REPUBLIC OF KENYA

SCHOOL MEALS PROGRAMME

Kenya School Meals Food Safety and Quality Guideline

2019

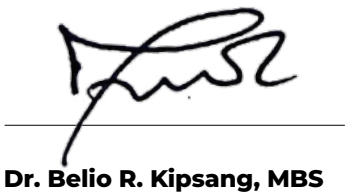
FOREWORD

The Government of Kenya is committed to improving access, equity and quality of education for all. This will lead to the realization of the Sustainable Development Goals 2, 3, and 4 on zero hunger, good health and well-being, and quality education, respectively. It will also contribute to the aspirations of the Social Pillar of Vision 2030 that aims to build a just and cohesive society that enjoys equitable social development. The Government is also cognisant of the fact that it will be difficult to achieve these educational milestones, especially the achievement of the Sustainable Development Goals, without providing adequate safe and quality meals to the learners in our educational institutions.

The School Meals Programme plays a significant role on the overall educational achievements and general development of school-age children. Ensuring that children are well fed, healthy and able to learn is essential to the effectiveness of any education system. However, when the meals provided in our institutions do not meet the requisite safety and quality requirements, children do not get the necessary nutritional requirements for growth and development and therefore their overall participation in the learning process is greatly compromised. The presence of high levels of toxins, such as aflatoxins, in food items can lead to further detrimental effects such as slowed cognitive development, stunting and cancers. Low quality food is also a drain on school finances because inedible food is discarded therefore reducing the portion available for children. Food safety and quality, therefore, are an essential part of the overall school meals programme and should be aligned with all other aspects of the programme, including water, sanitation and hygiene.

These guidelines provide practical guidance on how to implement and manage an effective food safety and quality system for school boards of management, traders, suppliers and public health officers in order to assure the safety and health of learners. The guidelines focus on food safety and quality assurance for the most commonly used food commodities in learning institutions. The implementation of these guidelines will also lead to realization of article 43 (1) (C) of the Constitution of Kenya on freedom from hunger and access to adequate food of acceptable quality. Successful implementation of these guidelines is expected to improve the implementation of food safety standards in our educational centres and hence increase enrolment, retention and health of our learners.

We recognize that successful implementation of these guidelines requires the concerted effort and commitment of a wide range of stakeholders in both the national and county governments. In this regard, the national ministries of health and education, and the county health departments of health and education will continue to provide stewardship in coordination of the school meals programme and further strengthen future engagement processes.



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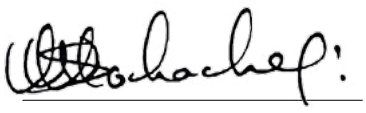

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PREFACE

These guidelines are anchored on the National School Meals and Nutrition Strategy (2017–2022), the National School Health and Nutrition Policy and the Home Grown School Meals Programme Implementation Guidelines (2016). In the process of developing these guidelines the views and priorities of a wide range of stakeholders were considered. These views and inputs were consolidated and affirmed during a validation workshop attended by the national and county governments.

The Kenya School Meals Safety and Quality Guidelines is a reference document for all stakeholders supporting the school meals programme in Kenya, especially the suppliers, traders, schools boards of management and county public health officers. It outlines the safety and quality requirements for food procured by schools and provides measures to be taken to ensure that food eaten by learners is safe and of good quality.

The development of this document arises out of the need to protect the health and safety of learners in schools from food hazards such as mycotoxins, and ensure that the food consumed in educational institutions is safe and wholesome and provides all the essential nutritional benefits intended. Adherence to the guidelines would reduce hidden costs in school meals emanating from purchase of low quality food which, besides lacking the required nutrients, is discarded during selection before cooking.

The guidelines envisage an effective and efficient food safety system in all educational institutions that is geared to secure access to safe and quality food for all school learners, thus preventing ill health due to food hazards. We strongly believe that it is the sum total of all our efforts – big or small – that will contribute to a better quality of life for our school learners and the reversal of the declining safety of foods consumed at schools.

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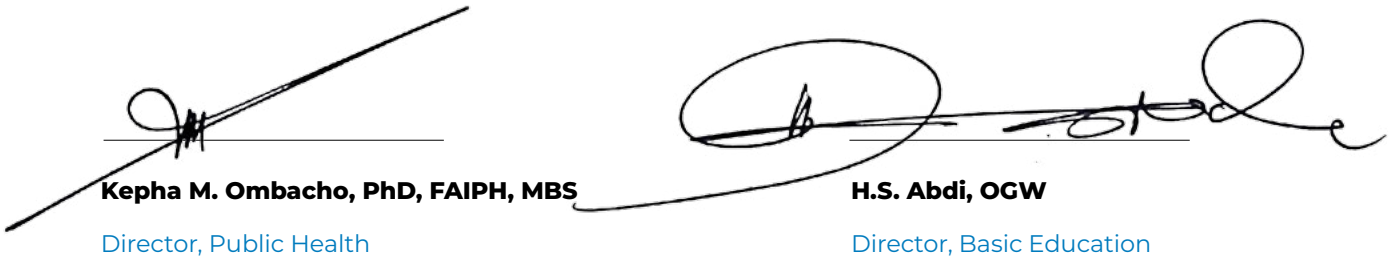
ACKNOWLEDGEMENTS

The Kenya School Meals Food Safety and Quality Guidelines is a culmination of extensive consultation with the relevant stakeholders of both national and county governments. We sincerely acknowledge the contribution and hard work of the many individuals and organizations that contributed to the development of the guidelines. In particular, we wish to acknowledge the United Nations World Food Programme for technical and financial support and the National Food Safety Coordinating Committee (NFSCC) members led by the chair of the NFSCC, Mrs Anne Onyango, for their insights that helped shape the guidelines.

Thanks also go to the following individuals, who constituted a NFSCC sub-committee for development and refinement of the guidelines: Robert Kilonzo, Brendah Obura and Sahara Ali (Ministry of Health); Margaret Aleke (Kenya Bureau of Standards); Agripina Ngilu (National Cereals and Produce Board); Charles Njeru, Zippy Mbati (World Food Programme), Paul Mwongera and Kibet Lagat (Ministry of Education). Special thanks to Charles Mannara (World Food Programme Kenya consultant) for his technical support and guidance during the whole writing process. A list of all individuals who contributed in the formulation of the guidelines is attached in Annex 1.

Many thanks to all the county staff who participated in development of these guidelines. The contributions from the counties of Turkana, Marsabit, Tana River, Samburu and Isiolo are highly acknowledged.



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LIST OF ABBREVIATIONS AND ACRONYMS

AFB1	Aflatoxin B1
AFB2	Aflatoxin B2
AFG1	Aflatoxin G1
AFG2	Aflatoxin G2
FAO	Food and Agriculture Organization of the United Nations
IARC	International Agency for Research on Cancer
ISO	International Organisation for Standardisation
NFSCC	National Food Safety Coordinating Committee
NGO	Non-Governmental Organization
SMC	School Management Committee
SMP	School Meals Programme
UNICEF	United Nations Children Fund
WASH	Water, Sanitation and Health
WHO	World Health Organisation

DEFINITION OF TERMS

Food safety: Safety of food is the state of being within acceptable standard requirements for physical, chemical and biological contaminants. Safety in food is the assurance that hazards, whether chronic or acute, that may be injurious to consumers are absent. Food safety is usually not negotiable.

Food quality: These are all the attributes that influence a food product's value to the consumer. This includes absence of negative attributes such as spoilage, contamination with filth, discoloration and off-odours, and positive attributes such as the origin, colour, flavour, texture and processing method of the food. Food quality may have tiers or grades different from minimum requirements.

Critical control point: A critical control point is a point, step, or procedure in a food process at which control can be applied and, as a result, a food safety hazard can be prevented, eliminated or reduced to an acceptable level.

Hazard: A hazard as related to food safety is a condition or a contaminant that can cause illness or injury if not controlled. The contaminant can be of a physical, chemical or biological nature. Allergens are also classified as hazards in food.

Hazard analysis and critical control points. This is a systematic preventative approach to food safety from biological, chemical, and physical hazards in food processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to a safe level.

Quality standard: This is a detail of the requirements, specifications, the various guidelines and characteristics prescribed for a product, process or service.

National standard: These are standards developed within a country for use in that country. National standards may include all or part of regional and international standards.

Regional standards: These are standards developed within regional trading blocs by consensus. They include the East African Community and COMESA standards.

International standards: International standards are standards developed by international standards organizations. International standards are available for consideration and use worldwide. They include the International Organization for Standardization (ISO) and Codex standards

Food standard: A set of criteria that a food must meet if it is to be suitable for human consumption, such as source, composition, appearance, freshness, permissible additives, and level of hazards.

Mycotoxins: These are toxic secondary metabolic products of moulds present on almost all agricultural commodities worldwide. Mycotoxin include aflatoxin, fumonisin, ochratoxin, deoxynivalenol and Zearalenone among others.

ISO 22000:2005: This standard sets out the requirements for a food safety management system. Firms can be certified to this system. It maps out what an organization needs to do to demonstrate its ability to control food safety hazards in order to ensure that food is safe. It can be used by any organization regardless of its size or position in the food chain.

Testing reference material: This is a sample of known composition that is tested alongside a product sample to ensure that the testing platform and analyst are performing with precision and accuracy.

Mycotoxin reader: This is an equipment for detecting mycotoxins after they have been extracted from the sample.

CHAPTER 1 | INTRODUCTION

1 Background

The School Meals programme has played an integral part in realizing the Kenya educational policy priorities namely access, equity, enrolment, attendance, retention and quality. This programme is implemented in the basic education institutions using different modalities. The National School Meals and Nutrition Strategy (2017) guides the implementation of the school meals programmes Kenya and therefore lays the foundation for formulation of these Food Safety and Quality Guidelines.

The Government of Kenya and the World Food Programme have jointly implemented the School Meals Programme, targeting the most food-insecure areas with the lowest school enrolment and completion rates and high gender disparities, since the 1980s. The programme has enhanced enrolment and retention of children, and especially girls, in primary schools and Early Childhood Development Education Centres in arid and semi-arid areas.

School meals provide a significant source of nutrition for learners. It is therefore important that food provided in these institutions meets the prescribed national food safety and quality requirements for the most common food stuff including maize, rice, bean, meat, green grams, fruits and vegetables, oil and salt.

Food safety and quality requirement is a public health concern and is managed by various regulatory agencies and county governments. These regulatory agencies are domiciled in the Ministry of Health, the Ministry of Agriculture, Livestock and Fisheries, the Kenya Bureau of Standards, the Kenya Plant Health Inspectorate Service, the Agriculture and Food Authority and the National Biosafety Authority. Although each agency may operate independently to fulfil its legal mandate for which it was established, the overall responsibly of ensuring food safety and quality rests with the Ministry of Health. The National Food Safety Coordinating Committee (NFSCC) was established in 2006 to integrate and coordinate the regulatory activities along the food supply chains.

2 Situation Analysis

The Ministry of Education has been implementing the School Meals Programme in Kenya since 1980. The provision of meals benefits school children from food insecure households in arid and semi-arid areas and aims at improving access to education. In 2018 the Government of Kenya launched a school meals and nutrition strategy that aims at ensuring the all children enrolled in basic learning institutions benefit from the provision of school meals

Currently, provision of meals in public Early Childhood Development Education Centres and primary schools in arid and semi-arid areas is designed and managed by county governments and national government, respectively. School meals in secondary schools and primary schools in other parts of the country are largely managed at institutional level.

