ASSESSMENT OF FOOD SYSTEMS DRIVERS IN GHANA

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High-level view on external drivers of the food system in GHANA

1. Introduction

Agriculture is a major sector in Ghana with a contribution about 21.1 percent of Gross Domestic Product (GDP) and employing nearly half of its labor force (50.6%) between 2010 and 2019 (World Bank, 2021). Several policies have been developed over the years in pursuit of the country's food systems objectives. The Food and Agriculture Sector Development Policy (FASDEP I and II) translates long-term objectives in the agricultural sector and primarily aims to increase productivity and production for strategic commodities. Another development program implemented is the medium-term plan under FASDEP known as Medium-Term Agriculture Sector Investment Plan (METASIP) whose global objective is to promote best practices in agriculture, in line with the country's Growth and Poverty Reduction Strategy (GPRS II) and with the Comprehensive Africa Agriculture Development Programme (CAADP). A third major program is the Planting for Food and Job which is a programme under phase 3 of METASIP that has been to help address the problem of declining growth in Ghana's agricultural sector.

The adoption of the Malabo Declaration at the continental level by African leaders also provides a broader framework for Ghana's food system development efforts. In addition to recommitting to the principles and values of CAADP, the Declaration sets ambitious targets in the following six other broad areas: enhancing agricultural investment, ending hunger, reducing poverty, boosting intra-African agricultural trade, and enhancing resilience, and strengthening mutual accountability. Moreover, the Malabo Declaration mandates the conduct of a continent-wide Biennial Review (BR) process to track progress made by each of the 55 AU member states towards commitments under each of the above areas (AU, 2014).

The present brief reviews the status and recent trends in Ghana's agri-food system. It provides insights into the roles of high level drivers in shaping food systems dynamics and outcomes in Ghana over time and in comparison to other ECOWAS countries and the Africa continent as a whole.

2. Performance in past Biennial Review Processes

The AU mandated BR referred to above rates progress achieved by African countries against 40 food system indicators regrouped in seven Malabo target areas. It started in 2017 and is carried out every two years. It is noteworthy that Ghana is the only country which has moved from not being on track in 2017 to being on track in 2019 to achieving the Malabo commitments by 2025. The

Table 1: Ghana overall performance on past BRs

Indicators	Ghana		ECOWAS		Africa	
	1st BR	2nd BR	1st BR	2nd BR	1st BR	2nd BR
Score	3.91	6.67	3.62	4.94	3.6	4.03
Score rank in ECOWAS	6	2	-	-	-	-
Score rank in Africa	21	4	-	-	-	-

Note: The 2019 BR benchmark score was set to 6.66 out of 10 compared to 3.94 in 2017

country also improved its performance vis a vis other countries in the region. It moved up to 2nd place in ECOWAS in 2019 up from a 6th in 2017 (Table 1).

Table 2 summarizes Ghana's performance in different commitment areas. Ghana is on track with respect to commitments 4, 5 and 7 related to ending hunger, reducing poverty and strengthening mutual accountability to actions and results in both rounds. In contrast, while the score on re-commitment to principles and values of the CAADP process (commitment 1) was higher than the benchmark in 2017, a setback is noted in 2019 with Ghana is now being off-track to off-track. Moreover, Ghana achieved a score 38 percent higher than the benchmark value in the areas of resilience of livelihoods and production systems to climate variability and other related risks. Compared to the best performing country, Ghana has a score between 21 and 74 percent of the highest scores in 2017. However, in 2019, it managed to significantly reduce the gap and reach 90 percent of the highest score in 4 out of 7 thematic areas. The highest Gap is noted in boosting intra-African trade with a score around 50 percent below the highest score.

Table 2: Ghana's performance on Malabo's thematic areas

7 Thematic Areas	1st BR			2nd BR		
	Ghana	**Benchmark**	**Highest - score**	**Ghana**	**Benchmark**	**Highest score**
1. Re-commitment to principles and values of the CAADP process	6.87	3.33	9.24	9.64	10.00	10.00
2. Enhancing investment finance in agriculture	4.33	6.67	8.33	5.01	10.00	8.49
3. Ending Hunger in Africa by 2025	1.99	3.71	3,62	3.05	5.04	5.10
4. Reducing poverty by half, by 2025, through inclusive agricultural growth and transformation	3.02	2.06	6.79	6.02	3.94	6.79
5. Boosting intra-African trade in agricultural commodities and services	1.11	1.00	5.19	4.43	3.00	8.58
6. Enhancing resilience of livelihoods and production systems to climate variability and other related risks	3.59	6.00	8.53	9.44	7.00	10.00
7. Strengthening mutual accountability to actions and results	6.45	4.78	9.96	9.07	7.67	9.95

Source: AUC, (2018,2020) - Biennial Review data

3. Environment and climate

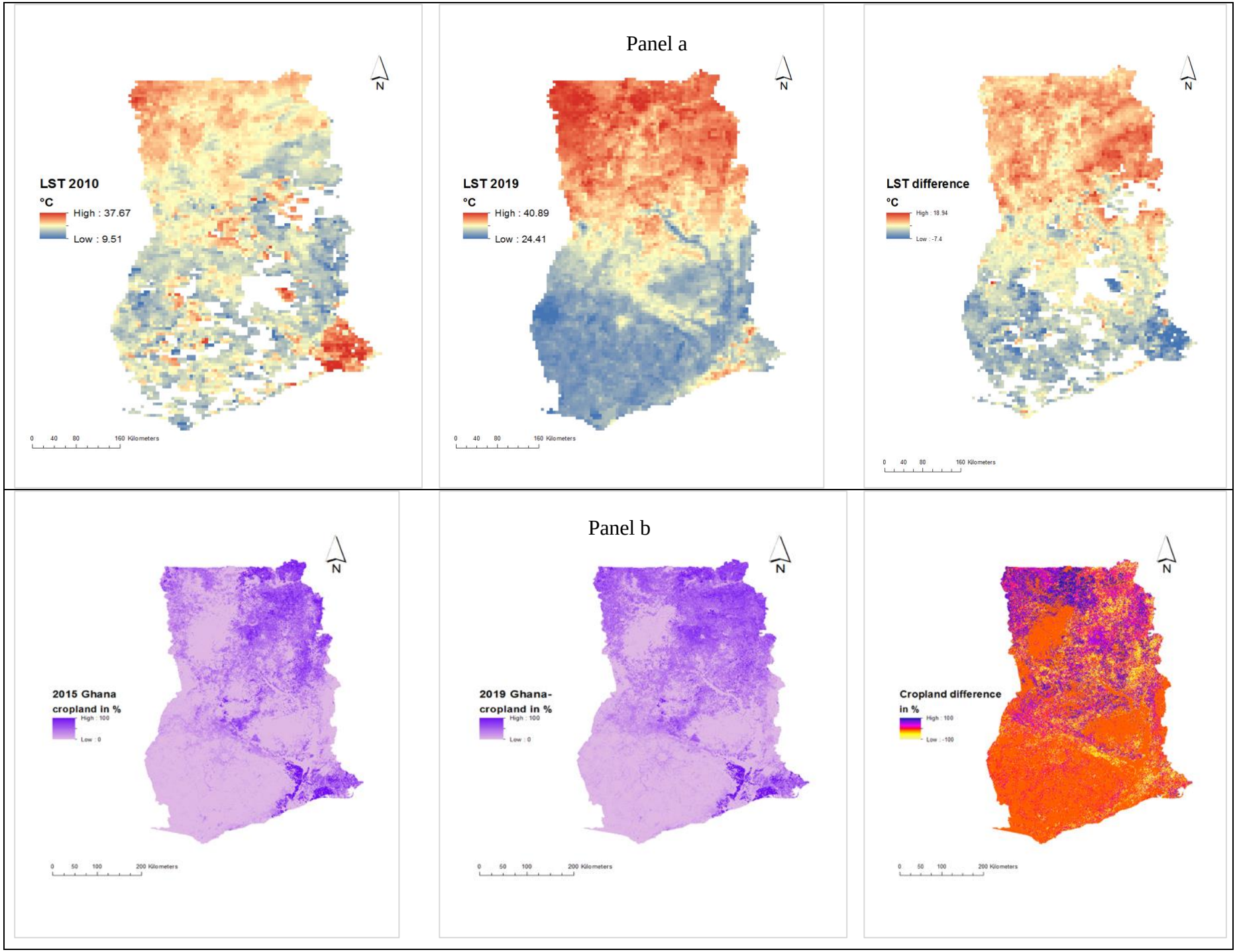
Ghana has a total land area of 239,540 km^2 of which 8,520 km^2 are covered by water bodies, primarily Lake Volta. The country has a tropical climate, warm and comparatively dry along the southeast coast, hot and humid in the southwest, and hot and dry in the north. As other parts of the globe, Ghana is also being affected by climate change. One example with direct impact on agriculture and food systems is rising soil temperature swings as displayed in Figure 1. The maps in Panel (a) present changes in the mean values of the daytime land surface temperature (LST) in 2010 and 2019 and their differences at pixel level. Clearly, in both periods, soil temperature in Ghana is highest in the north. LST differences have fluctuated considerably over time with variations ranging from -7.4 to 18.9. This brings the issue of variability of cropping temperature conditions which can lead to production, markets as well as food systems instability, pointing to the urgency of adaptation strategies to cope with temperature extremes and fluctuations.

Panel (b) shows major changes in cropland coverage between 2015 and 2019. The most obvious change is a sharp increase in land brought into cultivation in the northeast, east central, and northwest regions of Ghana. This seems to point out to extensification rather than intensification of agricultural production, with potentially significant environmental impacts, in these areas. Another important environmental and climate related development with implication for food system sustainability in Ghana is the sharp degradation of forest land, especially in the biomass rich southern part of the country. Ghana's protected forest reserves, for instance, have suffered average annual deforestation rates of 0.7%, 0.5%, 0.4%, and 0.6% for the periods 1990–2000, 2000–2005, 2005–2010 and 2010–2015, respectively (Acheampong et. al 2019). Total forest area in the country fell gradually from 885,000 sq. km in 2000 to 800,000 sq. km in 2020 (FAO, 2021).

