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Nigeria's Agrifood System: Structure and Drivers of Transformation

USDA Food And Feed Safety Expertise Coordination Workshop

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What do we do at IFPRI?

- Since its inception in 2007, the Nigeria Strategy Support Program (NSSP) Abuja Office of the International Food Policy Research Institute (IFPRI) has been contributing to **strengthening evidence-based policymaking in Nigeria in rural and agricultural development.**

Strengthened capacity for government agencies, research institutions, and other stakeholders to carry out and use applied research



Enhanced knowledge, information, data, and tools for the analysis, design, and implementation of pro-poor, gender-sensitive, and environmentally sustainable agricultural policies




Improved communication linkages and consultations between policymakers, policy analysts, and policy beneficiaries on agricultural and rural development policy issues



What has been our recent impact in Nigeria?

- Government of Nigeria approved IFPRI-supported National Agricultural Technology and Innovation Policy (2022–2027) and action plan
- Agricultural Research Council of Nigeria (ARCN), National Agricultural Seed Council (NASC), Federal Ministry of Agriculture and Food Security (FMAFS) adopted tools (OPI and MEL Plans) for improved performance improvement
- New tools: Food Security Simulator (FMAFS); Women's Empowerment in Agri-Food Governance (Ministry of Budget and Planning); Ongoing Social Accounting Matrix and Public Expenditure Analysis (NISER/NBS/NGF)
- Nigerian analysts using advanced tools for research; contributing to policy dialogues





What is the current structure and outlook for Nigeria's agri-food transformation?

IFPRI's Agri-Food System Transformation Diagnostics

- 2019
 - **Current structure**
What does Nigeria's food system look like today?
 - **Decomposing value chains**
How are different products contributing to the broader agrifood system?
- 2009-2019
 - **Growth and market structure**
How is Nigeria's agrifood system growing and transforming?
- 2019+
 - **Future drivers of inclusive agric. transformation**
Which value chains could be most effective?

Summary

Nigeria's agrifood system (AFS) diagnostic results

Nigeria's AFS lacked transformation between 2009 and 2019

- Primary agriculture is larger than off-farm AFS and its share in total GDP did not fall
- Off-farm share of AgDP+ barely changed over time

AFS growth has been mainly driven by domestic-market-oriented value chains

- Less-traded value chains dominated the AFS both in terms their size and contribution to AFS GDP growth
- Domestic consumption patterns (and changing diets) are therefore important drivers of agricultural transformation

Looking forward, the structure of AFS growth will be crucial in driving development outcomes...

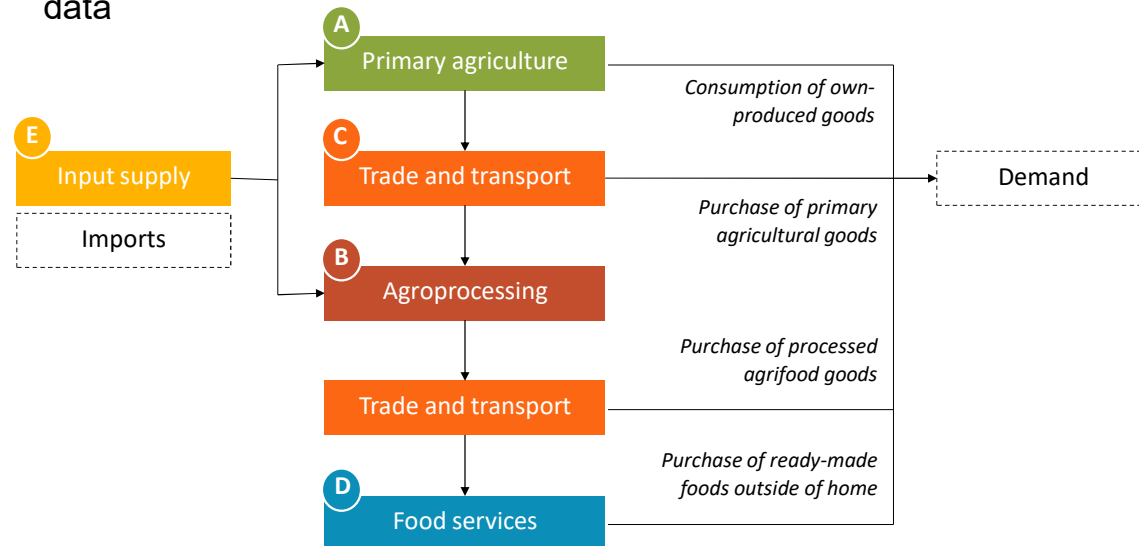
(e.g., poverty, dietary improvements, employment creation, and growth)