The modalities for providing meals in public and private learning institutions range from centralized, decentralized to mixed. In the centralized model, procurement is undertaken at the national or county level and the food is distributed to schools. In the decentralized model, funds are transferred from either national, county, community/parents or donors to the schools to procure, manage and prepare meals through locally established mechanisms. The mixed model involves a combination of the centralized and the decentralized models.

For primary school meals in the arid and semi-arid areas, quality checks are based on the Home-Grown School Meals Implementation Guidelines (August 2016). These guidelines have provisions on food quality control. However, the system for assuring safety and quality during procurement and transportation of food to the schools could be improved. In addition, the Home Grown School Meals Programme guidelines have not addressed school meals programmes in other education institutions like Early Childhood Development Education Centres, boarding primary and secondary schools, village polytechnics and private schools. Moreover, no structured training of food suppliers and donors is conducted nor guidelines provided to ensure that the food is safe and of good quality.

At the county level, the public health department is expected to inspect, sample, test and issue reports and certificates of analysis confirming that food supplied to schools is safe and of good quality. However, the extent to which this is done is not optimal especially for safety and quality parameters that need specialized equipment and skills.

Findings from a monitoring and evaluation exercise conducted in schools and traders' stores by the Ministry of Health and the World Food Programme in the three arid and semi-arid counties of Tana River, Isiolo and Turkana indicated that the maize and beans had high levels of aflatoxins exceeding the permissible levels of 10 parts per billion with 60% of maize exceeding the national standard. In addition, maize and beans were of low grain grades (poor quality) when compared to national standard specifications.

The prevalence of aflatoxins and fumonisins in the East African region, non-compliance with safety and quality requirements for food supplied to schools, coupled with the absence of a robust safety and quality management system exposes school children to health risks.

These foodstuffs, especially maize, are susceptible to fungal attack that leads to the production of mycotoxins. Aflatoxins are the major mycotoxins that occur in maize and other grains, such as sorghum and wheat. The largest outbreak of aflatoxin poisoning reported in the world during the last 20 years was in Kenya in 2004, where 317 cases including 125 deaths occurred (Lewis et al, 2005).[2] Aflatoxins continue to be detected in human food in Kenya (Okoth and Kola, 2012,[3] Mutiga et al, 20154). Kang'ethe et al (2017)[5] reported cases of exposure of children younger than five years to aflatoxins with tests showing the presence of aflatoxins in their urine. This study was conducted in two schools, each located in semi-arid and highland areas. In their findings, Kilonzo, et al (2014)[6] demonstrated that the amount and frequency of consumption is a more important contributing factor than the mean aflatoxin concentration levels to the risk of dietary exposure to aflatoxins. There is a relationship between aflatoxins and stunting, and numerous studies cited by the Partnership for Aflatoxin Control in Africa attest to this.

According to research by the International Agency for Research on Cancer (IARC) and the World Health Organization (IARC, 2017)[7] the presence of mycotoxins poses a high risk to children. These include stunted growth, slow mental development, liver cancer, susceptibility to other diseases, increased mortality, jaundice and death.

2 **Lewis et al., 2005:** Aflatoxin Contamination of Commercial Maize Products During an Outbreak of Acute Aflatoxicosis in Eastern and Central Kenya.

3 **Okoth and Kola, 2012:** Market Samples as a Source of Chronic Aflatoxin Exposure in Kenya

4 **Mutiga et al., 2015:** Assessment of Aflatoxin and Fumonisin Contamination of Maize in Western Kenya.

5 **Kang'ethe et al., 2017:** Exposure of Kenyan Population to Aflatoxins in Foods with Special Reference to Nandi and Makueni Counties.

6 **Kilonzo, et al., 2014:** Household Dietary Exposure to Aflatoxins from Maize and Maize Products in Kenya

7 www.iarc.fr.en/media-centre/iarcnews/2016

3 Rationale for Guidelines

The Constitution of Kenya (2010) guarantees every Kenyan the right to freedom from hunger and access to adequate food of acceptable quality. Further, the constitution guarantees every child basic nutrition and health care (section 53 (1) (C) amongst other rights. However, available evidence indicates that learners are exposed to health risks that result from inefficient food safety and quality management practices. Incidences of cholera and aflatoxin poisoning (aflatoxicosis) have led to loss of lives. Exceeding pesticide residues beyond regulatory limits in fruits and vegetables remain a challenge to the country. Analysis of food samples from some arid and semi-arid counties showed non-compliance regarding food safety and quality requirements. This evidence demonstrates the need for the formulation and implementation of food safety and quality guidelines.

Analysis of the same food samples for quality parameters revealed that the grains were of poor quality when compared to national standard specifications. Supply of sub-standard food commodities leads to economic loss, lower nutritional value and palatability and reduced rations where inedible quantities must be removed before cooking.

There is, therefore, an urgent need to provide comprehensive guidelines to food suppliers, public health officers and school boards of management to ensure that learners consume food that is safe and of good quality, and that schools get value for money. Through these guidelines, the national and county governments aim to enforce compliance and enhance coordination of the food supply chain to learning institutions to guarantee consumer protection.

4 Legal and Policy Framework

The School Meals Food Safety and Quality Guidelines are aligned to the Sustainable Development Goals 2, 3, and 4 on zero hunger, good health and well-being, and quality education, respectively, as well as the Social Pillar of Kenya Vision 2030. The guidelines are made to facilitate the realization of article 43 (1) C of the Constitution of Kenya on freedom from hunger and access to adequate food of acceptable quality. The food safety and quality guidelines complement other Kenya Government policies and strategies that provide a framework for successful implementation of school meals, health and nutrition initiatives. These include the National School Meals and Nutrition Strategy (2017-2022), National School Health and Nutrition Policy and the Home-Grown School Meals Programme Implementation Guidelines (2016). They complement other Kenya Government policies and strategies that provide a framework for successful implementation of school meals, health and nutrition initiatives. These include the National School Meals and Nutrition Strategy (2017-2022), National School Health and Nutrition Policy and the Home-Grown School Meals Programme Implementation Guideline (2016).

The guidelines are aligned to the Crops Act (2013) which provides for establishment and enforcement of standards in grading, sampling, inspection, testing, analysis, specifications and transportation of foodstuffs in order to ensure good health and trade. Other legal frameworks designed to protect consumers include the Public Health Act Cap. 242, Food Drugs & Chemical Substances Act Cap. 254, Dairy Industry Act Cap. 336, Meat Control Act Cap. 356, Fisheries Act Cap. 378, Animal Diseases Act Cap. 364 and the Standards Act Cap. 496.

These guidelines aim to operationalize the National School Meals and Nutrition Strategy (2017/2022) in which the Government of Kenya commits to enhance school meals programmes. The guidelines establish procedures for ensuring that food safety and quality standards and regulations are adhered to.

5 Objectives

Overall Objective

The overall objective of these guidelines is to ensure that food consumed in learning institutions in Kenya meets the required safety and quality standards.

Specific Objectives

1. Guide stakeholders in the supply chain to integrate and implement best practices for food safety and quality in all processes related to school meals programmes.
2. Provide guidance on coordination among the various stakeholders involved in implementation of food safety and quality for school meals programmes.

6 Food Safety and Quality Critical Control Points

In order to ensure that the objectives of these guidelines are achieved, guidance is provided at the critical control points along the food supply chain. Control measures must be enforced at each critical control point to ensure food safety and quality. These critical control points are:

a) Production, harvest and post-harvest handling (specific to institutions producing their own food)

b) Procurement

c) Storage

d) Transportation

e) Food preparation, cooking and serving

f) Waste disposal

CHAPTER 2 | FOOD SAFETY AND QUALITY REQUIREMENTS

2.1 Introduction

This chapter describes the requirements which shall ensure compliance to food safety and quality standards and regulations in the school meals programme.

The chapter covers food safety and quality requirements for:

a) Food items

b) Storage facilities

c) Transport

d) Handling and preparation of food

e) Handling and reporting of contaminated food

2.2 Requirements for Food Items

2.2.1 General labelling requirements

Labelling facilitates identification and traceability of the food supplied. It is intended to quickly ascertain the name, composition and origin of pre-packaged foods. In Kenya, food labels are required to be in Kiswahili or English. Where food is sold in bulk, there must be documentation containing the information about the food. Other details to be included on labels are:

a) Name of product

b) Name and address of the manufacturer/packer/importer

c) Brand name/registered trade mark

d) Batch or code number

e) Net weight in metric units

f) Storage instructions

g) The statement “Human Food”

h) List of ingredients

i) Country of origin

j) Date of manufacture

k) Expiry/best before date

l) Instructions for disposal of used package

m) Comply with the Kenya standard.

2.2.2 Cereals and pulses

Cereals and pulses shall be free from

a) Physical damage and discoloration

b) Infestation by pests

c) Diseased and germinated grains

d) Immature and shrivelled grains

e) Foul smell

f) Wetness and caking

g) Mouldiness and decay

h) Foreign matter and filth

i) Integrity of packaging material (leakages, damaged, wetness)

j) Compliance to labelling requirements

Requirements for safety and quality for maize are singled out in Table 1 because it is not only a key food component under the school meals programme but also considered as a food commodity prone to aflatoxin contamination amongst other contaminants.

Table 1 : Specific requirements for safety and quality of maize grain

S/N	Characteristic	Maximum limit		
		Grade 1	Grade 2	Grade 3
i.	Foreign matter, %, m/m	0.5	1.0	1.5
ii.	Inorganic matter, %, m/m	0.25	0.5	0.75
iii.	Pest damaged grains, %, m/m	1.0	3.0	5.0
iv.	Rotten and diseased grains, %, m/m	1	2	3
v.	Discoloured grains, %, m/m	1.5	2.0	2.5
vi.	Immature and shrivelled grains, %, m/m	1.0	2.0	3.0
vii.	Filth, %, m/m			0.1
viii.	Total defective grains, %, m/m	5	9	14
ix.	Broken kernels, %, m/m	2.0	4.0	6.0
x.	Moisture, %, m/m		13.5	

Note 1: The parameter "total defective grains" is not the sum total of the individual defects. It is limited to 70% of the sum total of individual defects.

Note 2: The parameter, Discoloured grains is limited to at least 25% discolouration on both sides of the kernel.

Source: *KS East African Community 2017 (this standard may be amended from time to time)*

2.2.3 Packaged flours, edible fats and oil

Packaged flours, edible fats and oils **shall**:

a) Have the KEBS standardization mark of quality;

b) Be Fortified and have fortification logo;

c) Have a Manufacture and Expiry date;

d) Comply with labelling requirements;

e) Comply with the Kenya standard.

2.2.4 Table salt

Table salt **shall**:

a) Have the KEBS standardization mark of quality;

b) Be iodized (50-84mg/kg) and have fortification logo;

c) Have an expiry date;

d) Comply with labelling requirements;

e) Comply with the Kenya standard.

2.2.5 Fruits and vegetables

a) Fruits **shall** be

(i). Whole and ripe;

(ii). Free from spoilage and insect infestation;

(iii). Free from pesticide residues, heavy metals and other contaminants;

(iv). In compliance with the Kenya standard.

b) Vegetables **shall** be

(i). Fresh and whole;

(ii). Free from spoilage and insect infestation;

(iii). Of the natural colour;

(iv). Free from pesticide residues, heavy metals and other contaminants;

(v). In compliance with the Kenya standard.

2.2.6 Meat

Meat **shall** be:

a) Inspected by an authorized officer;

b) Fresh;

c) In compliance with the Kenya standard.