4. Globalization and Trade

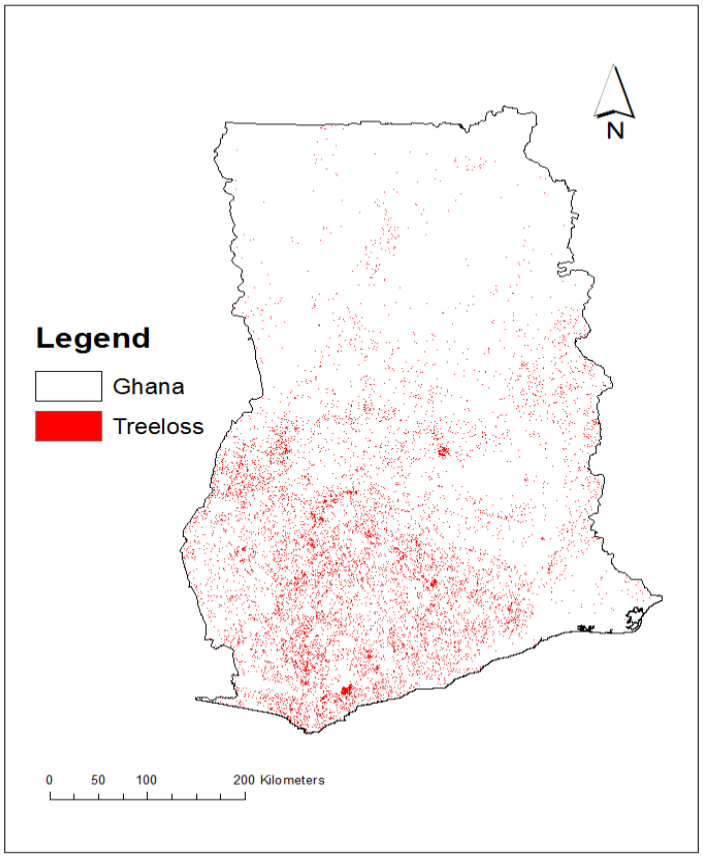
Agricultural trade is major driver of food systems as both imports and exports influence directly the level, composition and cost of domestic food supplies. More indirectly, trade affect overall economic performance and thus income growth and affordability of food. Ghana's exports are in general dominated by primary commodities while imports are concentrated on manufactured goods. In 2019, top exported products include gold (51.7 percent), crude oil (19.6 percent), cocoa seeds/beans (9.0 percent), cashew nuts (2.9 percent) (AATM2021 database). The role of agriculture in and its contribution to trade performance by Ghana has changed markedly over the last couple of decades. The share of the sector in Ghanaian exports has decreased considerably in recent years, moving from 66.7 percent in 2004 to 25.3 percent in 2018 (Figure 3). However, Ghana relies significantly more on agricultural exports than the average ECOWAS country and Africa as a whole with relative shares of 11.7 and 10.4 percent, respectively.

Figure 1: environmental indicators



Source of the data: Cropland: https://lcviewer.vito.be/2015 ; LST modis mod11C2: https://lpdaac.usgs.gov/products/mod11c2v006/

Figure 2: Environmental indicators – Tree Loss in Ghana



Source: https://earthenginepartners.appspot.com/science-2013-global-forest/download_v1.6.html

On the imports side, the share of agricultural products has been on an increasing trend before peaking at 18.9 in 2004, and then stabilizing around 15.6 percent between 2010 and 2018 (Figure 4). As a comparison, agriculture accounts for 14.4 percent of Africa's overall imports and 16.0 percent of imports by ECOWAS member states. According to figures from the AATM2021 database, top agricultural and food products imported by Ghana in 2019 include rice (2.3 percent), fish (1.4 percent) sugar beet or cane (0.9 percent) and wheat (0.9 percent). Ghana is dependent on imports for 35 percent of its consumption of cereals, in particular rice, a staple food.

Ghana's trade with other African countries between 2010 and 2018 amounts to about US $ 0.17 billion annually for exports, representing about 10.7 percent of total exports, and US $ 0.32 billion for imports, equivalent to 16.6 percent of total imports. Africa's market share in Ghana's trade flows increased significantly from 5.6 to 11.8 percent on the exports side and from 13.7 to 19.9 percent

Figure 3: Agricultural exports (% of total merchandise exports)

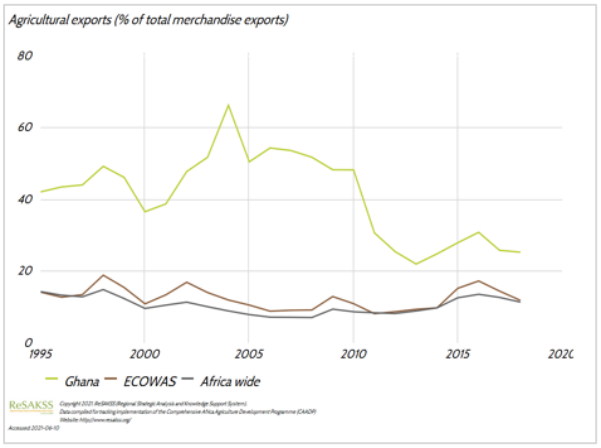


Figure 4: Agricultural imports (% of total merchandise imports

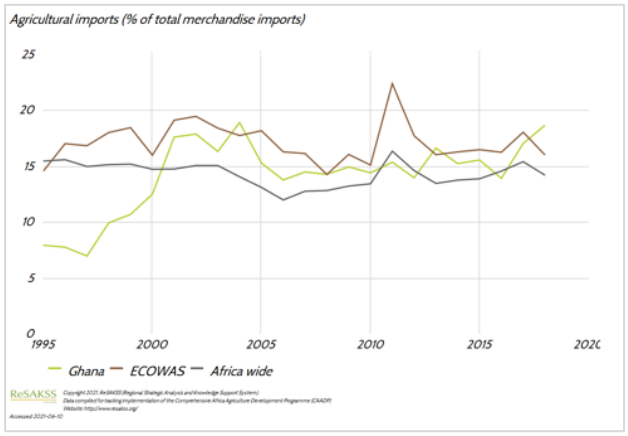
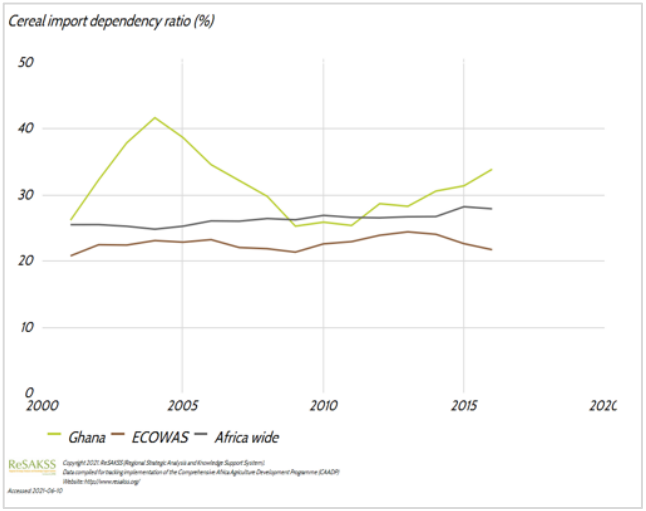


Figure 5: Cereal import dependency ratio (%)

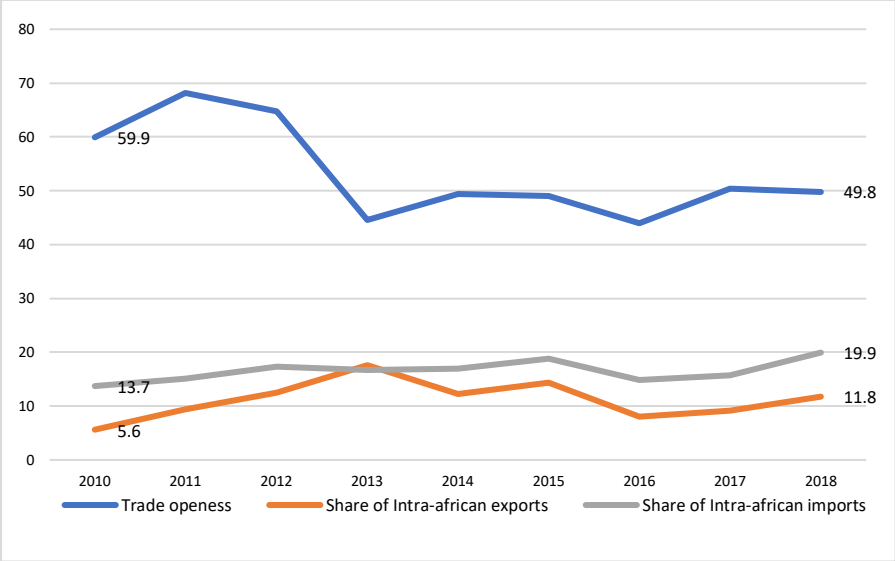


Source: ReSAKSS (2021)

for imports. However, the degree of trade openness, measured as the ratio of imports and exports to the country's GDP, decreased from 59.9 percent in 2010 to 49.8 percent in 2018, which points to a declining role of trade Ghana's economy. Given the importance of trade in the food systems and for growth in general, this development requires more urgent attention.

