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DRAFT TANZANIA STANDARD

Processing of edible vegetable oil — Code of practice

DRAFT STANDARD

TANZANIA BUREAU OF STANDARDS

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0 Foreword

This Tanzania Standard was published under the authority of the Board of Directors of Tanzania Bureau of Standards.

Tanzania Bureau of Standards (TBS) is the statutory national standards body for Tanzania established by the Standards Act Cap. 130.

Tanzania Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. The Technical Committees work under the supervision of Divisional (sectoral) Committees. The Standards are developed in accordance with the Guide and Procedure for Development of Tanzania Standards and TZS 0, *Guide for presentation of Tanzania Standards*.

Tanzania Standards are subject to review, to keep pace with science and technological advances. Users of the Tanzania Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

This Tanzania Standard was developed under the supervision of Agriculture and Food Divisional Standards Committee [AFDC]. The Technical Committee responsible for the standard is AFDC 04, Edible fats and oils

The reporting of the results of a test or analysis made in accordance with this Tanzania Standard, if the final value, observed or calculated is to be rounded off, shall be done in accordance with TZS 4.

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Introduction

The edible vegetable oil industry is an important component of Tanzania's agricultural, manufacturing and food sectors, contributing to food security, employment, value addition and economic development. The sector encompasses the production, collection and processing of oilseeds and other oil-bearing crops, as well as the refining, packaging, distribution and marketing of edible vegetable oils. Major oil crops in Tanzania include sunflower, soybean, sesame, groundnuts, coconut, oil palm, avocado and other emerging oil-bearing crops.

Tanzania has considerable potential to strengthen its edible vegetable oil industry through increased production and productivity of locally grown oil crops, improved processing technologies, investment in value addition and enhanced linkages between farmers, processors and markets. The sector is characterized by the participation of large-scale refineries, medium, small and micro scale enterprises (MSMEs), with large-scale refineries predominantly undertaking the refining of imported crude vegetable oils, while MSMEs are largely involved in the primary processing of oilseeds and coconut.

Despite the sector's significant potential, the edible vegetable oil industry faces a number of challenges that affect the quality, safety, efficiency and competitiveness of its products. These include variations in processing practices, limited access to appropriate processing technologies, inadequate quality control systems, inconsistent compliance with regulatory and standards requirements, challenges in traceability and product identification. There is therefore a need to promote good manufacturing and processing practices throughout the edible vegetable oil value chain.

A Code of practice for the processing of edible vegetable oils in Tanzania will provide practical guidance to processors on hygienic handling of raw materials, appropriate processing methods, quality control, food safety management, storage, packaging, labelling, transportation and distribution. The Code will also support processors in establishing consistent and appropriate practices that minimize contamination, deterioration and other factors that may compromise the safety and quality of edible vegetable oils.

The Code of practice will further facilitate compliance with applicable Tanzanian, regional and international standards and regulatory requirements. Its implementation will contribute to strengthening consumer protection, improving confidence in locally processed edible vegetable oils and promoting fair competition within the industry. It will also provide a common framework for improving processing operations among large-scale processors, MSMEs and other actors involved in the edible vegetable oil value chain.

Processing of edible vegetable oil — Code of practice

1 Scope

1.1 This Tanzania Standard provides guidelines and best practices for processing of edible vegetable oil from various oil crops (oilseeds, nuts and fruits) to achieve food safety and quality, compliance to standards and regulatory requirements while ensuring industry sustainability and competitiveness.

1.2 This Tanzania standard applies to all players involved in the processing of edible vegetable oil.

2 Normative references

The following referenced standards are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced standard (including any amendments) applies:

TZS 538, *Labelling of pre-packaged foods — General requirements*

TZS 4646, *Code of practice for the storage and transport of edible fats and oils in bulk*

3 Terms and definitions

For the purpose of this draft standard, the following terms and definitions shall apply:

3.1 audit

systematic, independent and documented process to determine whether processes, activities and results are in compliance with planned procedures and whether they are implemented and suitable to achieve set objectives

3.2 calibration

determination of the accuracy of an instrument, usually by measurement of its variation from a standard, to ascertain necessary correction factors

3.3 certification

those actions leading to the issuing of an official document attesting to a status or level of achievement of requirements of a standard.