2.2.7 Milk and other dairy products

Milk and other dairy products **shall**:

a) Be pasteurised/heat treated;

b) Have expiry date;

c) Have the KEBS standardization mark of quality;

d) Comply with labelling requirements;

e) Comply with the Kenya standard.

2.3 Storage Facilities

Storage facilities **shall**:

a) Be used for storage of food only;

b) Prevent damage, deterioration, or contamination of food;

c) Have perishable foods stored under special conditions as appropriate to prevent spoilage;

d) Have adequate space for intended amount of food;

e) Have adequate ventilation and lighting;

f) Be situated away from dumping sites and toilets;

g) Be maintained in hygienic condition.

2.4 Transportation of Food

Food shall be transported in a hygienic manner to prevent contamination. Means of transportation **shall** meet the following requirements:

i. All trucks, pick-ups, carts and containers carrying food should be clean and dry.

ii. Containers (trailers) and trucks used for transporting food **shall**:

   a) Maintain the quality and integrity of the food;

   b) Be tightly closed or covered to prevent environmental contaminants, spillage and maintain cold chain for perishable products;

   c) Be easy-to-clean.

iii. Open trucks, pickups and carts **should not** be used for transportation unless covered.

2.5 Handling and Preparation of Food

Handling and preparation of food shall be conducted in a manner that will prevent possible contamination. The following **shall** be observed during handling and preparation of food:

a) Cooking utensils, water and soap should be appropriate, adequate and should not contaminate the food;

b) Kitchen areas and food should be protected from insects, pests and other animals;

c) Raw meat, poultry and sea food should be separated from other foods;

d) Separate equipment and utensils such as knives and cutting boards will be used for handling raw foods;

e) Food should be stored in separate containers to avoid contact between the raw, prepared and cooked food.

f) A good kitchen **shall**:

i). Be spacious and well-ventilated;

ii). Be easy to clean;

iii). Be away from the dumping area and toilets;

iv). Have clean and safe water for cooking and washing of cooking utensils;

v). Have clean food preparation surfaces, for example, a table/bench;

vi). Have enough and appropriate dish racks for placing utensils;

vii). Have a good drainage system;

viii). Have hand-washing facilities.

g) All food handlers **shall**:

i). Have a valid certificate of medical examination;

ii). Be clean in body and clothing;

iii). Wear protective clothing (headgear, aprons, dust coats, closed shoes);

iv). Refrain from unhygienic practices (smoking, chewing tobacco, chewing miraa, spitting);

v). Be knowledgeable and skilled in food preparation and hygiene;

vi). Wash hands before handling food and often during food preparation;

vii). Wash hands after going to toilet, sneezing/ handling soiled materials;

viii). Wash and sanitize all surfaces and equipment used for food preparation.

h) The following **shall** be observed when serving of food:

i). Food shall be served while hot;

ii). When prepared earlier before time of consumption, the food shall be hygienically covered and kept at an appropriate temperature;

iii). Cooked food will be kept piping/uniformly hot (more than 600C) prior to serving;

iv). Cooked food shall not be left at room temperature for more than 2 hours;

v). Cooked food will be reheated thoroughly for not less than 5 minutes at boiling temperatures;

vi). Hand washing facilities should be provided.

2.6 Handling and Reporting of Contaminated Food

The following measures **shall** be undertaken when handling contaminated food:

a) Suspected food shall not be consumed until confirmed safe for human consumption;

b) Suspected food shall be seized;

c) Condemned food shall be disposed under supervision of the Public Health Officer.

CHAPTER 3 | RESPONSIBILITIES OF PUBLIC HEALTH OFFICERS, SUPPLIERS AND SCHOOL BOARDS OF MANAGEMENT

3.1 Responsibilities of Public Health Officers

Under the school meals programme, the Public Health Officers will be involved at all stages of the food supply chain, from procurement to preparation of food at the school kitchen. The public health officer will create awareness and hold health education sensitization forums to all players along the different food value chains.

3.1.1 Procurement of food

The public health officers should be involved in the school meals programme from the early stage of sourcing. Proper checks at this stage will ensure that the food getting into the school system is of the required standard.

During sourcing the public health officer will:

a) Participate in development of specifications for food stuffs;

b) Inspect and issue food hygiene licences to suppliers;

c) Issue a Public Health Inspection and Clearance Certificate to suppliers;

d) Sample food from suppliers and school stores and submit for laboratory analysis.

3.1.2 Inspection

Inspection is an important exercise carried out to ascertain the safety and quality of food products. Visual assessment is an initial exercise carried out to identify attributes that affect acceptance of food and keeping quality, provide an indication of poor food handling and storage, contamination, spoilage and potential health hazard risks (unwholesome/unfit for human consumption). The assessment provides a general overview of food safety and quality before delivery to schools. This is important especially where resources limit specialized validation or laboratory analytical confirmatory processes for safety and quality. Public health officers shall inspect food stuff, transportation vessels, storage, preparation and serving facilities.

3.1.2.1 Inspection of cereals and pulses

Cereals and pulses **shall** be inspected to ensure that they are free from:

a) Physical damage and discoloration

b) Infestation by pests

c) Diseased and germinated grains

d) Immature and shrivelled grains

e) Foul smell

f) Wetness and caking

g) Mouldiness and decay

h) Foreign matter and filth

And additionally, that

i) The integrity of packaging material (leakages, damaged, wetness) is retained

j) There is compliance to labelling requirements.

3.1.2.2 Inspection of packaged flours, edible fats and oil

Packaged flours, edible fats and oils **shall** be assessed for:

a) Presence and authenticity of the standardization mark of quality by sending a text message with SM# permit number/ ISM to 20023

b) Presence of the fortification logo

c) Expiry date

d) Cleanliness, damage of package and leakage

e) Unusual smell

f) Integrity/tampering of the seal

3.1.2.3 Inspection of table salt

Table salt **shall** be assessed for:

a) Presence and authenticity of the standardization mark of quality by sending a text message with SM# permit number/ ISM to 20023

b) Iodization (50-84mg/kg)

c) Presence of the fortification logo

d) Expiry date

e) Cleanliness, damage of package and leakage

f) Wetness and caking

g) Integrity/tampering of the seal

h) Compliance to labelling requirements

3.1.2.4 Inspection of fruits and vegetables

Fruits and vegetables shall be assessed to conform to the following:

a) Fruit

(i). They are whole and just ripe, not overripe

(ii). They are not rotten, eaten by insects or diseased

(iii). They are free from pesticide residues, heavy metals and other contaminants

b) Vegetables

(i). They are fresh and whole

(ii). The leaves are not infested by insects and are in the natural colour, not withered

(iii). They are free from pesticide residues, heavy metals and other contaminants

3.1.2.5 Inspection of meat

Meat **shall** be assessed for:

a) Inspection mark

b) Freshness

c) Transport permit duly signed by the authorised officer

d) Transport conditions (cold chain)

3.1.2.6 Inspection of milk and other dairy products

Milk and other dairy products **shall** be assessed for:

a) Pasteurisation

b) Expiry date

c) Condition of the container/package

d) Presence and authenticity of the standardization mark of quality by sending a text message with SM# permit number/ ISM to 20023.

3.1.2.7 Inspection of storage facilities

The storage facilities include traders/suppliers and school stores. Storage facilities **shall** be inspected to ascertain the following:

a) There is adequate space for intended quantity of food;

b) There is adequate ventilation and lighting;

c) It is situated away from dumping sites and toilets;

d) The roof provides adequate protection against adverse weather conditions;

e) The doors and windows are well fitted;

f) Walls and floors are not cracked and are easy to clean;

g) They are rodent-, insect- and bird-proofed;

h) They are only used for storage of food.

Additionally, the public health officer **shall** check:

a) That unprocessed food commodities are not stored in the same store with processed food, unless it can be shown that there is no risk of cross contamination;

b) That perishable food commodities are stored under special conditions as appropriate to prevent spoilage;

c) That food is not in direct contact with either the floor or walls;

d) That food is not packaged in split or torn bags;

e) For signs of pest infestation such as damaged grain, droppings, sounds and warming of the grain. Heating which can be verified or checked by lifting a top bag and feeling the bag underneath;

f) For presence of insects and rodents hiding from light through the use of sight, hearing and smell;

g) For staining, caking and moulding caused by water;

h) For leakages evidenced by leaking containers and stained cartons especially in the case of vegetable oil;

i) That the outside of the store and the area around are maintained in a hygienic manner.

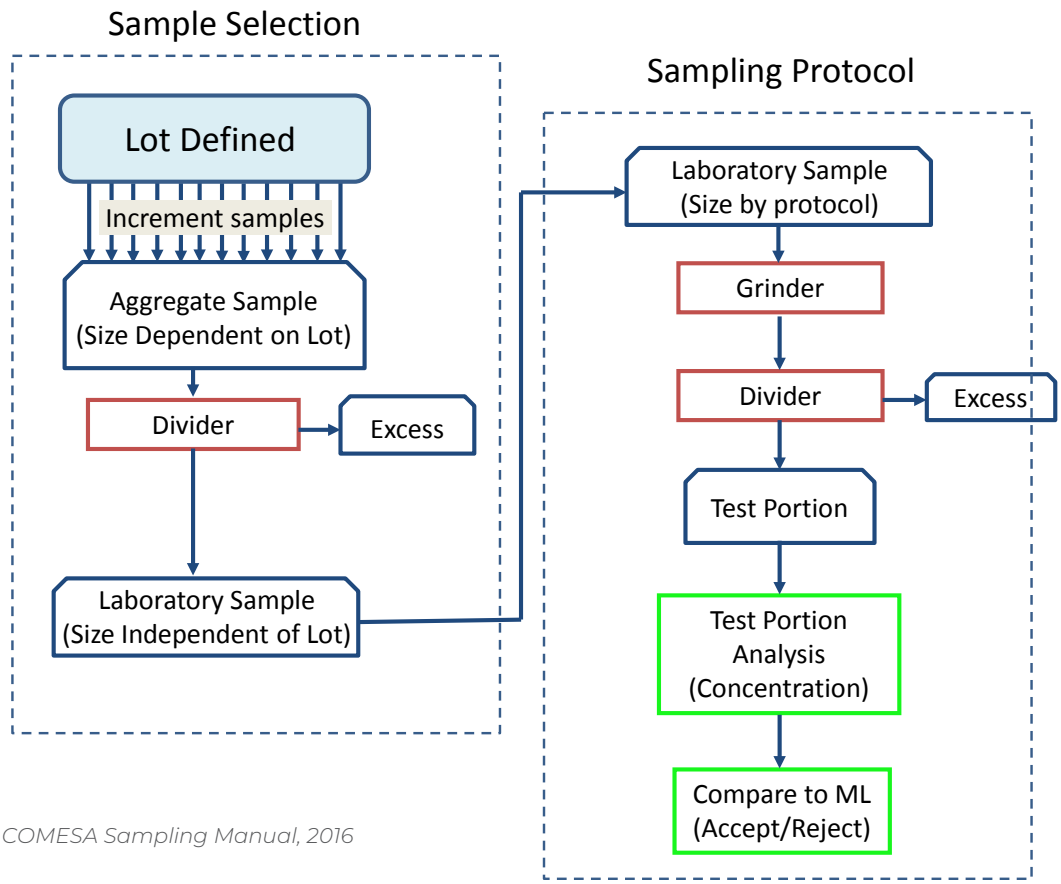
Any problems that are identified during the inspection should be dealt with.

