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July 2023

AGRIFOOD SYSTEM DIAGNOSTICS
COUNTRY SERIES

Nigeria's Agrifood System
Structure and Drivers of Transformation

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This diagnostic analysis was conducted by IFPRI with financial support from USAID and funders of the CGIAR Research Initiative on Foresight and on National Policies and Strategies.

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Four Parts to the 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)

… but no single value chain is the most effective at driving all these development outcomes

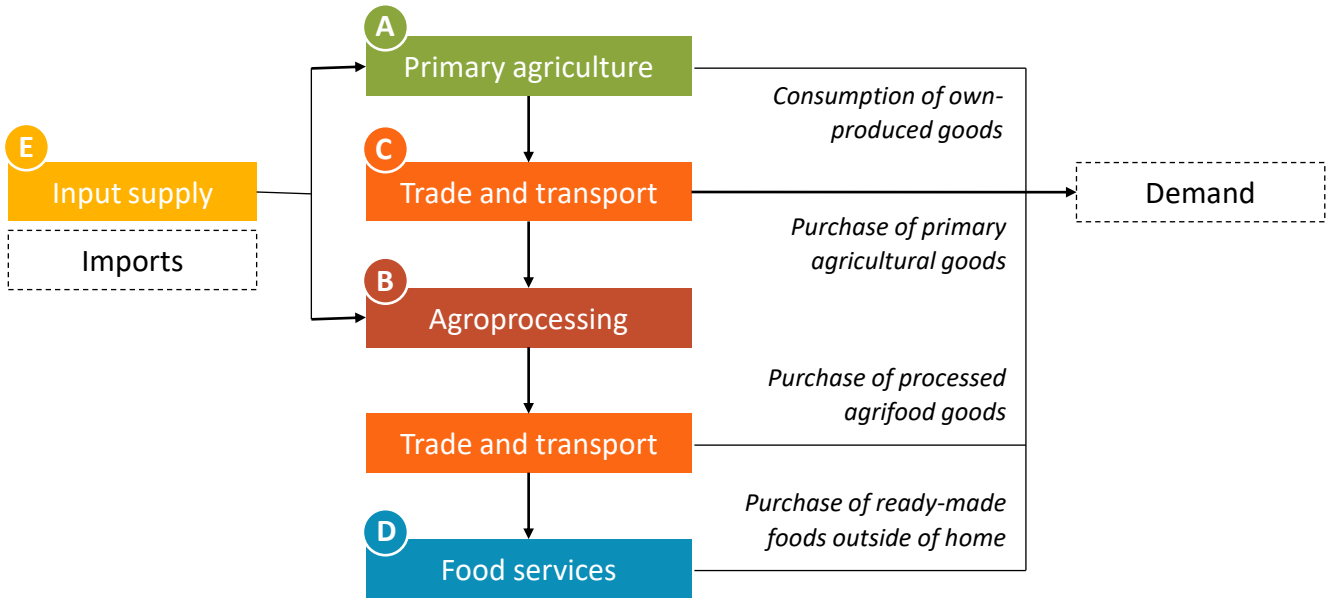
- The two livestock value chains, rice, maize, and fish rank highly in the combined outcome scores; soybeans and cowpeas have more balanced impact on the four outcomes; cowpeas are grown by many small farmers and have potential to expand rapidly

⇨ ***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
- Uses **official data** sources
  - GDP from national accounts
  - Employment from various sources (i.e., population census, labor force surveys, ILO, etc.)
- **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	**469**	**100%**	**66.8**	**100%**
Agri-food system	**175**	**37.4%**	**41.9**	**62.8%**
Primary agric. (A)	103	22.0%	32.2	48.2%
Off-farm AFS	**72**	**15.3%**	**9.7**	**14.6%**
Processing (B)	24	5.1%	1.7	2.6%
Trade & transport (C)	41	8.8%	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	**294**	**62.6%**	**25.0**	**37.2%**