3.4 competent authority

any entity that has the legally delegated or invested authority, capacity, or power to perform a designated function.

3.5 conformity assessment

any activity that determines whether a product, system, service and sometimes people fulfil the requirements and characteristics described in a standard or specification.

3.6 contaminant

any substance not intentionally or intentionally added to food in the course of processing rendering it unfit for consumption

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3.7

documentation

organized collection of records, procedures, and information related to a product, process, or system in written or electronic form

3.8

food fraud

intentional substitution, addition, tampering or misrepresentation of food, food ingredients, food packaging or labelling product information or false or misleading statements made about a product for economic gain that could impact consumer health

3.9

food defence

effort to protect food from intentional adulteration from acts intended to cause wide scale harm to public health, including acts of terrorism targeting the food supply chain

3.10

food safety

assurance that food will not cause harm to the consumer when it is prepared and consumed according to its intended use

3.11

extraction

the process of obtaining oil from oil crops (nuts, fruits or seeds)

3.12

establishment

any building or area in which food is handled and the surroundings under the control of the same management.

3.13

environmental management plan

comprehensive document that outlines how an entity will prevent, reduce, manage, and monitor environmental impacts caused by its activities.

3.14

foreign matter

all organic and inorganic matter other than edible vegetable oil.

3.15

Good Manufacturing Practices (GMPs)

pre-requisite programmes that ensure food is efficiently, consistently and sustainably produced and controlled to maintain quality and safety.

3.16

procedure

step by step set of instructions that explains how to carry out a specific task or process correctly and consistently.

3.17

hazard

biological, chemical, radiological and physical agent or any other property that may cause a food product to be unsafe for consumption

3.18

Hazard Analysis Critical Control Points (HACCP)

system which identifies, evaluates, and controls hazards which are significant for food safety.

3.19

oil crops

plants grown for their nuts, seeds or fruits that may be used for edible vegetable oil extraction.

3.20**Personal protective equipment (PPE)**

clothing and items selected or designed to protect the wearer against injury and the product against contamination

3.21**miscella**

oil-solvent mixture in solvent extraction process.

3.22**pest control products**

product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, attracting or repelling any pest

3.23**risk**

function of the probability of an adverse health effect and the severity of that effect, consequential to a hazard(s) in food

3.24**traceability**

ability to trace the history, application, use and location of an item or its characteristics through a coded identification data.

3.25**value chain**

complete sequence of activities required to bring a product or service from conception to final disposal that encompasses all stages from sourcing raw materials to delivering the finished product or service to the end customer.

3.26**water fit for purpose**

water that is determined to be safe for its intended use.

4. Management system**4.1 General**

4.1.1 The processor has ultimate responsibility for compliance with the code of practice. The processor shall ensure high productivity, food safety, quality, worker welfare, and environmental sustainability across the entire value chain.

4.1.2 The processor shall take adequate measures as appropriate throughout the value chain to;

- a) Implement food safety, quality, and environmental management systems and may seek certification to these systems by allocating adequate resources;
- b) Investigate non-compliance and taking corrective actions and;
- c) Ensure that employees/suppliers are given information, instruction, training and guidance to implement the provision of this code of practice

4.2 Documentation and record keeping

The processor shall maintain and retain relevant documented information and ensure that they are accurate, retrievable, legible and up to date.

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4.3. Competence development

Processors shall ensure;

- a) staff are trained in Good Manufacturing Practices (GMP), environmental protection and safe handling of product and resulting waste; and
- b) Competence gaps are addressed through training, hiring, or reassignment as may be appropriate

4.4. Safety and security

The processor shall ensure controlled access to edible vegetable oil production, storage, and handling facilities.

