# CATHOLIC UNIVERSITY OF RWANDA


## FACULTY OF PUBLIC HEALTH AND HUMAN NUTRITION

### DEPARTEMENT OF HUMAN NUTRITION

### LEVEL V

### ACADEMIC YEAR 2021

# NUTRITION POLICY, FOOD QUALITY LEGISLATION

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## 1. BRIEF DESCRIPTION OF AIMS AND CONTENT

The module enables the students to:

- Understand principles of Food Quality Assurance and Legislation
- Learn nutritional problems and policy interventions in Rwanda, different criteria for food and nutrition policies and their implementation.
- Understand food quality assurance in small to medium scale enterprises and export oriented enterprises
- Describe legislations regarding different types of foods

## 2. LEARNING OUTCOMES

By the end of the module the student should be able to:

**In Nutrition Policy:**

- Describe policies linked to nutritional related problems in Rwanda
- Define criteria used to set Food and nutrition policies in Rwanda
- Analyze policy implementation and elements preventing effective implementation
- Explain nutrition policies in Rwanda and how they are implemented
- Describe how food and nutrition policies are made and driving forces
- Compare Food and nutrition policies in Rwanda to other countries
- Observe nutrition policies in Rwanda
- Adapt nutrition policies in Rwanda by considering different driving forces
- Supervise food and nutrition policies implementation
- Revise Food and Nutrition policies by considering other countries experiences

**In Food Quality Assurance and Legislation:**

- Basically explain food quality assurance in small to medium scale enterprises and export oriented enterprises.
- Generally describe the global perspective of quality assurance with food legislations and implications, particularly in developing countries.
- Describe basic principles of establishing and maintaining modern quality management systems in the food industry
- Discuss the concepts of Quality Assurance as applied to the food industry.
- Describe legislations regarding different types of foods in Rwanda (Milk, Cheese, yoghurt, meat products, fisheries, cereals, Fruits and Vegetables)
- Discuss the concept of foodstuff legislations as applied to the food industry
- Be able to observe principles of Quality Assurance as far as food is concerned
- Be able to adapt Rwanda Food legislations for different types of foods

**COURSE CONTENT**

# PART I. NUTRITION POLICY

## 1.1. INTRODUCTION

Although many countries have adequate policies on nutrition, those policies are either not sufficiently well-known, or practitioners are not well equipped to implement them effectively. Implementing policies often requires training. The challenge is to build capacity at all levels and to build a network of people who understand and internalise the link between poverty and malnutrition. In addition, those in the fields of, for example, health, social welfare and development, need to work together in a more integrated way. This aim of this module is to guide you through the experience of different countries in implementing nutrition programmes and policies and to encourage you to study them critically looking for lessons and good practices. In addition, you are invited to study the relationship between successful programmes and their guiding policies as well as the socio-political and technical factors that contribute to their success. In this way, it is hoped that you will be equipped to apply your knowledge, understanding and skills and to contribute to the improvement of nutrition policy implementation through integrated programmes in your own site of practice.

## 1.2. DEFINITION OF KEY CONCEPTS: POLICY, PUBLIC POLICY AND NUTRITION POLICY

- **A Policy** is a deliberate system of principles to guide decisions and achieve rational outcomes. A policy is a statement of intent, and is implemented as a procedure or protocol. Policies are generally adopted by a governance body within an organization. Policies can assist in both subjective and objective decision making. Policies used in subjective decision making usually assist senior management with decisions that must be based on the relative merits of a number of factors, and as a result are often hard to test objectively. In contrast, policies to assist in objective decision making are usually operational in nature and can be objectively tested.

  A policy is a set of ideas or plans that is used as a basis for making decisions, especially in politics, economics, or business. It is a set of ideas or a plan of what to do in particular situations that has been agreed to officially by a group of people, a business organization, a government, or a political party.

- **A Public policy** is a system of "courses of action, regulatory measures, laws, and funding priorities concerning a given topic promulgated by a governmental entity or its representatives."
- **Nutrition policy** is a set of agreed actions, based on governmental mandate, aimed to ensure good health in the population through informed access to safe, healthy and adequate food.

  The Food and Nutrition Policy encompasses the collective efforts of the government and other stakeholders to influence the decision making environment of food producers, food consumers and food marketing agents in order to improve the nutritional status of the population.

### 1.3. ELEMENTS OF NUTRITION POLICY

A well planned nutrition policy has the concept of inducing positive changes within the population. Positive changes include:

1) Marked increase in the variety and quality of foods available due to globalization and improved food technology.
2) Increase in production and imports leading to adequate accessibility to foods;
3) Increased awareness on food safety, improved preservation and storage facilities
4) More food subsidies
5) Greater awareness on nutrition
6) Better health-care facilities and
7) Reduction in the prevalence of iodine deficiency disorders (IDD) and in severe forms of protein energy malnutrition (PEM) and vitamin A deficiency (VAD).

Any Nutrition policy has the following key elements:

- Sustainable food production, processing, distribution and consumption
- Ensure optimal food quality and safety
- Collective/multi-sectoral efforts for sustainable food and nutrition security
- Achieve and maintain nutrition well-being and healthy lifestyle of the population

### 1.4. DEVELOPING AND ANALYZING A NUTRITION POLICY

This process involves the following steps:

1) Understanding the need for a policy
2) Review the current food and nutrition status of the population
3) Review the existing the policies (if any) and identify the lacunae

4) Develop appropriate food and nutrition policy using
    - Direct policy instruments
    - Indirect policy instruments
5) Develop plans of action for implementation
6) Evolve an effective and strong monitoring and evaluation mechanism
7) Establish a nutrition surveillance system to facilitate programme appraisal and follow-up action.

## 1.5. THE NATIONAL FOOD AND NUTRITION POLICY IN RWANDA

The NFNP in Rwanda provides background, describes the current situation and key trends as well as the challenges and opportunities related to nutrition and household food security in Rwanda. It retains close linkage to Rwanda VISION 2020 and the Millennium Development Goals while aligning with the Economic Development and Poverty Reduction Strategy (EDPRS 2), and more recent sector and subsector policies and strategic plans. The linkage of food and nutrition to productivity and economic development also underlies the importance of the NFNP Policy Scope.