⇒ ***Jointly promoting these value chains would offer an effective way to achieve multiple development outcomes***

Framework | Agrifood Systems (AFS)

Includes agriculture, plus all upstream/downstream sectors

- Five major components (A to E)
- Same format as standard economywide datasets (e.g., national accounts)
- Allows us to measure AFS structure and performance using actual data



Agrifood System GDP (AgGDP+)

Total value added generated by all agricultural value chains (in constant dollars)

Agrifood System Employment (AgEMP+)

Total number of workers who are primarily employed in an agricultural value chain

Structure ₂₀₁₉ | Nigeria's Agrifood System Today

- **Part 1** focuses on the **current size and structure** of the national agrifood system
 - Latest AgGDP+ and AgEMP+ estimates
 - Decomposed into five AFS components
 - Situates AFS within the broader economy
- **Nigeria estimates** indicate that
 - AFS makes up 40% of GDP (\$181 billion AgGDP+) ...
 - ... and nearly two-thirds of total employment (41.9 million AgEMP+)
 - Primary agriculture (A) is large, but off-farm components (B–E) are also important (40% of AgGDP+, one-fifth of AgEMP+)

GDP and employment in Nigeria's agrifood system (2019)

	GDP (\$ billions)		Employment (millions of workers)	
Total economy	478	100%	66.8	100%
Agri-food system	181	37.9%	41.9	62.8%
Primary agric. (A)	105	22.0%	32.2	48.2%
Off-farm AFS	76	15.9%	9.7	14.6%
Processing (B)	24	5.1%	1.7	2.6%
Trade & transport (C)	45	9.4%	7.4	11.1%
Food services (D)	3	0.7%	0.3	0.4%
Input supply (E)	3	0.7%	0.3	0.4%
Rest of economy	297	62.1%	25.0	37.2%

Structure 2019 | Comparing to Other Countries

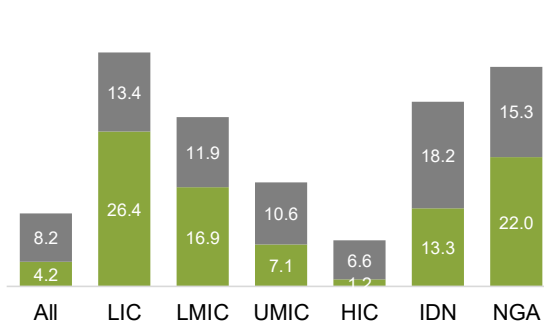
■ Importance and structure of the AFS varies at different stages of development

Nigeria is a lower-middle-income country (LMIC)

- **A:** Nigeria's AgGDP+ share of total GDP lies between low-income countries (LICs) and LMICs
- **B:** Nigeria's primary agriculture and off-farm components in AgGDP+ are same as the LMIC average
- **C:** Nigeria's off-farm structure of AFS is close to the LMIC average

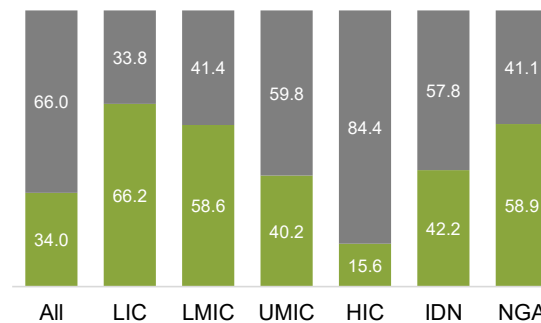
A Share of total GDP (%)