Regional trade and food markets play a particular important role in the level, stability and cost of food supplies. The patterns of trade and competitiveness in regional markets are therefore a major food system driver. Figure 7 reveals that Cote d'Ivoire and Nigeria are the only ECOWAS countries with export patterns similar to Ghana's and thus its most likely competitors in regional markets. The Export Similarity Index (ESI) is one of several measures used to assess the degree of specialization

Figure 6: Ghana agricultural trade flows within Africa- (2010-2019)

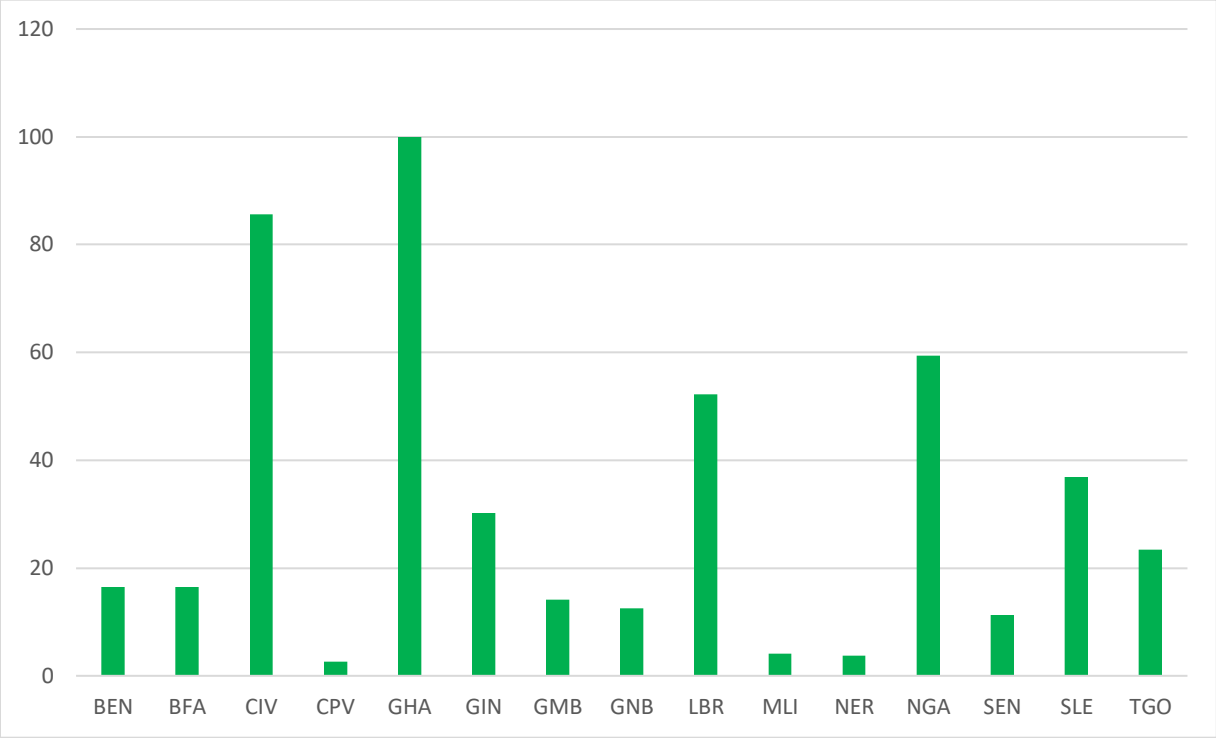


Source: ReSAKSS (2021), Authors' calculations.

among trading countries. Conventionally, indicator values of 60 or above are interpreted as indicative of highly similar patterns of specialization and thus limited room for mutual trade, as the considered countries tend to export the same commodities. The indicator values reported in Figure 7 are close to or exceed the threshold value of 60 only in the case of Côte d'Ivoire, Nigeria and, to a lesser extent, Liberia. Thus, these three countries have similar patterns of specialization in trade and thus limited scope for mutual trade expansion in agricultural and food commodities. In contrast, the much lower levels of export similarity with all remaining ECOWAS member states suggest untapped export expansion potential for Ghana in regional markets.

In addition to different patterns of specialization, the potential to expand trade with other countries in the region is determined by the strength of Ghana's competitiveness in regional markets. Table 3 shows the products for which Ghana has strong competitive advantage as measured by the Normalized Revealed Comparative Advantage (NRCA) indicator. The NRCA indicator, which varies from 0 (low) to 1 (high), shows that Ghana is most competitive in the following 5 agricultural commodities: cocoa beans, cashew nuts with shell, cocoa butter, sugar refined and cocoa paste. The tables also show other ECOWAS countries with high NRCA values for the same commodities and thus likely competitors of Ghana in regional and global markets.

Figure 7: Export Similarity Index in Ghana vs ECOWAS countries- (2016-2018)



Source: AATM 2020 database

Table 3. List of 5 products with highest Normalized RCA Ghana and corresponding NRCA values among other ECOWAS countries, 2011

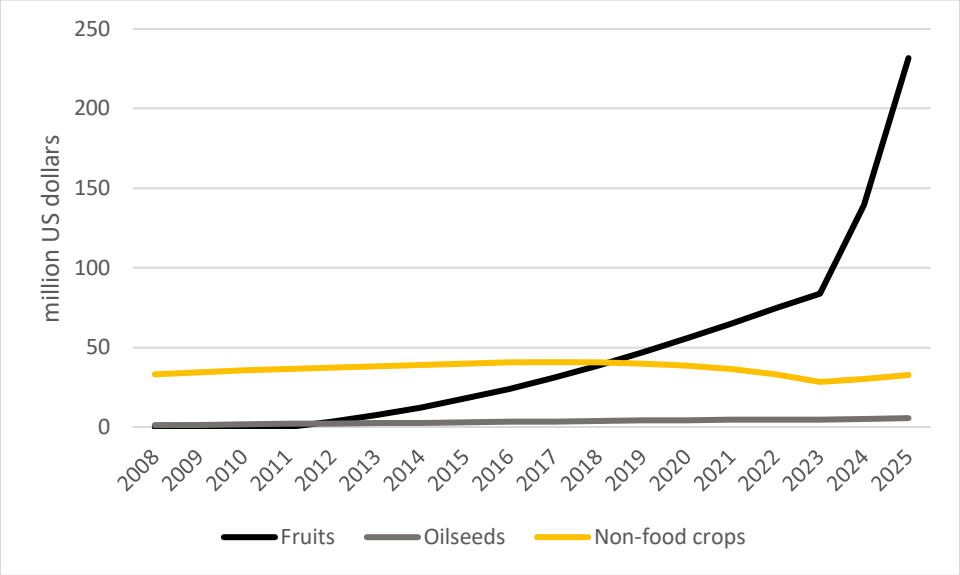
	Cashew nuts, with shell	Cocoa beans	Cocoa Butter	Cocoa Paste	Sugar Refined
Benin	0.999				0.928
Burkina Faso	0.995				
Côte d'Ivoire	0.994	0.996	0.978	0.994	
Gambia	0.994				0.943
Ghana	***0.991***	***0.994***	***0.971***	***0.765***	***0.816***
Guinea	0.994	0.966			
Guinea Bissau	1.000				0.917
Liberia		0.990			
Mali	0.867				
Niger					0.716
Nigeria	0.408	0.860	0.479	-0.627	
Sierra Leone		0.988			
Togo	0.880	0.885			0.246

Source: Authors' calculation based on FAOSTAT data

The outlook for intra-regional trade by Ghana in the agri-food sector represents another key driver of the country's food systems. Figures 8a and 8b, from an earlier simulations by AKADEMIYA2063 scientists, show trends in Intra-regional agricultural exports and imports by Ghana between 2008 and 2025, under a baseline scenario which assumes a continuation of historical trends observed during the first decade of the millennium. In other words, the baseline scenario assumes that, in Ghana as well as the rest of the region, trends with respect to income growth, demand patterns, agricultural sector performance, trading environment, etc will remain on the respective trajectories observed in the first decade of the millennium. Figure 8a shows the trends in net exports by Ghana with other ECOWAS countries, if nothing else changes. Fruits exports are projected to pick up rapidly, under this scenario, from initially relatively low levels to become the dominant exports from Ghana. The other two groups of products emerging as main agricultural exports to the region are oilseeds and non-food crops, such as cocoa, nuts and spices. The latter are shown to grow very slowly before trending downwards toward the end of the study period. Oilseeds exports, on the other hand, remain flat and at very modest levels during the entire period. Net imports shown in Figure 8b exhibit a more dynamic picture. Net imports of roots and tubers are projected to increase considerably from negligible levels a decade ago to nearly US$ 8.0 billion by 2025. Cereals and other crops are also expected to grow but less dramatically to around US$ 1.00 million and US$ 0.5 million, respectively.

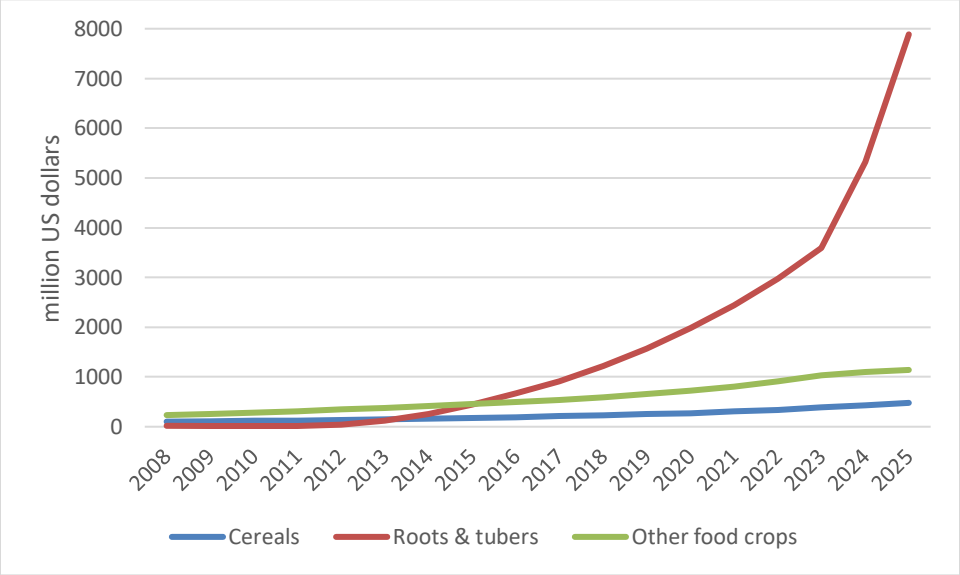
Looking forward, it should be possible for Ghana and other ECOWAS countries to boost both intra-regional exports and imports beyond the baseline levels presented Figures 8. Several policy options are available to do that. Here, we provide three policy scenarios for consideration. Scenario 1 would reduce overall trading cost across all ECOWAS countries by 10 percent; Scenario would eliminate all regulatory and administrative obstacles to cross-border trade; Scenario 3 would raise yields across all crops by 10 percent, also in all countries. Figures 9a and 9b shows how Intra-regional agricultural trade by Ghana would be affected under such policy scenarios. Figure 9a shows the cumulative change in net regional exports under each of the three scenarios. Removal of barriers to cross-border trade by all member states is shown to have the largest impact of agricultural exports by Ghana to neighboring countries. More so than a generalized reduction in cost of trading or an increase in productivity. The increase in regional exports by Ghana ranges between 20 and 35 percent under scenario 2, corresponding to additional cumulative export earnings of nearly US$ 300 million in the case of fruit exports. Investment to raise productivity and yields by 10 percent, as postulated under scenario 3, would still raise exports by 10 and 15 percent, respectively, for oilseeds and non-food crops. Across the board reduction in trading cost would have the least impact on Ghana's agricultural exports to regional markets. It is shown to have a modest negative impact on fruits exports and similarly modest increase in exports of oilseeds and non-food crops. It appears from the above results that Ghana's agricultural and food exports to its neighbors is driven more by what happens at the borders than the broader trading climate in countries.