### 1.5.1. Vision and Mission of NFNP

**The vision of the NFNP** in Rwanda is to ensure services and practices that bring optimal household food security and nutrition for all Rwandese. This policy is based on the values of solidarity, ethics, and equity, as well as cultural diversity and the importance of gender, for the harmonious development of Rwanda as a nation.

**The mission of the NFNP** is to provide a legal framework and favourable environment for the effective promotion and implementation of food and nutrition strategies and interventions that guarantee the nutritional well-being of the entire population, giving special attention to pregnant and lactating women and children under two years of age for the sustainable development of Rwanda.

### 1.5.2. NFNP Objectives and Outcomes

#### 1.5.2.1.General objective

The general objective of the National Food and Nutrition Policy is to improve the household food security and nutritional status of the Rwandan people, to substantially reduce chronic

malnutrition in children under two years of age and to actively identify and manage all cases of acute malnutrition.

**1.5.2.2.Strategic objectives and key expected outcomes**

In order to improve the food and nutritional status of the population, the policy seeks to achieve the specific objectives that are taken from the HSSP III. The National Food and Nutrition policy relies in the following strategies to bring about changes in the population:

1) Sustaining the position of food and nutrition as central priorities of the government across sectors at all levels and among development partners (Strategic Direction 1).
2) Preventing stunting in children under two years of age (Strategic Direction 2).
3) Strengthening, expanding and promoting services and practices that result in household food security year round (Strategic Direction 3).
4) Preventing and managing all forms of malnutrition (Strategic Direction 4).
5) Strengthening nutrition education in schools through curricular and extracurricular activities (Strategic Direction 5). .
6) Strengthening emergency preparedness and response in areas of nutrition and food security of families and individuals and response to natural disasters and in refugee situations (Strategic Direction 6).
7) Improve governance systems and accountability for nutrition and food security (Strategic Direction 7).

## 1.6. NUTRITION PLANS AND PROGRAMS

### 1.6.1. Why is it important to think strategically about nutrition?

Nutrition has a significant impact on the health and quality of life of all people. This impact is most profound when an integrated and sustained national-level nutrition program that focuses squarely on beneficiaries acknowledges the importance of nutrition to people's health and well-being. To ensure a national program has the necessary level of integration and sustainability, it must follow a strategic approach that is thoughtful and comprehensive. Specifically, this means identifying the long-term goals and the critical priorities of an effective program as well as the means of achieving these goals and priorities, including broad political support, strong technical capacity, and adequate funding. The ability to develop, implement, and monitor a practical, relevant, and coordinated strategy is particularly important when making a case for external/donor support of a nutrition program. Activities across the strategy should be aligned,

linked, and leveraged, to ensure resources allocated to nutrition lead to positive and sustained outcomes. An emphasis on integration also focuses attention on opportunities to combine activities, both within the nutrition arena and extending across other areas, such as agriculture, education, and environment. This approach is in direct contrast to strategies designed around short-term initiatives, narrowly focused approaches, and pilot projects, which historically have not led to the lasting improvements in health outcomes that nutrition programs can and should provide.

### 1.6.2. National Food and Nutrition Strategic Plan in Rwanda (NFNSP)

The Rwanda National Food and Nutrition Policy (NFNP) developed in 2013 builds on several achievements that have improved the status of nutrition and household food security in Rwanda during the past six years. The National Food and Nutrition Strategic Plan (NFNSP) 2013-2018, like the NFNP, outlined ambitious but necessary strategies needed to solve serious and persistent problems including the high prevalence of child stunting and high levels of anaemia in children and women. The NFNP and this NFNSP also take into account major differences in the economic development environment and the higher national and international priority placed on improving nutrition and related household food security problems in the second decade of the new millennium compared to 2007 when the country's first National Nutrition Policy was adopted.

## 1.7. FOOD AND NUTRITION POLICIES IN OTHER COUNTRIES AND INTERNATIONAL FOOD AND NUTRITION POLICIES

The International Conference on Nutrition (ICN), convened jointly by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) in 1992 served as a motivating force for countries around the world to develop and implement food and nutrition policies and plans of action. The World Declaration and Plan of Action for Nutrition adopted by the ICN have in fact provided a technical framework for the preparation of national plans of action through nine strategies, which involve various sectors of government, international agencies, nongovernmental organizations (NGOs) and the private sector.

In 1996, the World Food Summit (WFS) reinforced the validity of the goals and strategies identified at the ICN. It also provided an exceptional opportunity to reaffirm the commitment to achieve food and nutrition security for all and to invest resources effectively at national, regional

and global levels in order to accelerate the translation of national nutrition plans into meaningful action and visible results.
Subsequent to ICN, FAO and WHO have jointly conducted regional workshops to assist countries in formulating national plans of action on nutrition and to review their implementation.

In the context of various emerging and re-emerging issues like natural calamities, political instabilities, growing infectious diseases (like HIV/AIDS), surging rates of prevalence of noncommunicable diseases and impact of globalization and market economy on availability of foods, etc. policymakers and programme managers are confronted with significant challenges. The experience of WHO and FAO in supporting countries to develop and implement food and nutrition plans indicates that policymakers of various sectors need the capacity to critically analyse the existing food and nutrition responses, so as to fully understand the increasing complexity of food and nutrition policy development.

A number of agencies have already recognized these factors and developed high quality tools and mater ials to address this situation. The United States Agency for International Development (USAID) project has developed the "PROFILES" programme, an advocacy tool to promote the importance of nutrition. WHO has designed a short training course that focuses on equipping policy-makers to evaluate and modify existing food and nutrition policies in light of the changing context of food and nutrition policy. FAO and the Interagency Working Group (IAWG) have been helping countries to develop integrated monitoring and surveillance systems, such as Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS).

### 1.7.1. WFP Nutrition Policy

WFP's Nutrition Policy details how the organization will support governments to achieve Sustainable Development Goal 2, particularly target 2.2: to end all forms of malnutrition by 2030.

The Sustainable Development Goals (SDGs) give critical importance to malnutrition as a contributor to, and outcome of, poverty. The 2030 Agenda brings malnutrition to the centre of the global policy framework, and reinforces the global community's resolve to eliminate malnutrition. Nutrition is interrelated with eight SDGs because of how it impacts, and is

impacted by: poverty; education; sustainable growth; poor water and sanitation; quality healthcare; gender inequality; sustainable consumption; and environmental conservation.

