

Implementation of the African Food Safety Index and biennial review of food safety control based on set indicators

PACA Secretariat, AU Commission

Africa Food Safety Conference 2021

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Partnership
for Aflatoxin
Control in Africa

Partenariat pour
la lutte contre
l'aflatoxine en Afrique

Parceria para o
Controle da
Aflatoxina em África

الشراكة من أجل مكافحة
الافلاتوكسين في أفريقيا

Background: Africa is disproportionately impacted by unsafe food

- According to WHO (2015), **91 million** people in Africa fall ill each year and it represents one-third of the 400,000 global death toll for foodborne diseases although Africa accounts for only 16% of the world population
- Unsafe food costs low and middle income countries **US\$110 billion** annually, from productivity loss and medical expenses alone (World Bank, 2018) – mostly in SSA, SA, SEA
- Food safety is an important precondition for access to global food markets and increasingly, for high-value domestic markets
- Therefore, focus on production and productivity alone can not guarantee healthy diets/food security and nutrition, nor net trade

Food safety is crucial to attainment of AU Malabo Declaration Commitments

- In 2014, AU leaders signed Malabo Declaration on Accelerated Agriculture Growth and Transformation for Shared prosperity and Improved Livelihoods in Africa
- Among the seven Malabo Commitments (targets to be achieved by 2025), food safety is crucial to achieve the following:
 - Ending hunger: Malabo Decl. 3d
 - Tripling intra-Africa trade: Malabo Decl. 5a &b
 - Halving poverty: Malabo Decl. 4
- ‘Malabo Declaration’ also committed AU member states to Mutual Accountability, which requires to conduct a **Biennial Review** of Agriculture and related sectors: tracking, monitoring and reporting on progress
- However, food safety not adequately captured when the Biennial Review was launched.

“Biennial Review” and food safety

- The inaugural biennial review report was presented to the January 2018 Summit with 43 indicators
- Food safety is part of the Malabo Declaration Implementation Plan but was not tracked in the First Biennial Review
- The BR has seven indicators tracking nutrition outcomes, which is a move in the right direction.
- However, among 43 indicators in the BR, food safety is not adequately captured.
- Food safety identified as one of the gaps in the first BR, as unsafe foods will hold back Commitments 3, 4, and 5 on ending hunger, poverty reduction (raising incomes), and tripling intra-African trade in agricultural commodities

Food safety tracking and country level efforts to meet food safety benchmarks expected to have a domino effect on:

1. Prioritization of food safety in AU member states
2. Inclusion of food safety tracking in government systems
3. Improvements in data availability and quality
4. Improvements in food safety and reductions in food borne disease burden, trade rejections

Thus, Africa Food Safety Index was borne to contribute to realization of the AU Malabo Declaration Commitments!

Steps in institutionalizing food safety (AFSI) through AU BR

- Stakeholder consultation
- Development of the index
- Establishment of Food Safety Experts Network (FSEN)
- Capacity building training to national experts and technical backstopping using FSEN members
- Development of a bi-directional digital platform for data submission/reporting – alignment to the AU eBiennial
- Data collection and submission
- Validation studies to improve AFSI

Consultations (mostly expert) on inclusion of food safety indicator in the 2nd Malabo BR



Experts at 4th CAADP Partnership Platform recommended to include food safety in 2nd BR, Libreville

PRC of AU appreciated the efforts to initiate food safety tracking in the 2nd BR, AUC

