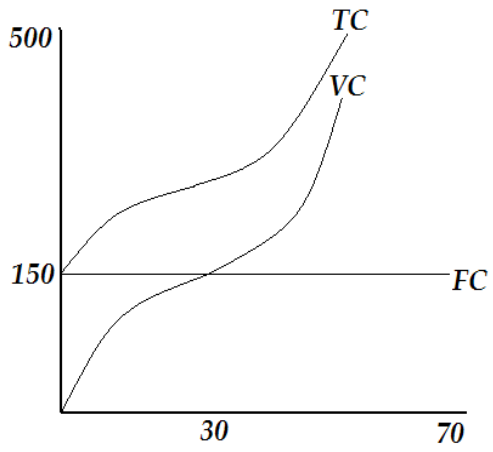
Q	Labor	VC	Capital	FC	TC FC+VC	AFC FC/Q	AVC VC/Q	ATC TC/Q	MC TC'/Q'
0	0	0	750	?	150	-	-	-	-
6	1	50	750	?	200	25	8.33	33.33	8.33
16	2	100	750	?	250	9.38	6.25	15.63	5.00
29	3	150	750	?	300	5.17	5.17	10.34	3.85
44	4	200	750	?	350	4.41	4.55	7.95	3.33
55	5	250	750	?	400	2.73	4.55	7.27	4.35
60	6	300	750	?	450	2.50	5.00	7.50	10.00

Table 3.1

Note that:

FC is constant
VC is inverted S curve from the origin
TC is same as VC but starts at 150
The gap between TC & VC = FC = 150.

Why?



Activity 2

Class Discussion

Revenues are earnings generated from the sale of a product or service and a measurement of Profitability. Supposing in a competitive market, Price P=10 and Quantity Q varies from 1 to 10.

1. What would be the total revenue (TR), the Average Revenue (AR), and Marginal Revenue (MR)? Note that marginal revenue is one additional revenue from one additional unit of a product or service sold.

In this section, use PowerPoint or draw the table and figures on board to illustrate the relationships among the revenue types shown below.

Quantity Q	Price P	Total Revenue TR	Marginal Revenue MR	Average Revenue AR
1	950	950	950-0 = 950	950/1 = 950
2	950	1900	1900-950 = 950	1900/2 = 950
3	950	2850	2850-1900 = 950	2850/3 = 950
4	950	3800	3800-2850 = 950	3800/4 = 950

Table 3.2: Revenue Types Relationships

Please note that while the price P remained constant at 950, total revenues TR kept increasing at a constant rate of 950 per additional unit sold. In other words, marginal revenue MR remained constant at 950. Similarly, average revenue AR remained at 950 since on average, each additional unit sold contributed 950.

Implications of the Curves

Referring to figure 3.2 below, please note that price P is set at 950 in the maize industry's supply and demand forces (such as in the figure on the left). Therefore, no one firm (such as in the figure on the right), can influence the price P which is represented by the line P=MR=AR and just tangent at the intersection of MC and ATC.

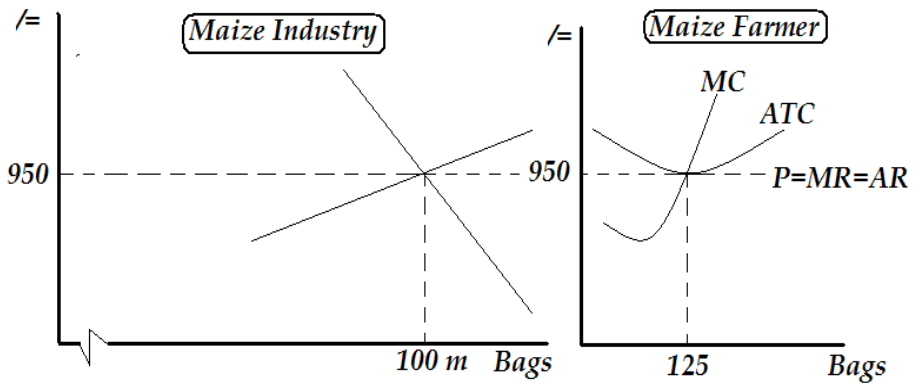


Fig 3.2: Revenue Types Relationships

Profit Maximization
In the market place, profit is maximized where the difference between TR and TC is widest.

