Addressing food safety challenges in the African informal sector through innovative strategies & use cases

D3.4: Model and development of mezzanine structures

Responsible Author: Yamine Bouzembrak, Youri Dijkxhoorn, Ayalew Kassahun, Bart de Steenhuijsen Piters, Gijs Kleter

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Contributors	
Reviewer(s)	Yamine Bouzembrak (WU), Ayalew Kassahun (WU), Bart de Steenhuijsen Piters (WR)

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FS4Africa Consortium			
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Executive Summary

The subject of this deliverable is the development of the mezzanine model towards increased food safety within the African informal sector and the assignment of hubs to trial this approach. This research is carried out within the Food Safety for Africa project. The underlying considerations are that it is impractically to pursue formalization of the informal economy, while also recognizing its importance in providing a supply of nutritious and fresh food to many Africans. Use Cases that are elaborated within the same project exploring aflatoxins, pesticide residues, and the safety of aquaponics and vegetable cultivation by smallholders were taken as prospective hubs. Stakeholders within the prospective hubs were approached with a questionnaire to enquire about the current food safety status, the regulation and oversight of it, and what could be improved in future. Moreover, a literature search was instigated to infer the lessons learned from previous initiatives to improve food safety in the informal African food economy. It builds on a previous study based on three pillars (drivers, relationships/interlinkages, incentives). This deliverable will support the parallel project activities in creating an enabling environment and policy recommendations and best practices towards improving food safety in the informal African economy. It has proven possible to set up activities involving the Use Cases as soundboard and to develop proactive approaches based on inventories of the status quo and past experiences.

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Glossary of terms and abbreviations used

List of Abbreviations and Acronyms	
AU	African Union
ILRI	International livestock Research Institute
LMIC	Low and Middle-Income Country

1 Introduction

The informal economy has been defined by the International Labor Organization as “all economic activities by workers or economic units that are – in law or practice – not covered or sufficiently covered by formal arrangements” [1]. The share of this informal component in the overall economy can be substantial. In African agriculture, for example, these data may range from 31% for males employed in South Africa to almost 100% in various other countries on the continent [2]. Examples of informal actors further downstream in the food supply chain are street vendors of food, hawkers, market traders, small-scale processing businesses, etc. From the consumer side, more than two billion people worldwide depend on street food for their daily consumption It is considered that workers within this economy may be at particular risk, for example due to the lack of social security protection, insurances, workplace safety requirements, etc.

1.1 New insights about the informal economy

Historically, initiatives sought to “formalize” the informal economy to improve the livelihoods of the actors and increase revenues for the authorities. Its value for the economy and alternative ways to improve conditions are increasingly being recognized, though. Moreover, there is a transition from supply chain thinking towards a broader food systems thinking.

In their review, Jaffee and Henderson [3] note, for example, that the informal market can be “critically important” in providing nutritious and fresh foods. Yet the suboptimal food safety status of the informal segment negatively impacts on public health. This has several reasons, such as unawareness of food safety among operators, lack of appropriate facilities, as well as governmental oversight and control. The latter commonly focus on food safety issues with commodities produced by formal well-organized export-oriented food businesses. There is no clear separation between formal and informal businesses in the domestic marketplace, for example, with supermarket chains and larger businesses operating in parallel to informal microbusinesses. Furthermore, supermarket penetration has been limited in many countries as consumers still prefer to buy their foodstuffs in traditional community markets [3].

Moreover, Termeer and co-workers [4] assert that there must be more reasons besides administrative and financial burdens as to why food businesses remain informal. They note, for example, that despite the limited reach of governmental oversight, there is no lack of governance within the informal economy. Rather, “hybrid governance” would be a more accurate description, in which other associations of market vendors and other midstream networks operate within the informal economy. Mixes of formal and informal arrangements can be profitable for the food businesses and provide them with recent technologies and increased productivity. Yet informality may also create mistrust and trigger opportunistic behaviour amongst actors. Digitalization, such as through smartphone apps, is a promising means to give informal actors access to credit and useful information. This way, they can optimize the performance of their businesses, also with respect to food safety [4].