Building on the successes and learnings of the 2012 Nutrition Policy, the new Nutrition Policy of the World Food Programme (WFP) reaffirms the organization's commitment to addressing malnutrition as a primary channel to reach Zero Hunger. The new policy aims to contribute to the elimination of all forms of malnutrition—including overweight/obesity—and confirms addressing nutrition in emergencies as a central priority.

As climate, socio-political and economic dynamics continue to place stress on food and health systems, and as alarming levels of malnutrition persist, new ways of improving nutrition are also required. The policy therefore puts forward an integrated approach to nutrition that simultaneously considers issues of availability, access, demand and consumption of nutritious foods – with a goal of adequate and healthy diets for vulnerable groups of all ages.

With its strong operational and technical skills, WFP uses its broad range of nutrition experience in various contexts, both to support direct implementation and to provide governments with technical assistance in developing and sustaining nationally-owned nutrition solutions. To the furthest extent possible, WFP's interventions reinforce and align to national nutrition plans.

As women often bear the primary responsibility for feeding their families, gender equality and women's empowerment are essential to eliminating malnutrition. The nutrition policy reconfirms WFP's commitment to implementing the WFP Gender Policy by considering societal and intra-household gender dynamics in the design of nutrition programmes.

### 1.7.2. EAC Food and Nutrition Security policy (FNSP)

The East African Community (EAC) region suffers from frequent food insecurity despite the huge resource endowments and great potential for production of adequate food. Food insecurity in the region is caused by both natural and policy related factors. The Food and Agriculture Organization (FAO) estimates that 20 million of the over 160 million people in the region are food insecure. It is against this back drop that in 2011, that the EAC Heads of States Summit directed the Secretariat to develop the first Food Security Action Plan (FSAP) 2011-2015 to guide the implementation and actualization of the regional food security objectives.

The process of developing the EAC Food and Nutrition Security policy (FNSP) was steered by the EAC Food and Nutrition Security Policy Working Group with support from the East Africa Trade Hub (EATH), a regional USAID/East Africa Program. The development and validation of the FNSP was concluded in 2014. The FNSP was presented to and adopted by the 7th Sectoral Council on Agriculture and Food Security in September 2014. The overall goal of the policy is to ensure food security and adequate nutrition for the people in the East African region.

The goal of the EAC Food and Nutrition Security Action Plan (FNSAP) 2018-2022 is to contribute to elimination of hunger, malnutrition, and extreme poverty in the East African region by the year 2022. This will be achieved through three interrelated objectives and six intermediate result areas as follows:

i. To improve sustainable and inclusive agricultural production, productivity and trade of crops, animal and animal resources, fisheries, aquaculture, apiculture and forest products. Under this objective there are three (3) intermediate results (IR):

- IR1: Improved agricultural production, productivity and incomes
- IR2: Improved trade and market access
- IR3: Increased farm and off-farm enterprise and job opportunities for youth and women at all levels of the Value Chains

ii. To strengthen resilience among households, communities and livelihood systems by promoting sustainable utilization of natural resources, environmental conservation and uptake of disaster risk reduction with enhanced post-harvest value addition.

Under this objective there are two(2) intermediate results (IRs):

- IR4: Strengthened disaster risk preparedness and management with sustainable utilization of natural resources and environmental conservation under the changing climate
- IR5: Improved post-harvest handling, agro-processing and value addition.

iii. To improve access and utilization of nutritious, diverse and safe food. The IR under here is:

- IR6: Increased investment in nutrition

The action plan has also proposed Cross-Cutting Intermediate Results (CCIR) which include;

- CCIR1: Commitments by EAC Partner States and donors to invest in the action plan
- CCIR2: improved governance, policy, and institutional effectiveness

## 1.8. PROGRESS AND CHALLENGES IN IMPLEMENTING NUTRITION POLICIES AND PROGRAMS

To be effective, commitments to action must be implemented and enforced. The implementation of policies and interventions depends on converting political commitment to practical action.

The Global Nutrition Report (GNR) is the independent and comprehensive annual review of the state of the world's nutrition. The 2016 report focuses on the theme of making and measuring global commitments to nutrition, and what it will take to end malnutrition in all its forms by 2030. This edition of the report presents a comprehensive analysis of the multiple burdens of malnutrition, from stunting and wasting to obesity and related non-communicable diseases. Findings reveal a global lack of progress against malnutrition – which afflicts one in three people worldwide. Beyond health burdens, the report offers data on the cost of malnutrition to societies and individuals, explores examples of progress and offers ways to engage stakeholders to help end malnutrition across a variety of sectors – from education and agriculture to sanitation and hygiene. The 2016 Global Nutrition Report points to ways to reverse this trend and end all forms of malnutrition by 2030.

## 1.9. RELATIONSHIP BETWEEN AGRICULTURAL POLICIES AND FOOD POLICIES

Agriculture and nutrition share a common entry point: "**food**." Food is a key outcome of agricultural activities, and, in turn, is a key input into good nutrition. Without agriculture there is little food or nutrition, but availability of food from agriculture doesn't ensure good nutrition.

- Food security is the primary justification for all government involvement in agriculture.
- Governments would have little justification for farm and food policies if their citizens could otherwise be assured of dependable access to adequate supplies of safe and wholesome food at reasonable costs.
- Programs subsidizing farm commodity prices and incomes are justified as a means of stabilizing prices at levels that will ensure consumers with a stable and affordable supply of food.
- Pesticide and animal health regulations are justified as means of ensuring food safety.
- Soil conservation and water quality programs are means of protecting the agricultural resources necessary for long productivity.

- Even government subsidies for development of technologies that enhance agricultural productivity are justified as means of making food less costly and more available to more people.
- Public policies affecting agriculture have persisted in countries around the world because governments have not been willing to leave the food security of their constituents to the impersonal forces of the marketplace.

## 1.10. NUTRITION'S IMPACT ON AGRICULTURE

The impact of the improved understanding of nutrition and the importance of the diet in nutrition status has had subtle but far-reaching consequences for food and agricultural policy. Many of the changes in the food supply are in response to increased consciousness of diet, nutrition and health status. The simple connection between nutrition policy and food and agricultural policy follows from the sovereignty of the consumer. Nutrition policy influences consumers' attitudes and choices. These impact the behavior of agents in the food and production system. And, if properly designed, food and agricultural policies can accelerate the process of adapting the production and distribution systems for agriculture and food to better meet the demands of the more informed consumer. Policies that reflect the behavior of consumers and supply better information to the agents in the food and agricultural system will be the most effective.

