



## **DRAFT TANZANIA STANDARD**

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**Code of practice for production, processing and handling of coffee beans**

DRAFT TANZANIA STANDARD FOR STAKEHOLDERS COMMENT ONLY



# Code of practice for production, processing and handling of coffee beans

## 0 Foreword

Good Agricultural Practices (GAP) on crop production entails on/off farm processes that ensure safety of produce for human consumption. It is a combination of environmental, economic and social sustainability aspects along the supply chain which ends in safe and quality food products.

## 1 Scope

This draft Tanzania Standard prescribes a Code of practice for production, processing and handling of coffee beans both Robusta (*Coffea canephora*) and Arabica (*Coffea arabica*) intended for human consumption.

## 2 Normative reference

The following referenced document is indispensable for the application of this document. For dated reference, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies;

ISO 3509: 2005, *Coffee and coffee products — Vocabulary*  
TZS 789, Potable water specification

## 3 Terms and definitions

For the purpose of this Tanzania Standard, terms and definitions given in ISO 3509 (see clause 2) shall apply.

### 3.1 good agricultural practices (GAP)

GAP in coffee are a set of, standardized, sustainable, and scientifically-backed procedures applied during cultivation, harvesting, and post-harvesting to ensure high-quality, safe, and traceable production.

## 4 Good agricultural practice for Coffee cultivation (robusta and arabica)

### 4.1 Agro- ecological zones

Agro ecological zones for coffee production are classified based on geology, rainfall and soil characteristics. Coffee grows well in high lands and volcanic soils. Arabica coffee grows well at altitudes 760 m to 1800 m above sea level in the climatic conditions which are frost-free and without strong winds and cool climate at the optimum temperature of 15- 24 °C . Robusta coffee grows well at altitudes 0-1500 m above sea level. This species does well in warmer conditions ranging from 18- 30 °C with optimum temperature of 24- 28 °C.

### 4.2 Rainfall

Arabica and Robusta coffee require adequate rainfall. Both coffee species need a minimum of 1200 to 1500 mm per year. However in some areas both species grow well in areas with rainfall less than 1000 mm per year provided the rain is well distributed or supplemented by irrigation.

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### 4.3 Soils

Arabica and Robusta coffee grow well in deep, well drained, loamy soil slightly acidic and rich in humus and exchangeable bases in particular potassium. Arabica coffee grows well in the volcanic soils. Both species do not grow well in heavy soils, saline and waterlogged conditions. For the coffee to flourish well, soil moisture and oxygen should be available in the root zones throughout the growing season.

### 4.4 Selection of planting materials

In order to get high coffee productivity and quality, proper selection of planting materials for coffee production is very important. For the producers, coffee planting materials should come from the high yielding, resistant to diseases, insect pests and other abiotic conditions. **From a market and consumer quality perspective**, coffee planting materials should give coffee with fine, suitable for human consumption with excellent cup quality. Based on these criteria, therefore coffee varieties selected for commercial production should be of high yielding varieties with reasonable bean sizes, resistant to diseases and insect pests and good cup quality as recommended by reputable agricultural research institutions such as Tanzania Agricultural Coffee Research Institution (TaCRI).

### 4.5 Nursery establishment and management

#### 4.5.1 Nursery Establishment

Coffee production starts by using coffee seedlings. Seedlings are initially seeded in the coffee nurseries for 9 - 12 months. When the seedlings are ready for planting in the main coffee fields. Prior to establishment of coffee nurseries, the following basic requirements should be considered for proper site selection;-

- i. Site selected for coffee nursery establishment should be well leveled/ or gently sloped. When slope percent is greater than 4- 5 % the site must be bench terraced.
- ii. The site should be weeds free especially noxious weeds such oxalis and perennial weeds like couch grass.
- iii. The site should be sheltered from strong winds and sun shine
- iv. The site should be free from big trees, trees stumps without heavy shade.
- v. The site should be accessible for ease transportation of coffee seedlings and other nursery requirements
- vi. The site should has permanent or reliable water sources
- vii. The site should not have a problem of water logged conditions and salt water

#### 4.5.2 Construction of nursery structures

Since coffee can be raised using both seeds and vegetative shoots, coffee nursery should have vegetative propagation units (VPU). VPU is the structure consisting of elevated shelter of about 8 - 9 feet ( 244 - 274 cm)height made up of poles and covered with shade nets, bamboo reeds, banana leaves or palm tree leaves etc which allows 70 % sun shine to provide shade to coffee seedlings, rooting boxes /or seed beds. Rooting boxes and seed beds are constructed/ prepared under the VPU. Both rooting boxes and seed beds are 120 cm wide for ease nursery operations and 60 cm wide left between the two adjacent rooting boxes or seed beds for the nursery attendant to walk easily. The length of the rooting

boxes or seed beds can vary as per the need. However, in most cases both rooting boxes and seed beds are 12 feet (366 cm) long.