Supposing the price P is 950 as discussed above and the total costs TC (explicit + implicit) are given as in table 3.3 below, we can determine the profit maximization level by increasing quantity from one unit onwards to see where the difference between TR and TC (or TR-TC) is widest.

Quantity Q	Price P	Total Revenue TR	Total Cost TC	Economic Profit TR-TC
1	950	950	1450	-500
2	950	1900	1900	0
3	950	2850	2450	400
3.74	950	3550	2850	700
4	950	3800	3800	0
5	950	4750	5250	-500

Table 3.3: Revenue Maximisation

It is evident from the table that profits are maximized when 3.74 units are produced with approximately TR=3550 and TC = 2850 and therefore economic profit TR-TC = 700. Note that this is an abnormal profit since it is above total explicit and implicit costs.

This information can be represented graphically as shown in Figure 3.3 below derived from Table 3.3 above.

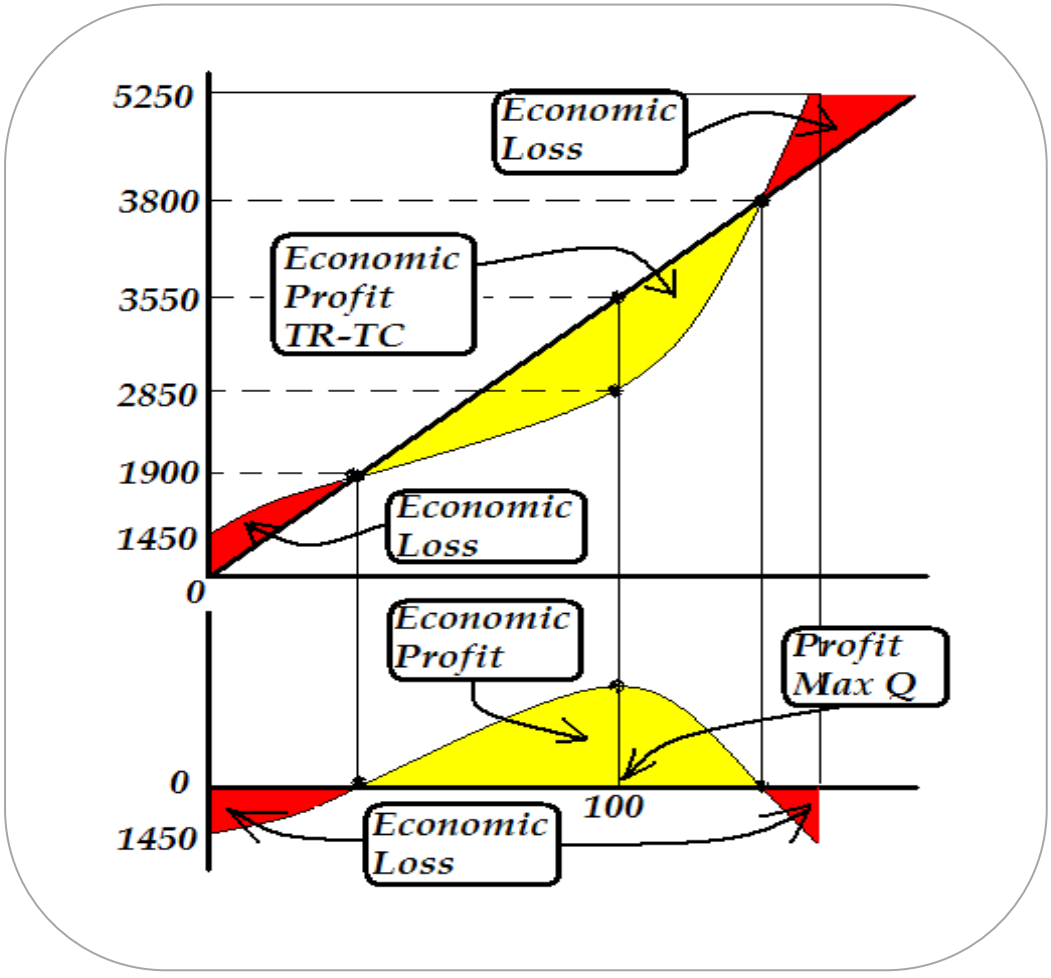


Fig 3.3

Please note that the yellow areas are the profit range while the red areas are the loss range. Profit is maximized where the yellow range is widest. Also note that at point sets where the red and yellow ranges meet, profit is zero and is referred to as a break-even point. A break-even is a situation where total revenue (TR) is equal to total cost TC.

Also note that the curve on the bottom part of figure 3.3 represents total revenues. The TR increases from negative to positive, reaching the highest point where profit is maximized and then declining back to negative.

Activity 2

(20 Minutes)

Work in groups of four and discuss what will happen if:

1. Price per unit was 850.
2. Price per unit was 762.

See the feedback section at the end of this lesson to see a completed table

Conclusion

Overall, it has been clear that each farmer who plans to transform their farm into a firm must account for all costs, both explicit and implicit. Implicit costs include resources owned by the farmer (including his or her own time and his or her own children's time at market price) for which they would earn money if they sold to someone else. When all of these costs are accounted for, a farmer can make abnormal profits if the total revenues exceed total costs, normal profits if total revenues equal total costs and economic loss if total revenues are less than total costs.

For a competitive market, since the price per unit is set by the market (the farmer cannot affect it), the role of the farmer would be to strive to reduce the costs if they wanted to increase their profits.