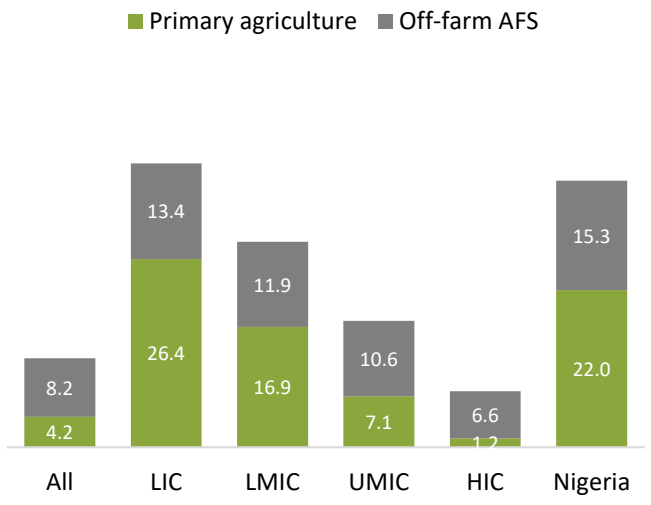
Structure $_{2019}$ | Comparing to Other Countries

- **Importance and structure of the AFS varies at different stages of development**

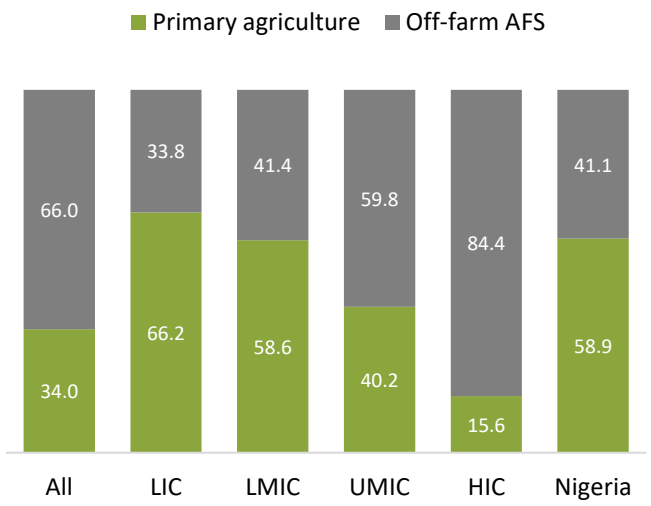
  Nigeria is a lower-middle-income country (LMIC)