#### **4.5.3 “Certified” planting materials**

Planting materials of Arabica and Robusta coffee in forms of seeds/ or cuttings (clones) should be Certified. Certified planting materials for coffee planting in Tanzania should be obtained from Tanzania Coffee Research Institute (TaCRI) and / or from TaCRI certified supplier to maintain the purity of commercial coffee varieties. Procedures for sowing coffee seeds/or cuttings and nursery management should follow the recommended techniques as stipulated in the nursery establishment and management handouts. The management techniques of coffee nurseries vary depending on the intended coffee production whether it is conventional or organic coffee.

#### **4.6 Field establishment and management**

Coffee productivity and quality together with other already stated criteria depend very much on the field establishment and management. Field establishment and management can have either positive or negative effects on coffee productivity and quality. Proper site selection and land preparations will result into well established coffee trees that will produce more coffee with good quality. Improper site selection and poor land preparations can result into poor establishment of coffee trees that will give low yield and poor quality. Therefore, based on these, it is important to make sure that sites selected for coffee production meet all agro- ecological requirements for coffee production in Tanzania. Planting coffee in marginal lands will result in producing little coffee with poor quality.

##### **4.6.1 Use of inputs**

Like other crops, coffee requires use of agro- inputs to improve soil fertility and to manage pests (weeds and insect pests). To ensure healthy environment and safety of consumers coffee growers should use appropriate rates of recommended inputs as well as safety handling of containers of agro inputs. It is forbidden to use inputs which are in the list of hazardous products as stipulated under Tanzania Coffee Board TCB, European Union, National Organic Products (NOP USA) and Japanese agro inputs standards. Inputs used should comply with coffee international standards such as Organic, UTZ kapeh, Rain Forestry Alliance, Fair Trade, C.A.F.E Practices and the Common Code for the Coffee Community (4C) or any other recognized institutions dealing with inputs.

##### **4.6.2 Conserving soil fertility**

Soil conservation is very important practice on coffee production. Properly fertilized coffee fields lands with recommended fertilizers (inorganic and organic) will result into increased/ or improved coffee productivity and quality. Soil conservation measures include:

- i. Use of recommended fertilizers (inorganic and organic) to replace nutrients and improve microorganisms activity
- ii. Preparing terraces in slope areas to reduce soil erosion and fertilizers loss because of moving water
- iii. Contour planting to reduce erosion and to ease harvesting and plant maintenance
- iv. Making hill channels to collect runoff water and slow down the running water on the soil.
- v. Using live barriers to stop water currents and to retain surface soil.

- vi. Mulching to retain moisture to the soils. Other benefits of mulching include: nutrient supply when the mulch rot, suppress weeds growth, enhances microbiological conditions in the soils and improve rate of rainfall penetration and prevents runoff and erosion.

#### 4.6.3 *Planting at recommended spacing*

In order to obtain optimal yield it is very important to optimize plant densities per unit area. The spacing of 3 m rows by 3 m or 2.1 m between the plants within the rows are recommended for Robusta coffee in the country. For Arabica coffee recommended spacing is 2.74 x 2.74 m or 2.5 x 2.5 m. Planting patterns and spacing in most cases are determined by either the crop is mono culture or intercropped. Wide spacing is used in intercropped crop patterns and narrow ones in mono culture.

#### 4.6.4 *Planting shade trees*

Shade trees are very important in coffee production. The recommended spacing for shading tree is 15 m by 15m. Shade trees maintain cool weather and good microclimate in the coffee plantations. To grow properly, coffee requires good sunlight and partial shade in hot areas that allow good percentage of sunlight to fall daily upon the coffee trees. Shade trees reduce air movement serving as wind breakers thus controlling transpirations and flower protection. Other advantages of shade trees include reduction in soil surface temperature, provide mulching materials, some shade trees fix nitrogen, and some contribute nitrogenous fertilizers to the coffee.