4.5. Conformity assessment

The processor should maintain the existing management system in order to conduct appropriate internal and/or third-party audits and address identified non-conformities.

4.6 Risk management

The processor shall identify, assess, prioritize and mitigate risks to ensure long-term sustainability.

4.7 Procurement

The processor should source inputs from approved suppliers and maintain a supplier management system to monitor quality, safety and performance.

4.8 Food fraud and food defence

The processor shall have in place a documented procedure to identify and mitigate the risks of food fraud and food defence which should be integrated in the organization's food safety management systems.

5 Sourcing and handling of raw materials

5.1 Sourcing

5.1.1 The quality and condition of raw materials including oilseeds, nuts or fruits, are crucial to producing high-quality vegetable edible oils. Raw materials should be sourced based on but not limited to relevant standards, processor needs and specifications, supplier evaluation and quality control.

5.1.2 Maturity assessment shall be done where applicable to ensure maximum oil yield and maintain produce and product quality. Maturity evaluation should be done based on visual, physical and biochemical indicators relevant to the oil crop of interest.

5.2 Handling

5.2.1 Transportation

Transportation of raw materials to the processing facility should be carried out in a manner that prevents contamination, adulteration and deterioration. Transport vessels should have security control measures as well as controlled hygiene practices to avoid cross contamination.

5.2.2 Raw material reception

5.2.2.1 Raw materials should be appropriately sampled, inspected and/or tested by trained and competent personnel to assure quality and safety before receipt.

5.2.2.2 The processor shall establish, maintain and retain relevant documented information.

5.2.3 Storage

Raw materials should be stored under conditions such as cool and dry environment with proper ventilation to minimize degradation and maintain quality. Regular inspection of storage areas should be conducted.

5.2.4 Raw material documentation and records

Proper documentation of sourcing and handling processes should be maintained and retained.

6. Establishment, design and facilities

6.1 Location of establishment

The location of edible vegetable oil processing establishment shall comply with GMP and relevant legislations.

6.2 Premises design

6.2.1 General

The processing premises shall be in good structural condition and compliant to relevant legislations.

6.2.2 The premises shall be pest-proof, cleanable and spacious to prevent overcrowding.

6.2.3 The premises shall be designed to prevent objectionable odour, smoke, dust or other contamination

6.2.4 Materials used in the construction of the premise shall not predispose the product to contamination by dust, flaking paint or other hazards

6.2.5 The processor should have separate zones for raw materials, processing, and finished products to avoid cross-contamination.

6.2.6 The processing area should not be used for activities not related to processing of edible vegetable oil.

6.3 Equipment

6.3.1 Equipment and machinery used for processing of edible vegetable oil shall be fit for purpose, depending on the nature of the raw materials to optimize processing operations.

6.3.2 Equipment used for processing shall be;

- a) designed and constructed to allow easy cleaning and maintenance;
- b) made of food grade materials for all food contact surfaces; and
- c) compliant with occupational health/safety legislations
- d) regularly cleaned as per manufacturer's instructions

6.4 Facilities

The processing facility shall have;

- a) adequate water fit for the purpose;
- b) adequate and well-maintained waste storage and/or drainage systems to prevent contamination;
- c) cleaning and hygiene facilities, including but not limited to handwashing stations, raw material, equipment and premises cleaning;
- d) clean toilets and personnel hygiene facilities compliant with the relevant legislation;
- e) adequate ventilation designed to prevent the accumulation of dirt, moulds and condensation and;
- f) adequate lighting to ensure safe and effective operations. The use of natural lighting is encouraged to reduce energy consumption and enhance visibility. Where artificial lighting is used, fixtures should be made of shatter-proof materials to prevent potential contamination of products and maintain a

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safe working environment.