■ Primary agriculture ■ Off-farm AFS



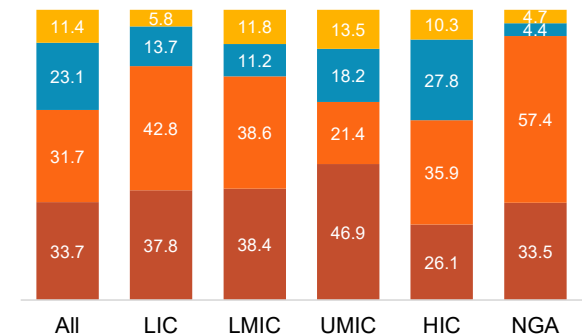
B Share of AFS GDP (%)

■ Primary agriculture ■ Off-farm AFS



C Share of off-farm AFS GDP (%)

■ Processing ■ Trade and transport
■ Food services ■ Input supply



LIC = low-income countries | LMIC = lower-middle income | UMIC = upper-middle-income | HIC = high-income System Database

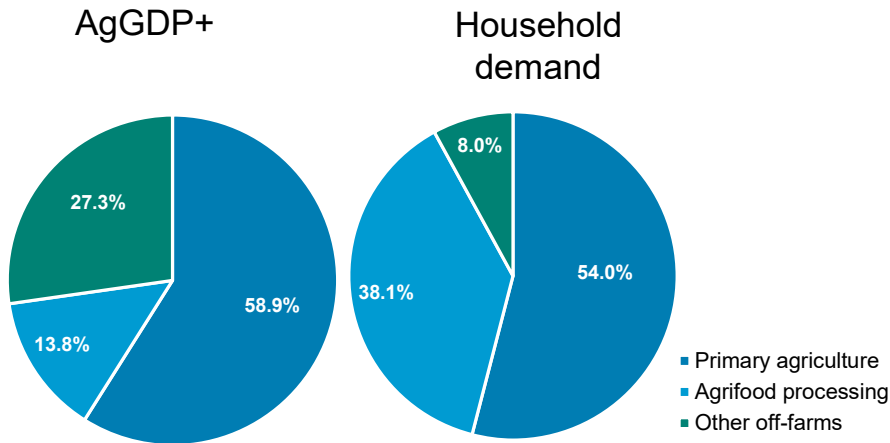
Source: IFPRI Agri-Food

Structure 2019 | Supply vs. Demand Sides of the Agrifood System

- AgGDP+ defines the AFS on the **supply side**
- Household demand and trade (imports) capture AFS structure on the **demand side**
- Processing agriculture is more important on the demand side than the supply side

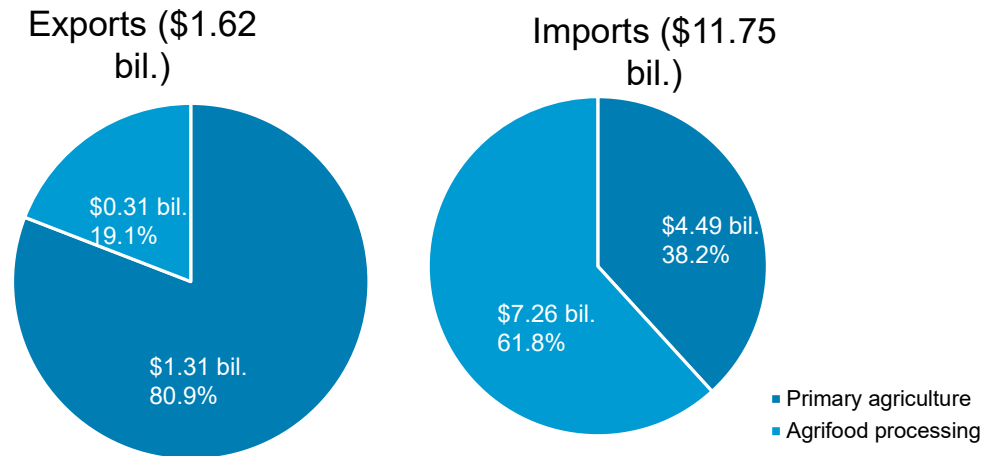
Agrifood GDP vs. consumption

Primary, processed, and other product shares (%)