#### 4.6.5 *Practicing pruning, stumping and change of cycle.*

##### 4.6.5.1 *Pruning*

This is the practice of removing excessive suckers and all other branches which grow upwards, inwards, and towards the main stem. The aim of this practice is to reduce competitions for nutrients, water and sunlight between suckers and branches which produce a crop, to remove coffee plants which grow too high for easy harvesting, disease and insect pest management.

##### 4.6.5.2 *Stumping and change of cycle*

This involves cutting down old coffee trees at a height of 15-45 cm from the ground, so as to rejuvenate and allow them to have new shoots which are productive. Stumping or change of cycle is done every seven years when coffee production per tree fall down. Techniques for stumping and changing of cycles should be done based on scientific recommendations.

## 5 Harvesting practices for wet and dry processed coffee

Depending on the variety, it will take approximately 2 to 4 years for the newly planted coffee trees to begin to bearing fruit. The fruit, called the coffee cherry, turns a bright, deep red when it is ripe and ready to be harvested. The harvesting process begins with coffee cherries are plucked from their trees. In most countries, the coffee crop is picked by hand, a labor-intensive and difficult process, though in places, where the landscape is relatively flat and the coffee fields immense, the process has been mechanized. Whether picked by hand or by machine, all coffee is harvested in one of two ways:

**Strip Picked** - the entire crop is harvested at one time. This can either be done by machine or by hand. In either case, all of the cherries are stripped off the branch at one time.

**Selectively Picked** - only the ripe cherries are harvested and they are picked individually by hand. Pickers rotate among the trees every 8 - 10 days, choosing only the cherries which are at the peak of ripeness. This kind of harvest is labor intensive, and thus more costly. However this type of harvest it produces better quality coffee.

Once the coffee has been picked, processing must begin as quickly as possible to prevent spoilage.

### **5.1 Red cherry/ harvesting and handling**

The quality of coffee may be spoilt at the harvesting stage. The coffee cherries should be picked when they are bright red all over. At this stage the bean can be squeezed out from the pulp by applying light pressure between finger and thumb. With over-ripe coffee there is a possibility that the cherry will start fermenting which will result into deterioration in flavor.

Immediate picking of damaged or over ripe cherries is vital to combat disease and damage to the trees and the quality cherry. Those defective cherries should be separated from the main crop and dry processed separately.

### **5.2 Transport and storage of red cherries**

Red cherry should be transported and pulped on the same day of harvesting. Farmers should not prolong storage of the harvested cherry beyond 8 hours without pulping. Container for harvesting and vehicles for transporting red cherries to pulping units should be clean and free from impurities and odors.

## **6 Processing**

### **6.1 Primary processing –**

There are two ways in which coffee can be processed namely - dry ('natural') processing and wet ('fermented and washed') processing. In most cases, wet processing is regarded as producing a higher quality product. However, some areas prefer dry processed coffee for its 'fuller' flavor. In either way, it is a prerequisite that only ripe cherries that have been subjected to selection and floatation are used for better results.

#### **6.1.1 *Dry processing***

##### **6.1.1.1 *Sun drying***

The coffee cherries are dried immediately after harvest. This is usually sun drying on a clean dry floor or on mats. The bed depth should be less than 40 mm and the cherries should be raked frequently to prevent fermentation or discoloration. However, there are problems associated with this method. The most serious problem is dust and dirt blown onto the produce. Another problem is rainstorms often appear (even in the dry season) with very little warning, this can soak the produce very quickly.

The ripe cherries are simply picked and put out on the sun to dry. It is spread in a thin layer, raked and turned regularly to maintain even temperatures from top to bottom of the layer. The cherries are spread on concrete slab. It is very wise to use wire mesh and at least 1 m from the ground just to avoid contamination such as grassy, dusty and smell of the ground/earthy. Drying takes anywhere from ten days to three/five weeks. In areas where there are lot of rains/ extreme highland areas, when it is about to rain the cherries must be covered with plastic covers. The coffee must also be covered over-night as night air brings in moisture. To have even drying, the farmer has to turn it over at regular intervals to ensure even drying and avoid fermentation of the lower layers. Once the moisture is around 12 % then it is ready for hulling.