3.1.3 Sampling for testing

The official sampling and testing of food stuffs will be conducted by a gazetted officer. Sampling is a technical procedure of picking a representative sample for the purpose of testing to facilitate decision making with regard to compliance of the sampled lot to food safety and quality standards for specific food products.

A flow diagram (figure 1) of the sampling protocol (from sampling the bulk lot to the analytical measurements, especially for aflatoxin in the test portion) is shown below.

Figure 1: Aflatoxin Sampling Process from Lot to Laboratory



Source: *COMESA Sampling Manual, 2016*

3.1.3.1 Stages of sampling for the school meals programme

Sampling for safety and quality verification shall be done at the following points along the supply chain:

a) Suppliers stores/warehouses

b) Transport vessels

c) School stores

3.1.3.2 Frequency of sampling

These guidelines recommend that public health officers sample food commodities in all stores owned and managed by all suppliers of food to the schools. In addition, the public health officers will continuously sample food commodities at schools' stores in at least 30% of the schools in the county. The framework for monitoring the safety and quality of foods will include sampling and testing twice per term: at the beginning and during the school term. The procedure for sampling and testing is contained in the annexed sampling protocol **(Annex II)**.

3.1.4 Grading of grains

Grading of grains entails physical assessment to ascertain conformity to Kenyan standard specification for quality. The public health officer will use the quality parameters to make a decision on the type of analysis, including grading to be requested from public analysts and seizure as the laboratory analysis is undertaken. Pictorials of quality parameters are given in **Annex III.** During grading the grains are checked against the parameters in table 2.

Table 2: Parameters Used in Grading of Grains

Parameter	Definition
Pest damaged grain	Grain which shows evidence of damage owing to attack by rodents, insects, mites or other pests.
Stained grain	Grain/kernel whose natural colour has been altered by external factors, such as ground, soil or weather. This may include grain which has dark stains or discolouration with a rough external appearance.
Rotten and diseased grain	Grain affected by mould growth or bacterial decomposition or other causes that may be noticed without having to cut the grains to examine it and renders it unsafe for human consumption.
Discoloured grain	Kernel which is damaged by heat, frost or water.
Immature and shrivelled grain	Grain which is underdeveloped, thin and papery in appearance.
Broken kernels	Pieces of maize which pass through a 4.5mm round hole metal sieve.
Foreign matter	All organic and inorganic material other than maize grain, broken kernels and other grains.
Inorganic matter	Stones, glass, pieces of soil and other mineral matter.
Organic matter	Any animal or plant matter (seed coats, straws, weeds) other than grain in question, other grains, inorganic extraneous matter and harmful/toxic seeds.
Filth	Impurities of animal origin
Defective/damaged grain	Pest damaged, discoloured, stained, rotten and diseased, immature and shrivelled grains and broken grain.

3.1.5 Handling and preparation of food

Food hazards may occur or be introduced into food during improper cooking and poor personal hygiene.

3.1.5.1 Food preparation at school level

Food preparation should be undertaken in a manner that prevents contamination and transmission of diseases. The management and cleanliness of the kitchen should be of high standard. The public health officer will regularly inspect the school kitchen for compliance with hygienic requirements including:

a) Validity of food handler's certificate of medical examination;

b) Personal hygiene;

c) Use of protective clothing (headgear, aprons, dust coats, closed shoes);

d) Hygienic practices;

e) Knowledge and skills in food preparation and hygiene;

f) All surfaces and equipment used for food preparation are washed and sanitized;

g) Water conforming to the Kenyan Standard for portable water (i.e., water which is safe for human consumption) KS EAS 12;

h) Hand washing facilities.

3.1.5.2 Handling and reporting of contaminated food

In the event that food commodities are suspected to be unsafe or of poor quality, the following actions shall be taken in case the food is already at school:

a) Enforce separation of the suspected foods from the rest;

b) The public health officer will assess and determine its suitability for human consumption;

c) If the public health officer concludes that the food is unfit for human consumption, he or she will seize the food and issue a seizure form;

d) In the event that there is need for further analysis, the public health officer will take samples and submit them for a conclusive laboratory analysis;

e) If the test results indicate that the food is unfit for human consumption, the public health officer will condemn and issue condemnation certificate to the head teacher, copied to the SCDE;

f) The disposal of the food shall be done in the presence of a representative from the Ministry of Education and the public health officer;

g) Investigate to establish the cause of contamination for proper mitigation.

3.2 Responsibilities of the Food Supplier

This section is meant to guide food suppliers to meet and maintain food safety and quality requirements for both schools and general public. The section lays out what measures suppliers ought to take to ensure that food in their possession meets the threshold for safety and quality as required by national laws and standards. It is intended as a reference guide for suppliers in their everyday handling of food meant for human consumption.

3.2.1 Procurement of food

It is the responsibility of the supplier of food commodities under the school meals programme to supply safe and quality food as per the existing national standards and regulations as prescribed in **Chapter Two Section 2.2** of these guidelines. The suppliers must, therefore, ensure the following:

a) Food commodities are labelled as per the existing national standards and regulations as prescribed in **Chapter Two Section 2.2.1**

b) Cereals and pulses, packaged flour, edible fats and oils, table salt, fruits and vegetables, meat, milk and other dairy products supplied to schools meet the food safety and quality requirements prescribed in **Chapter Two, Sections 2.2.2** to **2.2.7**

c) Obtain a certificate of analysis, food hygiene licence, and public health inspection and clearance.

d) Suppliers should ensure grains in their possession are free from the following;

(i). **Blemished/damaged grains:** Grains which are insect or vermin damaged, stained, diseased, discoloured, germinated, frost damaged, or otherwise materially damaged.

(ii). **Insect or vermin damaged grains:** Kernels with obvious weevil-bored holes or which have evidence of boring or tunnelling, indicating the presence of insects, insect webbing or insect refuse, or de-germed grains, chewed in one or more than one part of the kernel which exhibit evident traces of an attack by vermin.

(iii). **Stained kernels:** Kernels whose natural colour has been altered by external factors. This includes ground, soil or weather damaged kernels, which may have dark stains or discolorations with a rough external appearance.

(iv). **Diseased grains:** Grains made unsafe for human consumption due to decay, moulding, or bacterial decomposition, or other causes that may be noticed without having to cut the grains to examine them.

(v). **Discoloured kernels:** Kernels materially discoloured by excessive heat, including that caused by excessive respiration (heat damage) and dried damaged kernels. Kernels may appear darkened, wrinkled, blistered, puffed or swollen, often with discoloured, damaged germs. The seed coat may be peeling or may have peeled off completely, giving kernels a checked appearance.

(vi). **Germinated kernels:** Kernels showing visible signs of sprouting, such as cracked seed coats through which a sprout has emerged or is just beginning to merge.

(vii). **Frost damaged kernels:** Kernels which appear bleached or blistered and the seed coat may be peeling, germs may appear discoloured.

(viii). **Mouldy kernels:** Maize grains with visible mycelia growth on its tip or surface.

(ix). **Immature/shrivelled grains:** Maize grains which are underdeveloped, thin and papery in appearance.

(x). **Broken kernels:** Pieces of maize which shall pass through a 4.50 mm metal sieve.

(xi). **Other grains:** Other grains are edible grains, whole or identifiable broken, other than maize (i.e., cereals, pulses and other edible legumes).

(xii). **Foreign matter:** All organic and inorganic material (such as sand, soil, glass) other than maize, broken kernels and other grains.

(xiii). **Filth:** Impurities of animal origin.

(xiv). **Defective grains:** Pest damaged, discoloured, diseased, germinated, mouldy, immature and shrivelled grains, or otherwise materially damaged, which specifically do not include broken grains.

3.2.2 Food storage

a) The supplier must obtain food hygiene licence for store which shall be issued after an official inspection by the public health officer.

b) Suppliers should ensure that stores conform to the storage requirements prescribed in **Chapter Two Section 2.3** of these guidelines.

c) The supplier shall maintain good store management practices including the following:

(i). The store should be kept clean and tidy both inside and outside for easy management and to keep away pests and rodents.

(ii). Vegetation and waste around the store which provide cover and breeding grounds for rodents should be removed and disposed appropriately.

(iii). Cereals and pulses spilled on a clean floor should be re-bagged, after cleaning by sieving if necessary.

(iv). The store should be swept and stacks dusted regularly.

(v). Application of controlled pesticides (e.g. phosphine fumigant – "LIPUKA") should be handled by licensed personnel and records kept.

3.2.3 Transportation of food

The supplier should prevent contamination of food during transportation. The following measures should be taken to prevent food contamination during transportation:

a) Separate food commodities from non-food products like sand, cement, livestock and passengers;

b) Clean and dry transportation vessels before loading;

c) Load food into transportation vessels when they are ready to start the delivery runs, it should not stay on the trucks for very long periods of time; d)Cover open trucks with clean tarpaulins.

e) Ensure that food containers are:

(i). Rigid and sectioned if carrying different food items;

(ii). Tightly closed or covered to minimize spillage and maintain quality;

(iii). Nonporous to avoid leakage;

(iv). Easy-to-clean.

f) Before loading of food commodities for delivery suppliers should ascertain the following:

(i). Proper packaging

(ii). Correct weights

(iii). No leakage/spillage

(iv). Cleanliness of the packaging

(v). Quality of the food products.

3.2.4 Delivery and offloading

The suppliers should ensure that:

a) Food is not exposed to adverse weather (rain, snowing, windy dust, etc.) during offloading;

b) Handling of bags and cartons or any other packaging types for the food commodities is done properly;

c) Boxes and cartons with "- this side up" instructions are properly stacked;

d) Hooks are not used to handle bags;

e) Loaders lift the bags and not drag them;

f) The stacking is done carefully on pallets.

3.3 Responsibilities of School Board of Management

The school Board of Management should take full responsibility of ensuring that food safety and quality requirements are maintained through-out the food supply chain i.e. from procurement to food preparation and serving.

3.3.1 Procurement of food

The School Board of Management shall put special emphasis on tendering, ordering and receipt of food as described below:

3.3.1.1 Tendering

Procurement begins with the preparation and issuance of tender documents. These documents should clearly include the requirements for safety and quality for the food being procured. The Board of Management shall provide leadership in development of the specifications of food stuff to be procured. These specifications should be availed to bidders during tendering.

Bidders should be requested to submit their bids attaching certificate of analysis, food hygiene licence, and public health inspection and clearance as confirmation that the intended food supply meets safety and quality requirements.

3.3.1.2 Ordering and contracting

The school should re-emphasize that the food ordered is fit for human consumption as specified in safety and quality specifications (Chapter Two Section 2.2). The contract should clearly indicate that the school will not accept food that does not meet safety and quality standards. This will ensure that supplier is aware of the buyer's (school's) expectations and therefore source for food that will meet specified quality requirements.