BR Technical Working Group Lead Experts approved inclusion of AFSI in BR, AUC

PACA PPM reviewed draft AFSI, Dakar

A side event at the 1st FAO/WHO/AU Int. Food Safety Conf. applauded AFSI, AUC

April 2018

May 2018

Aug 2018

Sep 2018

Oct 2018

Feb 2019

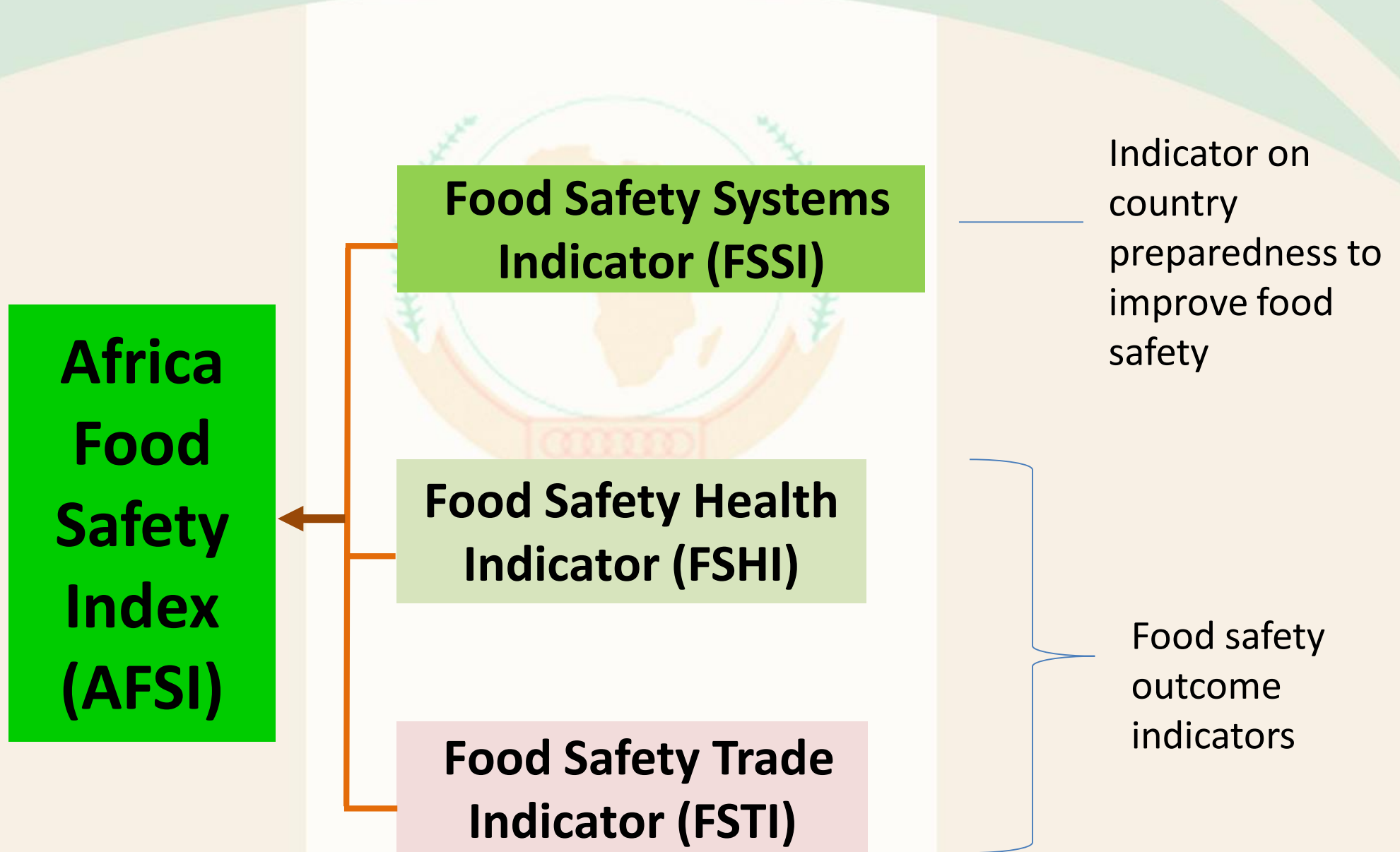
BR Experts Task Force identified food safety as one of the critical gaps, Cotonou

Writeshop to draft the Africa Food Safety Index, AUC

Peer-to-Peer Meeting of AU MS endorsed inclusion of AFSI, Nairobi



Structure of AFSI: What is measured?