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

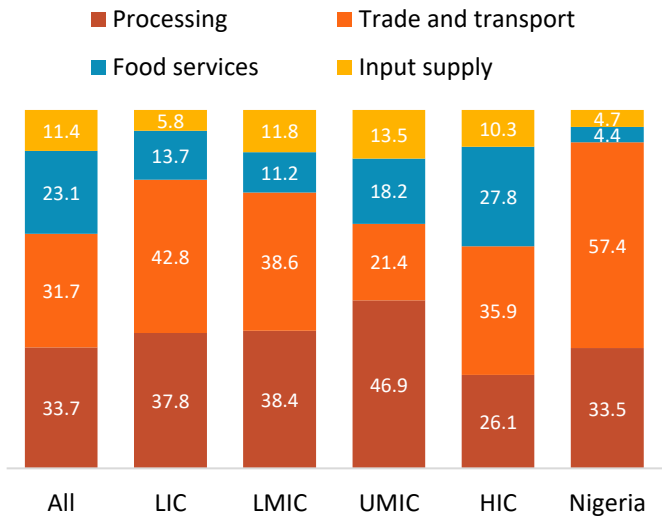
A **Share of total GDP (%)**



B **Share of AFS GDP (%)**



C **Share of off-farm AFS GDP (%)**



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

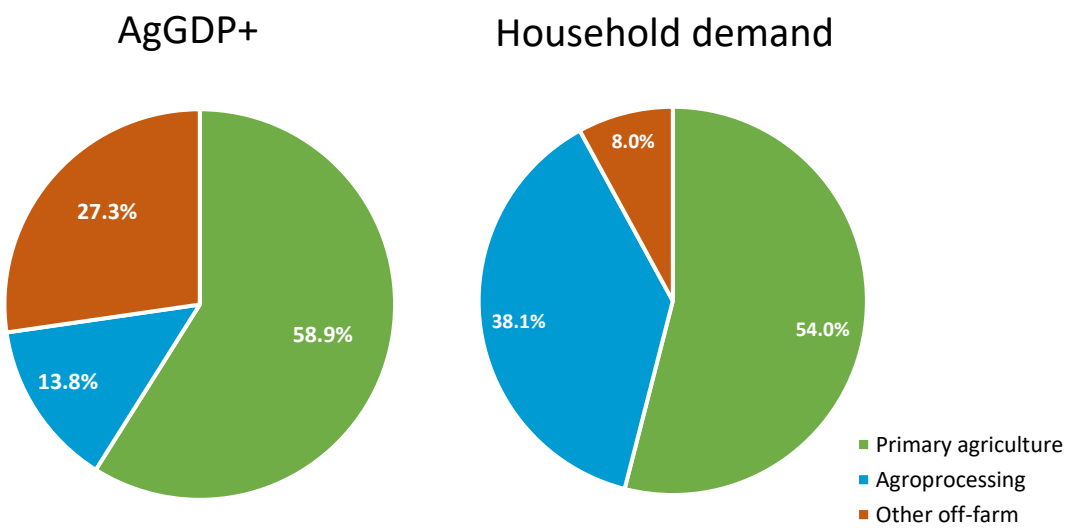
Source: IFPRI Agri-Food System Database

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 in the AFS

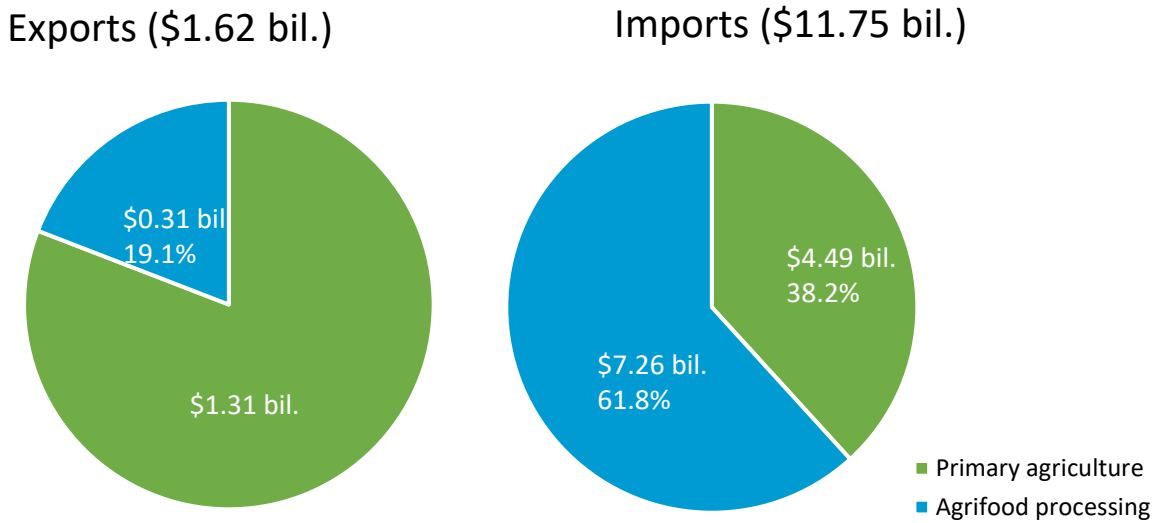
Agrifood GDP vs. consumption

Primary, processed, and other product shares (%)



Agrifood exports vs. imports

Primary and processed product shares (%)