6.5 Maintenance

6.5.1 The processor shall establish maintenance procedures to ensure;

- a) regular equipment calibration and cleaning
- b) efficient operation for all plant machinery and equipment

6.5.2 Where lubricants, detergents and disinfectants are used, they shall be approved by the relevant competent authority.

6.6 Pest control

6.6.1 The processor shall establish and maintain pest control programmes.

6.6.2 Pest management programmes shall be documented and shall identify target pests, and address plans, methods, schedules, control procedures and, where necessary, training requirements.

6.6.3 Programmes shall include a list of pest control products which are approved for use in specified areas of the establishment.

7. Processing

Edible vegetable oil should be processed in a manner that optimises recovery and ensures that the products meet quality requirements and are safe for human consumption, protects the environment and the worker from occupational hazards.

7.1 Primary processing

7.1.1 Cleaning

7.1.1.1 The processor should carry out cleaning to remove foreign materials and ensure that the final product is free from contaminants and to protect the processing equipment from damage.

7.1.1.2 Cleaning may be done by hand sorting, washing, use of screens, air classifiers, and magnets. The processor should undertake preparation processes such as shelling/threshing, cracking, dehulling, ripening and conditioning.

7.1.2 Preparation

7.1.2.1 Shelling/threshing can be done manually or mechanically by using equipment such as a thresher or stripper.

7.1.2.2 Dehulling may be done to remove the outer shell or husk, which is not needed in the oil production process. Dehulling is recommended to reduce wax levels which pose a challenge during the refining process.

7.1.2.3 Where fruits are used as raw materials (like in the case of avocado and palm oil processing), sterilization washing and sanitization may be done. In the case of sterilization, it should be done at appropriate high-pressure steam in the required holding time for effective heating of bunches. Where applicable, the threshed fruits can be cooked in water.

7.1.2.4 Digestion (or pounding) of the fruit, where applicable, may be done at recommended temperatures as this helps to reduce the viscosity of the oil, destroys the fruits' outer covering (exocarp), and completes the disruption of the oil cells already begun in the sterilization phase.

7.2 Secondary processing

7.2.1 Extraction of oil

Oil extraction may be done by mechanical or solvent methods.

7.2.1.1 Mechanical extraction

This method should be preferred for producing high-quality oils, particularly virgin and cold-pressed oils, which preserve more nutrients, flavour profile and the chemical nature of the oil. The process should involve physically pressing the oil out of the raw material using mechanical means. Cold pressing should be done without application of heat to preserve the nutritional value and natural flavour of the oil.

7.2.1.1.1 Filtration, clarification and drying of oil

Filtration should be done to ensure elimination of foreign matter/insoluble impurities in the oil. Appropriate filter materials including but not limited to filter cloths, screens and centrifuge should be used.

For oil extracted from oil seeds and nuts, the fluid coming out of the press should be screened to obtain a clear oil.

For extracted oil that requires clarification, the process may involve multiple steps to ensure the removal of impurities such as water, cell debris, fibrous material and non-oily solids as follows:

- a) Hot water may be added to the press output mixture to thin it and passed through a screen to remove coarse fibre.
- b) The screened mixture may be boiled and then allowed to settle by gravity in a large tank so that the oil will separate and rise to the top.
- c) The clear oil should be decanted into a food grade container. The clarified oil may still contain traces of water and dirt. To prevent increasing free fatty acids through hydrolysis of the oil, the moisture content of the oil should be reduced by re-heating the decanted oil and carefully skimming off the dried oil from any engrained dirt.
- d) Clarification and drying of oil may also be done using continuous clarifiers which consist of three compartments to treat the crude mixture, dry decanted oil and hold finished oil in an outer shell as a heat exchanger.

7.2.1.1.2 By-product recovery

Where palm kernel is used for oil extraction, the stepwise recovery operations may include:

- a) The residue from the press consists of a mixture of fibre and kernel and the kernels can be separated from the fibre by hand in small-scale operations.
- b) The fibre may be covered and allowed to heat, using its own internal exothermic reactions, for about two or three days. The fibre may be pressed in spindle presses to recover oil that can be used in soap-making.
- c) The separated kernel may be dried and sold to processors who process them into various products.
- d) Mills may use the recovered fibre and shells to fire the steam boilers.