1.2 Enhancing food safety in the African informal economy

Various recent initiatives will enable policy makers to exploit the informal economy's key role as provider of food for fostering food safety and thereby improving public health. The International Livestock Research Institute (ILRI) and the African Union (AU), for example, are drafting guidelines for managing food safety in the African informal economy. The approaches featured will involve not only raising awareness and safe practices amongst food business operators but also amongst consumers, for example. ILRI and AU are currently consulting member states and informal market actors. They are to publish the final guidelines in 2025 following approval by the AU's policy bodies [5].

The AU-ILRI guidelines will extend upon those of the Codex Alimentarius Committee on Food Hygiene for handling food safety in informal markets. These consider, for example, the need for adequate and safe facilities to host such markets, as well as governmental governance plus training and awareness amongst food business operators and the safety of the foodstuffs being traded [6]

Moreover, the European Union has established a Nutrition Research Facility for worldwide research into improvement of nutrition through dissemination of research to the public. Part of the research activities pertain to food safety. Preliminary results show high prevalence of pathogens in African vegetable produce, which is linked to poor conditions within the distribution chain and lack of inclusiveness of informal chain actors in the design of regulations and controls [7,8].

1.2.1 FS4Africa's mezzanine approach

Within the recently initiated Horizon Europe-funded Food safety for Africa (FS4Africa) and Food Convergence Innovation for Africa (FCI4Africa) projects, the so-called "mezzanine" approach is fostered. "Mezzanine" refers to the intermediate level between informality and formality. It builds on the realization that a rapid transit towards "formalization" of the informal economy is impractical. It considers that "semi-formality" can already help improve the weakness of the informal sector regarding food safety, sustainability, equity, and fairness of income distribution. This will benefit not just the operators' income but at a higher level, also market access (regional intra-African, foreign), public health, and economic sustainability. Key to both projects is also the deployment of digital tools, such as apps and information on mobile devices (smartphones) in addition to the creation and curation of digital knowledge platforms. These platforms are quality-controlled collections of data a =on a variety of relevant subtopics, trained with large-language models and automatically collected with AI algorithms. These IT tools will help reach out to informal business communities that would otherwise be more difficult to reach with relevant information and guidelines for safe practices.

1.3 Aim and set-up of the study

The FS4Africa project aims to improve food safety systems by transforming the local market, enhancing regional trade, and reducing environmental, biodiversity, health, and food security risks. Work Package 3 of FS4Africa is concerned with creating an enabling environment for inclusive food safety systems. In brief, its tasks include the study of the status quo of food safety within African food systems, particularly that within the informal economy. In addition, it

is to make an inventory of the food safety authorities within Africa and create linkages with informal economy players, and create awareness and learning opportunities. It will also develop a result-focused “mezzanine” approach towards uplifting the informal food economy to a higher level of safety without pursuing complete formalization. The outcomes of these activities are then to be distilled into actionable recommendations for policy makers on how to promote food safety in the wider context of facilitating intra-continental free trade in Africa, pursuing improved health under OneHealth, and the cooperation amongst national food safety agencies (and the recently established pan-African agency).

This particularly study expands upon the previously deliverer deliverable D3.1 with an inventory of the current state of food safety within the informal markets and the outstanding challenges for improvement of the food safety status [9]. The current deliverable (3.4) is to develop a mezzanine approach that will address these challenges and can help to uplift the informal businesses into a safer enterprise. The description of this deliverable foresaw the development of a model that is to be trialled and establishment of hubs towards that end. For this, the study followed a two-pronged approach, approaching stakeholders within the hubs (use cases) and the taking stock of lessons learned from previous initiatives.

2 Preliminary outcomes

This section will focus on the two activities initiated for this deliverable and Tasks 3.1 and 3.3, including the survey and review of lessons learned

2.1 Survey amongst informal economy actors

The first approach particularly targeted the 4 use cases within the study (as prospective hubs), dealing with respectively aflatoxins, pesticide residues, aquaponics, and safety of vegetables, respectively. Following the approval of the various ethical boards of involved institutions, partner Wageningen University initiated an online survey. The questionnaires for these surveys contained a general part and another part specifically adapted to the pertinent use case. Hence the survey involved the use of 4 different questionnaires, one for each Use Case. Invitations to fill out the survey were disseminated via the Use Case Leaders. It proved hard sometimes to motivate prospective respondents to fil out the questionnaire. Yet due to the anonymous nature of the survey (in line with data protection rules), it was not possible to monitor the responses for their provenance, hence these communications could not be specifically targeted towards non-respondents. The WP3 team will continue pursuing completion of the survey, which will also inform the further activities within the project to develop an enabling environment for the mezzanine approach implementation. It will also keep collaborating with the communication and dissemination experts, use case leaders, and coordinators towards optimizing future communications with stakeholders on the mezzanine approach.