- Most of the world's poor live in rural areas depend on agriculture.
- Good nutritional status supports agriculture through enhanced work capacity and productivity.
- Productive agriculture depends on adequate nutrition status and vice versa.

## PART. II. FOOD QUALITY ASSURANCE AND LEGISLATION

### 2.1.QUALITY ASSURANCE IN FOOD PROCESSING

#### 2.1.1. Food quality

Quality can be defined as combination of attributes or characteristics of a product that have significance in determining the degree of acceptability of that product to the consumer.It can also be said as measure of purity, strength, physico-chemical & oregano-leptic characteristic of food products. Quality is a measure of the degree of excellence or degree of acceptability by the consumer. It can be defined as "summary of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs". In simple words, the product should have attributes to "satisfy the wants/ needs of the consumer or conformance with the user's requirements".

It also covers the safety and value for money. Food quality can be considered as a complex characteristic of food that determines its value or acceptability to consumers.

Thus it may be defined as "the composite of those characteristics which have significance in determining the degree of acceptability by the buyer. These characteristics should also have the ability to differentiate individual unit of the product."

#### 2.1.2. Quality characteristics of foods and measurements of sensory attributes

Every food product has characteristics and indices measurable by sensory, physical, chemical, or microbiological methods. Some characteristics are easily perceived; others are unseen. Understanding these quality characteristics and being familiar with the appropriate measuring tools are vital to quality control and the quality assurance of food products.

The important components of food quality are food safety, sensory characteristics and nutritional value.

The quality attributes includes primarily sensory attributes and hidden attributes. The hidden characteristics are those which cannot be evaluated with human senses and yet are of real importance to human health and welfare.

- **Food safety:** Safety of food is a basic requirement of food quality. "Food safety" implies absence or acceptable and safe levels of contaminants, adulterants, naturally occurring toxins or any other substance that may make food injurious to health on an acute or chronic basis.

  Besides safety, quality attributes include: nutritional value; organoleptic properties such as appearance, colour, texture, taste; and functional properties.

The quality attributes are outlined in Table and includes primarily sensory attributes and hidden attributes.

- **Quality attributes**

| | |
|---|---|
| Sight | Appearance<br>Colour<br>Gloss<br>Viscosity/ consistency<br>Size and shape |
| Touch | Texture<br>Hand/ Finger/ Skin feel<br>Mouth Feel |
| Smell and Taste | Flavour |
| Hidden | Nutritive value<br>Digestibility<br>Adulterants<br>contaminants<br>Toxicity |

The quality attributes include primarily sensory attributes and hidden attributes

- **Primary sensory characteristics**: The sensory attributes include characteristics such as color and appearance, viscosity and consistency, smell, taste, touch etc.
- **Hidden attributes:** The hidden characteristics are those which cannot be evaluated with human senses and yet are of real importance to human health and welfare.
  - Nutritive value is one of the hidden characteristics, which is considered by the consumers as a quality attribute.
  - Adulterants and toxicants are the other hidden characteristics. Toxic substances may be of microbial origin, veterinary drugs residues, pesticide residues or heavy metals.

### 2.1.3. Quality Assurance

Quality Assurance (QA) is a set of activities used by food companies to ensure that the process by which products are developed and produced meet a set of standards and specifications. The

goal of QA is to prevent defects with a focus on the process used to make the product. Tools commonly used in a QA programs are process checklists, project audits, and developing standard operating procedures.

## 2.2.QUALITY ASSURANCE MANAGEMENT IN FOOD INDUSTRY

The quality management combines commitment, discipline and a growing effort by everyone involved in the production process and fundamental techniques of management and administration, with the goal of continuously improving all processes. For that, the industries need to be structured organizationally, establish policies and quality programs, measure customers' satisfaction and even use more quality tools and methodologies. Specifically for the food industry, also involves the knowledge and application of techniques and programs for product safety. Each company has a particular stage of maturity on the issue of quality management.

There is a An activity or set of activities performed to ensure that the food quality and food safety requirements of a food are fulfilled. Food quality requirements are established by laws and regulations, by customers and consumers, and internally.

### 2.2.1. Quality assurance (QA) and quality control (QC)

QC is defined as a procedure or set of procedures designed to make certain that the end product conforms to a designated set of criteria as set forth by either the company or the customer. Quality assurance (QA) and quality control (QC) are two terms that are often used interchangeably. Although similar, there are distinct differences between the two concepts. Quality assurance and quality control are two aspects of quality management. While some quality assurance and quality control activities are interrelated, the two are defined differently. Typically, QA activities and responsibilities cover virtually all of the quality system in one fashion or another, while QC is a subset of the QA activities. Also, elements in the quality system might not be specifically covered by QA/QC activities and responsibilities but may involve QA and QC.

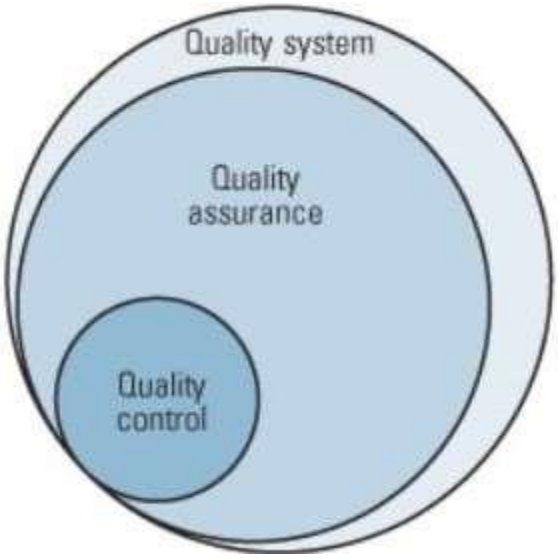



**Figure 1: Quality System, Quality Assurance, and Quality Control Relationships**

### 2.2.2. Quality Assurance, Quality Control and Inspection

Inspection is the process of measuring, examining, and testing to gauge one or more characteristics of a product or service and the comparison of these with specified requirements to determine conformity. Products, processes, and various other results can be inspected to make sure that the object coming off a production line, or the service being provided, is correct and meets specifications.

2.3.Quality Assurance and Audit Functions

Auditing is part of the quality assurance function. It is important to ensure quality because it is used to compare actual conditions with requirements and to report those results to management.