3.3.2 Preparation of the food store before delivery of food

The store should be prepared before food is delivered (Figure 2). The preparations should include:

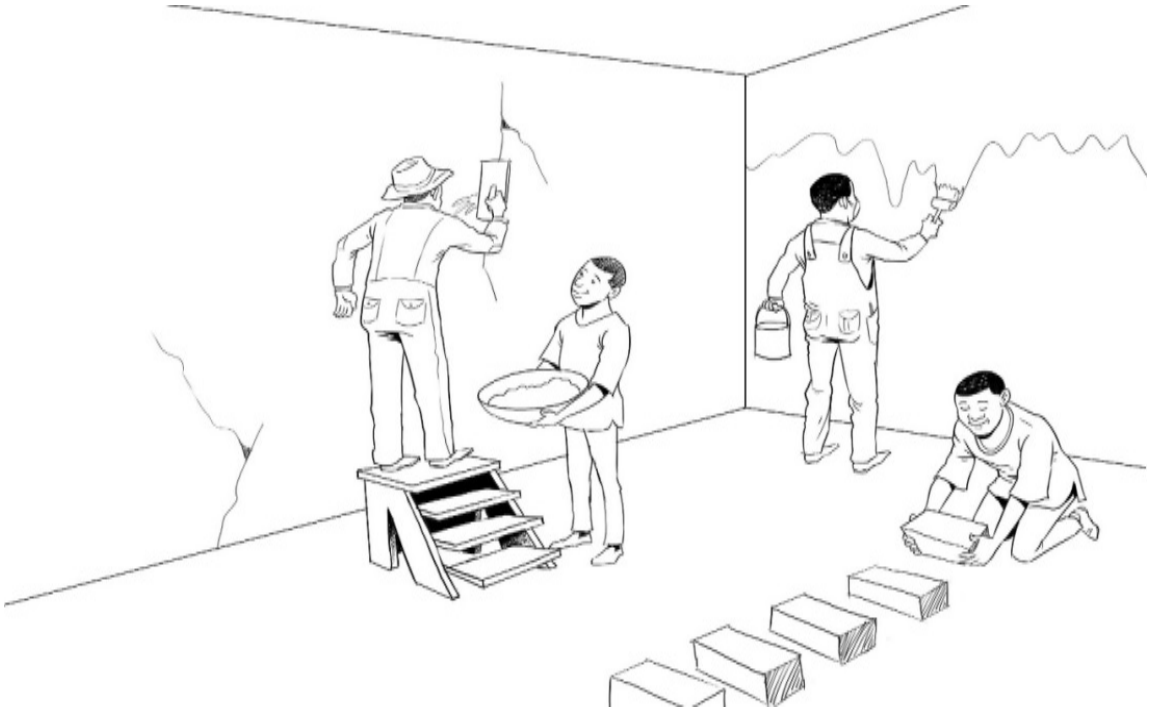
a) Cleaning the store;

b) Planning the layout of the store for the different food commodities expected by the school;

c) Making or improvising pallets (with stones or logs) as food commodities should not be placed on the floor;

d) The head teacher informing the Board of Manager members and, where possible, the local public health officer to ensure that they are available during the arrival of the food commodities at the school.

Figure 2: Preparation and Repair Works in a Food Store Before Delivery of Food Stuffs



3.3.3 Receipt of food

At this stage, the Board of Management should assess and either accept or reject the food. The Board of Management shall therefore ensure the following:

a) Inform the public health officer of the date and time when deliveries are expected in order for him/her to make food checks;

b) Conduct checks to ascertain that the food is of the required quality;

c) Assess the physical quality of all the food commodities delivered to confirm that they meet the required standard and will not expire before the expected consumption period;

d) Note down the condition of the commodities and count the packages as they are offloaded **(Figure 4)**;

e) The Board of Management may receive the food pending sampling for testing which shall be conducted by the public health officer.

f) Reject food commodities which show the following characteristics:

i). Underweight bags, that is, bags that weigh less than the specified quantity

ii). Signs of live infestation

iii). Wet bags

iv). Tampered bags or signs of siphoning

v). Contaminated bags or cartons

vi). Leaking oil containers

vii). Soiled bags

viii). Expiry date is before the end of expected consumption period or missing

g) Food is received in good condition and handled in a way that will not compromise its quality. Place the fo-od commodities in the store observing good storage management practices as outlined in **Section 3.3.3.1 below**

h) Set aside all commodities that do not meet food safety and quality standards and ask the supplier to replace.

i) Off-loading of food should not take place under conditions which could cause deterioration, contamination or damage.

Figure 3: Head Teacher and Parent Representative Checking and Recording Food Commodities Being Offloaded at School Level

3.3.3.1 Good store management practices

The food stores should be regularly inspected and prompt action taken in case of any problems.

a) The store should be kept clean and tidy both inside and outside for easy management and to keep away pests and rodents

b) Vegetation and waste around the store which provide cover and breeding ground for rodents should be removed and disposed appropriately

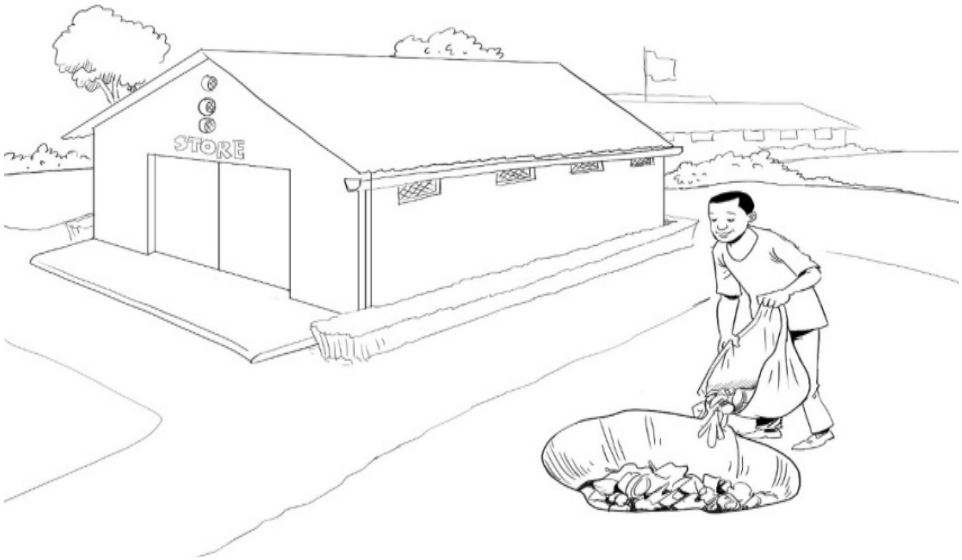
c) Cereals and pulses spilled on a clean floor should be re-bagged, after cleaning by sieving if necessary

d) The store should be swept and stacks dusted regularly **(Figures 4 and 5)**.

e) Application of controlled pesticides (e.g. phosphine fumigant – "LIPUKA") should be handled by licensed personnel and records kept.

Figure 4: Sweeping and Dusting of the Food Store

Figure 5: Composite Pit for Disposal of Waste



An example of a store layout is shown in **Figures 6, 7(a)** and **7(b)** below. Sacks are stacked and an

allowance of 0.5-1 metre given from the wall. The stacks should not go all the way to the roof.

Figure 6: Recommended Layout of a Food Store

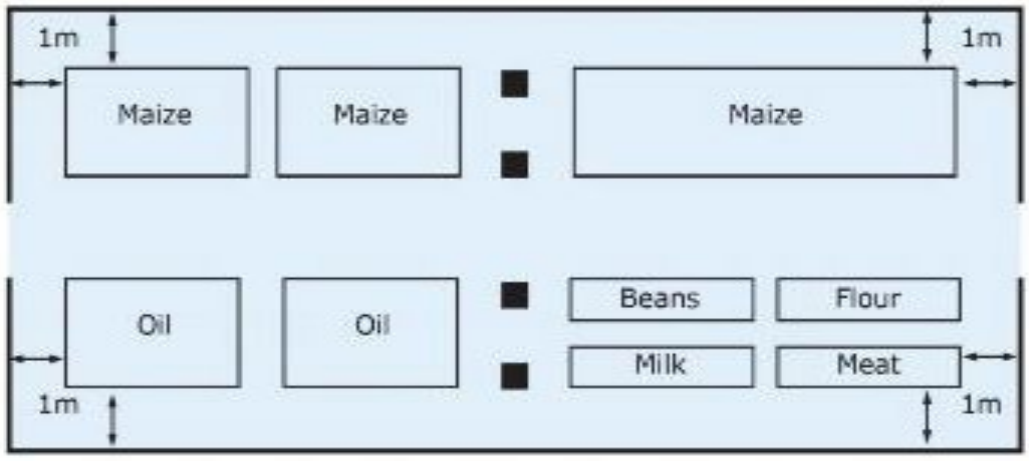
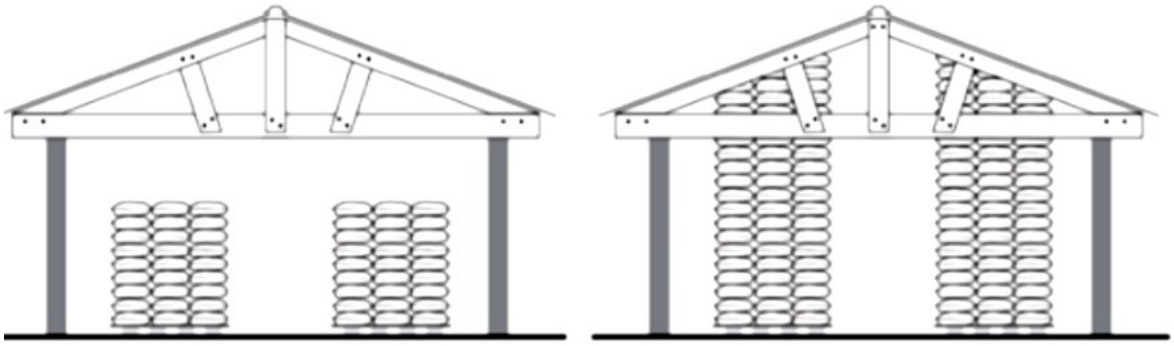


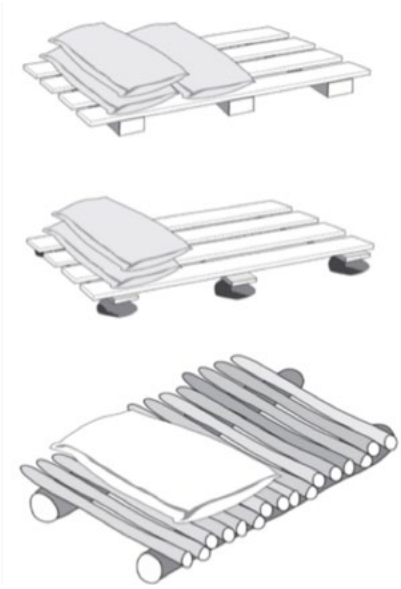
Figure 7 (a): Store Spacing and Stacking



Appropriate spacing *inappropriate spacing*

Appropriate spacing *Inappropriate spacing*

Figure 7 (b): Store Spacing and Stacking



3.3.3.2 Inspection of food stores

Food stores should be regularly inspected so that prompt action can be taken in case of any problem **(Figure 8)**. The store should be checked for the following:

a) Split or torn bags;

b) Pest infestation indicted by damaged grain, droppings, sounds and warming of the grain. Heating which can be verified or checked by lifting a top bag and feeling the bag underneath;

c) Presence of insects and rodents hiding from light through the use of sight, hearing and smell;

d) Staining, caking and moulding caused by water;

e) Leakages evidenced by leaking containers and stained cartons especially in the case of vegetable oil **(Figure 9)**.

f) The store should also be inspected for the following:

   (i). Leaking roofs;

   (ii). Broken windows and ventilators;

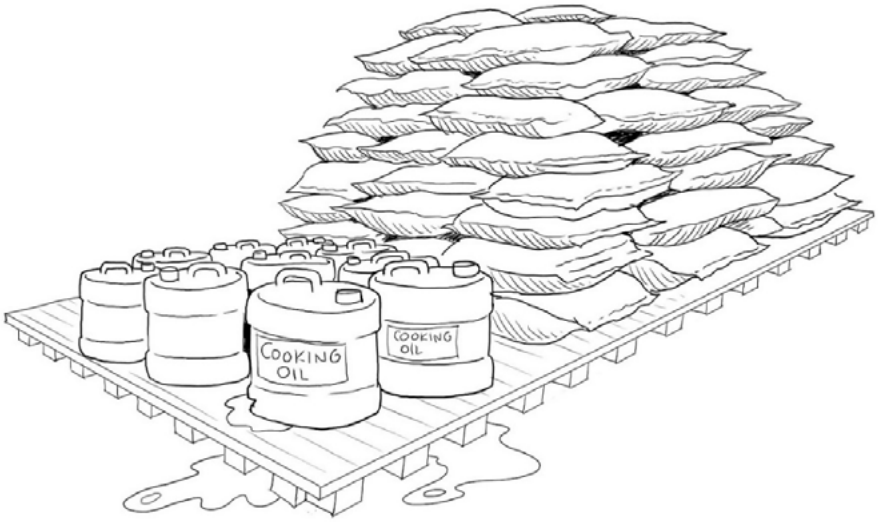
   (iii). Badly fitted doors;

   (iv). Cracked walls and floors.

g) The outside of the store and the area around should also be inspected. Any problems that are identified during the inspection should be dealt with.