AFSI is composed of three indicators looking at two dimensions in an attempt to capture the complexity of food safety; taking into account the state of data availability and country level capacity but also need to drive improvements towards optimal systems

Overview of AFSI parameters and elements under the 3 indicators

Food safety systems indicator (FSSI)

Parameter	Sub-parameter	(Description)	Elements
Fssi1 (n=48)	Lw1	Food safety policy	
	Lw2	RB FS standards	
	Lw3	Regulatory institution	
Fssi2 (n=48)	MS1	RB FS monitoring plan	
	MS2	Database of FBD	
	MS3	FBD Response system	
	MS4	Participation in FS notification systems	
Fssi3 (n=46)	Lab1	Assessment lab capacity	
	Lab2	Lab capacity (3 elements)	L2-Elt1
			L2-Elt2
			L2-Elt3
	Lab3	Existence of labs (5 elem)	L3-Elt1
			L3-Elt2
L3-Elt3			
L3-Elt4			
Fssi4 (n=46)	Prog1	CapDev programs (3 elem)	P1-Elt1
			P1-Elt2
			P1-Elt3
	Prog2	CapDev HACCP	
	Prog3	Sensitization programs (4 elem)	P3-Elt1
			P3-Elt2
			P3-Elt3
P3-Elt4			
Prog4	Incentives for private sector		

Health indicator (FSH)

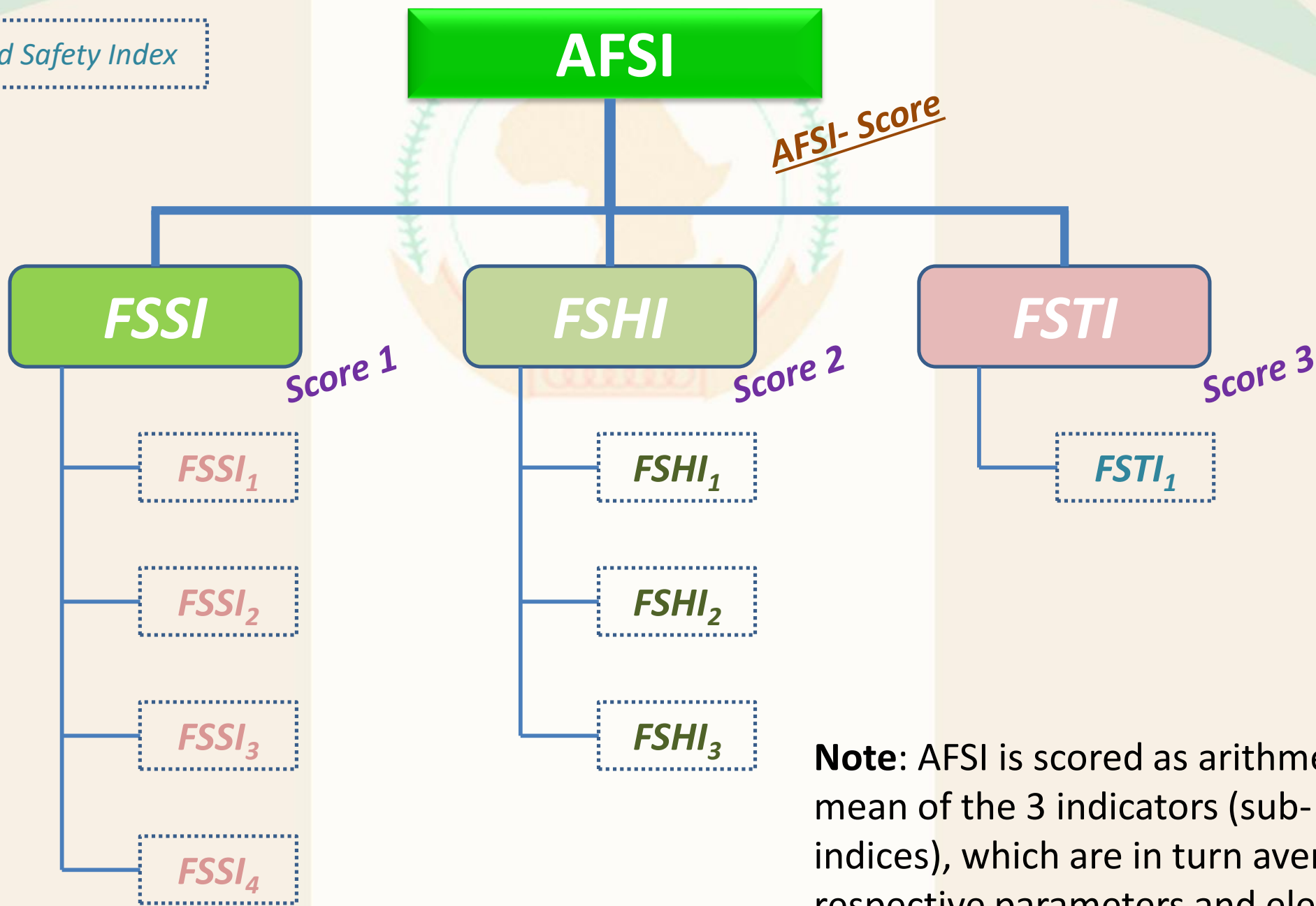
FSH1 (n=26)	FBDD	FBD related diarrhea cases/100,000/yr	TP NCDD
FSH2 (n=12)	FBDM	FBD related child<5 mortality/100000/yr	TPC NCDM
FSH3 (n=13)	FBHCC	FBD related liver cancer cases/100000/year	TP NHCC