Figure 8a: Ghana: net intraregional EXPORTS of fruits, oilseeds, and non-food crops under baseline, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases, Authors' calculations.

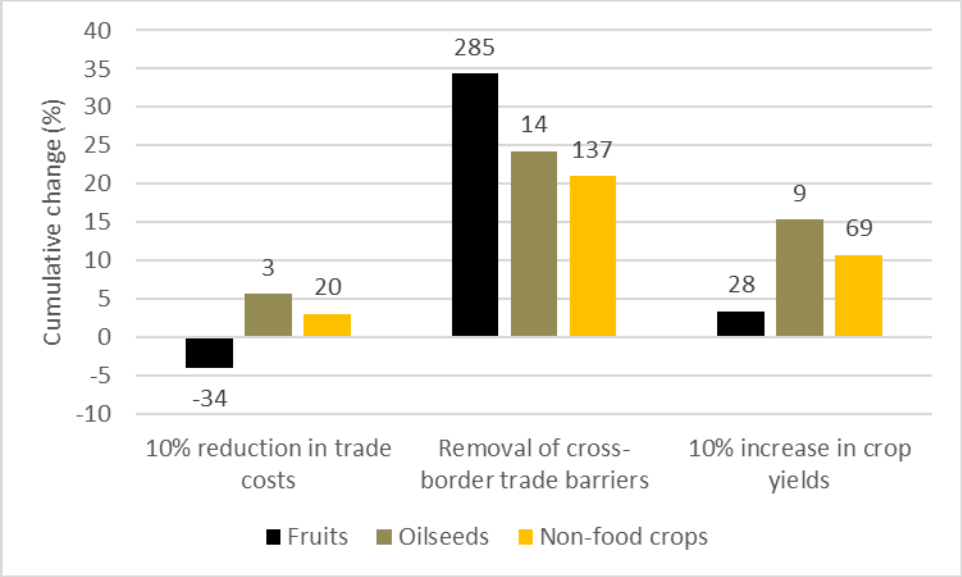
Figure 8b: Ghana: net intraregional IMPORTS of food crops under baseline, million US dollars



Source: EMM model simulation results based on FAOSTAT and WDI databases, Authors' calculations.

On the import side, Figure 9b indicates that cereals imports would increase the most in percentage terms, while also starting from the lowest level. Under scenario 2, assuming an elimination of all transborder trade barriers, net cereals imports would increase by 40 percent or a total incremental value of US$1.7 million. Net imports of roots and tubers would also grow by a similar amount but less in percentage term, given their already very high levels. Other food crops would increase by similar amounts under scenario 1 and 2 but at levels significantly lower than for cereals and roots and tubers. Here again, Figure 9b shows that barriers to cross border trade are the single most significant obstacle to expanding Intra-regional imports by Ghana. Under scenario 3, which assumes an increase in crop yields across the region, Ghana is projected to reduce imports in roots and tubers and to a lesser extent, imports of other food crops. Cereal's import would remain unchanged from baseline levels.

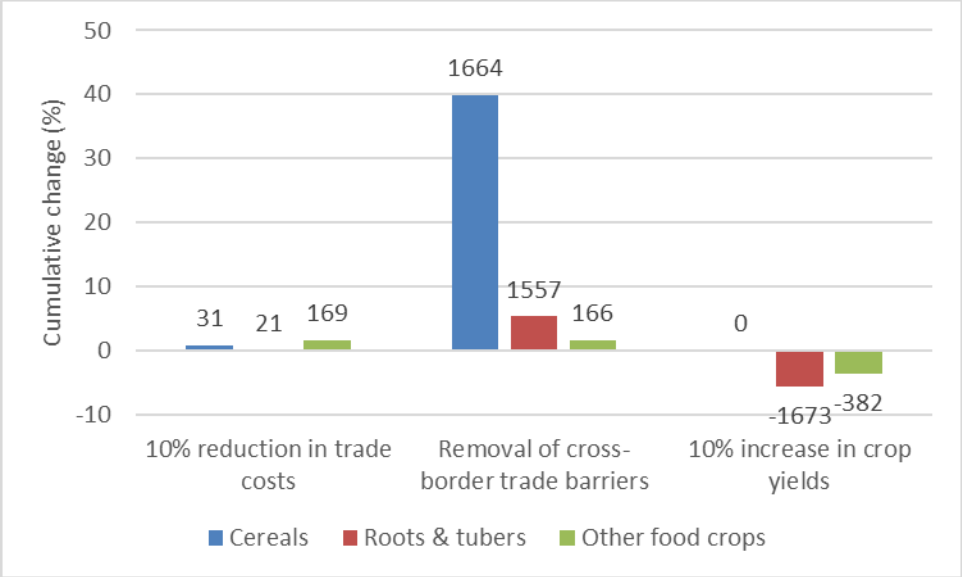
Figure 9a: Ghana: Cumulative change in net intraregional EXPORTS of fruits, oilseeds, and non-food crops under scenarios, 2008-2025 .



Source: EMM model simulation results based on FAOSTAT and WDI databases, Authors' calculations.

Note: Figures on top of bars indicate cumulative increases in net intraregional EXPORTS supply in million US dollars. Non-food crops include cotton, cocoa, coffee, spices, and nuts.

Figure 9b: Ghana: Cumulative change in net intraregional IMPORTS of food crops under scenarios, 2008-2025



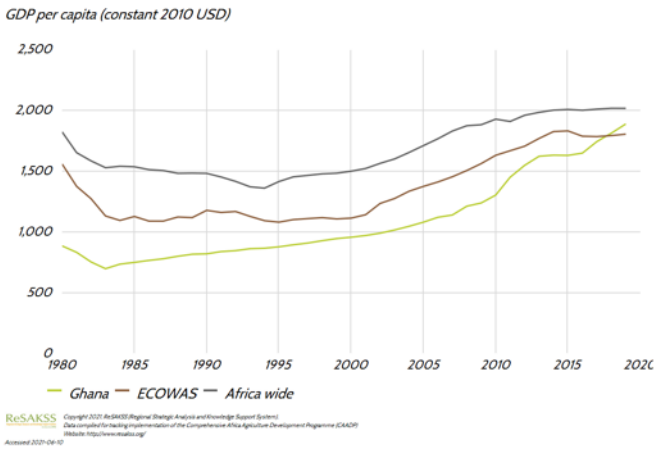
Source: EMM model simulation results based on FAOSTAT and WDI databases, Authors' calculations.
Note: Figures on top of bars indicate cumulative increases in net intraregional IMPORTS demand in million US dollars. Cereals include maize, rice, sorghum, and wheat; Roots and tubers include cassava, yam, sweet potato, and potato; Other food crops include soybeans, oil palm, sesame seed, pulses, vegetables, and fruits.

5. Income growth and distribution

Statistics on growth in real GDP in Ghana in 2019 show that real gross domestic product grew by around 6.5 percent compared to the previous year. The average growth rate between 2010 and 2019 is estimated at 6.7 percent, which is far above the average of the continent (3.0 percent) and ECOWAS region (3.9 percent). Similarly, GDP per capita, as shown in Figure 10, increased much more rapidly in Ghana (3.4 percent) compared to other ECOWAS (1.2 percent) and Africa countries (0.6 percent). As a result, Ghana has exceeded the average per capita GDP in ECOWAS and close to catching up with the African average. In contrast, income inequality, measured by the GINI index, has increased gradually in Ghana by 0.6 percent annually, while the distribution of income and wealth within EOCWAS and Africa has become slightly more equal, with annual rates of decline in the Gini index of -0.2 and -0.1 percent, respectively. Equity and inclusion will have to be a major factor in future food system strategies for the country.

Poverty in Ghana has fallen significantly over the last three decades. Sustained growth has enabled the country to lower the poverty rate by 85 percent between 1990 and 2019 (Figure 11). In 1990, the poverty rate at $1.90 poverty line was 49.8 percent in Ghana, the same as the African average, and 10 percentage points lower than the average for ECOWAS countries, estimated at 59.7 percent.

Figure 10: GDP per Capita (Constant 2010 USD)



Source: ReSAKSS (2021)

Table 3: Gini Index -Ghana 2010-2019

GINI Index	Average (2010-2019)	Annual avg. change (2010-2019)
Ghana	43.7	0.6
ECOWAS	41.4	-0.2
Africa	41.5	-0.1

The latest poverty level of 7.6 percent in 2019 is significantly lower than average poverty rates for Africa as a whole (34.4 percent) and for ECOWAS (43.2 percent). Table 5 shows changes in the poverty rate, this time based on the national poverty line of (GH¢1,314). The decline is less dramatic, from 32.9 in 2005/06 to 23.4 percent in 2016/2017, compared to changes based on the US$1.90 poverty line. What the table reveals, however, is that poverty in Ghana is predominantly a rural phenomenon, with an incidence of rural poverty (39.5 percent) that is nearly 5 times that of urban areas (7.8 percent). Not only have rural households accounted for over three quarters of all poor households throughout the period under consideration, poverty rates in rural areas have fallen less and, more concerning, have started to rise again.

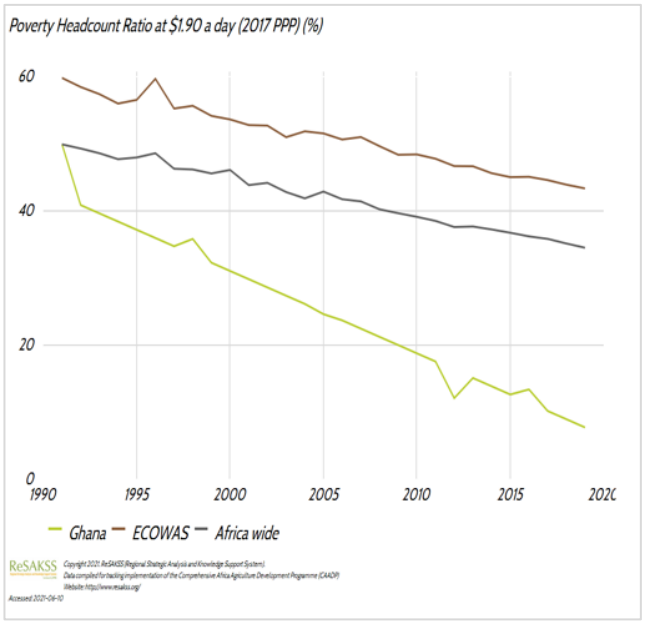
The poverty trends discussed above and shown in Figure 11 are averages that may hide significant disparities at local level. Figure 12, which presents a map of poverty across Ghana, shows a distinct pattern of geographic distribution, with rising rates from south to north, with highest values located in the northwest. Agri-food system strategies to deal with poverty and hunger, therefore, will have to be designed in a way to allow effective targeting for maximum impact. For that purpose, the next section provides a disaggregated assessment of agricultural sector productivity, growth performance, potential, and efficiency such as to facilitate prioritization and targeting of investments to boost agri-food system transformation in Ghana.