Value Chains $_{2019}$ | Contributions & Trade Orientation

- **Part 2** decomposes the AFS across **broad value chain groupings**

- 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 (> 4.3%)
  - **Less traded** value chains make up the rest

- Domestic market dominates AgGDP+ (78.6%) – nine less-traded value chains; relatively smaller off-farm share (68.4%) and larger on-farm (primary) share (84.7% of total), with cattle & dairy an exception
- Only one exportable value chain group that includes cocoa and coffee with small share of AgGDP+ (3.2%)
- Four importable value chains account for a disproportionate share of off-farm AFS (27%); these value chains compete with processed agrifood imports

⇨ *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**	**4.3**
Exportable	**3.2**	**2.4**	**4.5**	**12.1**	**2.4**
Export crops	3.2	2.4	4.5	12.1	2.4
Importable	**18.2**	**12.9**	**27.0**	**0.5**	**17.1**
Rice	3.6	2.6	5.1	0.0	12.5
Other cereals	7.5	5.5	10.5	0.1	17.2
Other crops	3.6	0.8	8.2	1.8	26.0
Fish	3.6	3.9	3.0	0.6	8.0
Less traded	**78.6**	**84.7**	**68.4**	**0.3**	**0.6**
Maize	4.0	4.0	4.1	0.0	0.4
Root crops	17.0	22.5	8.1	0.0	0.0
Cowpea	4.4	5.6	2.3	0.0	0.0
Soybeans	0.8	1.0	0.5	0.0	0.0
Other oilseeds	9.7	11.7	6.7	1.7	0.8
Horticulture	32.2	32.2	32.3	0.3	0.6
Cattle & dairy	3.8	2.5	6.1	0.2	3.2
Other livestock	3.9	4.3	3.3	0.0	0.2
Forestry	2.5	1.0	5.1	0.0	1.6

Growth $_{2009\text{-}2019}$ | Agrifood System Performance

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

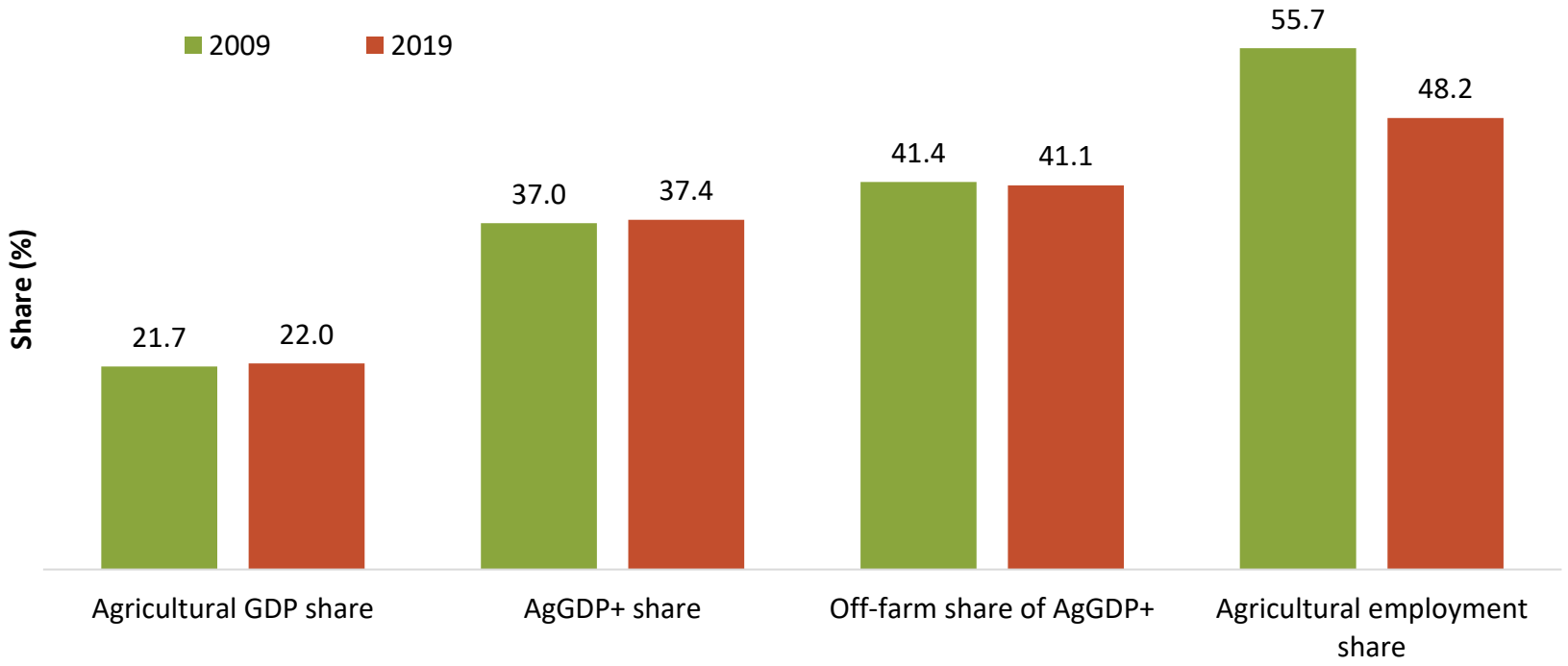
Nigeria's AFS lacked transformation between 2009 and 2019