Agrifood exports vs. imports

Primary and processed product shares (%)



Note: Value Chain Groups and Agricultural Sectors in Individual VC Groups

Value chain group and their share of AgGDP+	Individual products and share of group's agriculture GDP
Maize (3.8%)	Maize 100%
Rice (3.3%)	Rice 100%
Other cereals (7.1%)	Sorghum & millet 96.9% Wheat & barley 0.5% Other cereals 2.5%
Soybeans (0.7%)	Soybeans 100%
Other oilseeds (9.1%)	Other oilseeds 100%
Cowpea (4.1%)	Cowpea 100%
Roots (15.8%)	Cassava 51.9% Irish potatoes 3.3% Sweet potatoes 3.7% Other roots 41.1%
Horticulture (30.3%)	Leafy green vegetables 10.7% Other vegetables 33.2% Nuts 2.0% Bananas 26.4% Other fruits 27.7%
Export crops (3.0%)	Coffee 6.9% Cocoa 53.2% Cut flowers 38.2%
Other crops (3.4%)	Sugarcane 55.4% Cotton & fibers 34.6% Tobacco 5.8% Rubber 1.6% Other crops 2.5%
Cattle & milk (3.6%)	Cattle meat 73.5% Raw milk 26.5%
Other livestock (3.6%)	Poultry meat 24.3% Eggs 19.4% Small ruminants 41.9% Other livestock 14.5%
Fish (3.3%)	Aquaculture 26.1% Capture fisheries 72.9%
Forestry (3.5%)	Forestry 100%

Value Chains 2019 | Contributions & Trade Orientation

- **Part 2** decomposes the AFS across broad value chain groups
- Classify value chains based on trade orientation
 - **Exportable** value chains have above-average export-output ratios ($> 0.6\%$)
 - **Importable** value chains have above-average import-demand ratios ($> 4.2\%$)
 - **Less traded** value chains make up the rest

⇒ *Promoting some importable value chains and cattle & dairy (less traded) could be effective in driving agricultural transformation by boosting value added and employment in off-farm AFS*

Breakdown of Nigeria's agrifood system (2019)

	Share of total GDP (%)			Exports / output (%)	Imports / demand (%)
	Total AFS	Primary agric.	Off-farm AFS		
Total	100	100	100	0.6	4.2
Exportable	3.2	2.4	4.5	12.1	2.4
Export crops	3.0	2.4	4.5	12.1	2.4
Importable	18.1	12.6	26.8	0.5	16.0
Rice	3.5	2.6	5.0	0.0	12.4
Other cereals	7.5	5.4	10.8	0.1	17.1
Other crops	3.6	0.8	8.1	1.8	25.0
Fish	3.5	3.9	3.0	0.6	8.0
Less traded	78.7	85.0	68.7	0.3	0.6
Maize	4.0	3.9	4.0	0.0	0.4
Root crops	16.7	22.1	8.1	0.0	0.0
Cowpea	4.3	5.5	2.3	0.0	0.0
Soybeans	0.8	1.0	0.5	0.0	0.0
Other oilseeds	9.7	11.5	6.8	1.7	0.8
Horticulture	32.0	31.6	32.6	0.3	0.6
Cattle & dairy	3.8	2.5	5.9	0.2	3.1
Other livestock	3.8	4.2	3.2	0.0	0.2
Forestry	3.7	2.8	5.3	0.0	1.2