In *The Quality Audit: A Management Evaluation Tool* (McGraw-Hill, 1988), Charles Mill wrote that auditing and inspection are not interchangeable: "*The auditor may use inspection techniques as an evaluation tool, but the audit should not be involved in carrying out any verification activities leading to the actual acceptance or rejection of a product or service. An audit should be involved with the evaluation of the process and controls covering the production and verification activities*."

Formal management systems have evolved to direct and control organizations. There are quality management systems (QMSs) as well as environmental or other management systems, and each of these systems may be audited.

### 2.2.3. Tasks of Quality Management System in the food industry

In general, the operating system of quality control in the food industry must meet some specific tasks. One of the tasks is to ensure compliance with sanitary standards and compliance requirements of the legislation, including with regard to food safety standards, the Good Manufacturing Practices (GMP) and the system Hazard Analysis and Critical Control Points (HACCP). For this, there is need for procedures to control insects, rodents, birds and other pests, and procedures for cleaning and sanitizing equipment, industrial plant and storage areas. Still, personal hygiene of staff working on process lines and proper habits on food handling should be implemented and monitored to ensure that food safety standards are met. In cooperation with the departments of production, research and development, engineering or operations, the department of quality control analyzes manufacturing processes to "Hazard Analysis and Critical Control Points." The integrity and safety of food products should be ensured through the identification and assessment of all unit operations of the process in order to prevent potential contamination and adulteration that could expose consumers to health risks.

In cooperation with the department of research and development (R&D), production, purchasing and sales, should be prepared written specifications for raw materials, ingredients, packaging materials, other supplies and finished products. Furthermore, should be established in writing form and in cooperation with the departments of production and R&D the procedures for each unit operation of all manufacturing processes of the fashion industry that can be implemented in processing lines. The participation of staff from other departments of the company occurs by the virtue of their expertise in relation to consumer demands or knowledge of product technology and process, and the participation of the operators of the process, because of its experience in the production.

### 2.2.4. Total Quality Control and management

Total Quality Management is described as a process for managing quality; a philosophy of perpetual improvement. TQM relies on the fundamental principle that is the core of any business: maximize productivity while minimizing costs. Its goal is customer satisfaction. It consists of the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of goods and services.

The TQM approach embodies both management principles and quality concepts, including:

- customer focus,

- empowerment of people,
- leadership,
- strategic planning,
- improvement, and
- process management.

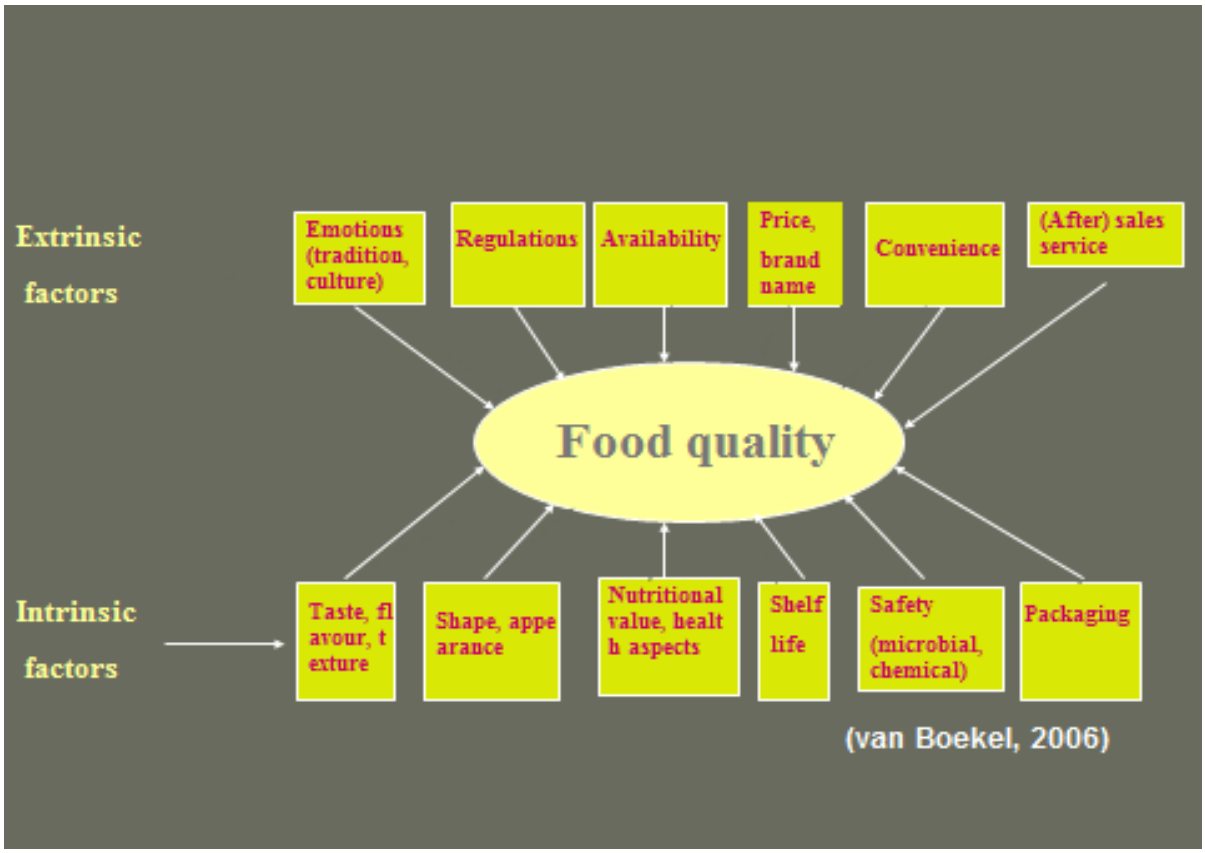
### 2.2.5. Quality control in small and medium scale enterprises

The goal of a food company's quality control program is to ensure that all requirements are fulfilled so that only safe foods of acceptable quality are sent to its customers or to consumers. QC is defined as a procedure or set of procedures designed to make certain that the end product conforms to a designated set of criteria as set by either the company or the customer. Quality is designed into the product specification and quality checks into the production system.

In modern food manufacturing environments, quality control systems are the supporting programs that are outcrops of the Hazard Analysis Critical Control Point (HACCP) program.