The FS4Africa questionnaire was designed to identify key drivers, indicators, and data sources relevant to food safety and fraud risks over the next 20 years across multiple use cases.

Experts from Ghana, Nigeria, Kenya, Benin, Cameroon, and South Africa were selected based on expertise in food safety, supply chain vulnerabilities, and relevant drivers such as trade, climate, and human behavior.

A background document and questionnaire were developed in English using Google Forms. The questionnaire included open and closed questions. An internal test by three FS4Africa experts ensured clarity and usability, leading to refinements before distribution.

The questionnaire was distributed for four use cases, and primary results were collected. Efforts are ongoing to recruit more experts for Use Cases 3 and 4.

- **Use Case 1:** Sustainable Aflatoxin Management through a Food Convergence Innovation approach. So far 54 responses (Link)
- **Use Case 2:** Reduction in the use and misuse of pesticides. So far 29 responses (Link)
- **Use Case 3:** Safe and healthy vegetable and fish production through online platform and mobile communication. So far, 7 responses (Link)
- **Use Case 4:** Microbiological quality of tomatoes and leafy greens from farm to fork. So far, no responses (Link)

2.1.1 Definitions

The main structure of the questionnaire contains the following (see example in Annex 5.1):

- Respondents' perception of food safety risks and volunerabilities:
  - General information about the role of the respondent, which could be a public authority, an academician, member of a public research institute, working in the food industry, or any other role the respondent identifies.
  - The respondent's perception of the nature and frequency of toxicants in the informal food sector and vulnerabilities in the food system, which allows for determining understanding and perceptions of the severity of food safety risks and vulnerabilities.
- Indicators and drivers of food safety risks:
  - Economic indicators such as energy prices, feed proces, fertilizer prices, farm land proces, incomes, global demand and consumption, investment to measures to strengthen detection and resilience, transporation costs, and other coss;
  - Environmental indicators such as temperature and precipitation, use of renewable resources, the use of pesticide and fertilisers, climate related contaminations of feed and food;
  - Social indicators such as population growth and urbanization, the share of agriculture to GDP, socio economic indicators of farmers; and
  - Technological indicators, biotech/GM crop cultivation, investment in R&D, and adoption of automated farming technologies

The following terminologies were defined:

- **Driver**: Internal/external factors influencing developments, policies, and risks.
- **Indicator**: A measurement providing information on hazards and risks.

- **Informal Sector**: Unregulated economic activities outside government oversight.
- **Food Fraud**: Deliberate misrepresentation or adulteration of food for economic gain.

2.1.2 Intermediate results

Only the survey amongst Use Case 1's stakeholders has so far resulted in a sufficient number of responses, whilst efforts are continued to be made to recruit as many respondents as possible for the other three surveys. Some intermediate meta information from UC1 includes the following details of the provenance of respondents, both geographically and sector-wise (Figures 1 and 2):

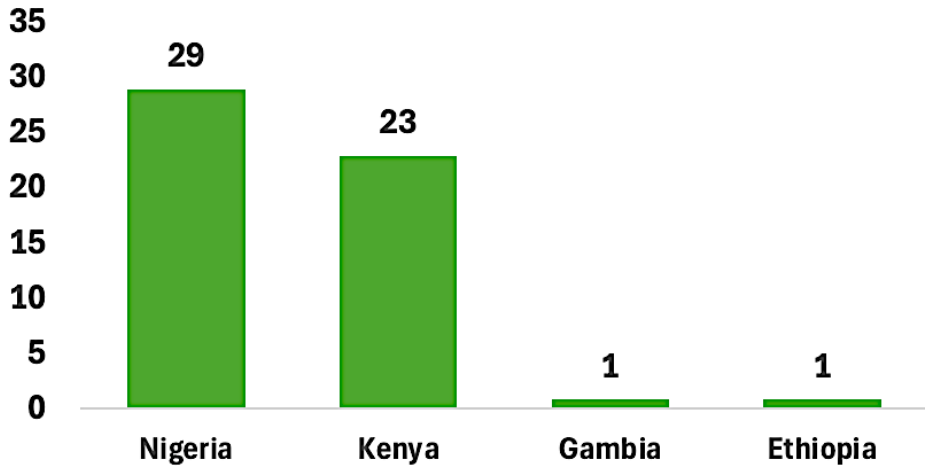


Figure 1: Number of participants per country in used case 1 (54 responses)

