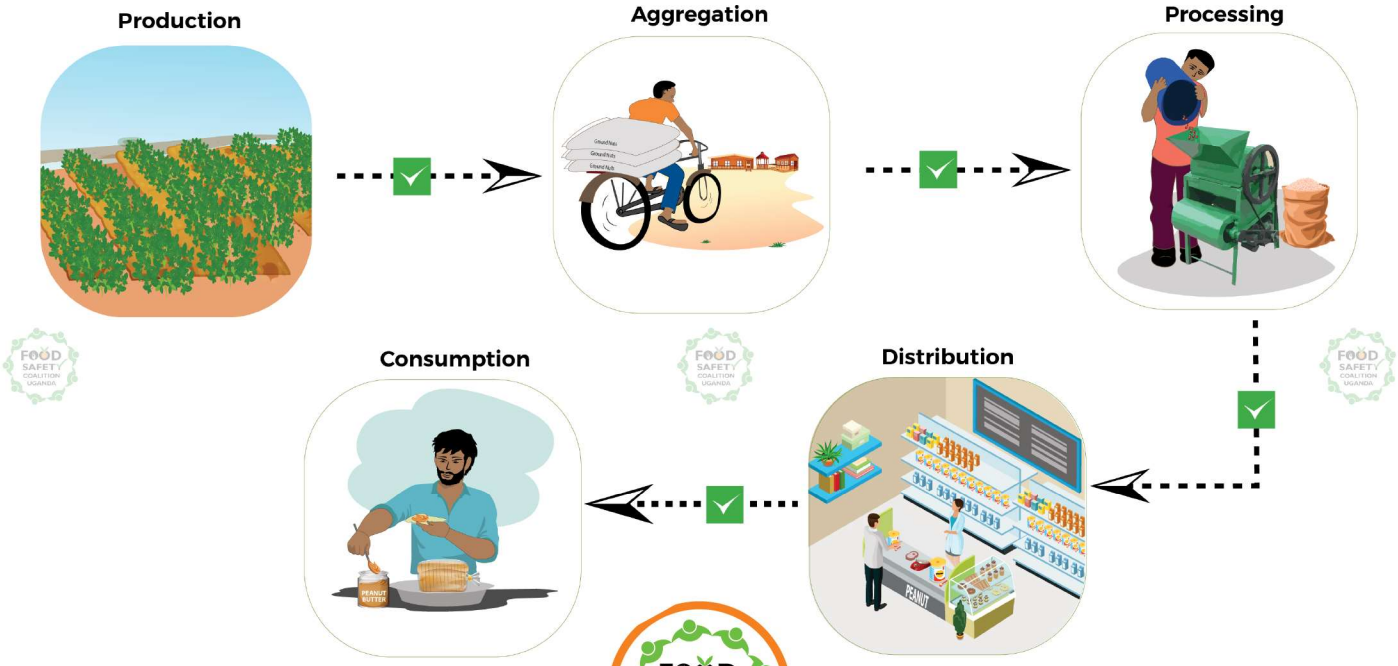
-Food Safety-

GROUND NUTS VALUE CHAIN



FOOD SAFETY COALITION UGANDA

Acronyms and Abbreviations

CBO	Community Based Organisation
CSO	Civil Society Organisation
DDA	Dairy Development Authority
DLGs	District Local Governments
FAO	Food and Agriculture Organisation of the United Nations
FBIs	Food-Borne Illnesses
FBO	Faith Based Organisation
FoSCU	Food Safety Coalition Uganda
HHP	Highly Hazardous Pesticide
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MDAs	Ministries Departments and Agencies
MoFPED	Ministry of Finance Planning and Economic Development
MoH	Ministry of Health
MT	Metric Tonnes
MTIC	Ministry of Trade Information and Cooperatives
NDA	National Drug Authority
NEMA	National Environment Management Authority
SPS	Sanitary and Phytosanitary
TBT	Technical Barriers to Trade
UBOS	Uganda Bureau of Statistics
UNBS	Uganda National Bureau of Standards
USD	United States Dollar

1.0 Context

Groundnut is the second most important legume in Uganda mainly grown in eastern and northern regions of Uganda, predominantly by smallholder farmers (Okello et al., 2013; Okello et al., 2015). UBOS (2021) reported ground nuts production and acreage at 183,000MT and 420,000Ha, respectively for the year 2020. Considered a staple crop in Ugandan diets, ground nuts are consumed in different forms in the country- the raw grains are pounded into flour, roasted grains are ground into peanut butter, and pastes or flour mixed with different traditional dishes as a sauce (Akullo et al., 2023). Irrespective of its dietary and economic importance in the country, the quality and safety of groundnuts continues to be compromised through unsafe practices by actors at its different value chain nodes.

