SIMPLE QUALITY MANAGEMENT

Aim of the module
The aim of this module is to familiarise participants with the concept of quality management and its application to the informal food sector.

Objectives of the module
By the end of the module, participants should be able to:

(a) Define quality
(b) Describe the benefits of ensuring quality
(c) Explain the concept of Quality Management
(d) Differentiate between Quality Control and Quality Assurance
(e) Describe simple techniques that can be used in the informal sector to promote quality
13. SIMLPED QUALITY MANAGEMENT

13.1 DEFINITION OF QUALITY

The International Standard, ISO 9000:2000, *Quality management systems – Fundamentals and vocabulary*, defines Quality as:

The degree to which a set of inherent characteristics fulfils requirements

Let us analyse the above definition of quality in order to understand the implied meaning of quality.

A product has many quality characteristics (features) intended to meet the needs of the customer, and contribute to its acceptability by the customer.

The customer, on the other hand, has a number of expectations, which will serve as basis for selecting a product.

A product is therefore said to be of good quality if the quality characteristics of the product match the expectations of the customer.

Quality, therefore, consists of those features of a product, which meet the needs of the customer, and thereby provides product satisfaction. The customer defines the quality criteria needed in a food product. To meet this requirement, the manufacturer puts in a Quality System to ensure that the product meets these criteria. For example, customers may specify that potato chips should be white, crisp, and have a good flavour and taste. The manufacturer of the chips needs to focus on the process (quality of raw material, time, temperature of frying etc) to ensure that the raw materials are consistently handled to produce crisp, white chips with the expected flavour and taste. Quality Management is one way of ensuring that a product has quality and it satisfies the user’s needs.

13.3 QUALITY MANAGEMENT
Quality Management (QM) includes the development of practices used to control the quality and safety of products, which enable the organization to produce products/services that enhance customer satisfaction. QM requires the creation and continual improvement of processes along with other QA activities. This system provides a competitive advantage, that increases marketing and sales opportunities.

Over the last century, there has been a gradual evolution from inspection to quality management to ensure that customers get products that are fit for use. The stages of evolution i.e. inspection quality control, quality assurance and quality management are summarized below.

### 13.3.1 Inspection

Under this system, one or more characteristics of a product (colour of sauce, size of mango) are examined, measured or tested and compared with the specification to assess conformity. Non-conforming products are reworked, rejected or accepted with concession. This system is normally used for inspection of incoming goods or products that are ready for delivery. Using inspection to improve quality is too late, costly and ineffective.

*Quality cannot be inspected in a product; it has to be built in the product.*

### 13.3.2 Quality Control

Quality control is the evaluation of a final product prior to its marketing, i.e., it is based on quality checks at the end of a production chain aiming at assigning the final product to quality categories such as "high quality", "low quality" and "non-marketable". However, it is difficult to correct production failures or upgrade the quality of the final product, at the end of the production chain. Very often, this results in selling the low-quality products at lower prices and discarding of the non-marketable products. Yet the production costs for these products, however, have been as high as those of the high or regular quality.

In production of fried potato chips, quality control can be through:
- Inspection of raw materials (raw potatoes, oil, salt) to ensure that only good quality ingredients are used
- Carrying out checks on the process to ensure that the size of chips, temperature and time of frying are correct.
- Inspecting the final product to ensure that poor quality chips are not sold to the consumer.

However, this Quality Control approach is focused on the process whereas the problems that customers may face can also occur elsewhere in the production and distribution chain. Therefore, the need to produce and sell high quality products and increase the efficiency of the production process has led to the development of quality assurance systems along production chains.

### 13.3.3 Quality Assurance

A Quality Assurance approach therefore, englobes the *whole food chain*, from on-farm production, processing and distribution to the consumer. Quality Assurance, in contrast to Quality Control, is the implementation of quality checks and procedures to immediately correct any failure and mistake that is able to reduce the quality of the *interim products* at *every production step*. A Quality Assurance System focuses on the prevention of problems and not simply on their cure. The desired high quality of the final product is planned and obtained by conducting Standard Operating Procedures (SOP’s) that guarantee the desired quality.