References

1. **Lipsey, R.G. (1983),** *Introduction to Positive Economics*, English Language Book Society, Weidenfeld.
2. **McConnel, R.C., and Brue, S.L.**, *Economics: Principles, Problems and Policies*, McGraw-Hill, Toronto.
3. **Parkin, Michael, (1997),** *Microeconomics, 4th Ed.,* Addison-Wesley, New York

Feedback

Feedback Activity 1

1. What would the annual total revenue for this business be?
   TR= Q x P or 10 x 10,000 = 100,000
2. What would the annual total supplies or materials cost for this business be?
   Your supplies or materials is the chicken feed which is = 50,000
3. What would the annual total labour cost for this business be?
   Hired employee cost is 20,000
   Value of your son's labour is worth 20,000, like your employee.
   Since he works only half time his labour cost is 10,000
   Total labour cost of employee and son is therefore 30,000.
4. What would the annual total managerial cost for this business be?
   Value of your work is the salary you gave up from your employer.
   Therefore annual managerial cost is 20,000.
5. What would the annual total cost for this business be?
   TC = hired cost + sons cost + managerial cost = 50,000
6. What would the annual accounting profit for this business be?
   Accounting Profit is TR – Explicit Costs (hired labour and purchased supplies)
   Therefore Accounting Profit = 100,000 – 70,000 (20,000 +50,000) = 30,000
7. What would the annual economic profit for this business be?
   Economic Profit is TR – (Explicit Costs + Implicit Costs)
   In this case, implicit cost is the sons labour cost and your managerial cost.
   Therefore Economic Profit = 100,000 – 100,000 (70,000 + 30,000) = 0
8. What would the annual normal profit for this business be?
   Normal profit is zero as above.
   Should supplies have been 40,000, then abnormal profit would have been 10,000.
   Should supplies have been 60,000, then economic profit would have been -10,000.

Feedback Activity 2

The table below represents the price of 950.

Quantity Q	Price P	Total Revenue TR	Total Cost TC	Economic Profit TR-TC
1	850	850	1450	-600
2	850	1700	1900	-200
3	850	2550	2450	100
3.74	850	3180	2850	330
4	850	3400	3800	-400
5	850	4250	5250	-1000

Notice that when the price declines to 850, while total costs stay the same, total revenues decline leading to decline in profits. Maximum profits (total abnormal profits) are now 330.