### 6.1.1.2 Solar drying

Solar drying involves the use of solar driers which are; - solar cabinet drier. These driers have trays in which coffee is placed. The layer of the crop should be no deeper than 2.5 cm (one inch). And it is better if the whole tray area is covered. The drier should be ready as early in the day as possible so that all possible sunlight hours are used. The coffee should be stirred regularly so that a uniform coloration is formed. At night, the crop should be placed in a cool dry room.

### 6.1.1.3 Mechanical drier

In the wet season solar drying of produce is difficult as. Rain is very unpredictable and frequent. Solar driers will prevent the coffee getting wet. However, due to the low level of sunlight, solar drying can take a long time. This can lead to mould growth. Therefore, mechanical driers are the alternative to solar drier.

## 6.1.2 Wet processing

The wet processing involves sorting, pulping, fermentation, washing and drying. Coffee processed by the wet method is called wet processed or washed coffee.

- **Sorting**

Primary sorting process designed to remove defects and ensure consistency. It begins with floating/sorting cherries by density in water.

- **Pulping**

When fresh cherries are received from farmers are pulped using pulping machine. Machine uses a grinding action and a force of water to remove the pulp from the beans.

- **Fermentation:**

The wet parchment coffee is taken into a fermentation tank to undergo fermentation for 2 to 3 days to facilitate decomposition of the mucilage. Hand fill texture method is employed to check for the removal of mucilage from the pulped coffee. The slimy beans then are allowed to settle in tanks to undergo fermentation to facilitate decomposition of the mucilage the fermentation of wet processed coffee is important to watch carefully as this is not related to a specific time process, but to the speed of fermentation that is governed by the ambient temperatures and humidity. If coffee is under fermented it will make the coffee difficult to wash, clean and can cause damage from mucilage off tastes. Also over fermentation can cause damage of the coffee beans and spoilage by imparting off flavours.

NOTE: — complete fermentation of coffee can be judged when coffee has completed fermentation process through coffee ground in the hand which gives gritty rather than slimy texture.

- **Washing:**

After fermentation the beans are thoroughly washed using potable water conforms to TZS 789 to remove all traces and decomposed products of the mucilage. At this stage the coffee is referred as —parchment coffee.

- **Drying**

The wet parchments coffee are placed on about 1m raised wire mesh table for sun drying. Parchments coffee with some defects are removed by hands at this stage. During drying process the moisture content of the parchment coffee should reached to the required level (12%).

## 6.2 Secondary processing -

### 6.2.1 *Coffee curing*

It usually takes place at a special plant just before the coffee is sold. The coffee is hulled, to remove the parchment, then passed through a number of cleaning, screening, sorting and grading operations which are common to both wet- and dry-Processed coffee. Electronic sorting machines may be used to remove defective beans that cannot be distinguished by eye.

### 6.2.2 *Hulling*

The dried cherry is then hulled to remove the pericarp. This can be done by hand using a pestle and mortar or in a mechanical huller. The mechanical hullers usually consist of a steel screw, the pitch of which increases as it approaches the outlet so removing the pericarp.

### 6.2.3 *Cleaning*

The hulled coffee is cleaned by winnowing.

## 7.0 **Factory/ establishment location**

Factory should not be located near

- Polluted areas that pose threat of contaminating food
- Areas prone to pest infestation
- Areas prone to flooding, high humidity, etc.
- Areas from which waste cannot be easily removed

## 7.1 *Factory design, construction, equipment and facilities*

### 7.1.1 *General considerations*

- Walls and partitions should be easily cleaned
- Floors should be constructed to allow adequate cleaning and drainage
- Ceilings and overhead fixtures should be constructed to minimize buildup of dirt and condensate
- Working surfaces in direct contact with food should be durable and easy to clean

### 7.1.2 *Internal design and layout of establishment should:-*

- Permit good hygiene practices
- Minimize possibility of cross contamination
- Be made of durable materials
- Be easy to clean and maintain

### 7.1.3 *Adequate ventilation is required to:*

- Minimize build-up of dust and husk particles from handling operations
- Control temperature and prevent condensation
- Dissipate odours that might taint the coffee

7.1.4 Adequate natural or artificial lighting should be provided to enable operations to be carried out adequately.

#### 7.1.5 Facilities

- Containers for storage of dangerous materials (fuel, chemicals for cleaning, disinfestations, etc.) should be clearly marked and safely stored
- Water supply – potable water should be available for processing
- Systems carrying unsuitable water should be separate
- Electricity supply – operators should ensure alternative sources of electricity in case of cuts to the central power supply
- Drainage and waste disposal system should be adequately available
- Cleaning facilities - should allow for adequate cleaning of equipment and facilities
- Personal hygiene facilities - adequate toilet, hand washing and changing facilities should be provided for staff