Quality control in small and medium entreprises relates to different requirements, once met lead to consumer acceptability.

### 2.2.6. Broadening of the quality control concept in food industries



Note:

- All of the intrinsic quality factors are influenced by:
  - the quality of raw materials
  - the composition of the food
  - processing methods
  - storage method and conditions
- Good quality of product is related to:
  - conformance to specification (production)
  - fitness for use (consumption)
  - customer satisfaction
  - exceeding consumer expectations

### 2.2.7. Quality Management Programs and Systems

Quality management system (QMS) is defined as a formalized system that documents processes, procedures, and responsibilities for achieving quality policies and objectives. Quality management systems (QMS) are indispensable in each sector of the food industry, to ensure safe, quality food for the consumer.

## 2.3. DIFFERENT QUALITY ASSURANCE STANDARDS IN PRIMARY PRODUCTION

### 2.3.1. Food Quality Standards

Some of quality characteristics are covered in food laws and regulations. Failure of a food to meet regulatory requirements relating to a standard of identity, the declared quantity, declared ingredients, or label claims, can be considered as misrepresentation, misbranding, or fraud.

The spoilage, deterioration, or decomposition of foods with the absence of any resulting harmful substance that can lead to illness or injury, can be considered as failure to meet food quality requirements based on fitness for human use or wholesomeness criteria.

There are 4 common standards:

#### 2.3.1.1.**Legal Standards**

Legal standards are mandatory and are set up by law or through regulations. Legal standards are generally concerned with the lack of adulteration involving insects, molds, yeasts and pesticides; the maximum limits of additives permitted; or by establishing specific processing conditions so that extraneous materials do not contaminate foods.

2.3.1.2.**Company or Voluntary Label Standards**

These standards represent those established by various segments of the food industry. They represent a consumer image and may become a trademark or symbol of product quality.

Voluntary standards are generally used by private companies or supermarkets and tend to vary depending upon the particular requirements of a given label.

2.3.1.3.**Industry Standards.**

Those whereby an organized group attempts to establish given quality limits for a given commodity. Industry standards are implemented due to the pressure from marketing organizations or by specific commodity groups where legal standards are not involved.

2.3.1.4.**Consumer or grade standards**.

These represent the consumers' requirements for a product.

**2.3.2. International Food Standards**

**2.3.2.1.The Codex Alimentarius Commission**


- The **Codex Alimentarius** or the food code is the global reference point for consumers, food producers, processors, national food agencies and international trade organisations.
- The Codex Alimentarius Commission is often simply referred to as "Codex"

The Codex Alimentarius Commission shall be responsible for making proposals to, and shall be consulted by, the Directors General of the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) on all matters pertaining to the implementation of the Joint FAO/WHO Food Standards Programme.

**2.3.2.2.World Trade Organization**

The World Trade Organization (WTO) is the global international organization dealing with the rules of trade between nations.

- Established on 1 January 1995
- Created by Uruguay Round negotiations (1986-94)
- Membership: close to 200 countries

2.3.2.3.**Assurance throughout the food chain**

In this context HACCP is a concept as well as a method of operation, applied to all phases of food production, including agricultural production, food handling, food processing, foodservices, food distribution, and consumer use. The HACCP program considers all types of hazards (biological, chemical, or physical) that could affect food safety and that occur naturally in the food or in the environment, or that are generated due to an error during food processing.

Nowadays, HACCP concept has been combined with ISO 9000 → ISO 22000.

2.3.2.4.**ISO 9000**

- ISO 9000 is a Quality System Management Standard.
- The international process standard is ISO 9000-2000.

This standard is a quality management system for establishing process control, maintaining a customer orientation and achieving continual improvement.

- ISO's food safety management standards help organizations identify and control food safety hazards, at the same time as working together with other ISO management standards, such as ISO 9001.

**2.3.2.5.ISO 22000**

- ISO 22000 is the new international generic FSMS standard for food safety management systems. It defines a set of general food safety requirements that apply to all organizations in the food chain. It is designed to be fully compatible with ISO 9001:2000.
- . Applicable to all types of producer, ISO 22000 provides a layer of reassurance within the global food supply chain, helping products cross borders and bringing people food that they can trust.

### 2.3.4. Adhering to Safety Standards

The advantages associated with adhering to food safety standards are:

- Ensures safety of food products.
- Greater health protection.

- Increased international acceptance of food products.
- Helps to meet applicable food safety related statutory & regulatory requirements.
- Demonstrate conformance to international standards and applicable regulatory requirements.
- Reduces risk of product/service liability claims.

## 2.4. FOOD QUALITY EVALUATION

The quality evaluation is a quality management activity in which another individual, typically a supervisor or someone from the QM/QA team scores an agent interaction based on key criteria defined in a quality form. Quality evaluations provide feedback to agents on their performance and act as a foundation for coaching and improvement.

There are tree methods of food quality evaluation: Subjective methods, Objective methods and microscopic methods.

### 2.4.1. Subjective Methods

Evaluating quality is based on opinion of the investigators. It includes sense organs. It is usually a physiological reaction which is a result of past training, experience of the individual influence of personal preference and power of perception. It is also referred as subjective or sensory method. e.g. flavor, color, touch, odour and taste.

### 2.4.2. Objective methods

Objective methods of quality evaluation are based on observations from which the human perception is excluded. They are based on scientific tests.

- ***Physical methods of measurement:*** This is perhaps the quickest methods. They are generally concerned with attributes of product quality such as size, texture, color, consistency imperfections or they may be concerned with process variables like headspace, fill, drained weight, etc.
- ***Chemical methods of measurement:*** Standard analysis methods are generally used for quantitative chemical evaluation in most cases, but these chemical analysis are often too long & tedious as a result industries have developed method termed as quick test for such as those for enzymes, moisture, fiber, pH or acidity.

### 2.4.3. Microscopic methods

They have excellent application in a quality control programs, because they help in determination of microbial count, spoilage protection in fresh and processed products and can differentiate between cell types and organisms. These methods can be divided into two categories: **Adulteration and contamination.**

Both are terms that refer to unfavorable conditions with regards to substances that are used in day-to-day life. Adulteration and contamination share certain differences that set them apart:

- Adulteration stands for the addition of certain ingredients that are not legally permitted in them. Contamination stands for the deterioration of the quality of the substance.
- Adulteration is performed as a practice by certain merchants to obtain more profit. Contamination is not performed as a practice.
- Adulteration is mostly man-done. Contamination can happen naturally as well as a result of environmental factors such as heat, humidity etc.