Where oilseeds are used for oil extraction, recovery operations may include;

- a) Cold pressed oilseed cakes can be pressed further under higher temperatures to recover more oil.
- b) Hot pressed cakes can be subjected to solvent extraction for more recovery.
- c) Where the by-products are intended for feed consumption, they should be handled in a safe manner to ensure conformity to feed requirements.

7.2.1.2 Solvent Extraction

7.2.1.2.1 General

Solvent extraction of edible vegetable oil is a chemical method used to separate oil from oil-bearing seeds, nuts or fruits using food grade solvents. This process can be used independently and/or to extract the remaining oil after mechanical extraction. The solvent used should be efficient in extracting the oil and be

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entirely removed during the refining process.

7.2.1.2.2 Extraction

Monitoring of temperature and solvent flow while ensuring extractor seals are solvent-tight is strongly recommended.

7.2.1.2.3 Desolventizing

The extracted meal contains residual solvent that shall be recovered through desolventization. Desolventization should be done by application of indirect heat to evaporate and completely remove the residual solvent which should be effectively recovered.

7.2.1.2.4 Miscella distillation

This process shall be done to separate the oil from the solvent and recover the solvent for reuse. The miscella should be processed through evaporators and a final stripper under controlled vacuum and temperature conditions to ensure efficient and effective separation while minimizing oil degradation. The recovered crude oil shall be refined and the condensed solvent may be recycled into the extraction process.

7.2.1.2.5 Solvent recovery and condensation

Solvent vapours from the desolventizer and distillation units should be condensed efficiently, and non-condensable vapours should be treated using a mineral oil scrubber or similar system. Solvent losses should be monitored and improved, and routine checks for vapor leaks and emissions is recommended.

7.2.2 Refining

Crude vegetable oil is the primary raw material for the refining process. Refining of crude vegetable oil shall be carried out to remove impurities, obtain required quality specifications and meet customer preferences. The processor shall have a clearly defined process flow chart describing all refining process steps and operational/quality controls.

7.2.2.1 Degumming

Degumming should be done as the first step in the refining process to improve stability, clarity, shelf life and improve process efficiency. Water, acid and/or enzymatic degumming are all acceptable methods used to remove phospholipids and other hydratable impurities.

Where acids are used, mild acids such as phosphoric and citric acid are recommended. The use of strong acids such as hydrochloric acid and sulphuric acid is highly discouraged due to health, safety and environmental concerns.

7.2.2.2 Dewaxing/Winterization

Some oils including but not limited to sunflower, corn oil and rice bran oil contain natural waxes which crystalize at low temperatures and give a turbid or cloudy appearance. To remove these waxes, the oil should be chilled to crystalize the waxes and subsequently be removed by centrifugation or filtration.

7.2.2.3 Neutralization

Neutralization is carried out in some oils including but not limited to sunflower, corn oil and rice bran oil to mainly neutralize free fatty acids to improve stability, clarity, shelf life and improve process efficiency. The neutralization process, whether physical or chemical, should be controlled to avoid excessive loss of oil.

7.2.2.4 Bleaching

The bleaching process removes colour pigments such as chlorophyll and carotenoids, oxidation products, metals, residual soaps and other impurities to improve appearance, flavour and shelf life. Bleaching can be done by use of bleaching earth, activated carbon or any other appropriate bleaching agent. Use of activated

clays containing chlorine compounds is highly discouraged to mitigate the formation of 3- MCPD contaminants. Dosage of these bleaching agents should be adapted to ensure the efficient removal of the specific substances.