Figure 8: Store Inspection

Figure 9: Leaking Oil Containers



3.3.4 Handling and preparation of food

Food hazards may occur or be introduced into food during improper cooking and poor personal hygiene.

3.3.4.1 Food handling

Handling of food should be done hygienically to prevent contamination of food. Careful food handling will help prevent damage to packages and keep losses low. The bags should not be dragged on the floor. Some of the good handling practices are shown in **figure 10**.

Figure 10: Different Ways of Handling Bags Containing Food Commodities

3.3.4.2 Food preparation at school level

Food preparation should be done in a manner that prevents contamination and transmission of diseases. The management and cleanliness of the kitchen should be of high standard. Hygienic preparation of food includes:

a) Cooking utensils, water and soap should be appropriate, adequate and should not contaminate the food;

b) Kitchen areas and food should be protected from insects, pests and other animals;

c) Separate raw meat, poultry and sea food from other foods;

d) Use separate equipment and utensils such as knives and cutting boards for handling raw foods;

e) Store food in separate containers to avoid contact between the raw, prepared and cooked food.

f) A good kitchen should

(i). Be spacious and well-ventilated

(ii). Be easy to clean

(iii). Be away from the dumping area and toilets

(iv). Have clean and safe water for cooking and washing of cooking utensils

(v). Have clean food preparation surfaces, for example, a table/bench

(vi). Have enough and appropriate dish racks for placing utensils

(vii). Have a good drainage system

(viii). Be close to the store

(ix). Have a serving area

g) All food handlers should

(i). Have a valid certificate of medical examination;

(ii). Be clean in body and clothing;

(iii). Wear protective clothing (headgear, aprons, dustcoats, closed shoes) and refrain from unhygienic practices (smoking, chewing tobacco, chewing miraa, spitting) **(figure 11)**;

(iv). Be knowledgeable and skilled in food preparation and hygiene;

(v). Wash hands before handling food and often during food preparation;

(vi). Wash Hands after going to toilet, sneezing/ handling soiled materials;

(vii). Wash and sanitize all surfaces and equipment used for food preparation.

Figure 11: Typical Food Handler

h) Safe water

Adequate supply of clean and safe water is required at school level to facilitate safe food preparation, drinking, cleaning of utensils and for hand washing at critical moments. Water should meet the requirements as specified in the Kenyan Standard for Portable Water KS EAS 12. Surface water sources, such as river, streams, ponds and lakes, are normally open to contamination and require treatment before being used for food preparation and drinking.

i) Serving of food

(i). Food shall be served while hot;

(ii). When prepared earlier before time of consumption, the food shall be hygienically covered and kept at an appropriate temperature;

(iii). Keep cooked food piping/uniformly hot (more than 600C) prior to serving;

(iv). Cooked food shall not be left at room temperature for more than 2 hours;

(v). Reheat cooked food thoroughly for not less than 5 minutes at boiling temperatures.

2.3.4.3 Handling and reporting of contaminated food

In the event that food commodities are suspected to be unsafe or of poor quality, the following actions shall be taken in case the food is already at a school:

a) Separate the suspected foods from the rest;

b) The head teacher shall immediately notify the SCDE and the public health officer that the food is suspect and seek guidance;

c) The head teacher will invite the public health officer to visit the school, to assess the food and determine its suitability for human consumption.

d) If the public health officer concludes that the food is unfit for human consumption, he or she will seize the food and issue a seizure form.

e) In the event that there is need for further analysis, the public health officer will take samples and submit them for a conclusive laboratory analysis.

f) If the test results indicate that the food is unfit for human consumption, the public health officer will condemn and issue condemnation certificate to the head teacher, copied to the SCDE.

g) The SCDE shall write to the Ministry of Education and attach a copy of the condemnation certificate and request for authority to dispose the condemned food.

h) The Principal Secretary for Education shall issue written authorization to the head teacher through the SCDE for the disposal of the condemned food.

i) The disposal of the food shall be done in the presence of the (Ministry of Education) representative and the Public Health Officer.

j) The Ministry of Education in conjunction with the Ministry of Health will investigate to establish the cause of contamination for proper mitigation.

CHAPTER 4 | IMPLEMENTATION ARRANGEMENTS OF THE GUIDELINE

This section outlines various arrangements for successful and effective implementation of these guidelines, including coordination, financing, capacity strengthening, effective reporting and feedback mechanisms.

4.1 Coordination

Food safety and quality assurance in schools is a shared responsibility between the national and county governments, local communities and other stakeholders. The engagement of various multi-sectoral players is essential for the successful implementation of the food safety and quality requirements. These players include national government state departments of health, basic education, special programmes, interior and national coordination, agriculture and trade, and the Council of Governors. At county and sub-county levels, the stakeholders include the county departments of health, treasury, education, trade, agriculture, planning and the offices of the county and sub-county directors of education and interior. Other stakeholders include food suppliers, community members, and development partners. The latter include United Nations agencies such as the World Food Programme, the Food and Agricultural Organisation and UNICEF, as well as national and international NGOs.

The stakeholders play complementary roles which must be well coordinated for synergy and effective implementation. A strong link between the national and county governments and between relevant ministries, departments and agencies is necessary for effective development of relevant policies, standards and regulations, budgeting, capacity strengthening of counties, implementation and reporting. A monitoring and evaluation framework will also be a shared responsibility between the two levels of government. The roles of the major stakeholders are shown in the tables 3 and 4.

Table 3: National Stakeholders and Their Roles in Implementing the Food Safety and Quality Requirements

Stakeholders	Main Activities /Roles
National Food Safety Coordinating Committee (NFSCC) (Annex 4)	■ Develop/disseminate policy and guidelines on food safety and quality ■ Consolidate reports from counties on the status of food safety and quality in educational institutions ■ Provide feedback to county food safety and quality committees based on submitted reports ■ Sensitize stakeholders on food safety and quality standards

Stakeholders	Main Activities /Roles
National School Meals and Nutrition Programme Technical Committee (Annex 5)	■ Policy formulation and guidelines ■ Budget preparation and funds disbursement ■ Coordination, collaboration and linkages ■ Support and guidance at regional and local ■ levels ■ Capacity building ■ Resource mobilization ■ Planning, monitoring and evaluation ■ Promotion and support to smallholder farmers
Kenya Bureau of Standards	■ Develop food safety and quality standards. ■ Provide testing services for compliance with standards
Government laboratories (government chemist, national public health laboratories)	■ Provide testing services for compliance with standards
Ministry of Education	■ Planning and policy support ■ Financing and budgeting ■ Procurement and logistics management ■ Develop standards, guidelines, and quality assurance of the National School Meals and Nutrition Programme in collaboration with other sectors when appropriate ■ Ensure the food supplied meets the standards and is properly stored ■ Provision of infrastructure, equipment and materials that will ensure food safety and quality ■ Ensure compliance in food safety and quality requirements when buying and delivering food to schools
Ministry of Agriculture, Livestock, Fisheries and Irrigation	■ Provide the framework and guidance to ensure production, harvesting and handling of crops and animal food products is done in a manner to ensure safety and quality
Ministry of Devolution and the ASALs	■ Ensure compliance in food safety and quality requirements when buying and delivering food to educational institutions

Table 4: County Stakeholders and Their Roles in Implementing the Food Safety and Quality Requirements

Stakeholder	Main Activity /Roles
County Food Safety and Quality Coordinating Committee	■ Coordinate all food safety and quality stakeholders in the county ■ Link the county and national government on issues of food safety and quality ■ Address food safety and quality issues affecting the county ■ Organise inspection, sampling and testing of food samples and use the results for decision making at county level. This data shall be shared with the National Food Safety Coordinating Committee (NFSCC) who will compile a national report on the status of food safety and quality ■ Organise county food safety and quality surveillance and monitoring
County Department of Health	■ Chair the County Food Safety and Quality Committee ■ Provide guidance on standards and specifications ■ Conduct inspection and testing of food commodities and issue relevant certification. ■ Certify food handlers ■ Inspect stores, kitchens and schools' sanitation ■ Enforce national legislation and standards on food safety and quality ■ Co-ordinate the handling of condemned food

Stakeholder	Main Activity /Roles
Education departments (national and county)	■ Ensure that educational institutions comply with procurement procedures, notably those related to food safety and quality ■ Liaise with the county department of health and other stakeholders at all levels of procurement to ensure that food safety and quality measure are adhered to ■ Collate and share enrolment data for planning purposes ■ Coordination, monitoring and reporting.
County Treasury	■ Allocate adequate funds to implement food safety and quality activities ■ Ensure adherence to procurement regulations, notably those related to food safety and quality in order to realise value for money
County Department of Agriculture	■ Provide technical guidance on food production, food storage and store construction and management ■ Capacity building for producers including educational institutions on safe production, harvesting and post-harvest management of food
County Department of Trade	■ Support traders in the implementation of these guidelines ■ Enforce compliance to these guidelines at county level.
Educational institutions and community (through school boards of management)	■ Ensure compliance in implementation of these guidelines

4.2 Financing

Sustainable implementation of these guidelines will require adequate and reliable funding. Some of possible sources of funding include:

4.2.1 National government funding

The national government will be relied upon to provide reliable and sufficient budget allocation for implementation of food safety and quality activities. Budget will be required for the following:

(i). Setting up and maintaining adequate national and regional laboratories

(ii). Capacity building and awareness creation on food safety and quality

(iii). Evaluation of the programme.

4.2.2 County government funding

County governments are required to budget and allocate funds under the county integrated development plans for food safety and quality activities. The budget is required for the following activities:

(i). Acquisition and maintenance of testing equipment;

(ii). Procurement of reagents for rapid testing of food;

(iii). Infrastructure for mini laboratories;

(iv). Food safety and quality surveillance in schools;

(v). Capacity strengthening activities.

4.2.3 Other actors

Development partners and the private sector.

4.3 Capacity Building

Successful implementation will be anchored on continuous capacity enhancement for the stakeholders and institutions involved in management of food safety and quality in learning institutions. The NFSCC will provide leadership on capacity building.

4.4 Reporting and Feedback Mechanism

Implementation of these guidelines will require regular reporting on the results of food safety and quality inspection and testing, communication among stakeholders, corrective action and reviews as necessary. The NFSCC, together with other stakeholders, will develop and implement a reporting and feedback mechanism.