- 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%)

- An indication of structural change in the economy with modest improvement in agricultural labor productivity

Agricultural GDP, agrifood system GDP, and employment shares (2009 and 2019)



Growth $_{2009\text{-}19}$ | Value Chain Performance (2)

- Modest AgGDP+ growth (3.7% p.a.) during 2009–2019
- Most value chains with AgGDP+ growth rate above 5% (*) are in importable and less-traded groups
  - Less-traded value chains dominated AFS growth with large size and above-average growth (4%), contributing more than 80% of AFS growth
- Exportable value chain grew rapidly led by high growth in processing and other off-farm AFS components
- Off-farm growth was faster for fast-growing importable value chains, but not for fast-growing less traded value chains

Value chain growth in Nigeria (2009-2019)

	Average annual GDP growth rate (%)			
	Total AFS	Primary agric.	Off-farm AFS	Process-ing
Total AFS	**3.7**	**3.8**	**3.6**	**4.0**
Exportable	**7.9**	**6.8**	**9.0**	**9.9**
Export crops*	**7.9**	**6.8**	**9.0**	**9.9**
Importable	**1.8**	**2.8**	**1.1**	**-1.1**
Rice	4.8	8.8	2.3	-0.9
Other cereals*	**5.2**	**4.3**	**6.0**	**8.2**
Other crops	-5.6	-10.6	-4.4	-6.2
Fish*	**5.6**	**4.7**	**7.7**	**2.6**
Less traded	**3.8**	**3.9**	**3.7**	**6.3**
Maize	4.1	6.2	1.4	0.5
Root crops	-0.2	0.1	-1.4	
Cowpea*	**6.4**	**7.2**	**3.9**	**3.3**
Soybeans*	**5.9**	**6.4**	**4.5**	
Other oilseeds*	**8.7**	**9.6**	**6.3**	**9.3**
Horticulture	4.9	5.1	4.7	6.3
Cattle & dairy	4.8	2.5	6.9	10.5
Other livestock	2.4	2.9	1.5	8.2
Forestry*	**5.4**	**4.0**	**5.9**	**5.5**