Trade indicator (FSTI)

FST	TRt (n=11)	Total number of FS related rejections in a year (2018)	
	URRt (n=8**)	Unit rejection rate - Rejections/total value of export /year (per 1M USD)/year (2018)	
	TRRt (n=9)	Rate of rejection – Rejections/total shipments/year (2018)	

Scoring of the AFSI: like any index AFSI is a score

Africa Food Safety Index



Note: AFSI is scored as arithmetic mean of the 3 indicators (sub-indices), which are in turn average of respective parameters and elements



Computations:

I-score_{3.6i} | Estimating progress on establishing operational and functional food safety systems



- Existence of national food safety policy, act or law updated in the last 10 years and covering the entire food chain, Lw_1
- Existence of competent regulatory institutions with clear mandates and coordination mechanism Lw_3

Existence of legal or policy and institutional frameworks on food safety $FSSI_1$

$$FSSI_1 = average(Lw_{i(i=1-3)})$$

$$W_1 = 20\%$$

- Existence of a risk-based and coordinated food safety monitoring/surveillance plan, MS_1

Quality of monitoring and surveillance programmes $FSSI_2$

$$FSSI_2 = average(MS_{(i)})$$

$$W_2 = 30\%$$

- Existence of a national epidemiological database/system for food borne diseases MS_2
- Existence of a food safety response system with standard operating procedure, traceability and recall systems MS_3
- Participation in reliable food safety information notification systems, MS_4

Food Safety Systems Index, $FSSI$

$$FSSI = \sum_1^4 (FSSI_i \times w_i)$$

- Existence of national assessment of in-country laboratory capacity, Lab_1

Laboratory infrastructure, analytical capacity and laboratory performance, $FSSI_3$

$$FSSI_3 = average(Lab_{(i)})$$

$$W_3 = 30\%$$

- Existence of demonstrable government programmes to build, equip (including human resource) and sustain competent laboratories, $Lab_2 = Average(Elt_{(i)})$
- Existence of competent laboratories (government, official or private) and their demonstrable fitness for purpose, $Lab_3 = Average(Elt_{(i)})$

$FSSI_i$ (%)

TARGET
 $\tau_{3.6i} = 100\%$

$$\frac{FSSI \times 10}{\tau_{3.6i}}$$

= C-score_{3.6i}

On Track ???

- Existence of national capacity building program in GAP, GMP, GHP, $Prog_1 = Average(Elt(i))$

Existence of programmes to facilitate/encourage compliance to food safety standards, $FSSI_4$

$$FSSI_4 = average(Pr og_{(i)})$$

$$W_4 = 20\%$$

- Existence of capacity building program in recognized quality management systems i.e HAACP, ISO, $Prog_2$

- Existence of national Food Safety awareness raising programs/activities, $Prog_3 = Average(Elt(i))$

- Existence of support/incentive for industry and producers (including private sector/SMEs), $Prog_4$

2018 Benchmark

$${}_{2018} B_{3.6i} = \frac{{}_{2018} \mu_{3.6i} \times 10}{\tau_{3.6i}} = 3.33$$