Poor agricultural, storage, and hygienic practices result in unsafe food, whose consumption is associated with food-borne illnesses (FBIs). FBIs remain a public health concern, notably in developing countries where food control systems are weak (Kankya et al., 2020). Estimates for the period 2019/2020 indicate that about USD 95.2 billion per year and USD 15 billion were the estimates for total productivity loss and annual cost of treating FBIs, respectively, in low- and middle-income countries. Africa was the most affected continent, accounting for over 20% of the burden of FBIs. In Uganda in the year 2021, about 1.3 million people were diagnosed with FBIs, accounting for an estimated 14% of all diseases treated in the country (FAO, 2022).

The existing synthesis of common hazardous practices in Uganda's ground nut value chain is inadequate, yet fundamental to inform food safety research and innovations, capacity building, awareness creation, compliance, policy and legislation in the country. Henceforth, Food Safety Coalition Uganda (FoSCU) undertook this targeted desk-study with the following objectives:

1) To assess the process and actors in Uganda's ground nut journey from farm to table.
2) To understand the most common categories and examples of food safety hazards in Uganda's ground nut supply chain.
3) To synthesise the commonly reported unsafe practices in the process of handling ground nut and its products.

2.0 Methodology

A qualitative research design was used to undertake this focused study. Using a document review guide, we conducted a desk-study of documented information and scientific literature on ground nuts' food safety aspects, most relevant to Uganda's context. Literature reviewed was broadly categorised as:

- Intervention Project reports
- National and Sectoral Policies (including Strategies and Plans)
- Professional blogs
- Research project reports
- Review articles
- Scientific research papers
- Written Expert opinions

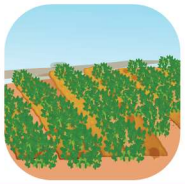
3.0 Results

⟶ The Proocess and Actors

In its farm to fork/table journey/process, ground nut was shown to go through six (6) main stages/nodes- from seed acquisition to grain/flour/paste consumption. Each stage has at least two (2) service providers/actors delivering on critical tasks to facilitate the flow of the supply chain.

Inputs

- Seed selection (seed companies, NGOs, Gov't)
- Land preparation
- Fertilizers
- Pesticides
- Herbicides
- Research
- Extension
- Loans (Microfinance/ VSLA)
- Equipment



Production

- Planting (timing, rows,rotation, inoculation)
- Weed control (weeding,earthing, rouging)
- Pest and disease management
- Harvesting(timing indicators, method)
- Cleaning
- Sorting
- Drying
- Packaging
- Stoarage

Aggregation

- Local bulking (rural traders)
- wholesalers
- Cleaning
- Sorting
- Storage (silos, ware houses, traditional)
- Exporting
- Packaging
- Transportation
- NGOs

Processing

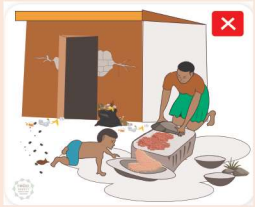
- Shelling(manual, mechanical)
- Sorting
- Winnowing
- Grinding(mortar, pestle, machines, griniding stone)
- Value added products (paste, flour,roasted, boiled, confectionary etc.)

Distribution

- Transportation
- Wholesalers
- Retailing
- Delivery
- Storage
- NGOs
- Government

Consumer

⟶ Hazards and Unsafe Practices

Poor practices *(predisposing consumers to hazard exposure)*	Resulting type of hazard (including examples)
• **Production and Aggregation** o Inadequate management of pests and diseases o Mechanical damage to pods during weeding and harvesting. o Delayed harvesting, after physiological maturity- resulting in moulding or germination. o Inadequate drying of ground nuts to safe storage moisture content (≤14%) and/or on bare ground or ground smeared with cow dung and/or leaving groundnuts to dry in the field.   o Inadequate storage of groundnuts allowing for moisture pick (rewetting) and pest infestation e.g. directly on the floor andwall, Leaking roofs, poorly ventilated and highly humid stores/granaries/cribs/silos, in shelled form for a long time, damaged/ discoloured/rotten/immature/sprouted kernels, use of poor packaging materials susceptible to mould and pest infestation. o Inappropriate transportation means e.g. bicycles & open trucks predisposing produce to moisture/rain, high temperature/heat accumulation.  • **Processing** o Inappropriate shelling by beating leading to physical damage o Inadequate processing with grinding stones (..due to potential stone particle peel offs) o Milling poor quality (wet, diseased, broken, soiled, unsorted) ground nuts into flour/paste. • **Distribution and Consumption** o Storing wet processed products o Use of non-food grade preparation tools and ingredients o Preparation and serving in open inappropriate spaces 	**Biological** Foodborne bacteria and viruses, pathogenic fungi, toxins, Insects (*...in ground nut seeds, flour, paste and prepared ground nut meal).*