ANNEX 1 | A LIST OF INDIVIDUALS WHO CONTRIBUTED TOWARDS THE DEVELOPMENT OF THE GUIDELINES

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S/No	Name	Organization	
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64	George Onyango	World Food Programme	Nairobi
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73	Hussein Osman	Ministry of Education	Nairobi


AccuScan
eppendorf
eppendorf
ReVeal Q+
for Fumonisin
NEOGEN
ReVeal Q+
for Fumonisin
NEOGEN
Fisherbrand
Fisher Scientific

ANNEX 2 | SAMPLING PROTOCOL: PROCEDURE FOR SAMPLING AND TESTING

The sampling protocol below is designed to reduce the risk of accepting mycotoxin-contaminated products while also reducing the probability of rejecting good products by erroneous rejection.

Principle

The lot to be examined is sampled separately. Lots larger than 500 tonnes (T) are subdivided in to sub-lots, which are then sampled separately. For lots greater than 500 T, the number of sub-lots equals to the lot weight in tonnes divided by 500 T. **Incremental samples** are randomly collected from each lot/sub-lot, which are then combined to make the aggregate sample. Each and every maize kernel has an equal chance of being picked. It is essential that the aggregate sample be the accumulation of many small incremental samples of the product selected from different locations throughout the lot or sub-lot.

1. Sampling from suppliers' stores/warehouses

This would involve the public health officers visiting suppliers' stores and warehouses and taking samples for verification. This would be based on the premise that the supplier will faithfully supply only that inspected and certified commodity to the schools.

2. Sampling from trucks

For arid and semi-arid regions that do not locally produce food consumed in schools, suppliers source the food from other regions and in some cases from neighbouring countries. This food is transported in trucks. Where suppliers make orders based on already awarded tenders, these trucks head straight to schools for off-loading. Sampling can therefore be carried out on trucks before food is delivered to schools. This can pose a challenge if sampling officers do not have the necessary equipment, like probes that can access all areas of the truck for effective sampling. Another challenge is the inability to obtain a representative sample since only top and rear bags are accessible. This may therefore not be an accurate way of sampling. In case of rejection of consignment, traders may incur losses through transportation charges or end up selling rejected consignments in local markets.

3. Sampling at school stores

Sampling could also be undertaken at school stores. However this places a lot of responsibility on suppliers in terms of complying with the requirements and returning non-conforming consignments. In situations where the school is under pressure to feed children, there is a danger of sub-standard food being accepted.

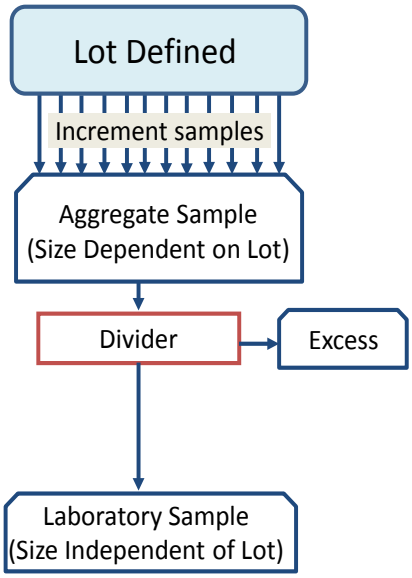
4. Simple random sampling per school term

Another suggested way of sampling would be to randomly sample consignments and/or suppliers across counties or sub-counties to check for compliance.

5. Recommended sampling by public health officers

It is recommended that suppliers MUST present their products for inspection, be they in stores or on trucks. Surveillance of foods in school stores should be conducted. A sampling procedure is outlined in .

Figure 12: Sampling Protocol Flow Diagram



6. Apparatus

a) **Requirements for Static Lots – Trailers/Trucks and Ships**

(i). Double-tube open-handle bulk probe

(ii). Weighing balances and scales

(iii). A canvas sheet, at least 6 inches longer than the probe

(iv). Sample splitter

(v). Sampling bags

b) **Requirements for static lots – Bags**

(i). Bag tiers

(ii). Weighing balances and scales

(iii). A canvas sheet, at least 6 inches longer than the probe

(iv). Sample splitter

(v). Sampling bags

c) **Requirements for dynamic lots**

(i). Sampling cup

(ii). A canvas sheet, at least 6 inches longer than the probe

(iii). Weighing balances and scales

(iv). Sample splitter

(v). Sampling bags

7. Procedure

Define the lot(s) as per Table 5. The maximum lot weight should be 500 T. If the consignment is more than 500 T the number of lots will be the total weight of the consignment divided by 500.

Table 5: Number and Size of Incremental Samples Composited for an Aggregate Sample of 5kg as a Function of Lot (or Sub-Lot) Weight

Lot or Sublot Weight (T in Tonnes)	Number of Increments (#)	Increment Size (g)	Aggregate Sample Size (KG)	Sampling Rate (kg/inc)
$T \leq 1$	10	500	5	100
$1 < T \leq 5$	10	500	5	500
$5 < T \leq 10$	20	250	5	500
$10 < T \leq 20$	40	125	5	500
$20 < T \leq 50$	60	84	5	833
$50 < T \leq 500$	100	50	5	5000

(i). Minimum aggregate sample size =laboratory sample size of 5 kg

(ii). 1 Tonne =1000 kg

(iii). Minimum incremental sample size = laboratory sample size (5 kg) / minimum number of incremental samples, i.e. for T< 1 Tonne, 500g = 5,000g/10

Table 6: Sampling from Bags

Number of bags in consignment	Number of bags to be sampled
Up to 10 bags	Each bag
10 to 100 bags	10, taken at random
More than 100 bags	Square root (approximately) of total number, taken according to a suitable sampling scheme

a) Sample each lot or sub-lot separately.

b) To determine the number of probing points or number of incremental samples needed to accumulate an aggregate or laboratory sample determine the following:

(i). approximate weight of the lot (LS)

(ii). minimum number of incremental samples from Table 1 (NIS)

(iii). minimum incremental sample size from Table 1 (MIS)

(iv). actual weight of the maize contained in the probe which is the actual incremental sample size removed by the probing device that may be different from that recommended in Table 1 (ISS)

(v). Required laboratory sample size (LSS)

NOTE: The weight drawn with the sampling device could be different from the minimum incremental sample size.

(i). If more, use the same number of incremental samples shown in Table 1, but the aggregate sample weight will greater than the laboratory sample weight of 5 kg.

(ii). If less, more incremental samples will have to be selected than shown in Table 1 to collect and accumulate an aggregate or laboratory sample of at least 5 kg.

(iii). To determine if the number of incremental samples is greater than that required in Table 1, divide the minimum incremental sample size (MIS) in Table 1 by the actual incremental sample size (ISS) that is related to the design of the probing device. The result is called a probing factor (PF).

PF = (MIS/ISS)

If PF < 1.0, round up to 1.0.

- The actual number of incremental samples (ANI) needed to accumulate at least a 5 kg of aggregate sample is equal to the probing factor times the minimum number of incremental samples (NIS) shown in Table 1.

ANI = PF×NIS

c) Develop a probing pattern, depending on the nature of the lot, static or dynamic, and draw the incremental samples.

d) Blend the incremental samples to constitute the aggregate sample.

e) Where the aggregate sample is larger than the laboratory sample use a random device to sample 5000 gm.

f) Place the sample(s) in the bag(s).

g) Label the samples appropriately and complete the sampling form.

8. Mycotoxin (Aflatoxin) Testing

Testing for aflatoxin and fumonisin is a requirement of the East African Community Standard for Maize and Beans. Due to the prevalence of aflatoxin in maize grains in Kenya, it is mandatory that all maize and maize products be tested before consumption. This is especially important for meals intended for children, who are much more vulnerable to aflatoxicosis. In Kenya three testing platforms are commonly used: the first two are rapid tests while the third is a confirmatory method undertaken in a well-established laboratory.

a) ELISA Kits

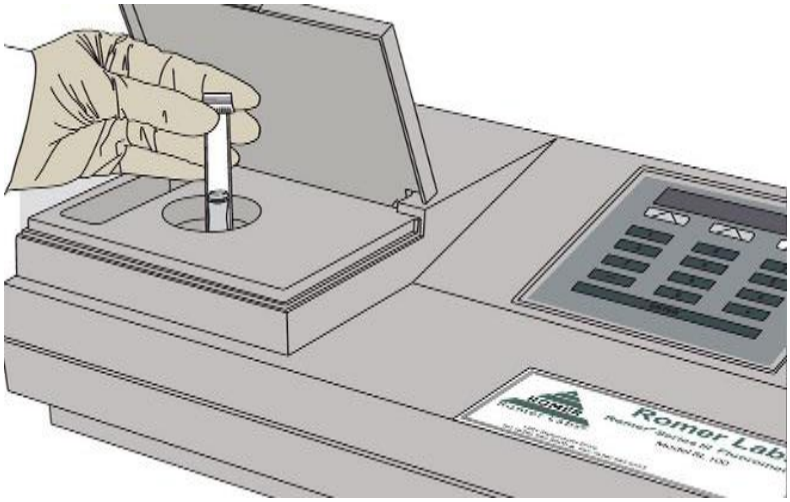
ELISA (enzyme-linked immunosorbent assay) kits are usually solid phase direct competitive enzyme immunoassays.

Principle

An aflatoxin-specific antibody optimized to cross react with one type or all four subtypes of aflatoxin or fumonisin. Toxins are extracted from a ground sample with different concentrations (60%-90%) methanol, ethanol or acetonitrile depending on the manufacturer. The extracted sample and **HRP-conjugated** toxin are mixed and added to the antibody-coated microwell. Toxin from the extracted sample and HRP-conjugated toxin compete to bind with the antibody coated to the microwell. Microwell contents are decanted and non-specific reactants are removed by washing. An **enzyme substrate** is added and colour (blue in most cases) develops. The intensity of the colour is directly proportional to the amount of bound conjugate and inversely proportional to the concentration of **toxin** in the sample or standard. Therefore, as the concentration of aflatoxin in the sample or standard increases, the intensity of the

colour will decrease. An acidic stop solution is added which changes the colour from blue to yellow. The microwells are measured optically by a microplate reader with an absorbance filter of 450 nm (OD450) The optical densities of the samples are compared to the optical densities of the kit standards and an interpretative result is determined.

Figure 13: Optical Density Reader



Sample preparation and extraction

(i). **Sampling and mixing**
The sample must be representative of the consignment and must be thoroughly ground to increase the surface area and mixed evenly.

(ii). **Weighing**
Correct weighing is important because the toxin is measured in parts per billion and the calculation of the level of contamination is based on the weight of the sample taken. It is important to have the measuring instruments like balances and cylinders calibrated. Calibration ensures that the instruments give the correct reading.

(iii). **Extraction of the toxin**
The extraction (removal) of the toxin from the ground sample is done using the solvent (methanol etc.), usually in a given ratio of solvent to sample. The solvent is added to the sample and filtered. The filtrate is collected and subjected to the procedure above depending on the manufacturer's specifications.

b) Lateral flow devices

Lateral flow immunoassays are also known as immune-chromatographic assays or strip tests. These are immune assays which have been designed to operate along a single axis. Although there are a number of different variations of the technology, they all operate using the same basic concept.