The table below represents the price of 762

Quantity Q	Price P	Total Revenue TR	Total Cost TC	Economic Profit TR-TC
1	762	762	1450	-688
2	762	1524	1900	-376
3	762	2286	2450	-164
3.74	762	2850	2850	0
4	762	3048	3800	-752
5	762	3810	5250	-1440

Also notice that when the price declines to 762, while total costs stay the same, total revenues decline leading to decline in profits. Maximum profits (total normal profits) are now 0. This means the business can still continue to operate since the owner is able to pay off all explicit costs and also pay off implicit costs. In other words, the owner is able to pay him or herself exactly the same amount they would be paid if they worked for someone else.

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MODULE 5: **Agribusiness Management for Farmer Organisations**

LESSON 4: **Decision Making Based on Loss Minimization and Present Value**

TIME: **1 hour 36 minutes**

AUTHOR: **Prof. Francis Wambalaba**

This lesson was made possible with the assistance of the following organisations:

LESSON 4 DECISION MAKING BASED ON LOSS MINIMIZATION AND PRESENT VALUE

AUTHOR:

Prof. Francis Wambalaba

TIME:

1 hour 36 minutes

OUTCOMES:

By the end of this lesson you will be able to:

- Account for different types of revenues and describe the measurement of profits based on different cost parameters.
- Identify different types and situations of risks and uncertainties, especially with respect to farming and discuss respective strategies for mitigation.

INTRODUCTION:

This lesson continues on from lesson 3 and should be seen as a continuation. You will need to review lesson 3 and the discussion on Economic versus Accounting Costs & Relevant Cost Analysis. In lesson 4, however, we will focus on *Revenues & Measurement of Profitability* and *Risk & Uncertainty*.

Relevant Costs in Decision Making

Based on the background covered in lesson 3, it is clear that for a farm that wishes to make decisions as a firm, a mix of economic and accounting cost skills will be handy. Relevant cost is an opportunity cost that should be used in a given decision making problem. Four illustrative devices are as follows; Depreciation cost measurement, inventory valuation, unutilized facilities and measurement of profitability.

Depreciation
Consider this scenario.

A farmer buys equipment worth 100,000. How much is it worth in 10 years?

Typical accounting allocates depreciation based on expected number of years. If the equipment = 100,000, and is expected to last 20 years, straight line depreciation = 100,000/20 = 5,000/year. Hence the equipment would be worthless (zero value) after 20 years.

However, from the economic or decision making perspective, the stipulated 20 years is arbitrary and may not reflect the actual economic condition. In this case, we have to ask how much the equipment is worth at this time (market value). If the equipment, after 20 years, can be sold at 14,000, then that is its value. Therefore, if a decision has to be made with regard to disposing or transacting the equipment, the market value rather than the book record should be used.

Inventory Valuation
In a related scenario, participants may be given the following below for discussion and decision on inventory valuation.

Closely related to the previous activity in lesson 3, suppose labour cost for constructing a fence was 60,000 and you already had acquired supplies (wires, nails, posts etc.) at 50,000. If the fencing supplies price declined to 37,500 (replacement cost), and a fencing contract is offered to you at 100,000, would you take the contract?

Typical accounting allocates costs based on acquisition. The challenge we face is whether to use acquisition cost or replacement cost. The table below presents the analysis of the two alternatives.

	Acquisition Cost	**Replacement Cost**
Value of Contract	100,000	100,000
Costs		
Labor, equipment etc	*60,000*	*60,000*
Materials	*50,000*	*37,500*
Total Cost	110,000	97,500
Profit (or loss)	(10,000)	2,500

If the acquisition approach is used, there would be no contract since the net income would be perceived as (– 10,000). However, if the replacement approach is used, the net income would be perceived as 2,500 and the contract may be signed.

From the decision making perspective, given that materials have already been purchased, and there is therefore an eminent loss, one needs to now think of how to minimize "out-of-pocket" loses by considering the two analyses below.