- **Inputs, Production, and Aggregation**
  - Acquisition and use of highly hazardous pesticides (HHPs) in the field and storage
  - Non-adherence to recommended dosage (mixing rates), pre-harvest interval, and application frequency.

- **Distribution and Consumption**
  - Consumption of chemical-treated seed for planting
  - Use of non-food grade utensils and equipment in preparation and serving of a ground nut meal.
  - Use of unapproved sanitary products to clean utensils and equipment
  - Deliberate chemical poisoning of seed/flour/paste or prepared food

Chemical

• High residue concentration levels of pesticides, fertilisers, heavy metals, and public health chemicals *(...in ground nut seeds, flour, paste and prepared ground nut meal).*

- **Production and Aggregation**
  - Drying of the ground nuts on bare ground leading to pick up of physical foreign material
  - Inadequate cleaning/sorting of chaff, thus keeping poor quality/contaminated (diseased, shriveled, broken) produce.

  - Transportation of ground nuts using uncovered/open trucks (sometimes with littered surfaces or old/peeling surfaces), resulting in pick-up of physical foreign contaminants
  - Inadequate packaging resulting in spillage and contamination.
- **Processing**
  - Processing ground nuts with non-food grade equipment made of mild steel or fabricated mineral fragments that easily peel off/wear out.
  - Use of rusty/corroded processing equipment
  - Improper cleaning of equipment before and after processing leading to physical cross-contamination
  - Processing low quality (soiled and poorly sorted) groundnut seed into flour or paste.
- **Distribution**
  - Selling in open packaging and untidy public spaces

Physical

Metal/plastic/wood, paper, sand, stones, soil, dust, droppings *(...in ground nut seeds, flour, paste and prepared ground nut meal).*

Recommendations

To the knowledge brokers (Academia, Private and Public Research Institutions, think tanks, Plant health industry), we recommend:

1. Dedicated innovation and research on simple and affordable devices to assess grain quality (e.g. moisture content) at production or aggregation levels.
2. Tailored research on possible alternative use of contaminated produce (e.g. with aflatoxins) that carries a monetary value which can act as an incentive to economic agents to withdraw contaminated foods from the food chain.
3. Undertaking epidemiological studies to assess consumer vulnerability and exposure to different targeted hazards.
4. Strengthening the capacity of the existing infrastructure such as regional laboratories for testing key food safety hazards such as pesticide residues and mycotoxins.
5. Strategic building of relevant value chain actors' capacity with skills and cost-effective technologies, along with a proper sustainability plan
6. Enhancing the capacity of the warehouse receipt system to support quality improvements in the grain sector.

To State actors (MAAIF, MoH, MoFPED, MTIC, UNBS, DDA, NDA, NEMA, DLGs, Parliament of Uganda) we recommend:

7. Strengthening the implementation of the relevant existing food quality control systems and non-tariff trade barriers that protect health and ensure product safety and quality e.g. Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT) for both the local and export markets.
8. Dedicating resources to revise and update food safety policy and regulatory frameworks, as well as facilitating the overall strengthening of the country's food quality control systems.
9. Expediting efforts to harmonise institutional food safety mandate through establishment of the food and agriculture authority.
10. To non-state (CSOs, CBOs, FBOs, Cultural institutions, producers, transporters, warehouse operators, millers, traders, and Development partners) and state actors, we recommend establishment of Public-Private Partnerships aimed at delivering among others, effective awareness creation campaigns on: Impact of unsafe food on human and animal health, trade, and their general livelihood; Responsible practices to mitigate exposure to food safety hazards; available technologies/innovations on safe groundnut production and handling regulatory tools- quality standards, regulations, and guidelines.

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For more information, watch these videos:

1. Food safety in ground nuts value chain: https://youtu.be/gNHJWofjhss
2. Food safety hazards and tips: https://youtu.be/SXZvO4zAi7g

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