Future Drivers $_{2019+}$ | Modeling Faster Growth

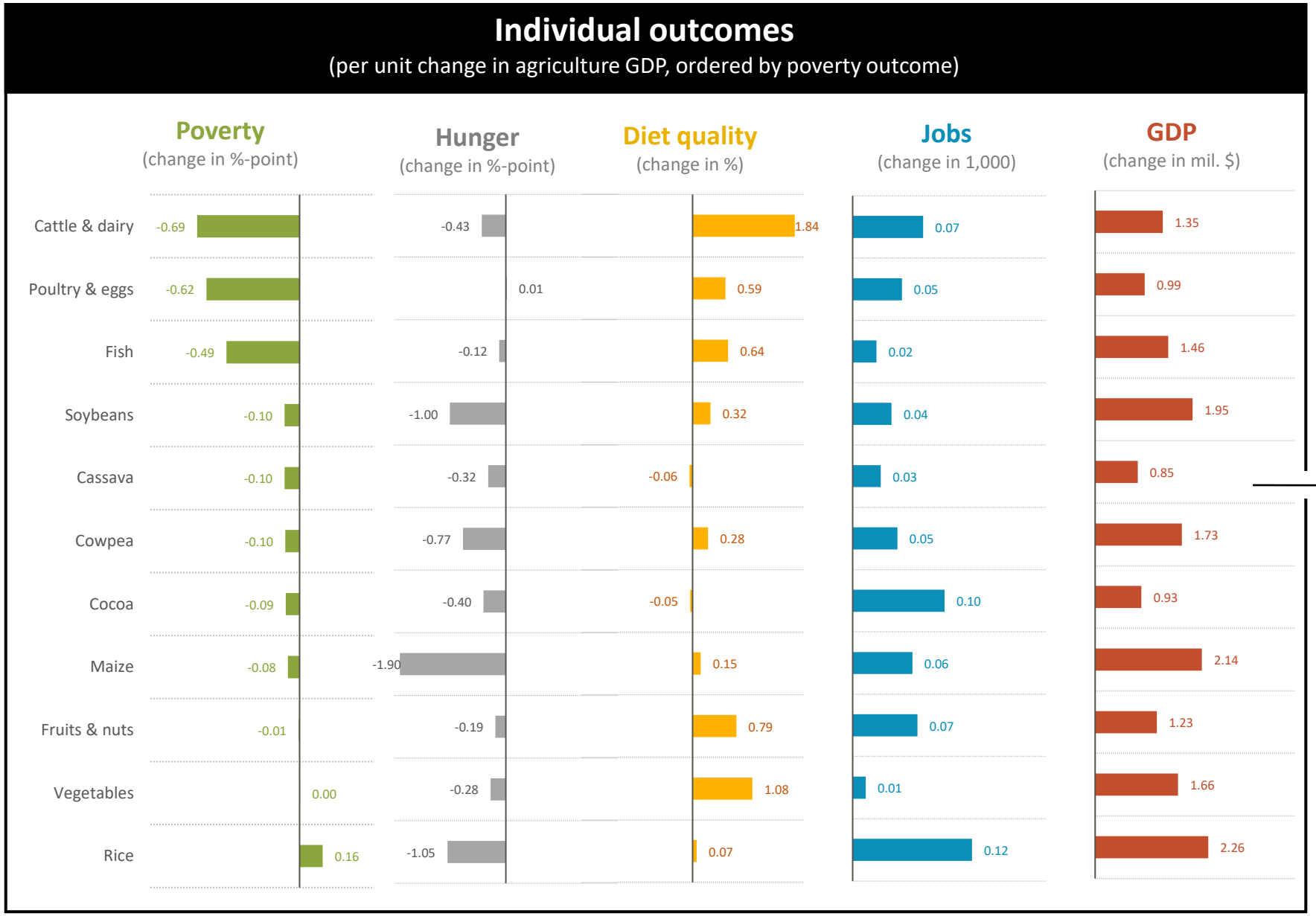
- IFPRI's **RIAPA model** is used to analyze different sources of agricultural growth