With acquisition approach, losses are perceived to be 10,000, which may lead to a "do nothing" decision not to hire labour and construct the fence. But if nothing is done, and the supplies are resold, the actual loss would be 50,000 – 37,500 = 12,500

However, with a replacement approach, labour will be hired and the fence built generating 100,000 at a cost of 110,000 (60,000+50,000) which results in a loss of 10,000. This later loss is less than the former loss by 2,500 which would not have to be borrowed (or come from your savings or elsewhere).

The goal here is that when eminent losses are anticipated, an entrepreneur strives to minimize losses by making the decision to take on the contract.

Unutilized Facilities

In some cases, a farmer may have made some investments that due to unexpected circumstances leave them with some idle capacity in form of equipment, space, labour etc. We need to know what needs to be considered in the decision making process should an opportunity arise.

For example, suppose you have leased 200,000 Sq ft for which you are paying 1,000,000 (5/Sq Ft) per year. Supposing further, that this year, one of your discontinued farming activities, (such as egg production) leaves 50,000 Sq ft of space unused. If another, a potential user offers to use that space during the term of the contract when you are paying 5/Sq Ft, would you sublease the space out to her for $125,000 (or $2.50/Sq ft)?

This is a similar concept to inventory valuation above. While rent at $2.50/Sq ft is less than lease cost of $5.00/Sq ft, it minimizes the lease cost which you have to pay regardless of whether the space is subleased or not.

	Decision	
	Do Not Rent Out	**Rent Out**
Total Lease Payment	1,000,000	1,000,000
Rental Income	0	125,000
Net Lease Cost	1,000,000	875,000

Measurement of Profitability

Consider this scenario:

An owner manager uses his building for business. The sales = $500,000, raw materials = $250,000, and operating expenses = $210,000. Should the owner close down this business?

Before we make this decision, we need to know how much the building is worth and how much the owner would be paid to manage a similar business.

For example, suppose the building is worth 18,000 if rented out and the owner could earn a salary of 30,000 working elsewhere, then the owner should close the business and rent out the building and work for someone else to avoid the loss of 8,000 as illustrated in the table below. Obviously, this assumes prospects for growth do not exist.

Accounting Income Statement		
Net Sales		500,000
Less: Cost of Goods Sold		250,000
Gross Profit		250,000
Less: Expenses	210,000	
Total		210,000
Net Profit		**40,000**
Economic Profit Statement		
Total Revenue		500,000
Less: Explicit Costs		460,000
Accounting Profit Before Taxes		40,000
Owner Manager (Salary)	30,000	
Owner Building (Rent)	18,000	
Less: Implicit Costs		48,000
Economic Profit (Loss)		**-8,000**

Activity 1

(20 Minutes)

Work in groups of four and discuss the issues below:

1. In the depreciation case above, when would it be economical not to consider the equipment as an asset?
2. In the inventory valuation case above, when would it be economical not to take the contract?
3. In the unutilized facilities case above, when would it be economical not to sublease the space?
4. In the measurement of profitability case above, when would it be economical for the owner manager to continue operating the business?

See the feedback section at the end of this lesson to see a completed table

Risks and Uncertainty

Risk is a situation in which there is a possibility that actual cash flows (returns) will be less than forecasted cash flows and can be neutralized through pre-planned action. *Uncertainty* is a situation where credible probabilities to possible outcomes cannot be assigned.

Types of risks and uncertainties include but are not limited to; *Price fluctuation, Fire, Water (floods), Pests and diseases, Weather, Political/policy*, and *Theft*.

Some of the strategies for mitigation against risk and uncertainty may include insurance, planning, diversification, adoption of technologies, innovation, indigenous and religious knowledge etc.

Measurement of NPV (Net Present Value)
Suppose a plot of land is worth $1 million today but expected to be worth $1.2 million in a year, would you buy it? Why or why not?

For average farmers, this situation involves a long term decision making process. We first need to know the level of interest rates.