2018 Milestone:

$${}_{2018} \mu_{3.6i} = \frac{(2018 - 2015)}{(2025 - 2015)} \times \tau_{3.6i} = 33\%$$

See the notes for the definitions of Elt_i

- Elt_1
- Elt_2
- Elt_3
- Elt_2
- Elt_1
- Elt_3
- Elt_5
- Elt_4
- Elt_2
- Elt_1
- Elt_3
- Elt
- Elt_2
- Elt_3
- Elt_4



Computations:

I-score_{3.6ii} | Estimating progress on reaching at least 50% for the Food Safety Health Index (FSHI), by 2025.

- Total population in a given year, TP_i
- Number of diarrheal disease cases per year, $NCDD_i$
- Multiplier to correct for attribution to foodborne causes, $Ma_i=0.4$
- Multiplier to correct underreporting (to be provided)

- Total population of children in a given year TPC_i
- Number of cases of diarrheal mortality cases per year for children under 5, $NCMD_i$
- Multiplier to correct for attribution to foodborne causes, $Ma_i=0.4$
- Multiplier to correct underreporting, Mu_i (to be provided)

- Number of Liver Cancer cases per year $NHCC_i$
- Multiplier to correct for attribution to foodborne causes, $Ma_i=0.4$
- Multiplier to correct underreporting, Mu_i (to be provided)

foodborne diarrheal disease per year per 100,000 people
FBDD_t

Rate (%) of reduction of foodborne diarrheal diseases,
FSHI₁

$$FBDD_t = (NCDD_i \times Ma_i \times Mu_i) * 100,000 / TP_i$$

$$FSHI_1 = (1 - (FBDD_t / FBDD_{2015})) * 100$$

$W_1 = 40\%$

foodborne diarrheal mortality per year per 100,000 children under 5
FBDM_t

Rate (%) of reduction of deaths in children under five years of age due to foodborne diarrheal diseases,
FSHI₂

$$FBDM_t = (NCMD_i \times Ma_i \times Mu_i) * 100,000 / TPC_i$$

$$FSHI_2 = (1 - (FBDM_t / FBDM_{2015})) * 100$$

$W_2 = 40\%$

foodborne HCC cases per year per 100,000 people,
FBHCC_t

Rate of reduction of the cases of liver cancer (Hepatocellular Carcinoma) caused by dietary exposure to aflatoxin,
FSHI₃

$$FBHCC_t = (NHCC_i \times Ma_i \times Mu_i) * 100,000 / TP_i$$

$$FSHI_3 = (NHCC_i)$$

$W_3 = 20\%$

2018

Food Safety Health Index (FSHI), FSHI

$$FSHI = \sum (FSHI_i \times w_i)_{i=1to3}$$

$$\frac{FSHI \times 10}{\tau_{3.6ii}}$$

Baseline Yr **2015**

Target Yr **2025**

= **C-score_{3.6ii}**

On Track ???

TARGET
 $\tau_{3.6ii} = 50\%$

2018 Benchmark

$${}_{2018} B_{3.6ii} = \frac{{}_{2018} \mu_{3.6ii} \times 10}{\tau_{3.6ii}} = 3.33$$

2018 Milestone:

$${}_{2018} \mu_{3.6ii} = \frac{(2018 - 2015)}{(2025 - 2015)} \times \tau_{3.6ii} = 15\%$$



Computations:

I-score 3.6ii | Estimating progress on reaching at least 50% for the Food Safety Trade Index (FSTI)

Baseline Yr	2015
Target Yr	2025

Total value of shipment of food commodities exported per year $TVSt$

Violation type 1 and number of rejection $TRV1$
 $RRV1 = TRV1 * 100 / TNS$

Violation type 2 and number of rejection $TRV2$
 $RRV2 = TRV2 * 100 / TNS$

Violation type 3 and number of rejection $TRV3$
 $RRV3 = TRV3 * 100 / TNS$

Other violations and number of rejections $TRV4$
 $RRV4 = TRV4 * 100 / TNS$

Number of rejected shipments based on food safety related trade violations in exported food commodities per year, TRt
 $TRt = \sum(TRV(i))$

Rate of reduction in unit rejection of food commodities due to food safety violation (non-compliance) disaggregated by type of violation, $FSTp1$

Food Safety Trade Index, $FSTI$

$$URR = TR_t / TV_t * USD1,000,000$$

2018

$C\text{-score}_{3.6ii}$

$$\frac{FSTI \times 10}{\tau_{3.6iii}}$$

TARGET
 $\tau_{3.6iii} = 50\%$

On Track ???