Growth 2009-2019 | Agrifood System Performance

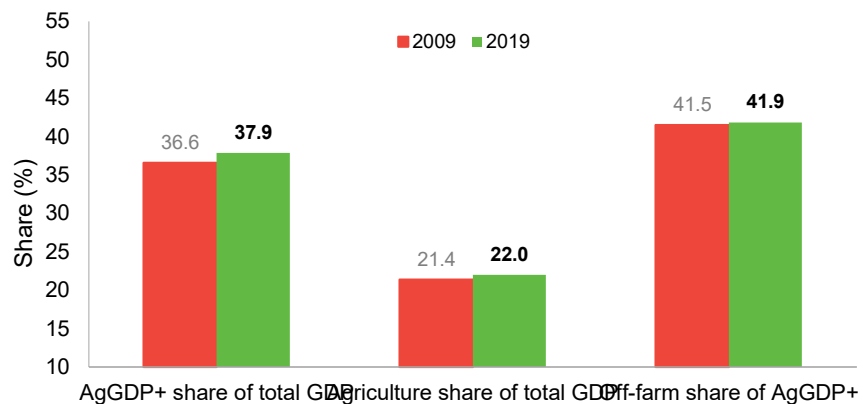
- Part 3 analyzes structural change in the AFS and the contribution of different value chains to AFS growth

Nigeria's AFS lacked transformation between 2009 and 2019

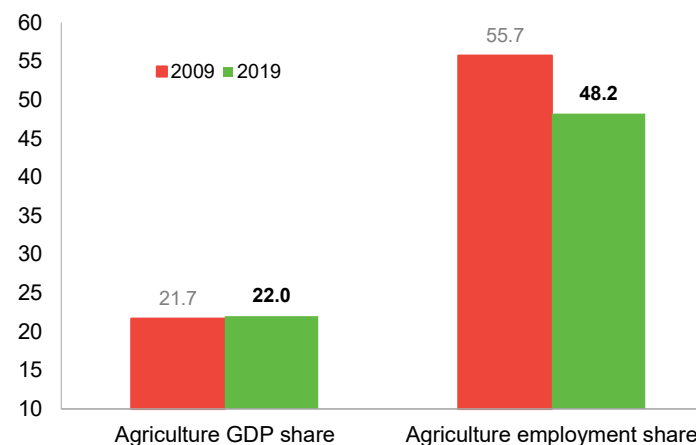
- Agriculture GDP's share in total GDP did not fall
- Off-farm share of AFS GDP was constant

Agricultural employment share fell significantly (55.7% to 48.2%)

Shares of AFS and agricultural GDP in total GDP and off-farm share of AgGDP+ in 2009 and 2019 (%)



Shares of agriculture in total GDP and employment in 2009 and 2019 (%)



Growth 2009-19 | Value Chain Performance (2)

- Modest AgGDP+ growth (3.9% p.a.) during 2009–2019
- Most value chains with AgGDP+ growth rate above 5% (*) are in importable and less-traded groups
- Exportable value chain grew rapidly
- Off-farm growth was faster for many fast-growing value chains

Value chain growth in Nigeria (2009-2019)

	Average annual GDP growth rate (%)			
	Total AFS	Primary agric.	Off-farm AFS	Processing
Total AFS	3.9	3.8	4.0	4.1
Exportable	8.1	6.8	9.3	10.0
Export crops*	8.1	6.8	9.3	10.0
Importable	2.0	2.8	1.4	-1.0
Rice	4.8	8.7	2.5	-0.9
Other cereals*	5.4	4.3	6.4	8.3
Other crops	-5.3	-10.6	-4.0	-6.1
Fish*	5.6	4.7	7.8	2.6
Less traded	4.0	3.9	4.0	6.3
Maize	4.2	6.2	1.7	0.5
Root crops	-0.2	0.0	-1.2	
Cowpea*	6.4	7.2	4.1	3.3
Soybeans*	6.0	6.4	4.6	
Other oilseeds*	8.7	9.6	6.7	9.3
Horticulture*	5.0	5.0	5.1	6.3
Cattle & dairy*	5.4	2.9	7.5	10.5
Other livestock	3.1	3.4	2.6	8.3
Forestry*	6.0	6.7	5.5	5.3