Table 4: Poverty incidence, 2005/06–2016/17 (%)

	2016/17		2012/13		2005/06	
	Poverty incidence (P_0)	Contribution to total poverty (C0)	Poverty incidence (P_0)	Contribution to total	Poverty incidence (P_0)	Contribution to total
Urban	7.8	16.8	10.6	22.0	12.4	14.7
Rural	39.5	83.2	37.9	78.0	43.7	85.3
Ghana	23.4	100.0	24.2	100.0	31.9	100.0

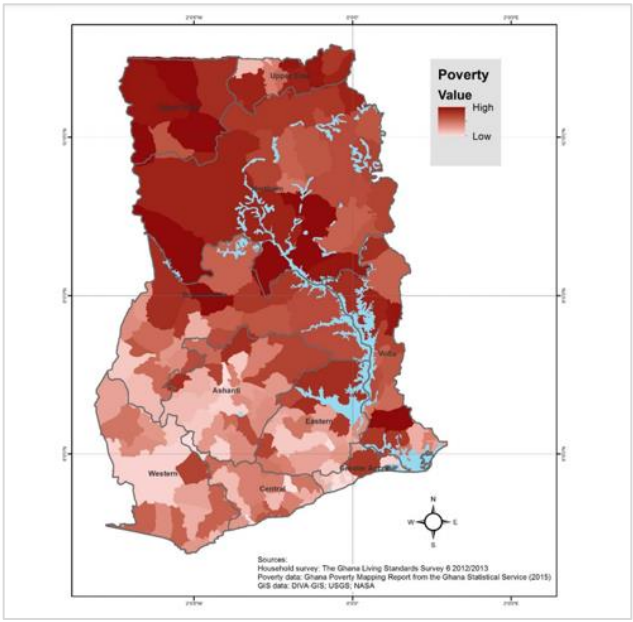
Source: Ghana Statistical Service (GSS) (2018)

Figure 11: Poverty Headcount Ratio at $1.90 a day (2017 PPP) (%)



Source: ReSAKSS (2021)

Figure 12: Mapping poverty levels in Ghana



Source : Maruyama et al. (2018)

6. Agricultural Sector Performance and Poverty Outcomes

The relative size of the agricultural sector, as measured by its contribution to overall economic output, has followed a steady downward trend since the 1980s. Just over the last decade, the relative share of the agricultural sector has declined from 28.0 percent in 2010 t to 17.3 percent of GDP in 2019 (Figure 13). The rate of growth of agricultural value-added has fluctuated during the same period, with values at the beginning of the period that are not significantly distinguishable from trends observed in ECOWAS and the rest of Africa. However, growth in Ghana seems to have picked up during the latter part of the decade to reach between 5 and 6 percent, considerably higher than the ECOWAS and African averages (Figure 14).

Figure 13: Agricultural value added (% GDP)

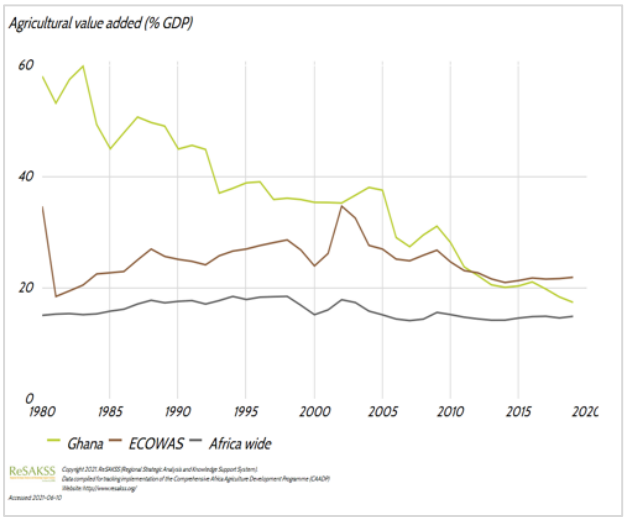
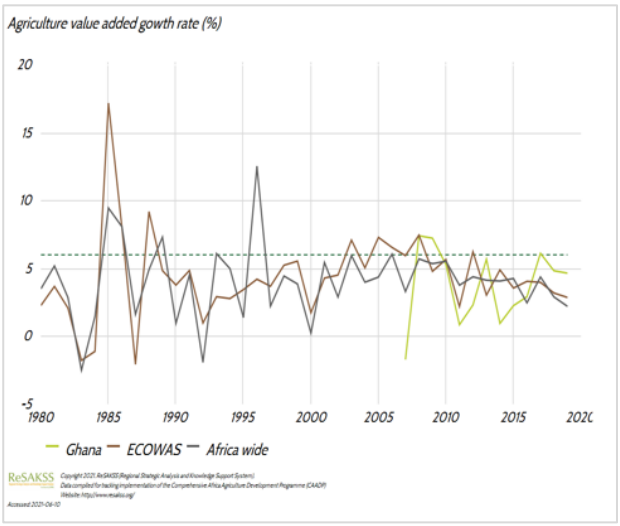


Figure 14: Agricultural value-added growth rate (%)



In terms of productivity, labor productivity measured by agricultural value added per worker improved by 7.9 percent annually between 2010 and 2019 in Ghana, compared with a growth of only 3.1 and 1.9 percent, respectively, in ECOWAS and the rest of Africa. However, average agricultural labor productivity is still higher in ECOWAS compared to Ghana. In contrast, land productivity measured by agricultural value added per hectare of arable land, estimated at US $ 592.2 in Ghana, is 9.6 percent higher compared to ECOWAS and almost twice (+83.0 percent) as high as the average for Africa.

Ghana uses more fertilizers, 13.7 kg per ha, than the average ECOWAS country (9 kg) but significantly less than the African average (21.4 kg). The rate of growth of fertilizer consumption is however 4 times lower, 1.7 percent, compared to the ECOWAS average of 7.7 percent, albeit double the African average of 1.0 percent. Successful food systems transformation in Ghana will require sustained boost in agricultural productivity to raise incomes and domestic food supplies. A better understanding of the potential to increase productivity provides critical guidance in designing broad based and thus more impactful food systems strategies. Equally important is evidence as to where and how best to achieve increases in productivity. This, in turn, requires a disaggregated analysis of drivers of the level and efficiency of use of available agricultural technologies. The resulting evidence

Table 5: Agricultural productivity in Ghana (Average 2010-2019)

	Average (2010-2019)			Annual avg. change (2010-2019)		
	Ghana	ECOWAS	Africa	Ghana	ECOWAS	Africa
Agriculture value added per worker (constant 2010 USS)	2475.6	2769.5	1606.3	7.9	3.1	1.9
Agriculture value added per hectare (constant 2010 USS)	592.2	539.5	323.5	1.6	2.5	3.7
Total fertilizer consumption (kilogram per hectare)	13.7	9.4	21.4	1.7	7.7	1.0

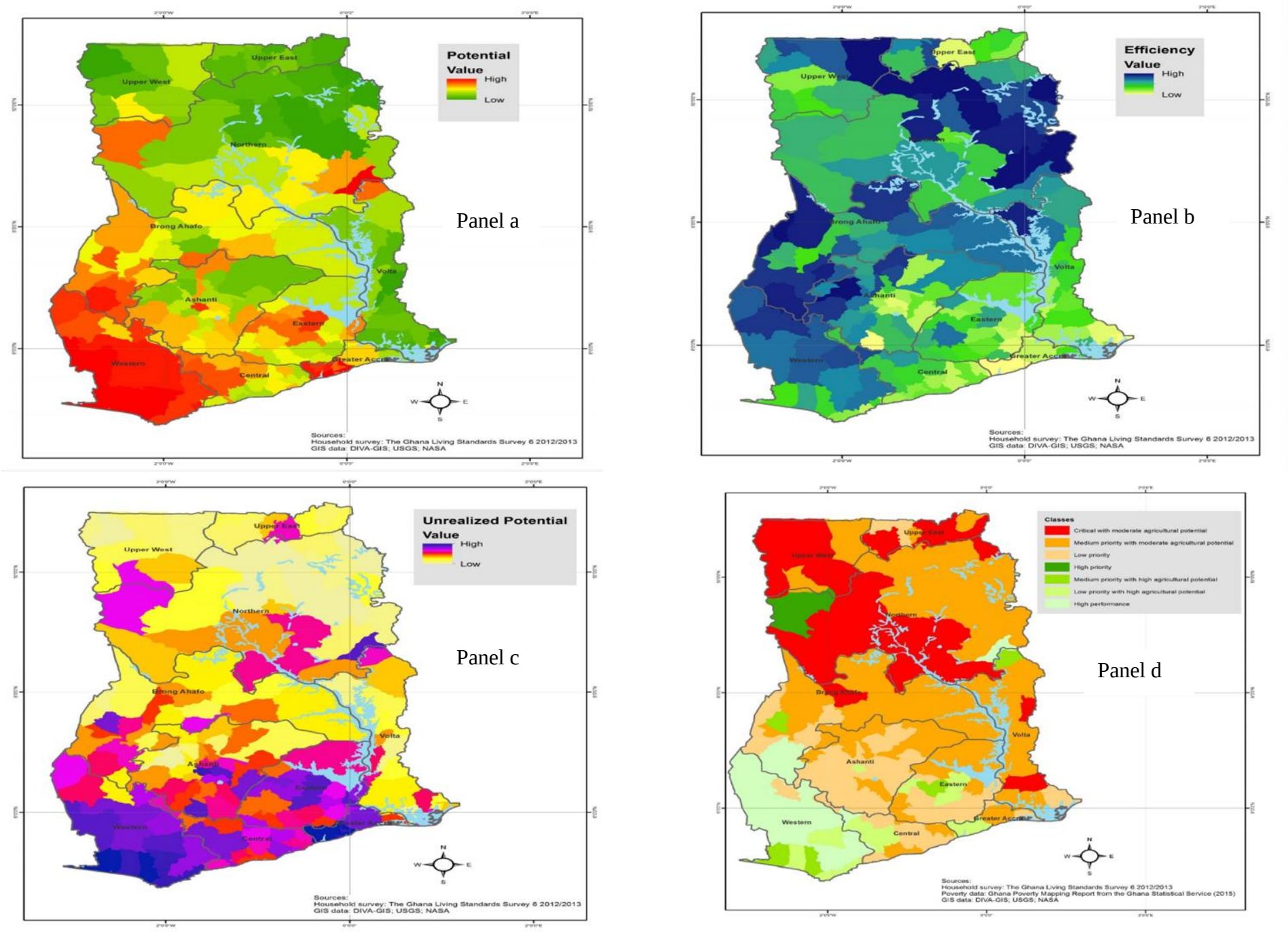
Source: World Bank (2021)- World Development Indicators.

would facilitate the design of effectively prioritized and targeted food system transformation strategies. For that reason, findings from a geographically differentiated analysis of agricultural potential and production efficiency at pixel level are presented in the following sections.