#### 7.1.6 Equipment should be:-

- Designed and constructed to ensure that they can be adequately cleaned and maintained
- Movable or capable of being disassembled to allow for maintenance, cleaning, monitoring, etc.
- Designed such that their operation is compatible with conditions necessary to ensure food safety and suitability. Main types of equipment in coffee processing include:-
  - Dryers
  - Pulpers
  - Hullers
  - Sorting equipment
  - Moisture monitoring equipment

### 8.0 Primary quality control at farm level

#### 8.1 Harvesting and drying

- i. The soil under the tree should be covered with a clean sheet of plastic during picking to avoid cherries getting contaminated by dirt or mixed up with mouldy cherries (gleaning) from previous harvests.
- ii. Cherries that have fallen to the ground are known to be susceptible to mould growth and therefore should not be mixed with main harvest.
- iii. Process fresh cherries as quickly as possible. Avoid storage of cherries, in a bag or in a piles this increases the likelihood of mould growth.
- iv. Do not dry on bare soil: Use trays or tarpaulins. Mould spores from previous lots are known to remain on the ground and this could result in clean cherries being contaminated during drying.
- v. Observe hygiene during the drying to ensure that the coffee does not absorb any odors or impurities.
- vi. The layer of drying cherries should be not more than 2.5 cm thick.
- vii. Drying cherries must be regularly raked and turned (5-10 times per day).
- viii. Protect cherries during drying from rain and night dew.
- ix. Avoid all re-wetting of partially dried and dried cherries, protecting them from moisture and rain.

- x. When using a dryer temperature inside the driers should not exceed 50 °C.

## 9.0 Quality control at factory level

### 9.1 General requirements

- Site processing plant in a dry area, not in a swamp.
- Dispose of pulp from wet processing away from clean dry coffee.
- Keep equipment and facilities clean, separating residual partially processed material and accumulation of dust and discarded materials.
- Clean coffee from all husk material – Majority of moulds come from husks in sun dried cherries.
- Remove as many defects (husks, un-hulled cherries or mouldy beans) as possible.
- Use clean bags for storing and transporting cleaned dried beans.
- Using preferably wooden pallets to stack bagged coffee.
- Keep separate cleaned dried beans from discarded material.
- Prevent recontamination by avoiding contact of clean green beans with dust, husks and dirty bags.
- Do not store cleaned, dry green coffee near rejects and husks to prevent cross-contamination.
- Processing should achieve a uniform green bean moisture content that is as low as feasible, but certainly not higher than 12.5% measured using calibrated equipment.
- Regularly inspecting coffee on the production lines and in storage. This should include sampling to grade and cup with the aim of isolating lots which are a reflection of poor practices during the production and processing of coffee.

### 9.2 Wet processing

- Harvested cherry should not be stored beyond 8 hours before pulping. Pulp on the same day of harvesting
- Separate floaters
- Control quality of water
- Equipment should be clean
- Completely separate parchment and pulp
- Complete fermentation within 2 to 3 days
- Control the quality of water and sanitation of equipment during washing
- Drying:
  - if possible, rapidly remove excess water with forced drying
    - dry slowly to avoid cracking by excessive heat, control layer thickness and turn regularly
    - avoid re-wetting
    - cover with ventilation especially at night
    - avoid soil contact
    - use mats or drying tables when possible
    - maintain mats/tables in clean and sanitized condition
    - achieve moisture content for parchment of not exceeding 12%

### 9.3 Dry processing

- Start drying on the day of harvesting
- Spread immediately – never heap – control layer thickness – turn regularly
- Avoid soil contact – dry on mats or preferably drying tables

- Avoid re-wetting – cover and ventilate
- Achieve moisture content of cherries not exceeding 12%
- Properly clean the mats and tables or drying surfaces

## 10.0 Handling and transportation of green coffee beans

### 10.1 Good Storage Management(GSM):

#### 10.1.1 Receiving coffee into storage

An important recommendation for safe storage is to ensure that products accepted into storage are sufficiently dry (for coffee beans this is around 12 % moisture content on a dry weight basis). Given the importance of this consideration, it is imperative that operators within the coffee marketing chain be able to determine the acceptable level of moisture. This means that they must have access to appropriate moisture measuring equipment and technical support to ensure that the measurements are being made correctly.