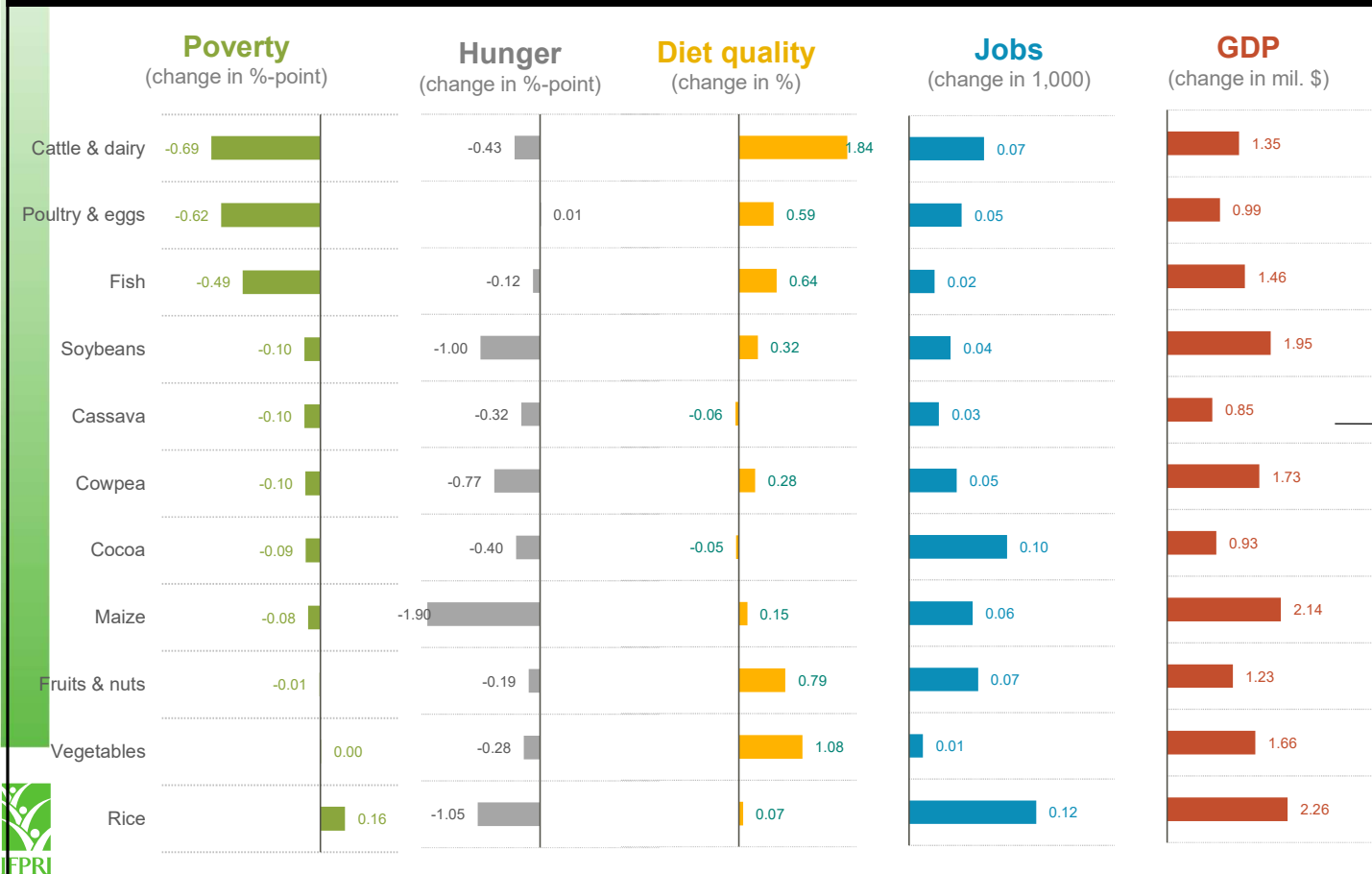
Future Drivers ₂₀₁₉₊ | Modeling Faster Growth