Panel (a) of Figure 15 displays a map of agricultural potential at pixel level across Ghana. The map shows the maximum level of attainable agricultural income in each geography or region based on adequate application of available technologies. The highest potential areas tend to be located in the southwestern regions while lower potential areas tend to be concentrated in the north. There are several reasons why the potential may not be realized, however. One major reason often is failure to access and efficiently use existing technologies. The map of agricultural efficiency presented in Panel (b) describes how much of the potential shown in Panel (a) is realized on the ground by farmers in a given region under current conditions. It reveals that high efficiency zones are concentrated in the northeast and southwest of the country. It is important to note that potential and efficiency are not necessarily related. Farmers in low potential areas can be very good at using available technologies efficiently so as to realize that potential to the maximum. Conversely, farmers in high potential areas may fail to either access or use the same technologies efficiently for a variety or reasons related to markets, infrastructure, institutional factors, skills, etc…. The map in Panel (c) indeed shows that the unrealized potential is higher in the central areas of the country where medium agricultural efficiency levels are combined with high production potential. Knowing where farmers have failed to realize the available production potential, to what extent and why, particularly among poor and vulnerable communities, offers a first and important entry point in designing interventions to boost food and agricultural sector productivity and improve community level livelihoods.

The map in Panel d combines the information on distribution of unrealized agricultural potential, patterns of production efficiency and community level prevalence of poverty to provide a typology of investment priorities to raise productivity, fight vulnerability and improve livelihoods. For instance, areas in red combine high levels of poverty (Figure 12), low to medium levels of unrealized agricultural potential and medium to high production efficiency. High vulnerability and threats to livelihoods resulting from higher levels of poverty make these top priority areas. On the other hand, high efficiency and limited unrealized potential means that agricultural productivity raising

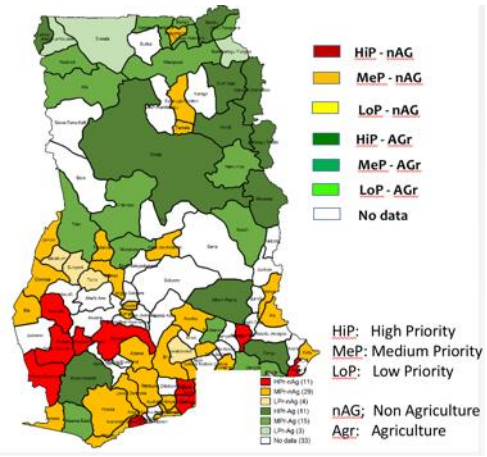
Figure 15: Agricultural potential, efficiency typology in Ghana



Source : Maruyama et al. (2018)

interventions will have limited effectiveness and would have to be complemented by alternative investments outside of agriculture and with social safety net programs. Other high priority areas are shown in darker green shades, characterized by medium to high poverty rates, high unrealized potential and low to medium efficiency. Investments that promote better access to and more efficient use of existing agricultural technologies to raise productivity would constitute the best options in these areas. Regions with lower poverty levels, low unrealized potential and low to medium efficiency, depicted in orange colors, rank lower in priority when it comes to agriculture based investments to fight poverty. How the different constellation of potential, efficiency and poverty can be used to prioritize and target investment is displayed in Panel e below. The map summarizes a menu of options across all areas showing where agriculture based interventions ought to be given priority vs where non-agriculture activities would provide the best way out of poverty. The analysis can be further refined in working out similar menus of options as to what categories of investments should be prioritized to target more effectively the most critical constraints (infrastructure, markets, policy and regulatory, institutional, skills) to boost productivity of the poor and vulnerable in a given community.

Figure 15: Panel e



7. Demographic shifts and Urbanization

In 2019, the population of Ghana was estimated at 30.42 million inhabitants, about 57 percent of it living in urban areas and 19 percent in urban agglomerations of more than 1 million (WDI, 2021). The population grew at 2.3 percent a year between 2010 and 2019, slightly below the average of the ECOWAS region (2.6 percent) and roughly similar to the African average of 2.4 percent. Ghana also has one of the highest rates of urbanization, with rate of growth of urban population more than four times that of rural population.

Ghana has a young population, as well, with about 37 percent of the population below the age of 15 in 2019 and 58.7 percent in the 15–65-year bracket. Only 3 percent of the population is older than 65. Moreover, population density increased over time from 109 to 131 people per square km of land area from 2010 to 2019. With an average density of 12, Ghana is more densely populated than the average ECOWAS country with 90 people per square km or Africa as a whole (97 people per square km).

Table 6: Demographic statistics in Ghana, average 2010-2019

Indicators	Ghana	ECOWAS	Africa
Labor force participation rate for ages 15-24, total (%)	42.19	43.27	44.72
Population ages 15-64 (% of total population)	58.69	54.11	55.05
Population growth (annual %)	2.30	2.64	2.36
Urban Population growth (annual %)	3.55	3.80	3.48
Rural Population growth (annual %)	0.86	1.67	1.39
Population density (people per sq. km of land area)	119.74	90.20	96.56

Source: World Bank (2021)- World Development Indicators.

8. Leadership and Governance

The quality of governance can have wide ranging effects on overall economic growth and food system performance as it affects the supply, demand, distribution, access and affordability of health diets. The quality of governance is assessed using the six dimensions defined as part of the World Governance Indicators (WGI) developed by the World Bank, which include: i) Voice and Accountability, ii) Political Stability and Absence of Violence, iii) Government Effectiveness, iv) Regulatory Quality, v) Rule of Law and vi) Control of Corruption (Table 7).

Table 7: Definition of the Six dimensions of Governance

Indicators	***Definition***
Voice and Accountability	*Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.*
Political Stability and Absence of Violence/Terrorism	*Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.*
Government Effectiveness	*Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.*
Regulatory Quality	*Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.*
Rule of Law	*Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.*
Control of Corruption	*Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.*

Source: World Bank (2021), World Governance Indicators
https://info.worldbank.org/governance/wgi/Home/Documents

Each of these indicators can have values ranging from approximately -2.5, signaling weak, to 2.5 denoting strong governance performance. Table 8 presents an overview of indicators describing the quality of governance in Ghana. The country has a higher score in all six dimensions compared either to other ECOWAS countries or to the African average. Three of the indicators are in positive territory while both ECOWAS Africa show negative values across the board.

9. Socio-cultural context

Ghana is a multi-ethnic country. Major ethnic groups in Ghana include: Akan (47.5%), Dagbani (17%), Ewe (14%), Ga-Adangbe (7%), Gurma (6%), Guan (4%), Gurunsi (2.5%), and Bissa (1%). Common languages in Ghana are: Asante 16%, Ewe 14%, Fante 11.6%, Boron (Brong) 4.9%, Dagomba 4.4%, Dangme 4.2%, Dagarte (Dagaba) 3.9%, Kokomba 3.5%, Akyem 3.2%, Ga 3.1%, and others at 31.2%[1]. Food consumption behavior include a wide range of foods which are mainly based on different types of stews and soups and include many different types of seafoods. Vegetables, poultry, meat, or fish are some major ingredients of Ghanaian soups. Fish is the most dominant and important part of Ghanaian cuisine. The top ten food items in terms of quantity and food caloric supply are presented in Tables 9 and 10 below.

Table 8: Governance Indicators in Ghana, Average 2010-2019

	Ghana	ECOWAS	AFRICA
Voice and Accountability	0.52	-0.26	-0.63
Political Stability and Absence of Violence	0.03	-0.58	-0.64
Government Effectiveness	-0.14	-0.80	-0.80
Regulatory Quality	-0.02	-0.58	-0.74
Rule of Law	0.06	-0.64	-0.71
Control of Corruption	-0.12	-0.58	-0.66

Source: World Bank (2021), World Governance Indicators
https://info.worldbank.org/governance/wgi/Home/Documents

[1] https://worldpopulationreview.com/countries/ghana-population

Table 9: Food Supply in Ghana (kcal/capita/day)

	Food item	Food supply (kcal/capita/day)	Share (%)
1	Cassava and products	749	24.7
2	Yams	423	14.0
3	Plantains	355	11.7
4	Rice and products	284	9.4
5	Maize and products	194	6.4
6	Wheat and products	152	5.0
7	Sugar	97	3.2
8	Groundnuts	79	2.6
9	Roots, Other	77	2.5
10	Sorghum and products	57	1.9
	Others	562	18.6
	Total	3029	100.0

Source: FAO (2021)

Table 10: Food Supply quantity in Ghana (kg/capita/year)

	Food item	Food supply quantity (kg/capita/yr)	Share (%)
1	Cassava and products	252	28.6
2	Yams	155	17.5
3	Plantains	146	16.5
4	Rice and products	38	4.3
5	Roots, Other	33	3.7
6	Oranges, Mandarines	23	2.6
7	Maize and products	22	2.5
8	Pineapples and products	21	2.4
9	Wheat and products	20	2.3
10	Pelagic Fish	17	2.0
	Others	155	17.6
	Total	882	100.0

Source: FAO (2021)

A host of factors are at play that determine the ultimate dietary status of individual communities. Ground level evidence on how the most important among them, when taken together, interact and create vulnerabilities that threaten community livelihoods provides useful guidance in fine-tuning food system policy interventions such as to ensure that they respond effectively to the prevailing

socio-economic environment. Vulnerability is in this case is defined as the likelihood of exposure to negative food security effects and other livelihood threats resulting from various types of shocks, as experienced currently under the COVID-19 pandemic. Vulnerability can affect the conditions for access to and utilization of food and therefore constitute a major external drivers of food systems. A good understanding of the nature and patterns of vulnerability is therefore a major step in the construction of resilient food systems. Similar to the presence of co-morbidities which undermines the capacity of individuals to absorb the negative effects of shocks and thus predisposes them to more serious consequences, communities can be more vulnerable to shocks than others due to the constellation of factors that erode their absorption capacities. We use a series of livelihood indicators to build a composite vulnerability index which can be used to map out the patterns of vulnerability across communities. They include indicators related to poverty, malnutrition, chronic illness, access to health infrastructure and services as well as population density. For each of these indicators, we assess and rank individual communities against the average of all communities across four categories: “much less”, “less”, “more” and “much more” vulnerable. We then construct a composite indicator by combining all individual indicators which allows a more substantive and systemic approach to measuring and tracking of vulnerability and its underlying drivers across communities.