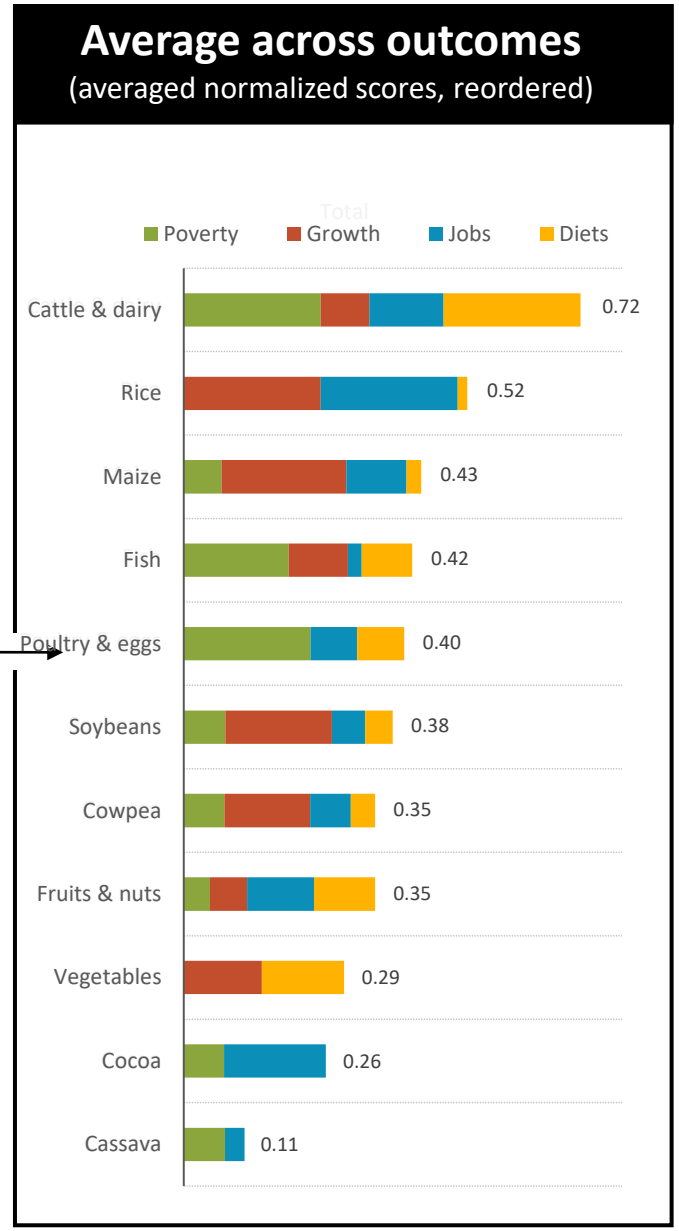
- **Expand production** in different value chains
  - Increase on-farm productivity growth rates in targeted value chains
  - Achieve same overall growth in agriculture GDP (e.g., 1.0%)
  - Track linkage effect within value chain and spillover effects to other value chains

- **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; not all value chains are equally effective at achieving all outcomes
  - Normalizing the individual outcome scores
    - The values of each outcome indicator are scaled so that the most effective value chain is given a score of one and the least effective is given a score of zero. A value chain with adverse impact is also given a score of zero.
  - An average score with equal weights is used to measure the total impacts across all value chains

Future Drivers $_{2019+}$ | Prioritizing Agricultural Growth





Future Drivers $_{2019+}$ | Key Messages

AFS growth is **pro-poor**

- Growth led by most value chains reduces poverty, but the two livestock value chains are most effective

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

- Most value chains reduce hunger; maize, rice, and soybeans are most effective
  - Soybeans are both directly consumed and used as an input in the feed industry; greater soybean productivity lowers feed costs and benefits the poultry sector, indirectly leading to more hunger impact in addition to its direct impact
- Most value chains improve diet quality; cattle & dairy, vegetables, and fruits & nuts are most effective

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

- All value chains are associated with an increase in total employment, but most AFS jobs are created off-farm
- Rice is the most effective value chain in creating jobs both in the overall economy and within AFS

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

- Rice and maize have stronger growth multiplier effects for both AFS income and total GDP growth because of their linkages with grain milling and other food industries

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

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%