Examination will indicate the presence of molds, insects, excreta or foreign material. Each test is specific. It can permit differentiation between cell types, tissue types of various stored foods.

## 2.5. FOOD SAFETY, FOOD SECURITY AND TRADE

### 2.5.1. Definition of key concepts

In order to understand "food safety" we must first know the terms **safe** and **hazard**.

- **"Safe"** means that nothing harmful happens when we consume a food.
- A **"hazard"** is the capacity of a thing to cause harm.

The objective of the food safety is **to protect the food supply from microbial, chemical and physical hazards** or contamination that may occur during all stages of production and handling-management of animals at farm, transportation, storage of raw milk, processing, production of value added products, distribution and storage of end products.

**Food borne hazards**

| Physical | Biological | Chemical |
|---|---|---|
| | | Natural occurring poisons of biological origin and Chemicals or deleterious substances |
| Glass<br>Hair<br>Metal<br>Stones, Plastic,<br>Parts of pests<br>Insulation material<br>Bone | Microbiological<br>Pathogenic Bacteria<br>Spore- Forming<br>Non- Spore forming<br>Parasites and<br>Protozoa<br>Viruses | Mycotoxins Algal Toxins<br>Veterinary drug residues,<br>Antibiotic residues,<br>Chemical residues Non-permissible food additives,<br>Excess amount of permissible food additives,<br>Pesticide residues, Growth stimulants, Adulterants |

A food borne hazard is a biological, chemical or physical agent in, or condition of, food, with the potential to cause an adverse health effect.

| **Contaminants** | **Foods** |
|---|---|
| **PCBs, dioxins, dieldrin, aldrin, DDT…** | Milk, butter, eggs, animal and vegetable fats and oils, fish, cereals, drinking-water… |
| **Lead** | Milk, canned/fresh meat, kidney, fish, molluscs, crustaceans, cereals, legumes, fruits, spices, drinking-water... |
| **Cadmium** | Kidney, molluscs, crustaceans, cereals, vegetables… |
| **Mercury** | Fish, fish products, mushrooms… |
| **Aflatoxins** | Milk, milk products, cereals, nuts, spices, cocoa, coffee... |
| **Ochratoxin A** | Wheat, cereals, wine |

| | |
|---|---|
| **DON** | Wheat, cereals |
| **Fumonisins** | Maize, wheat |
| **Chlorpyrifos, diazinon, melathion, parathion, aldicarb, captan, dithiocarbamate…** | Cereals, vegetables, fruits, drinking-water… |
| **Nitrate/nitrite** | Meat, drinking-water… |
| **Inorganic arsenic** | Wheat, drinking-water… |

### 2.5.2. Safety concerns

We know that the goal of food safety is to reduce the size of risks to the lowest reasonable level without severe disruption of the food supply. For this we should first identify hazards related to foods or food components and then estimate the size of the risk that the hazard will cause.

It is important to note that all foods have some degree of risk and that no food is absolutely "safe." The important consideration becomes "the size of the risk and how the size of the risk can be reduced" without eliminating the food source.

Specific food safety concerns differ markedly and include:

- Additives, colours and flavours.
- Antibiotics and other food additives.
- Fertilizers and other growing aids.
- Irradiation.
- Microbiological contamination.
- Naturally occurring food toxicants.
- Nutrition.
- Pesticides.
- Pollutants.
- Processing, packaging and labelling.
- Tampering.

### 2.5.3. Food Security and Trade

Food security is a state of having reliable access to sufficient quantity of affordable, nutritious food. "Food Security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".

**Four pillars of food security**

1) Availability refers to the amount of food of appropriate quality provided by domestic production or imports, food stocks and food aid;

2) Access refers to the importance of ensuring access to adequate resources to acquire appropriate foods for a nutritious diet. Economical, physical and social access;

3) Food utilization implies the need of an adequate diet achieved through an adequate access to safe and clean water, sanitation and health care system;

4) Stability recognizes that the availability, access and utilization dimensions of food security should be guaranteed at all times.

**Trade policy and food security:**

- Changes in trade policy affect the relative prices of goods and factors
- Both food production and consumption are affected
- Different impacts on different segments and population groups

## 2.6. FOOD INSPECTION

Food Inspection is the examination of food or systems for control of food, raw materials, processing, and distribution including in-process and finished product testing, in order to verify that they conform to requirements.

Food inspection process is in the responsibility of National Food Regulatory Authority or customs when established by the national food law.

Rwanda Food and Drugs Authority is responsible for local, imported, exported food regulations and inspection.

### 2.6.1. Importance of food inspection

- Food safety & QC are primary responsibility of producer/processor
- National governments have mandate to ensure health of population including safe food supply

- National food control system – legislations including regulations
- Inspection to ensure that food laws/ regulations being complied ie enforcement
- Facilitates market access
- Strengthens consumer protection and prevention of fraudulent practices
  - Safe food supply
  - Fair trade practices

### 2.6.2. Types of food inspection

1) **Traditional food inspection**

- Centered on determining compliance by processing establishments with a number of regulations.
- Non-compliance and violations dealt with by serving establishments notices/ fines.
- Traditional inspection seeks correction of food safety concerns than future violations occurring
- Traditional inspection focuses on GHP & samples drawn &tested.
- Role of food safety is responsibility of inspectors
- Inspections not based on risk – all premises inspected at similar frequency

2) **Risk-based inspection**

- Risk-based method is based on prioritizing inspection using a risk based approach.
- Change of focus from end product testing and compliance of a product or premises to assessment of controls put in place in operations to address food borne disease risk factors that could put products at risk
  - Inspecting premises & processes for compliance with hygienic & other requirements of standards/regulations
  - Evaluating HACCP plans & their implementation
- Consider hazards associated with the food
- Review the control measures in place
- Assess the adequacy of pre-requisite plans
- Prepare regulatory action plans including controls
- Verify HACCP plans, traceability and recall plans
- Target high risk establishments with available resources

**3) Traditional versus risk-based inspection**

| Traditional | Risk-based |
|---|---|
| • Corrective/ reactive<br>• Inspection planned randomly<br>• Emphasis on product/premises inspection<br>• Sample collection for assurance purposes | • Preventive<br>• Prioritization based on risk factors<br>• Emphasis on process inspection/ controls in place to address risk factors<br>• Sample collection for verification purposes |

## 2.7. FOOD CONTROL SYSTEMS

A national food control system ensures that food available within a country is safe, wholesome and fit for human consumption, conforms to food safety and quality requirements and is honestly and accurately labelled as prescribed by the law.