7.2.2.5 Deodorization

Deodorization is a process aimed at removing volatile compounds, odours, flavours, free fatty acids, carbohydrates, residual proteins among others to improve the final quality of the oil. The process involves heating the oil under a vacuum to strip off these unwanted compounds. The processor should take appropriate measure to control the temperature and vacuum levels to prevent:

- a) the degradation of beneficial nutrients such as tocopherols (vitamin E).
- b) formation of heat induced contaminants for example glycidyl esters (GE) and Trans Fatty Acids (TFAs)

7.2.2.6 Fractionation

Fractionation is a physical process used to separate some edible vegetable oil including but not limited to palm oil, shea butter and coconut oil into liquid and solid parts based on their melting point differences. The process involves controlled heating, crystallization and filtration. The process should not involve chemical alteration of the oil thereby preserving its natural properties.

7.3 Process control

7.3.1 All process steps should be designed, implemented, monitored, documented and reviewed for effectiveness of controls and compliance with critical control limits.

These process controls may include;

- a) A systematic and effective HACCP system which identifies potential hazards arising from process operations and relevant mitigation measures
- b) Measures to appropriately handle, rework and/or recycle material
- c) Calibration and maintenance of process control equipment and facilities
- d) Appropriate flow, mass, temperature, pressure and time controls
- e) Identification of non-conformities for appropriate corrective actions
- f) Representative sampling and analysis

7.3.2 The processor should carry out quality control and assurance throughout the processing stages by:

- a) Laboratory testing which may include routine testing, monitoring of contaminants and microbiological hazards.
- b) Sensory evaluation/organoleptic testing of the product

7.3.3 The processor shall adopt best and efficient processing practices that ensure quality, safety and competitiveness.

7.4 Product control and quality assurance

7.4.1 The processor shall demonstrate due diligence to ensure product quality and safeguard consumer health

7.4.2 To minimize risks associated with damage of the final product, the processor should ensure that:

- a) Products are packaged, stored, dispatched and transported in a manner that maintains its wholesomeness and complies with relevant standards, legislations and customer requirements;
- b) A quality control system is established to ensure compliance of finished products with specifications.

7.4.3 Samples should be kept for a minimum period of the anticipated shelf life of the product.

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7.5 Non-conforming products

7.5.1 The processor shall take action(s) to prevent non-conforming products from entering the food chain by taking appropriate correction and corrective action.

7.5.2 For products deemed not acceptable for release, disposition actions should be taken through;

- a) reprocessing or further processing within or outside the processor's premises; or
- b) redirected for other use as long as food safety in the food chain is not affected; or
- c) destroying and/or disposing as waste in accordance with the relevant legislation and standard operating procedures (SOPs).

7.5.3 Documented information on the disposition of non-conforming products, including the identification of the person(s) with approving authority shall be retained.

8. Packaging and labelling of edible vegetable oil

8.1.1 General

Packaging containers used shall comply with the provisions of the applicable environmental legislation and standards on packaging materials.

8.1.2 Packaging containers used shall be made of food grade materials and of such a design as to protect the product from quality degradation, contamination and/or alteration of the nutritional and organoleptic properties.

8.1.3 Packaging containers shall be stored in a clean and sanitary manner.

8.1.4 Packing should be done under conditions that preclude the introduction of contamination into the product.

8.2 Labelling

8.2.1 Labelling of edible vegetable oil shall be done in accordance with the requirements stipulated in TZS 538 or labelling guidelines in the country of sale or customer requirements.

9 Storage and transportation of edible vegetable oil

9.1 General.

Edible vegetable oil should be stored and transported in accordance with TZS 4646.

9.2 Proper storage of edible vegetable oil is essential to preserve its quality, prevent oxidation, maintain flavour, shelf life and nutritional value while ensuring compliance with food safety standards. Key factors such as temperature, light, air and humidity significantly impact the oil's shelf life and usability and hence should be properly monitored.

9.3 The processor should implement a First in First Out (FIFO) or First Expiry First Out (FEFO) system to ensure that older stock is used or sold before newer stock.