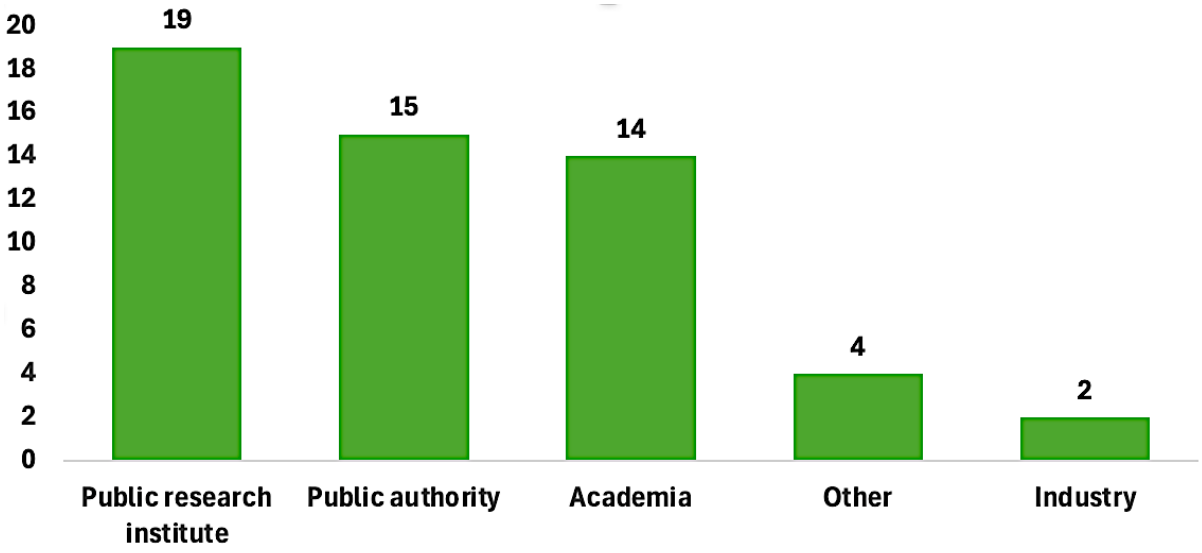


Figure 2: Number of participants per type of institution in Use Case 1 (54 responses)

Because the authors do not wish to compromise the final outcomes with intermediate, incomplete data, the responses to food safety-related answers are not provided at this stage yet.

2.2

The second approach for this study is a literature review to be undertaken under the lead of partner WR-Wageningen Socioeconomic Research. It will extend on Deliverable 3.1 [9] by making an inventory of experiences with experiments and innovations within de informal sectors of food systems. With this, we collect the lessons learned (how to do this, what is different about it) and formulate guidelines for researchers who want to improve the food safety status of the informal economy. The research is currently being carried out in parallel, particularly by newly contracted research specifically assigned to this research and that in parallel on nutrition for a CGIAR-funded project. It builds upon the insights and experiences gained from a previous investigation into three components for a mezzanine strategy (de Steenhuijsen Piters et al., submitted), namely: 1) the drivers of decisions of actors within the informal food economy; 2) the contributions that informal businesses can make to better food outcomes; and 3) how can policy makers incentivize these businesses to contribute even further to food outcomes? [10]. For this, it has explored the organization and structure and composition of the food businesses within the informal economy of LMICs, the interlinkages and relationships, and the behavioral drivers. It is envisaged that this is a good basis for the work within WP3 of FS4Africa, as well as more generally for the implementation of the guidelines and good practices developed by parallel initiatives cited above.

3 Conclusions

Various building blocks for a new and safe “food convergence innovation” within African food economy are being built within the different project activities. This explorative study already demonstrates that it is feasible to approach stakeholders through the Use Cases to solicit their feedback and directions for further transformations and model development. Moreover, project partners have established an inventory of the current food safety status and challenges towards its improvement in D3.1, which is the basis for the exploration of lessons learned, which is information which also will feed into the development and completion of the mezzanine approach.

