

MODULE 2: **Sustainable Agriculture**

LESSON 3: **Benefits of Sustainable Agriculture**

TIME: **1 hour 36 minutes**

AUTHOR: **Dr Maina Muniafu**

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LESSON

3

**BENEFITS OF
SUSTAINABLE AGRICULTURE**



TIME:

**1 hour 36
minutes**

AUTHOR:

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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

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

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

References



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/imp/imp/projects/tl2-publications/regional-situation-outlook-reports/rso-common-bean-esa.pdf

Feedback



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

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	100 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	<ol style="list-style-type: none"> 1. High yielding hybrid varieties 2. Selected local varieties 	<ol style="list-style-type: none"> 1. Dangers of GMO's, higher resource uptake (water and soil nutrients) 2. Reduced negative impacts 	<ol style="list-style-type: none"> 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