Suppose the interest rate is 9%, we can use the formula for present value to measure NPV:

$$PV0 = FV1 \times 1/(1+i)$$

Where:

FV1 is future expected value of land at end of the year (year 1)
PV0 is discounted value or present equivalent of the expected future value (year 0)
i is the interest rate
NPV is the net present value (present value of investment less initial cost)

$$PV0=1,200,000 \times 1/(1+0.09) = 1,100,917$$

Therefore NPV = 1,100,917-1,000,000=100,917
Since 100,917 is positive, one can invest in this land.

NPV represents the contribution of that investment to the value of the firm which is the value to shareholders. The higher the NPV, the more attractive is the investment. Thus, shareholder wealth is maximized when NPV is positive or return on investment (ROI) is greater than required rate of return (RRoR).

ROI > RRoR

Where:

Return on investment (ROI) is revenues or payback less initial cost
Required rate of return (RRoR) is the interest rate
or the minimum expected return for typical investment

In this case, given that:

Payback = 1,200,000
Initial cost = 1,000,000
And RRoR = 9%

Therefore:

ROI = (1,200,000-1,000,000)/1,000,000
= 200,000/1,000,000 = 20%
And 20% > 9% (or 20% is greater than 9%)

Since the ROI of 20% is greater than the RRoR of 9%, this is a good investment and should be seriously considered.

Why would some investment activities have a positive NPV?

- Buyer preferences for established brand names.
- Ownership or control of distribution system.
- Patent control of product design or production technique.
- Exclusive ownership of superior natural resource deposits.
- Inability for new firms to acquire necessary factors of production.
- Superior access to financial resources at lower costs.
- Economies of large scale production & distribution due to capital-intensive production process or high initial startup costs.

Measurement of Risk

The problem in NPV is that it does not provide a clear means of estimating risk. For example, how sure are we that the investment will be worth 1,200,000 at the end of the year? What if it turned out to be far less than 1.2 million? Managers therefore have to evaluate investment risk and translate it into the discount rate (RRoR) to reflect adequate compensation. We therefore need to show probabilities for the return.

Suppose in the land investment example, we are not very confident on the $1.2 million? We can compensate for the perceived risk by requiring the ROI to be, say 19% instead of 9%.

Calculation using 19% will be 1.2 x 1/(1 + 0.19) = $1,008,403.

Therefore, the NPV is 1,008,403 – 1,000,000 = $8,403
Thus, high risk reduces NPV from 100,917 to 8,403.
Given the positive NPV, it will still be economical to invest in the land.

Activity 2

(20 Minutes)

Work in groups of four and discuss:

1. Given the land value situation above, when will it not be economical not to invest in the land?
2. What other factors need to be considered in this decision?

See the feedback section at the end of this lesson to see a completed table

Conclusion

To turn a farm into a firm, the farmer must be on the alert in making decisions, typically considering a variety of alternatives and very often, making some calculations which, of course, require record keeping. In this case, the farmer must always consider when to use accounting valuation and when to use economic valuation. Accounting valuation tends to be useful for government reporting purposes, such as tax returns. Economic valuation tends to be useful for internal decision making purposes, such as keeping or disposing of equipment.

Similarly important are the issues of profit maximization and minimization of loss. While most entrepreneurs tend to focus too much on profit making decisions, often times, the minimization of loss is hardly considered. It is strongly advised that even when a situation is expected to result into a loss, the investment still needs to be analysed to see if there are opportunities to minimize loses.

Finally, each investment needs not only to be evaluated on the basis of a positive profit (TR-TC) but also in comparison to alternative investments. This includes calculations of present values discounted for potential interest that could be earned on the money as well as the potential risks of not earning the expected returns.

Glossary

Depreciation:	Reduction in value of the asset due to wear and tear.
Inventory:	Supplies and resources on hand, not yet deployed but in storage.
NPV:	Net Present Value, i.e., present value of investment less initial cost.
ROI:	Return on Investment, i.e., revenues or payback less initial cost.
RRoR:	Required Rate of Return, i.e., interest rate or minimum expected return for typical investment.

References

McGuigan, J.R., Moyer, R.C., and Harris, F.H., (1999), *Managerial Economics, Applications, Strategy and Tactics, 8th ed.* South-Western College Publishing, Ohio.