4 References

[1] ILO (2015) Key Indicators of the Labour Market (9th ed.). Geneva: International Labor Organization. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@stat/documents/publication/wcms_498929.pdf

[2] ILO (website) SDG indicator 8.3.1 - Proportion of informal employment in total employment by sex and sector (%). Geneva: International Labor Organization. https://ilostat.ilo.org/topics/informality/

[3] Jaffee S, Henson S (2024) Promoting food safety in the informal markets of Low and Middle-Income Countries: The need for a rethink. Food Protection Trends 44(5), 376-382. https://www.foodprotection.org/files/food-protection-trends/sep-oct-24-Henson.pdf

[4] Termeer E, van Berkum S, Dijkxhoorn Y, de Steenhuijsen Piters B (2024) Unpacking the informal midstream: how the informal economy could contribute to enhanced food system outcomes. Current Opinion in Environmental Sustainability 68, 101433. https://doi.org/10.1016/j.cosust.2024.101433

[5] ILRI (2024) First-Ever Guidelines to Help African Governments Improve Food Safety in Informal Food Markets to be Developed. Nairobi: International Livestock Research Institute. https://www.ilri.org/news/first-ever-guidelines-help-african-governments-improve-food-safety-informal-food-markets-be

[6] Codex Alimentarius (2024) Guidelines for Food Hygiene Control Measures in Traditional Markets for Food (CXG 103-2024). Rome: Codex Alimentarius Commission, c/o FAO. https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXG%2B103-2024%252FCXG_103e.pdf

[7] NRF (website) How Effective are Laws and Regulations to Improving Food Safety and Quality? Ghent: Nutrition Research Facility, c/o AgriNatura & Ghent University. https://www.nutrition-research-facility-studies.eu/How-effective-are-laws-and-regulations-to-improving-food-safety-and-quality

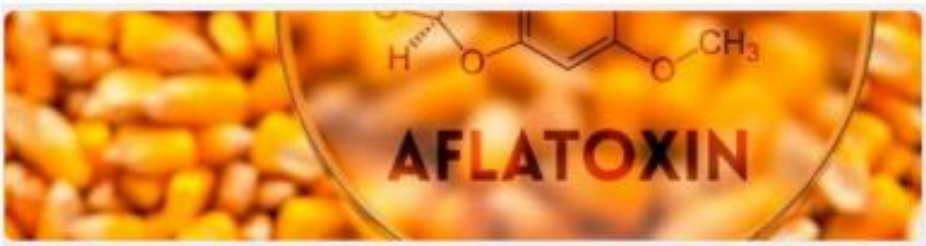
[8] CIRAD (2025) The Nutrition Research Facility: Science to Inform Public Action. Montpellier: CIRAD. https://www.cirad.fr/en/cirad-news/news/2025/nutritional-science-and-policy

[9] Dijkxhoorn Y, de Steenhuijsen Piters B (2024) Addressing Food Safety Challenges in the African Informal Sector through Innovative Strategies & Use Cases (D3.1: Report of Current Food Safety Attributes in the Informal Sector). The Hague: Food Safety for Africa, c/o Wageningen Research

[10] de Steenhuijsen Piters B, Termeer E, Dijkxhoorn Y, van Berkum S, Ruben R (submitted) Enabling Midstream Actors in the Informal Economy to Enhance Food System Outcomes.

5 Annexes

5.1 Annex 1: example of questionnaire (Use Case 1)



Sustainable Aflatoxin Management through a Breeding, capacity strengthening and Food Convergence Innovation approach

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Introduction

Thank you for dedicating your time to contribute to our questionnaire.

In the FS4Africa project we aim to improve the systems for food safety by transforming the local market, in doing so, we also aim to enhance the regional trade while reducing negative impacts on the environment, biodiversity, health, and food security. We pay particular attention to the informal sector (see in the next page what we mean by the informal sector).

Through this questionnaire, we aim to gather insights and experiences to identify specific hazards entering the food system through informal channels, such as food fraud, inappropriate storage of food that cause contaminations or lead to aflatoxins in food across the supply chain, and pesticide misuse.

This questionnaire will take approximately 20 to 25 minutes and we kindly request you to complete without stopping midway because the responses are only saved when you complete the questionnaire.

Once again, thank you for your participation.