Principle

When a lateral flow immunoassay is run, the test sample is added to a sample application pad at the end of the strip. The sample then migrates to the conjugate release pad, where a detection particle (typically gold or latex) that has been conjugated to a biological component of the assay is held. Next the sample and the detection reagent migrate to the reaction membrane; a second biological component of the assay will have been immobilized here to function as a capture reagent. The capture reagent usually

exists as a test line which spans the width of the membrane; a control reagent will be immobilized in a second line further along the membrane. The analyte is either captured at the test line or continues to migrate until reaching the absorbent wicking pad at the other end of the strip. The detection reagent binds at the control line to indicate that the assay has run successfully.

Figure 14(a): Lateral Flow Principle

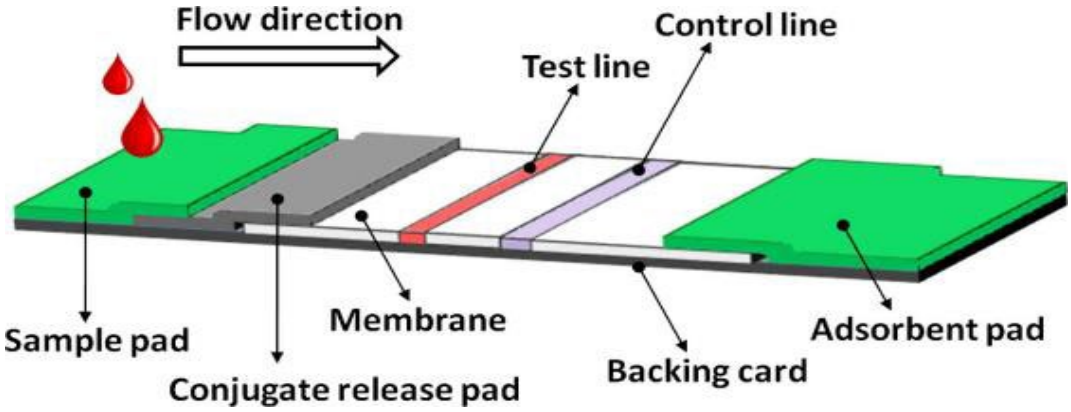
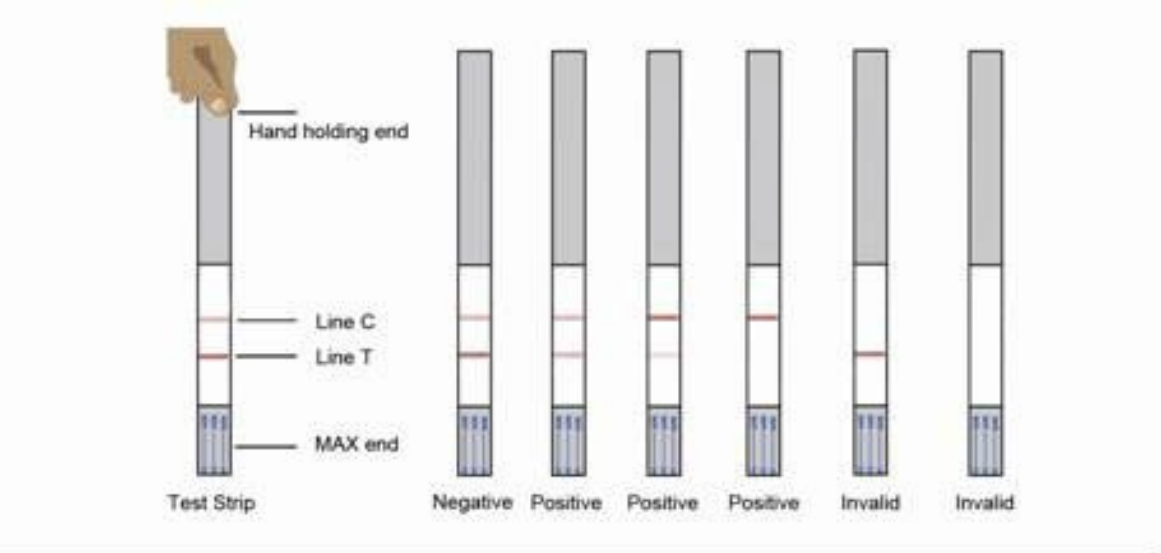


Figure 14(b): Lateral Flow Principle



Lateral flow devices can be set at different concentration levels of toxin detection, for example 10 parts per billion or 20 parts per billion for aflatoxin.

Sample preparation and extraction

The preparation of samples for testing follows the same procedure as the ELISA technique above up to the point of application of the test strip.

c) High Performance Liquid Chromatography method

High Performance Liquid Chromatography is a primary method used in a laboratory for toxin testing. Rapid tests are usually employed in the field for quick decision making but reference samples should be retained and sent to an accredited laboratory for confirmatory testing. It is important for final confirmatory testing to be done in an accredited laboratory because accreditation ensures that test reports can be relied on.

Figure 14(c): Lateral Flow Principle

ANNEX 3 | QUALITY PARAMETERS USED IN GRADING OF GRAIN

1. Wholesome Maize	
Good quality yellow maize 	Good quality white maize 
1a. Maize Quality Defects	
Live insect infestation 	Broken grains 
Rotten and diseased maize grains 	Germinated grains 

Discoloured grains	Insect-damaged grains
	
2. Wholesome Beans	
Rosecocco Beans	Red kidney beans
	
2a. Beans' Quality Defects	
Foreign matter	Broken
	

Mouldy 	
3. Wholesome Sorghum	
Wholesome Sorghum 	Wholesome Sorghum 
Wholesome Finger Millet 	

i) **Live Insect Infestation**

There are several methods of checking for live insect infestation depending on the degree of the infestation. The simplest is to pick a sample, spread it out of a clear flat surface for a few minutes and check for any insects crawling about. The surface can also be heated gently to about 45oC to flush out insects that may be within the grains. Sieving can also be used to detect insects. Sieving disturbs weevils and they are usually seen in the screenings.

ii) **Determination of Foreign Matter**

- Place a clean dry basin (bottom pan) in place to receive any materials that may go through the sieve
- Weigh 200 grams of the representative sample (weight$_1$)
- Put the maize in the sieve provided (4.5 mm round hole)

Round holed sieve

- Shake the sieve horizontally 30 times for about 15 seconds
- Collect all the foreign organic matter that has passed through the sieve
- Hand pick all foreign organic matter retained on top of the sieve
- Weigh all the foreign matter collected from the bottom pan and that handpicked from the top (weight$_2$)

$$Foreign\ Matter = \frac{weight\ 2}{weight\ 1} * 100$$

iii) **Determination of Inorganic Matter**

These are foreign materials of non-biological origin, e.g. metals, stones, glass, plastic, soil, sand, dust.

- From the working sample, weigh (200 grams) (weight1)
- Sort out all inorganic matter, e.g. metal, stones, plastics, glass or sand
- Weigh the inorganic matter (weight$_2$)
- Express the results as a percentage

$$Inorganic\ Matter = \frac{weight\ 2}{weight\ 1} * 100$$

iv) **Determination of Broken Grains**

- From the working sample weighed (200 grams) ($weight_1$)
- Collect all the whole and broken grains that passed through a 4.5 mm round-hole sieve
- Weigh the broken grain ($weight_2$)
- Express the percentage of broken grain as follows:

$$Broken\ grain = \frac{weight\ 2}{weight\ 1} * 100$$

v) **Determination of Pest-Damaged Maize**

- From the working sample, weigh (200 grams) ($weight_1$)
- Collect the maize grains retained by the sieve (after sieving off foreign matter, and broken grains)
- Pour maize on a flat surface
- Pick the insect damaged grain kernels by hand
- Weigh the insect damaged grain ($weight_2$)
- Express the percentage insect damaged grains as

$$Pest\ damaged\ Maize = \frac{weight\ 2}{weight\ 1} * 100$$

vi) **Determination of Rotten and Diseased Grains**

- From the working sample, weigh (200 grams) ($weight_1$)
- Collect the grains retained by the sieve
- Pour them on a flat surface.
- Pick the rotten and diseased grains by hand
- Weigh the rotten and diseased grains by hand ($weight_2$)
- Express the rotten or diseased maize grains as

$$Rotten\ and\ Diseased\ grains = \frac{weight\ 2}{weight\ 1} * 100$$

vii) **Discoloured Grains**

- From the working sample, weigh (200 grams) (weight)
- Collect the maize grains retained by the sieve
- Pour them on a flat surface

- Pick the discoloured grains by hand (taking care not to include other coloured maize).
- Weigh the discoloured grains (weight$_2$)
- Express the percentage discoloured grains as

$$Discoloured\ Grain = \frac{weight\ 2}{weight\ 1} * 100$$

viii) **Immature/shrivelled Grains**

- From the working sample weighed (200 grams) (weight$_1$)
- Collect the grains retained by the sieve.
- Pour them on a flat surface.
- Pick the immature/shrivelled grains by hand.
- Weigh the immature/shrivelled (weight$_2$).
- Express the percentage immature/shrivelled grains as:

$$Immature\ or\ Shrivelled\ grain\ = \frac{weight\ 2}{weight\ 1} * 100$$

ix) **Filth**

- From the working sample weighed (200 grams) (weight$_1$)
- Collect all the filth that went through the sieve and that which remains on top.
- Weigh the filth (weight$_2$)
- Estimate the percentage filth level as:

$$Filth = \frac{weight\ 2}{weight\ 1} * 100$$

x) **Total Defective Grains**

This refers to all defects mentioned above. It is limited to 70% of the sum total of individual defects tested as per the standard specifications above.

- From the working sample weighed (200 grams) (weight$_1$)
- Collect the maize grains retained by the sieve.
- Pour them on a flat surface.
- Put together all defective kernels handpicked above (diseased, discoloured, stained, immature/shrivelled, pest damaged, etc.)
- Weigh the defective (weight$_2$)
- Express the percentage total defective grains as:

$$Total\ defective\ grains = \frac{weight\ 2}{weight\ 1} * 100$$

ANNEX 4 | MEMBERS OF THE NATIONAL FOOD SAFETY COORDINATING COMMITTEE (NFSCC)

1) **Chair:** Agriculture Secretary
2) **Secretariat:** Director Public Health

Members

3) Ministry of Health
4) Ministry of Agriculture, Livestock, Fisheries and Irrigation
5) Council of Governors (CoG)
6) Kenya Bureau of Standards (KEBS)
7) Kenya Plant Health Inspectorate Service (KEPHIS)
8) National Public Health Laboratories
9) Government Chemist
10) Directorate of Veterinary Services
11) Directorate of Livestock Production
12) Kenya Fisheries Service
13) Kenya Dairy Board (KDB)
14) Kenya Agricultural and Livestock Research Organization (KALRO)
15) National Biosafety Authority (NBA)
16) Agriculture and Food Authority (AFA)
17) National Cereals and Produce Board (NCPB)
18) University of Nairobi
19) Kenya Association of Manufacturers (KAM)
20) Cereal Millers Association (CMA)
21) World Food Programme (WFP)
22) Food and Agriculture Organization of the United Nations (FAO)

ANNEX 5 | MEMBERS OF THE NATIONAL SCHOOL MEALS AND NUTRITION PROGRAMME TECHNICAL COMMITTEE

1) **Chair:** Director of Primary Education
2) **Co-Chair:** Ministry of Health

Members

3) Ministry of Education
4) Ministry of Agriculture, Livestock, Fisheries and Irrigation
5) Ministry of Labour and Social Protection
6) Treasury and Planning
7) Ministry of Water and Sanitation
8) Ministry of Devolution and the ASALS
9) County representatives
10) Development partners

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REPUBLIC OF KENYA

WFP
World Food Programme