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MODULE 2: **Sustainable Agriculture**

LESSON 3: **Benefits of Sustainable Agriculture**

TIME: **1 hour 36 minutes**

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

**MODULE 2**

**Sustainable Agriculture**

**3**



## AUTHOR:

**LESSON**

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

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.

**BENEFITS OF**

**SUSTAINABLE AGRICULTURE**

## INTRODUCTION:

## :

## OUTCOMES:

## :

**Dr Maina Muniafu**

## TIME:

## 1 hour 36 minutes

## OUTCOMES:

## :

## INTRODUCTION:

## :

**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)

**Table 1: Quality parameters for Agricultural products**

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.



## 



|  |  |  |  |
| --- | --- | --- | --- |
| **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.

## icon_activity.png



|  |  |  |  |
| --- | --- | --- | --- |
| **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.

Methods (20 minutes)

**Table 2: Exercise on yield constraints and improvements**

## Activity 2

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



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

Table 3: Value addition to agricultural products

## 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

**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.



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

# Enrichment Resources

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.

# Conclusion

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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](http://www.icrisat.org/what-we-do/impi/projects/tl2-publications/regional-situation-outlook-reports/rso-common-bean-esa.pdf)

# References

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|  |  |  |  |
| --- | --- | --- | --- |
| **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 |

**Table 1: Quality parameters for agricultural products**

## Feedback Activity 1

# Feedback

|  |  |  |  |
| --- | --- | --- | --- |
| **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 |

|  |  |  |  |
| --- | --- | --- | --- |
| **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**

## Feedback Activity 2

# Feedback

|  |  |  |  |
| --- | --- | --- | --- |
| **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 |

**Table 2: Exercise on yield constraints and improvements**

|  |  |  |  |
| --- | --- | --- | --- |
| **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 |

# Feedback

**Table 3: Value addition to agricultural products**

## Feedback Activity 3

|  |  |  |  |
| --- | --- | --- | --- |
| **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 |

**Table 3: Value addition to agricultural products**