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Definitions

For the purposes of this survey, the following definitions are used:

Driver: Generally, the energy providing impetus to a development. In futures research, frequently used as internal/external factors influencing developments, decisions, policies, etc., helping to define possible future scenarios. Often used in parallel to or overlapping with the term "trends". More specifically used in this report for describing the phenomena underlying trends and other developments that eventually lead to the emergence of risks.

Indicator: Measurement or observation (by some references referred to as "signals"): providing information on nature of the hazard and source of the risk; reliable, sensitive, & quantifiable; pointing to the risk directly or indirectly related to the food chain. Can be either qualitative or quantitative in nature.

Informal sector: The informal sector refers to unregulated economic activities that operate outside of government oversight, taxation, and labor laws. These include small-scale, unregistered businesses and casual jobs without formal contracts or worker protections.

Food fraud: Food fraud is the deliberate misrepresentation or adulteration of food products for economic gain. This can include practices such as mislabeling, substituting ingredients, adding unauthorized substances, or falsifying information about the origin, quality, or purity of food. The goal of food fraud is to deceive consumers and profit from selling inferior or counterfeit products. It poses risks to public health, safety, and consumer trust.

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* Verplichte vraag

Contact information

Please provide your country name: *

Kiezen

Type of institution: *

- Public authority
- Academia
- Public research institute
- Industry
- Other

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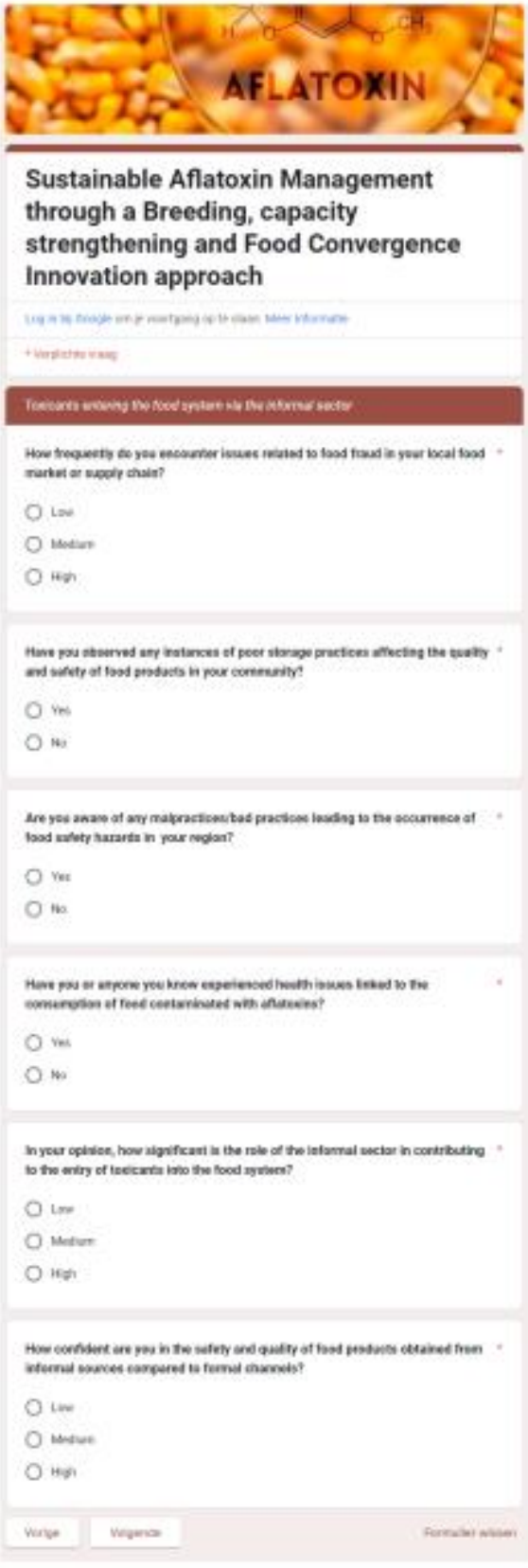
AFLATOXIN
Sustainable Aflatoxin Management through a Breeding, capacity strengthening and Food Convergence Innovation approach
How frequently do you encounter issues related to food fraud in your local food market or supply chain?
Low
Medium
High
Have you observed any instances of poor storage practices affecting the quality and safety of food products in your community?
Yes
No
Are you aware of any malpractices/bad practices leading to the occurrence of food safety hazards in your region?
Yes
No
Have you or anyone you know experienced health issues linked to the consumption of food contaminated with aflatoxins?
Yes
No
In your opinion, how significant is the role of the informal sector in contributing to the entry of toxicants into the food system?
Low
Medium
High
How confident are you in the safety and quality of food products obtained from informal sources compared to formal channels?
Low
Medium
High