Quality Assurance (*QA*) includes **planning** and **surveillance** of the activities related to quality. It gives confidence both within the organization and externally among its customers that their requirements will be met. Quality assurance systems should be documented in a simple way to show **who** has responsibility for doing **what** and **when**. In general, framework of Quality Assurance is presented at Figure 1.
Effective QA system for manufacturing food products need to be developed with the following characteristics:

a) **Effective QC system, not only** QC of a final product prior to its marketing, but also QC at several identified critical points of manufacturing process need to be done, with special emphasis on:

I. **Control of raw materials.** Specification of raw material and ingredients need to be established, and quality inspection on each raw materials and ingredients need to be established as well; to ensure it compliance to the predetermined specification.

II. **Control of production process.** Quality factors and any potential deviations; or potential hazards that may occur during the food production process need to be carefully identified. Furthermore, critical control points need to be identified, established, and monitored.

III. **Control of final products.** Final products have to comply with standard and other requirements; including its packaging, labeling and its handling practices. One important aspect of control of final products –for example is control of packaging, to assure that final product is protected from detrimental environmental factors; to ensure its expected shelf life.
IV. **Control of storage and distribution.** To provide assurance that the final products will reach the intended consumers in good condition, standardized practice of storage and distribution need to be established and monitored. Condition of storage (with respect to sanitation and hygiene, temperature, light, etc.) and distribution (with respect to sanitation of transporting vehicle and other apparatus, hygiene of worker, handling practices, etc.) need to be established and monitored; to minimize the possibility of deterioration of product and of contamination.

b) **Establishment of inspection system.** Within the industry, internal inspection systems need to be installed; to include technical audit and continuously monitoring. External inspection; done by independent third-party is also needed.

c) **Establishment of documentation system;** to record and archive all element of QA system, data, and activities

d) **Laboratory facilities.** Laboratory facilities; including equipment’s, chemicals and supplies for analysis is a necessary element of an effective QA system.

e) **Continuous training.** Capable human resources are a key for effective QA system. Consequently; continuous training and upgrading of human resources is essential part of the QA system. Focus of training should be on (i) understanding of the whole QA system and (ii) laboratory/analysis skill.

To illustrate the difference between QC and QA, we can say that the testing of vegetables for pesticides residues is Quality Control, while the implementation of proper pest management is Quality Assurance.

**13.3.4 Quality Management System**
A popular model of a quality management system which is implemented world wide is given in ISO 9000 series of standards published in 2000 and based on quality management principles (Annex I). In addition to the above standards, ISO has developed many supporting documents to assist an organization to implement a quality management system.
13.4 THE IMPORTANCE OF QUALITY MANAGEMENT IN THE INFORMAL FOOD SECTOR

Food safety and quality management, which assures the health and safety of food, is increasingly gaining importance at all levels of the food industry (production, sale and handling of food). The driving trends are consumers’ demands for quality and safe foods, increased competition, environmental issues and governmental policies. All food companies, including the smallest manufacturers, have a responsibility to provide consumers with safe, wholesome foods. Modern trading conditions and legislations require food businesses in many countries to demonstrate their commitment to food safety through an appropriate management programme. Safety is not an option but it is an essential part of the planning, preparation and production of foods. It has become a fundamental food attribute. As all aspects of quality are covered by quality management, it is important to introduce food safety considerations most efficiently into a quality system.

**Food safety management** has now become an integral part of quality management activity and a key component of managerial strategy to enhance the safety and quality of products (Figure 2). The implementation of **GMP** (Good Manufacturing Practices), **GHP** (Good Hygiene Practices) and the utilisation of a specific food safety assurance plan based on **HACCP** (Hazard Analysis Critical Control Point), embraced within a comprehensive quality management system, will provide an effective food safety management programme.

**An integrated approach**

An essential foundation of any activity involving food manufacture, handling and catering is a thorough understanding of the appropriate requirements of **GHP** and **GMP** associated with the particular product or commodity. Adherence to these good practices is the absolute minimum requirement in any food business. **GMP codes** and the **hygienic**
requirements are the relevant boundary conditions for the hygienic manufacture of foods. They should always be implemented.

GMP and GHP address the generic requirements for manufacturing safe food, while HACCP addresses specific determinants unique to a particular product and process. HACCP is now widely adopted as an essential approach to the systematic identification and control of hazards associated with the manufacture, distribution, and use of food products. It provides a mechanism to define preventive measures for hazard control. The combination of GMP/GHP and HACCP is beneficial in that the effective application of GMP/GHP allows the HACCP plan to focus on the critical determinants of safety (figure 3).