Maurice, S.C., and Thomas, C.R., (2002), *Managerial Economics, 7th ed.* McGraw-Hill Irwin, New York.

Salvatore, D., (2004), *Managerial Economics in a Global Economy, 5th ed.*, Thomson South-Western, Ohio.

Feedback

Feedback Activity 1

1. In the depreciation case above, when would it be economical not to consider the equipment as an asset?
    a. When nobody is willing to pay anything for it.
2. In the inventory valuation case above, when would it be economical not to take the contract?
    a. When the labour costs go up by 2,500 or more.
3. In the unutilized facilities case above, when would it be economical not to sublease the space?
    a. When the sublease offer is zero
    b. Also when the sublease period has to extend beyond a year.
4. In the measurement of profitability case above, when would it be economical for the owner manager to continue operating the business?
    a. When the net sales are 508,000 and above.
    b. When the expenses drop by 8,000 or more (to 202,000 or less).
    c. When the salaries for managers drop by 8,000 or more (to 22,000 or less).
    d. When potential rent for the building drops by 8,000 or more (to 10,000 or less).

Feedback Activity 2

1. Given the land value situation above, when will it not be economical not to invest in the land?
    a. When the sale price of the land exceeds 1.2 million.
    b. When the RRoR is equal to 20% or more.
2. What other factors need to be considered in this decision?
    a. When there is a negative outcome in all or some of the conditions that make some investment activities have a positive NPV discussed earlier (such as):
        i. Buyer preferences for established brand names.
        ii. Ownership or control of distribution system.
        iii. Patent control of product design or production technique.
        iv. Exclusive ownership of superior natural resource deposits.
        v. Inability for new firms to acquire necessary factors of production.
        vi. Superior access to financial resources at lower costs.
        vii. Economies of large scale production & distribution due to capital-intensive production process or high initial start-up costs.
    b. Any other reasonable arguments.

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MODULE 5: **Agribusiness Management for Farmer Organisations**

LESSON 5: **Closing the Loop**

TIME: **1 hour 30 minutes**

AUTHOR: **Prof. Francis Wambalaba**

This lesson was made possible with the assistance of the following organisations:

LESSON 5 CLOSING THE LOOP

TIME:

1 hour 30 minutes

AUTHOR:

Prof. Francis Wambalaba

OUTCOMES:

By the end of this segment, you will have:

- Identified hindering and enabling factors in your own environment, your community, and any other prevailing environments.
- Discussed strategies for overcoming challenges and seizing the opportunities you face.
- Developed and defended a work plan for transforming your farming practices into firm practices.

INTRODUCTION:

In this lesson you are expected to tie together the essentials of how to transform a farm into a firm through a group project presentation. The project activities include investigation of specific hindering factors as well as the enabling environments based on your own experiences.

Instructions (5 minutes)

For this module, you are expected to reflect on topics covered in both this module and other modules and to consider lessons learned. Out of these reflections you should be able to develop a work plan based on your farming situation. The goal is to develop a realistic but ***sacrificial*** plan that will result in a fast transformation from a farm to a firm.

Activity 1

Individual Planning (30 minutes)

Take 10 minutes to compile an individual plan.

1. First identify any hindering factors. What issues hold you back currently from moving forward?
2. Identify enabling factors. What current circumstances will allow you to develop into a firm?
3. Think back across all the modules and identify the strategies that will allow you to overcome some of the hindrances and allow you to seize opportunities. Think of strategies arising out of your study of:
    a. Policy and the agricultural sector;
    b. Economics.
    c. Entrepreneurship;
    d. ICT skills;
    e. Sustainable agriculture;

Activity 2

Class Presentation (60 minutes)

Present your plan and participate in the discussions that ensue. Also keep your plan open in front of you and refine it as you hear how others in the class have responded to this challenge. Incorporate the best of their ideas.

Conclusion

The real benefit of this course will be if you implement your plan. We challenge you to make the effort. Sacrifices will be involved and it will not always be easy but the end result should impact positively on both you and your family. Good Luck!