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* Verplichte vraag

Vulnerabilities in the food system via the informal sector

From your perspective, Which toxicant in particular could (e.g., aflatoxins) enter the food system via the informal sector? *

Jouw antwoord

From your perspective, what malpractices (e.g., food fraud) would increase the occurrence of hazards within the informal sector in particular? *

Jouw antwoord

From your perspective, which stages or locations in the food chain are particularly vulnerable to contamination (e.g., Aflatoxins)? *

Jouw antwoord

Have you observed any patterns or trends indicating specific points in the food chain where vulnerabilities are more pronounced? *

Jouw antwoord

Are there certain types of food products or categories that are more susceptible to Aflatoxins contamination, and if so, why? *

Jouw antwoord

In your opinion, what measures can be implemented to strengthen resilience and reduce vulnerabilities in the food chain? *

Jouw antwoord

Vorige Volgende Formulier wissen

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* Verplichte vraag

Driver 1: Economic

Please read the following indicators and drivers of food safety risks related to Aflatoxins in the food chain, and answer the following questions

Select the most important indicators and add indicators if missing *

- [ ] Energy prices (e.g., electricity and petrol) in your country
- [ ] Feed prices (e.g., hay, straw, grains, proteins, concentrate) in your country
- [ ] Fertiliser prices in your country
- [ ] Farm land prices in your country
- [ ] Farm incomes in your country
- [ ] Labour costs on farms in your country
- [ ] Global demand for the product
- [ ] Product consumption in your country
- [ ] Investments in R&D related to Aflatoxins detection
- [ ] Economic growth in your country
- [ ] Frequency of fraud related to Aflatoxins contamination in your country
- [ ] Transportation costs in your country
- [ ] Insurance costs for crop protection
- [ ] Accessibility to credit for farmers
- [ ] Others:

Dit is een verplichte vraag

If others was selected add here

Jouw antwoord

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* Verplichte vraag

Driver 2: Environmental

Please read the following indicators and drivers of food safety risks related to Aflatoxins in the food chain, and answer the following questions

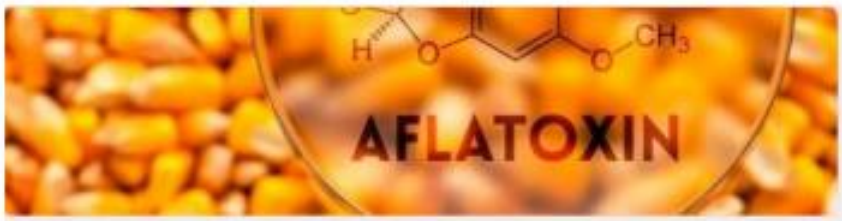
Select the most important indicators and add indicators if missing *

- [ ] Average temperature in your country
- [ ] Average precipitation in your country
- [ ] Total renewable water resources in your country (km³)
- [ ] Fertilizer consumption in your country
- [ ] Contamination in feed driven by climate
- [ ] Usage of pesticides
- [ ] Usage of herbicides
- [ ] Usage of antibiotics
- [ ] Others:

If others was selected add here

Jouw antwoord

Vorige Volgende Formulier wissen



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* Verplichte vraag

Driver 3: Social

Please read the following indicators and drivers of food safety risks related to Aflatoxins in the food chain, and answer the following questions

Select the three most important indicators and add indicators if missing *

- [ ] World population
- [ ] Inflow of foreign population into your country
- [ ] Agriculture share of GDP in your country
- [ ] Urban population in your country
- [ ] Average age of farmers in your country
- [ ] Others:

If others was selected add here

Jouw antwoord

Vorige Volgende Formulier wissen

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* Verplichte vraag

Driver 4: Technological

Please read the following indicators and drivers of food safety risks related to Aflatoxins in the food chain, and answer the following questions