Codex Alimentarius Commission define the 7 principles (see figure 2) and 12 steps that must be implemented to ensure safe and correct in all aspects of food production and processing. The 7 basic principles are implemented into the system through the 12 steps:

1. Assemble HACCP team
2. Describe product
3. Identify intended use
4. Construct flow diagram
5. On-site confirmation of flow diagram
6. List all potential hazards associated with each step, conduct a hazard analysis, and consider any measures to control identified hazards (Principle 1)
7. Determine Critical Control Points (Principles 2)
8. Establish critical limits for each CCP (Principle 3)
9. Establish a monitoring system for each CCP (Principle 4)
10. Establish corrective actions (Principle 5)
11. Establish verification procedures (Principle 6)
12. Establish Documentation and Record Keeping (Principle 7)
Many food businesses have a quality system, which addresses all aspects of quality control and quality assurance based on ISO 9000 standard. Where such a system exists, HACCP is an integral part of the overall system.
Figure 2: Food safety tools – an integrated approach
Figure 3: Food Safety and Quality Management
ANNEX 1

ISO 9000 family of Standards

ISO 9000 family comprises the following 4 primary standards.

ISO 9000:2000, *Quality management system-Fundamentals and vocabulary*

This International Standard describes the concept of a quality management system and defines the fundamental terms used in the ISO 9000 family. It includes the 8 management quality principles used to develop ISO 9001 and ISO 9004.

ISO 9001:2000, *Quality management systems-Requirements*

This standard specifies the requirements for a QMS whereby an organization needs to assess and demonstrate its ability to provide products that meet customer and applicable regulatory requirements and thereby enhance customer satisfaction.


This standard provides guidance for continual improvement and can also be used for performance improvement of an organization.


ISO 9001 and ISO 9004 form a consistent pair of standards on quality management, the former aims to give quality assurance to the manufacturing process for products while the latter takes a broader perspective and gives guidance for improvement.
This standard provides **guidance on conducting internal or external quality and/or environmental management system audits** to verify a system’s ability to meet defined objectives.

REFERENCES

EU (2016) HACCP system (7 Principles and 12 Steps based on Codex Alimentarius).

http://www.haccp-org.eu/food_safety/system.html#


Questions and Answers

1. Explain the concept of Quality Management (QM)!
   Quality Management includes the development of practices used to control the quality and safety of products, which enable the organization to produce products/services that enhance customer satisfaction. QM requires the creation and continual improvement of processes along with other QA activities. The stages of gradual evolution of quality management are 1) inspection, 2) quality control, 3) quality assurance and 4) quality management.
   The ISO 9000 family provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer’s requirements, and that quality is consistently improved.

2. What is the difference between Quality Control and Quality Assurance?
   a. Quality Control (QC) is the evaluation of a final product prior to its marketing, i.e., it is based on quality checks at the end of a production chain aiming at assigning the final product to quality categories. However, it is difficult to correct production failures or upgrade the quality of the final product, at the end of the production chain. This QC approach is focused on the process whereas the problems that customers may face can also occur elsewhere in the production and distribution chain.
   b. A Quality Assurance (QA) approach englobes the whole food chain, from on-farm production, processing and distribution to the consumer. This is the implementation of quality checks and procedures to immediately correct any failure and mistake that is able to reduce the quality of the interim products at every production step. This system focuses on the prevention of problems and not simply on their cure. QA includes planning and surveillance of the activities related to quality.
Example: The testing of vegetables for pesticides residues is QC, while the implementation of proper pest management is QA.

3. **What is the importance of quality management for the informal sector?**
   The consumers’ demands for quality and safe foods increased competition, environmental issues and governmental policies. All food companies have a responsibility to provide consumers with safe, wholesome foods. Modern trading conditions and legislations require food businesses in many countries to demonstrate their commitment to food safety through an appropriate management programme. As all aspects of quality are covered by quality management, it is important to introduce food safety considerations most efficiently into a quality system.

4. **What is HACCP system? Define steps in HACCP analysis!**
   HACCP is an essential approach to the systematic identification and control of hazards associated with the manufacture, distribution and use of food products. HACCP system consists of the following 12 steps:
   1. Assemble HACCP team
   2. Describe product
   3. Identify intended use
   4. Construct flow diagram
   5. On-site confirmation of flow diagram
   6. List all potential hazards associated with each step, conduct a hazard analysis, and consider any measures to control identified hazards
   7. Determine Critical Control Points
   8. Establish critical limits for each CCP
   9. Establish a monitoring system for each CCP
   10. Establish corrective actions
   11. Establish verification procedures
   12. Establish Documentation and Record Keeping