The composite index makes it possible to classify communities by degree of vulnerability while that of individual indicators provides insight as to the underlying determinants. For instance, the poverty indicator, for which food expenditure is used as a proxy, shows that poverty contributes more to overall vulnerability in the upper east, upper west and northern regions of Ghana (Figure 16). Chronic diseases, such as high blood pressure, represents a greater contributor to vulnerability among communities in the Volta, eastern and Greater Accra regions than in the upper west and central regions(Figure 17). In turn, access to health services plays a larger role in community vulnerability in the northern areas and to a lesser extent in the upper west, Volta and eastern regions (Figure 18). Finally, Figure 19 reveals that malnutrition as measured by the prevalence of Stunting is a more critical factor in shaping vulnerability in the northern, eastern as well as Ashanti regions.

The value of the composite indicator of vulnerability, presented in Figure 20, suggests that overall vulnerability is highest around northern and eastern areas. Communities in these regions are considerable more exposed to serious consequences from the current Covid and possible future shocks, due both to limited resources as well as absence of adequate services to deal with the possible effects.

Figure 16: Food expenditure per capita in ppp

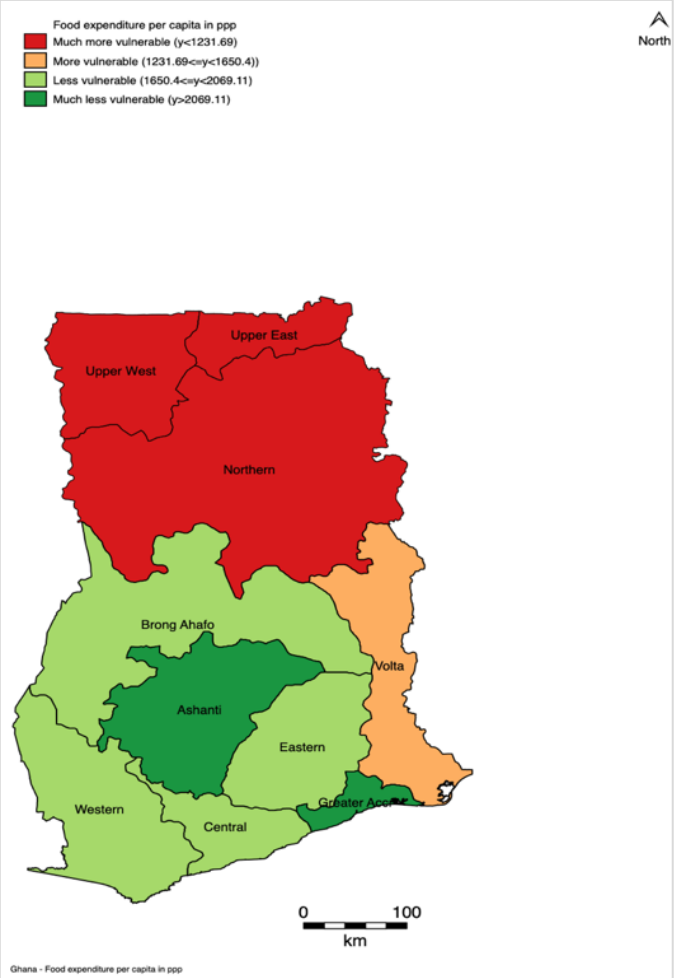
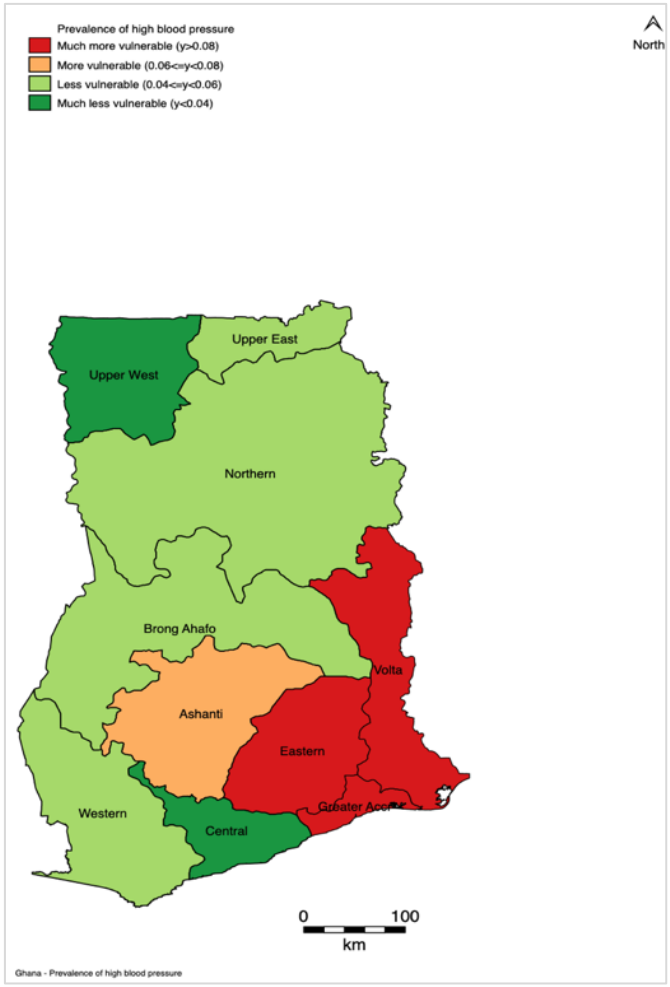


Figure 17:Prevalence of high blood pressure



Source: GLSS7 (2016/17), DHS (2014

10. Finance and access to capital

Financial inclusion measured by the access to financial services has significantly increased in Ghana between 2010 and 2017, according to a recent study conducted by the World Bank in 2019. The Global Findex Database[2] shows that the share of rural population with access to formal financial accounts reached 51 percent in 2017, twice as high as the 26 percent share in 2011. The GLSS round 7 survey in 2016/2019 estimates similar shares with 51.9 percent in urban areas and 26.7 percent in rural areas.

[2] Findex. 2017. The Global Findex Database. WorldBank: https://globalfindex.worldbank.org/.

Figure 18: Proportion of women 15-49 years receiving assistance from doctor, nurse etc.

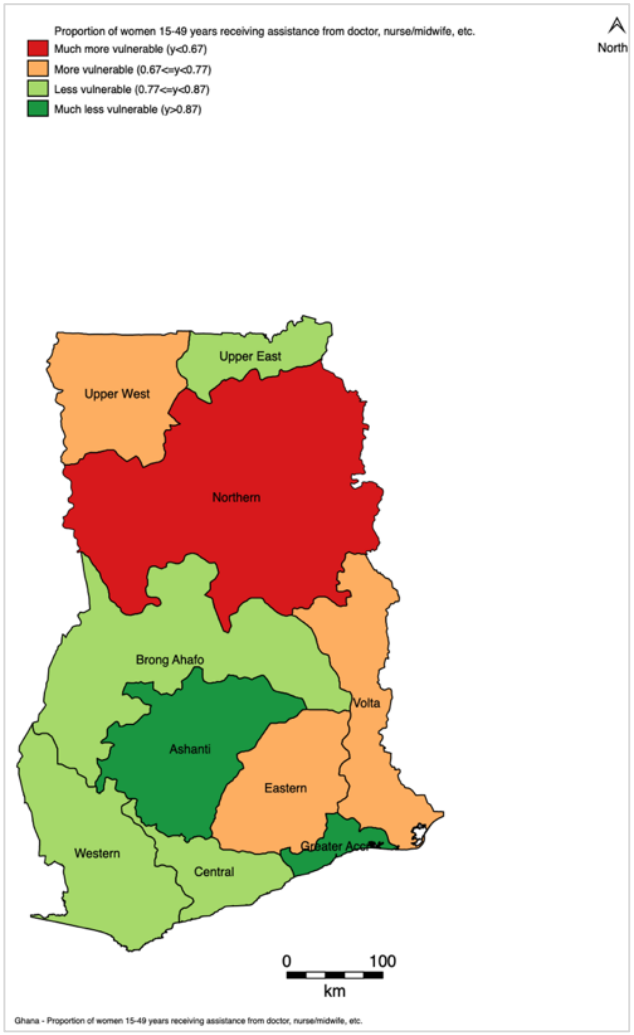


Figure 19: Stunting (Prevalence in children under 5)