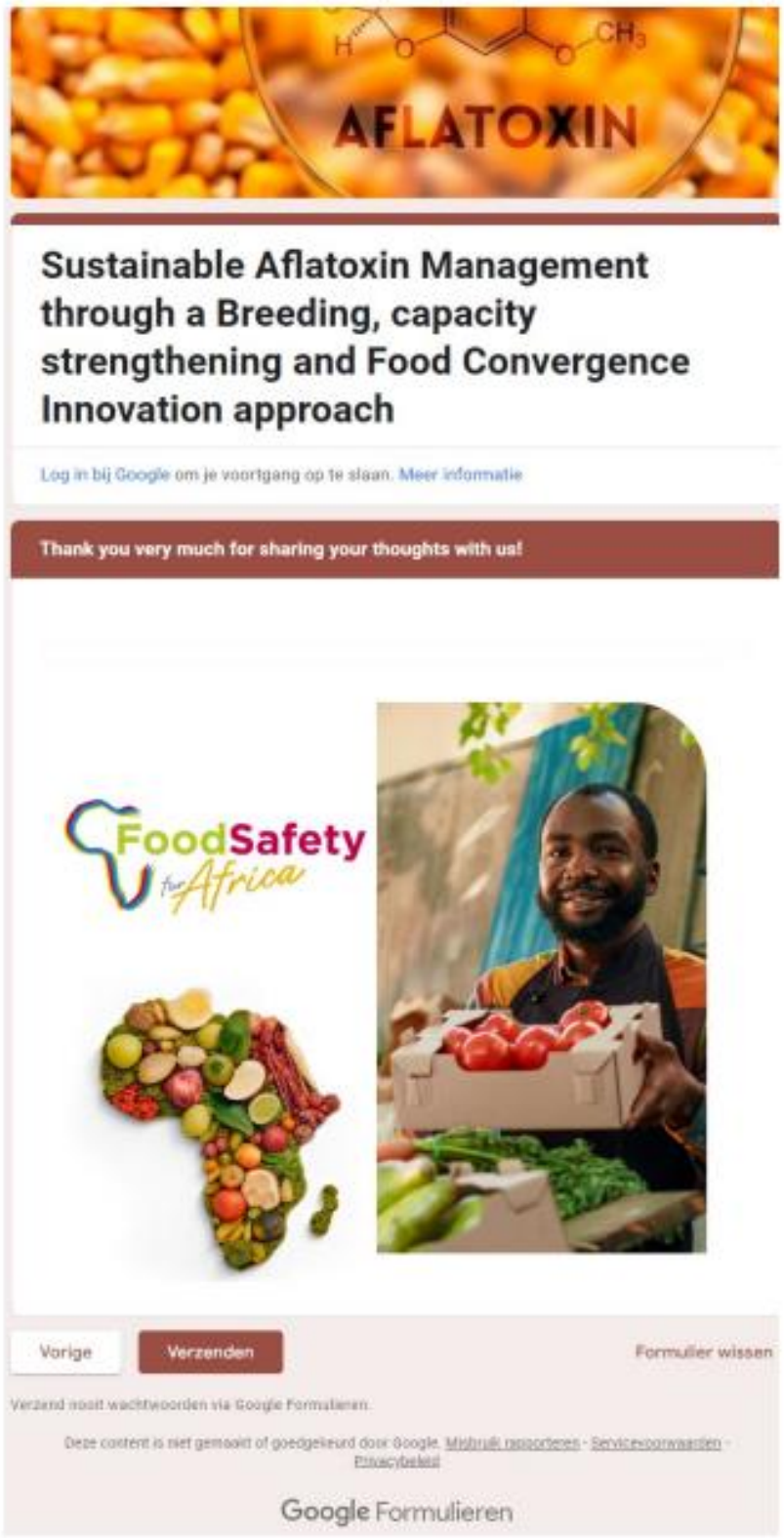
Select the three most important indicators and add indicators if missing *

- [ ] Area cultivated with biotech/GM crops in your country
- [ ] Number of transferrable embryos used in dairy sector in your country
- [ ] Investments in R&D related to dairy sector in your country
- [ ] Number of patents related to dairy sector in your country
- [ ] Level of adoption of technology on dairy farms in your country
- [ ] Percentage of dairy farms using an automated milking system in your country
- [ ] Others:

If others was selected add here

Jouw antwoord

Vorige Volgende Formulier wissen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