2018 Milestone:

$$2018 \mu_{3.6iii} = \frac{(2018 - 2015)}{(2025 - 2015)} \times \tau_{3.6iii} = 15\%$$

2018 Benchmark

$$2018 B_{3.6iii} = \frac{2018 \mu_{3.6iii} \times 10}{\tau_{3.6iii}} = 3.33$$

Regional considerations in the design of AFSI indicators

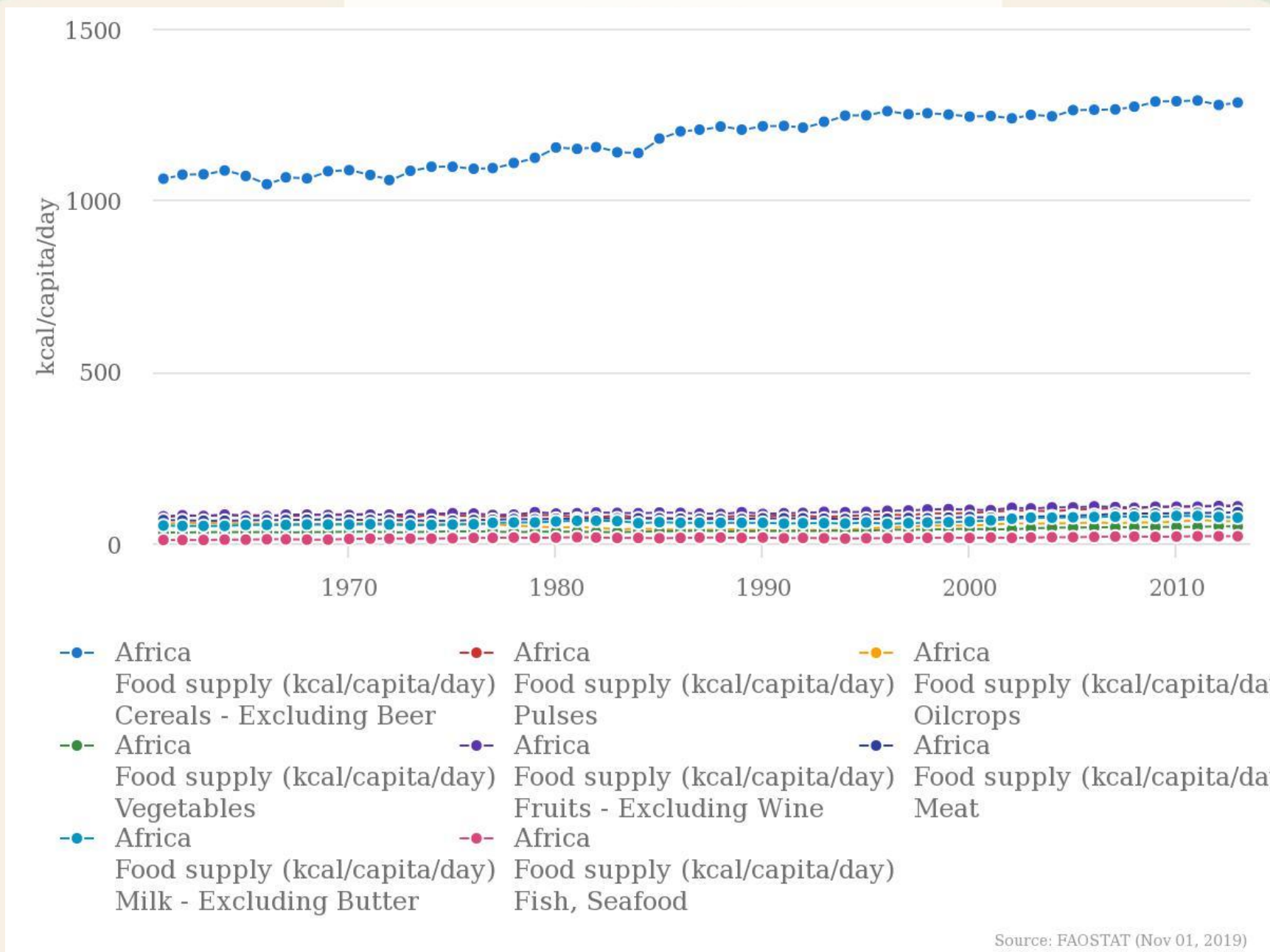
- Dietary staples prone to aflatoxin account for over 60% of calorie intakes in Africa
- Aflatoxin occurs in 80% of crop samples, often at levels unfit for human consumption
- Biomarker assays of human body fluids also show high exposure of African populations to aflatoxin
- Liver cancer is the number one cause of cancer mortality in Africa
- Up to 40% of liver cancer cases attributed to aflatoxin
- It was important to capture public health impacts of both microbial and chemical hazards especially aflatoxin
- The following slides show why liver cancer was one of the health indicators