- IFPRI's **RIAPA model** is used for analysis
- **Expand production** in different value chains
 - Increase on-farm productivity growth rates in targeted value chain and same overall growth in agriculture GDP
- **Assess outcomes**
 - **Poverty** – Poverty-growth elasticity in percentage points based on \$2.15-a-day
 - **Hunger** – Hunger-growth elasticity in percentage points based on prevalence of undernourishment
 - **Diet** – Diet quality to growth elasticity in % derived from Reference Diet Deprivation index (REDD)
 - **Jobs** – Employment multiplier in thousand employed persons associated with US\$1 million growth in targeted value chain
 - **GDP** – GDP growth multiplier in US\$ millions associated with US\$1 million growth in targeted value chain
- **Average across outcomes**
 - The value of outcome indicators (elasticity or multiplier) is expected to differ across value chain growth
 - Normalizing the individual outcome scores
 - An average score with equal weights is used to measure total impacts

Future Drivers 2019+ | Prioritizing Agricultural Growth

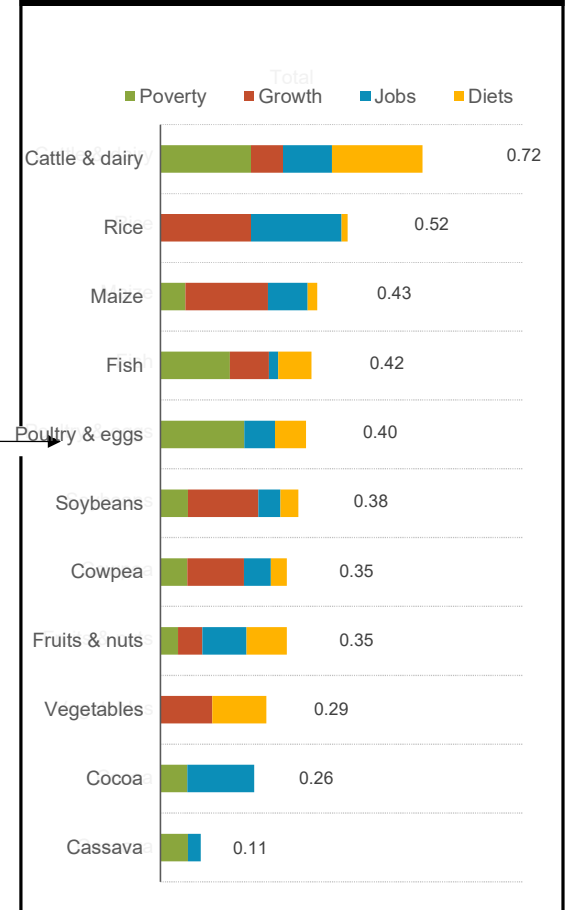
Individual outcomes

(per unit change in agriculture GDP, ordered by poverty outcome)



Average across outcomes

(averaged normalized scores, reordered)



Future Drivers 2019+ | Key Messages

AFS growth is **pro-poor**

AFS growth is effective in improving **food security (hunger)** and **diet quality**

Agricultural growth creates **jobs** but not necessarily on-farm

Agricultural growth has strong **growth** multiplier effects, generating income beyond agriculture

In conclusion, **promoting multiple value chains can achieve broad impact**

- No single value chain group is the most effective in achieving all the outcomes we consider
- The two livestock value chains, rice, maize, and fish rank highly in the combined outcome scores
- Soybeans and cowpeas have more balanced impact on the four outcomes; cowpeas are grown by many small farmers and have potential to expand rapidly
- Promoting these value chains would offer an effective way to achieve broad-based outcomes



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