#### 10.1.2 Overall Recommendations for Good Storage Management

Good store management aims at maintaining the coffee within the 'safe' range of moisture content over the required duration of storage, to protect the product from being damaged by insects or other pests, and to prevent cross contamination or new contamination from other sources. It also facilitates identification and handling of coffee lots.

The outlines of good storage practices are provided below:-

##### 10.1.2.1 Physical facility

- i. High, insulated roofs with air vents minimise heat transfer to the storage area and facilitate good ventilation;
- ii. Warehouses should be equipped with ventilation systems, such as fans, to facilitate air circulation;
- iii. Storage area (walls and floors) should be constructed of impermeable, smooth, easily-cleaned materials;
- iv. External surfaces should prevent entry of pests, including well-fitted doors (< 0.5 cm space), sealed walls, covered drains and leaking free roofs.
- v. Adequate light with protective covers should be provided to prevent contamination from broken glass.
- vi. Fire fighting equipment should be available and maintained.

##### 10.1.2.2 Organization of bags in the warehouse

- i. Store coffee on pallets and away from walls to facilitate good ventilation and avoid re-wetting through condensation;
- ii. Storage areas should be well demarcated to facilitate identification of coffee lots and to ensure adequate spacing between aisles which contributes to the overall ventilation in the facility and ease of handling of coffee stores.

**10.1.2.3 Prevention of contamination and cross contamination**

Coffee husk has been shown to be an important source of Mycotoxins such as, OTA mould and pre-formed OTA. Storage facilities should be away from coffee hulling, grading and cleaning operations that could be sources of contamination;

- i. Dry cherry, parchment coffee and green coffee beans should be stored separately;
- ii. Food-grade bags should be used for the storage of green coffee;
- iii. Clean, dry, odour-free silos should be used for bulk storage of coffee;
- iv. Green coffee beans should not be stored with un-acceptable material such as fuel, pesticides and cleaning chemical compounds etc.

**10.1.2.4 Monitoring of storage conditions**

- i. Moisture control of stored coffee should be done on a regular basis for taking corrective actions. Moisture meters should be regularly calibrated by reputable institution, at least once a year;
- ii. Hygrometers should be used to monitor relative humidity in the storage area;
- iii. Periodic roof inspections are necessary to ensure that there is no possible of leakage or pest entry through the roof;
- iv. Periodic facility inspection is necessary to ensure that gutters, ducts, vents, etc. are clear;
- v. Periodic facility inspection (internal and external) is necessary to ensure that pest entry and harbourage are under control.

**10.1.2.5 Immediate environment**

- i. The environment of the storage facility should be kept free of vegetation and garbage that could encourage pests and other contamination vectors;
- ii. There should be periodic inspection of the immediate surroundings to ensure that any sources of contamination are under control.

**10.1.2.6 General management considerations**

- i. Coffee should not be accepted into storage unless it meets established minimum criteria (moisture content, extraneous matter, etc);
- ii. Documented cleaning programmes must be routinely implemented for the storage area and storage silos and records must be kept.
- iii. There should be a documented programme of pest control and records of related facility checks. If fumigation treatments are used, procedures must be clearly established and records rigorously kept;
- iv. There should be a system of stock rotation, and especially when storage is in a humid area, storage time should be kept to a minimum;

- v. Records of facility inspections, inspection reports and corrective actions must be maintained.

## **10.2 Coffee transportation**

Transport of coffee also requires the adoption of practices to avoid re-wetting, to maintain temperature as uniform as possible and to prevent contamination by other materials.

### **10.2.1 Basic requirements for coffee transportation**

- i. Cover coffee loading and unloading areas to protect against rain, dust etc;
- ii. Vehicles should be cleaned from residues of the previous cargo;
- iii. The vehicles should have floor, side walls and the ceiling (in closed vehicles) checked for the presence of points where exhaust fumes or water from rain can be channelled into the coffee cargo.
- iv. Tarpaulins and plastic canvas used to cover the cargo should also be regularly checked to ensure they are clean and without holes.
- v. The carriers should also receive regular maintenance to be kept in good condition;
- vi. Reliable transport service-providers that adopt the recommended good transportation practices should be selected by operators

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