Occurrence of aflatoxin in priority crops sampled in 2015-2018 from six African countries (PACA AfricaAIMS data)

Crop	Number of samples analyzed	Samples (%) with aflatoxin	Samples (%) exceeding 20 ppb*
Maize	2,296	77%	25%
Groundnut	2,565	80%	29%
Sorghum	640	89%	62%
Total for the three crops	5,501	80%	33%

*** Less stringent maximum limit applied by a number of countries**

Aflatoxin is a priority food safety issue for Africa: harmful +widespread + hits staple foods/ grains



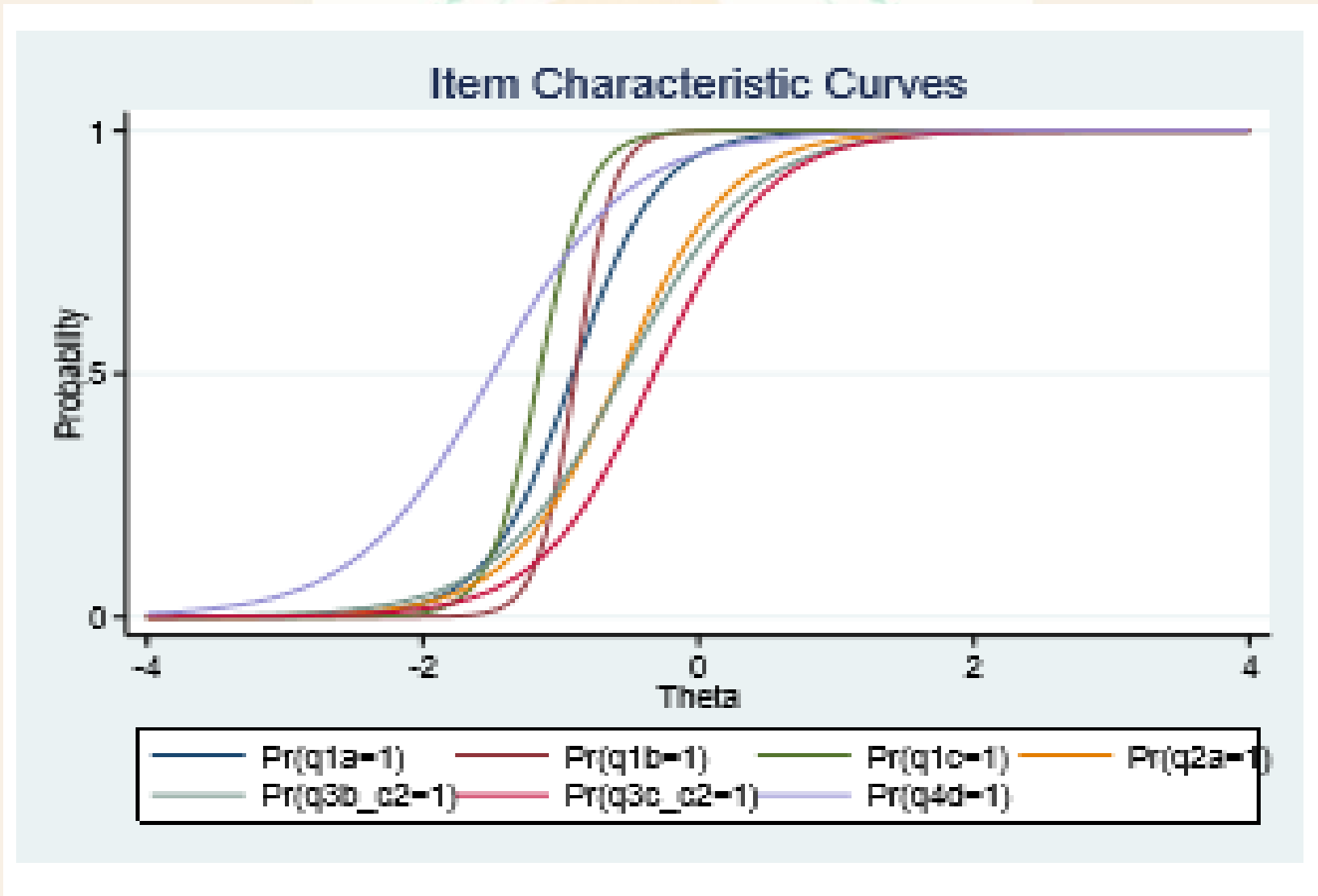
Extent of data submission in 2019: 49 of the 55 AU MS submitted data on at least 1 of the three AFSI indicators