10 Trade of edible vegetable oil

10.1 All actors in the edible vegetable oil value chain shall make effort to curb counterfeiting and sale of substandard edible vegetable oil products.

10.2 Edible vegetable oil trade shall be conducted in accordance with relevant legislations.

11. Product recall/withdrawal and traceability

11.1 The processor shall establish an edible vegetable oil traceability, withdrawal and recall procedure across the value chain.

11.2 The processor should put in place a robust batch tracking system that allows for the tracing of each product back to its source through lot identification.

11.3 The processor shall maintain and retain documented information on traceability/tracking from raw materials, in process and finished products.

11.4 The processor shall put in place effective recall/withdrawal procedures with clear steps for identifying affected batches, notifying distributors and retailers, contact information and responsibilities for team members, and retrieving the product from the market.

11.5 In the absence of an actual recall/ withdrawal, a mock recall should be conducted at least once a year to test, verify and review the effectiveness of the recall procedure.

11.6 Recalled/withdrawn products shall be segregated with controlled access until the appropriate disposition of the product has been determined.

12 Complaint handling procedures

12.1 There shall be an established and documented complaint handling procedure with steps taken to obtain, address and give feedback on arising complaints with recommended corrective actions

12.2 The procedure should be regularly reviewed to enhance suitability and effectiveness.

12.3 The records of complaints shall be retained and made available to interested parties as required

13 Environmental management

13.1 General

The processor should develop and implement an environmental management plan to cover all aspects as required by the relevant legislation.

13.2 Environmental impact assessment and audit

13.2.1 Environmental impact assessment and licensing should precede the intended operations.

13.2.2 The processor should carry out an environmental audit of their operations annually or as per the existing environmental laws and regulations.

13.3 Energy resource use and management

13.3.1 The processor should have procedures in place describing action to improve and optimize energy uses. Renewable energy sources are recommended.

13.3.2 The processor should provide a description of any on-site electricity or fuel generation activities and describe conservation measures and methods employed to optimize efficiency.

13.3.3 The processor should provide relevant auditable records on all aspects of energy management.

13.4 Integrated Waste and pollution management

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13.4.1 The processor should have procedures in place describing action on waste management and minimization, pollution reduction, recycling and personnel training.

13.4.2 All possible waste produced should be identified and documented.

13.4.3 Wastewater treatment and disposal systems such as constructed wetlands and bio-bed should be environmentally friendly.

13.4.4 The premise should be clear of litter and have adequate provisions for waste disposal.

13.4.5 Waste material such as plastic sheet, cardboard, wood etc. should be recycled. Shells and other waste material recovered from primary processing may be used as sources of fuel.

13.4.6 The Processor should explore the potential for:

- a) Reducing the volume of packaging per unit of product delivered.
- b) Increasing the use of certified recycled or compostable materials.
- c) Obtaining materials from certified sustainable sources.
- d) Re-using packaging materials.
- e) Developing an action plan to minimize packaging and packaging-related waste.

13.5 Water sources

13.5.1 Waste-water treatment facility, latrine, flush toilets or septic tanks should be located at least 40m away from an open water source, a borehole or a riparian land. The depth should be a minimum of 2m above the highest ground water levels.

13.5.2 Rivers should not be dammed or diverted without permission from the relevant competent authority for water resources. Lakes should not be restricted by bunds or dykes unless where permitted by the relevant competent authority.

13.6 Waste-water treatment

The processor should ensure all wastewater is treated as per relevant legislation.

14 Labour, employment and social issues

All labour, employment and social issues should at a minimum meet the requirements of the national labour and employment legislations including but not limited to: wages, staff recruitments & promotions, induction & training, work contracts, work hours & leave days, expectant & nursing mothers, termination, workman's compensation, freedom of association & participation, grievance and disciplinary procedures, forced labour, discrimination/harassment, child labour and record keeping.

15 Emergency preparedness

The processor should develop and implement an emergency response plan for responding to emergencies such as spills, fires, or contamination incidents.