In order to operate effectively, a food control system requires appropriate legal and policy instruments, well-qualified human resources, sound institutional frameworks as well as financial assets, equipment and infrastructure (including access to laboratories) as its foundation.

The regulatory authorities designated under the food control system (also known as competent authorities) help ensure food safety and quality along the food chain and manage food safety hazards, fraud issues, emerging risks and emergencies. This work includes oversight and inspection of Food Business Operators (FBOs), information collection processes that contribute to a better understanding of the food chain; and programmes aimed at preparing for and managing food safety emergencies. Appropriate connections to the foodborne disease surveillance systems are key to ensure a whole chain approach, up to the consumer, and in case of need, appropriately address food safety events and emergencies, both upstream (identifying the source of an outbreak) and downstream (being able to identify the population at risk).

In addition to mandatory activities performed by competent authorities under their regulatory mandate, the “non-regulatory” activities of that system also need to be taken into consideration; these include communication and capacity development programmes. Processes for constructive interactions with stakeholders (such a FBOs, consumers and the international community) are important to allow the system to take into account the evolving needs of both national and

international stakeholders, to inspire confidence and to keep them well informed about their responsibilities.

Furthermore, in order to manage current and emerging challenges, it is important for a food control system to be grounded in evidence and science, incorporate risk analysis principles and keep abreast of new scientific developments and innovations to continuously improve the effectiveness and efficiency of food control activities

## 2.8. FOOD LAW AND REGULATIONS AT THE INTERNATIONAL AND NATIONAL LEVELS

In preparing food regulations and standards, countries should take full advantage of Codex standards and food safety and quality lessons learned in other countries. Taking into account the experiences in other countries while tailoring the information, concepts and requirements to the national context is the only sure way to develop a modern regulatory framework that satisfy both national needs and meet the demands of the SPS Agreement, TBT Agreement and trading partners.

### 2.8.1. Form and Content of Food Law

Legal provisions relating to food regulate specific activities, namely the production, processing and sale of food. Such provisions are designed with specific purposes, such as health protection and/or the promotion of fair trade in food commodities.

Most commonly, they are contained in a general law covering all food products.

The law addresses specific aspects of food safety, food adulteration, food quality and food control, such as inspection, the use of additives, prevention of food contamination, food labelling and import controls.

Most modern food legislation consists of a basic law upon which all other regulatory instruments are based. However, a number of countries have enacted, side by side with this basic law concerning food products in general, other laws governing either a distinct sector of food law, certain types of food processing or specific legal aspects of the production of or trade in foodstuffs.

The general form of the basic law depends on the legislative traditions of the particular country. One established practice in highly industrialized common law countries is to enact

comprehensive and detailed texts which bring together practically all general provisions which may concern food.

### 2.8.2. Categories of provisions to be found in a basic food law

(a) **Scope and Definitions**

(b) **General Principles**: For example, the law may provide that all food in circulation in the country must be safe for human consumption, or the law may prohibit the adulteration of food

(c) **Enabling Provisions**: Every law must define the nature and the limits of the powers to be exercised under it and should designate the public authorities in whom those powers are to be vested.

(d) **Administrative Provisions**: For example, the law may establish a Food Control Agency, which brings together the many official actors from various ministries who are implicated in food control in the country.

(e) **Enforcement Provisions**: Because no penalty may be imposed except by virtue of legal authority, food laws contain provisions delegating to an executive authority the power to sanction as well as to take preventive measures in the public interest.

(f) **Substantive Provisions**: The food law will contain many substantive provisions relating to food control, production, import, export, transport, distribution and sale. For example, the regulations issued under the food law may outline all the precise information that must be contained on food labels (weight, name of manufacturer, sell-by date, etc.)

(g) **Regulations**: In most legal systems, the food law contains a provision or provisions listing the many subject matters that the Minister may address through regulations in order to carry out the purposes of the law.

(h) **Repeal and Savings**: Where a new food law makes significant changes to the food control system, existing laws or regulations may have to be amended or repealed. In such cases the food law will have to list which provisions in which other laws are to be repealed or altered. However, in order not to dismantle the food control system entirely, many laws contain a provision stating that any regulations made under any provision repealed under the new law remain effective, just as if they had been issued under the new food law itself.

### 2.8.3. Rwanda National standards and legislations on different types of foods

The set of Rwanda national standards and legislations on different types of foods is found in Rwanda Food and Drugs Authority library or online catalogue of this institution. It comprises many standards and specifications for different food products that are manufactured in Rwanda.

## REFERENCES


1. Rwanda Nutrition Policy, 2008.
2. Rwanda National Food and Nutrition Policy, 2014
3. National Food and Nutrition Strategic Plan 2013-2018
4. EAC Food Security Action Plan 2018-2023.
5. Rwanda Health Sector Policy, 2015.
6. WFP Nutrition Policy, 2017
7. Rwanda National Agriculture Policy, 2028
8. The Millennium Development Goals Report. UN Report. NY, 2009.
9. Strategic Plan for the Transformation of Agriculture in Rwanda. Phase II. PSTA II. Final Report, February 2009.
10. Rwanda Bureau of Standards. (2010). Rwanda Standards and regulations on Milk, yoghurt, cheese, meat products, fisheries, cereals, fruits and vegetables, 2010.
11. Juran, J.M. (1988). Quality Control Handbook.
12. Per Pinstrup, Andersen and P. Sandoe. Ethics, Hunger and Globalization: In Search of Appropriate Policies. Springer Publ. 2007.
13. Global Nutrition Reports, 2016-2020.
14. https://www.ifpri.org/publication/global-nutrition-report-2016-promise-impact-ending-malnutrition-2030
15. https://www.intechopen.com/chapters/41652
16. https://asq.org/quality-resources/quality-assurance-vs-control
17. https://health.eac.int/publications/eac-food-and-nutrition-security-action-plan-2018-2023#gsc.tab=0
18. https://pubmed.ncbi.nlm.nih.gov/8089764/