Indicator	Parameter	Number of countries
Food Safety Systems Indicator	Legal, policy and institutional frameworks	48
	Monitoring and surveillance programs	48
	Lab infrastructure, analytical capacity and lab performance	46
	Programs to facilitate compliance to standards	46
Food safety health indicator	Rate of reduction in food borne diarrheal diseases	26
	Rate of reduction in diarrheal mortality in children under 5	12
	Rate of reduction in liver cancer cases caused by dietary exposure to aflatoxin	13
Food safety trade indicator	Rate of reduction in unit rejection of food commodities due to food safety violation (non-compliance) disaggregated by type of violation	8-11

AFSI validation studies: **relevance, usability** and **validity** of AFSI

- Three-pronged approach of validation:
 1. Online questionnaire
 2. Focus group interview (data collectors and submitters) and stakeholder meetings in a sample of 9 countries
 3. Analysis of the actual 2019 data (qualitative and Item Response Theory analysis)
- In general, need to improve ability of parameters to discriminate among countries with below average to average systems
- Overall, there is a need for capacity boost in food safety data collection and submission at country level for better data availability
- Some improvements made in AFSI for the 2021 data collection and capacity building trained continued; more systemic capacity improvements will be needed

Item Response Theory (IRT) analysis showed that some of the parameters were able to discriminate among countries with below average to average systems (unpublished, credit: ILRI)



Future prospects of AFSI

- Further data collection in 2021, 2023, and 2025
- Further assessment and continuous improvement, at the risk of losing comparability of successive data points
- Develop AFSI into food safety data hub for Africa
 - Develop data architecture for generating data beyond AU BR
 - Seek data sharing collaborations
 - Negotiate data sharing protocols, in the end the success of AFSI will depend on how much data is available for users

How the AFSI is contributing to solutions faced in Intra-regional and extra regional trade

- Countries are prioritising food safety
- AFSI is creating a culture of reporting on food safety as it is embedded in government systems
 - Therefore easing regional and extra regional trade
 - Access to food safety data will enhance how effectively and efficiently countries can fully utilize the AfCFTA
- Countries are able to address their food systems based on gaps identified in the data reported on AFSI
 - Therefore encouraging continuous improvement of national food systems
- Prospects of the establishment of a food safety data hub will in future allow for a one stop shop for food safety information on the continent
 - Therefore, Africa will witness improvements in data availability and quality

We thank our partners in AFSI:



BILL & MELINDA
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