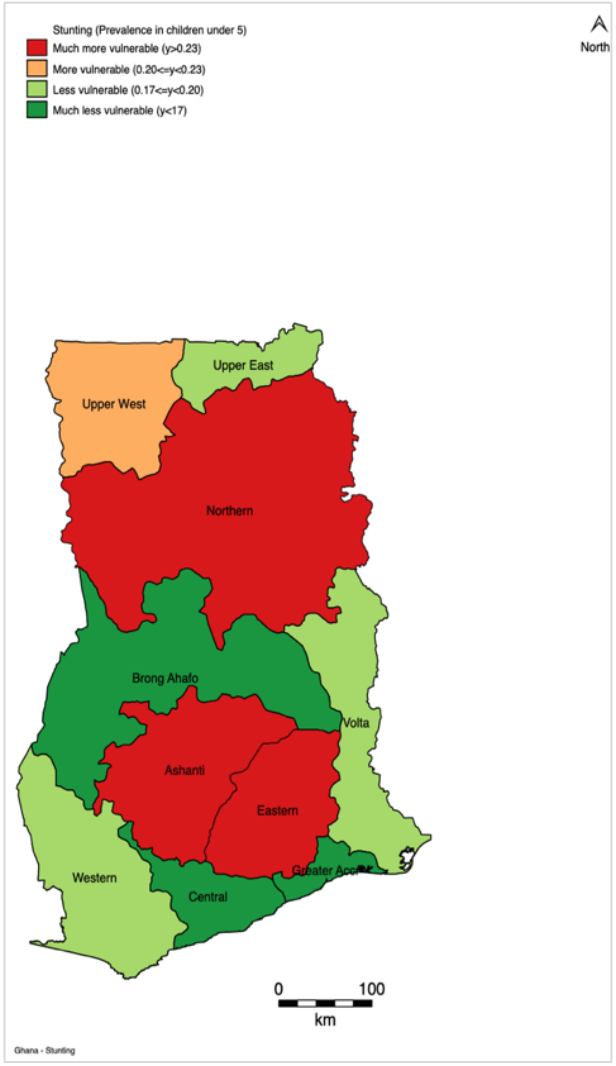
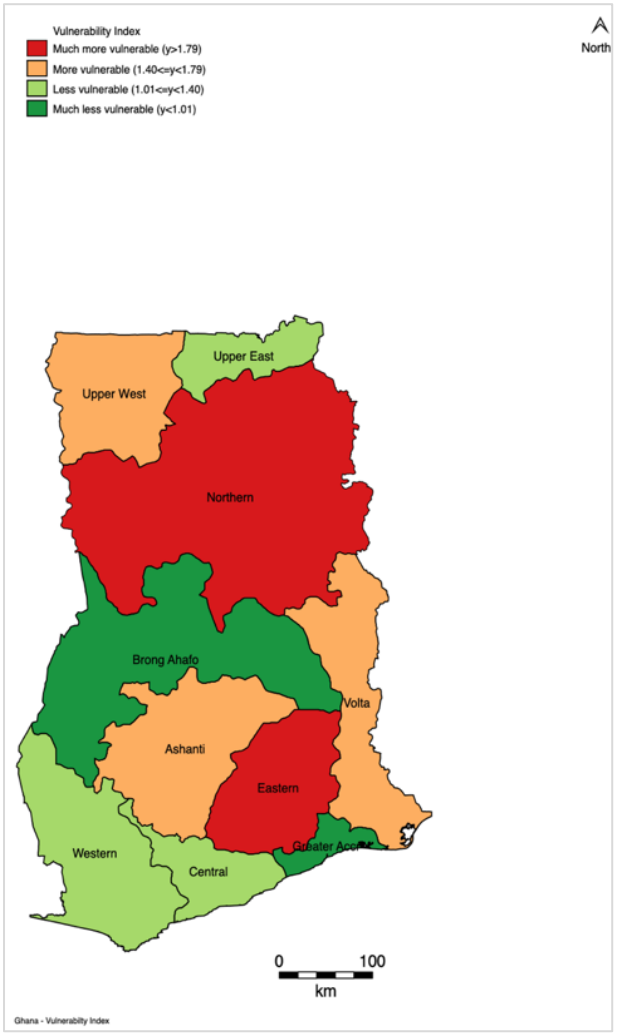


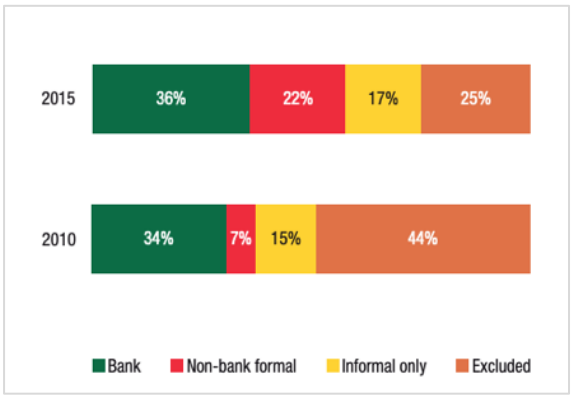
Figure 20: Composite vulnerability index - Geographic distribution of community vulnerability



Source: GLSS7 (2016/17), DHS (2014)

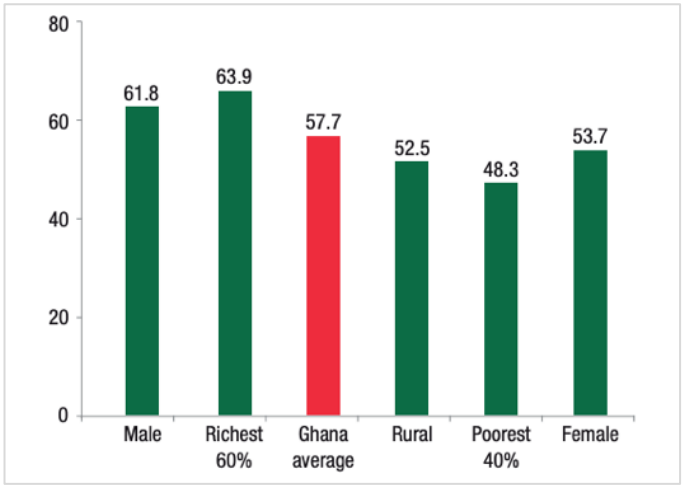
Figure 21 shows that access to formal financial services in average has risen by 17 percentage points between 2010 and 2015, from 41 to 58 percent. This is explained partially by the surge in digital financial services and payment like mobile money services and other electronic payments brought to market by non-bank financial institutions. In addition, poor households (poorest 40 percent) had significantly lower access to formal financial services than the 60 percent richest households, with respective rates of 48 percent vs 64 percent (Figure 22).

Figure 21: Access to all types of financial services (in %), 2010 and 2015



Source: Compiled by World Bank (2019) based on CGAP (2015)

Figure 22: Access ownership across population group (in %)



Source: Compiled by World Bank (2019) based on Findex on 2017.

Disaggregated data on the type of financial institutions and services used by households by region and locality (urban vs rural) shows very similar patterns (GSS, 2019). Households have accounts mainly in commercial banks (43.4 percent), followed by mobile money (30.4percent) before community and rural banks (15.2 percent). However, some disparities can be observed across the the different regions. Access to commercial banks is highest in Greater Accra (70.0 percent) and lowest in Upper East (17.4 percent). Use of mobile money accounts is highest in the Central region with 60.0 percent and lowest in the Western region with 13.7 percent. The proportion of accounts held in community and rural banks is lower than that of commercial banks across all regions. Similarly, Susu schemes are predominately used in Upper East (26.3 percent) and least in the Ashanti region (7.1 percent). Finally, the proportion of accounts held with savings and loans schemes is about the same in Greater Accra and Eastern regions (9.7percent).

In 2017, women were less included financially than men, with an access rate of 55 percent compared to 64 percent for men. Moreover, access to financial services is shown to be essential to increasing smallholder agricultural productivity. According to the indicator under the thematic area of the 2019 Biennial Review report that is related to investment finance in agriculture, men (15 years and older)

Table 11: Access to financial institutions by Ghana

	Financial Institution							
	Commer-cial Bank	Investment/ mortgage	Community/ Rural Bank	Savings and loans Scheme	Cooperative/ Credit Union	Susu Scheme	Mobile Money	Other
Region								
Western	37.1	4.2	27.9	18.6	4.4	9.5	13.7	0.0
Central	33.5	4.5	13.5	10.7	4.1	13.7	60.0	0.1
Greater Accra	70.0	4.3	2.1	9.7	1.5	9.2	19.7	0.0
Volta	34.2	1.4	6.9	5.5	3.8	12.2	55.0	0.2
Eastern	29.2	7.3	27.2	9.7	0.8	8.2	33.4	0.0
Ashanti	37.3	1.8	22.3	18.2	2.1	7.1	31.7	0.1
Brong Ahafo	38.7	1.9	21.1	14.9	9.5	11.1	19.0	0.0
Northern	32.5	11.8	7.5	5.0	2.1	30.1	24.1	0.0
Upper East	17.4	5.7	12.2	6.4	2.3	18.6	51.2	0.3
Upper West	35.9	7.1	13.8	8.6	6.0	26.3	14.9	0.1
Urban	**51.9**	**5.1**	**12.2**	**12.9**	**2.8**	**9.0**	**27.3**	**0.0**
Accra	73.1	4.4	0.5	8.2	0.8	10.4	11.9	0.0
Urban Coastal	59.1	4.4	5.9	11.7	2.6	10.8	32.9	0.0
Urban Forest	41.9	4.5	19.9	16.3	3.1	6.9	27.4	0.0
Urban Savannah	41.2	12.0	15.7	7.1	5.0	10.6	28.9	0.1
Rural	**26.7**	**2.1**	**21.2**	**11.1**	**3.3**	**14.3**	**36.6**	**0.1**
Rural Coastal	36.0	1.5	10.7	12.2	2.1	15.3	39.3	0.1
Rural Forest	26.5	2.2	27.8	11.7	3.4	8.8	35.9	0.1
Rural Savannah	19.1	2.4	14.4	8.7	4.3	27.0	35.9	0.2
Total	43.4	4.1	15.2	12.3	3.0	10.8	30.4	0.0

Source: GSS (2019)- Ghana Living Standard Survey Round 7 Report.

Table 12: Access to credit in Ghana- 2018

	Ghana	ECOWAS	Africa
Access finance in agriculture - men (%)	26	72	41
Access finance in agriculture - women (%)	8	37	24
Access finance in agriculture All (%)	20	54	33

Source: ReSAKSS (2020) - Biennial review Data

were found to be more likely to use financial services in agriculture (26 percent) than women (8 percent). These shares are similar to what is observed among ECOWAS countries and for Africa on average but are much higher than the shares in Ghana.

11. Energy

The share of the total Ghanaian population with access to electricity rose from a 64.2 percent in 2010 to 83.5 percent in 2019, a jump of nearly 20 percentage points. Over the same period, the share of rural population with access to electricity increased by 14.6 percentage points from 55.4 to 70.0 percent. Changes for urban areas are smaller, with an increase from 72.8 percent in 2010 to 93.8 percent in 2019. In addition, Ghana has about 4,399 MW of installed generation capacity, although actual availability rarely exceeds 2,400 MW, due to changing hydrological conditions, inadequate fuel supplies and poorly maintained infrastructure (USAID, 2020). The total installed capacity is made up of 35.9 percent hydro-electric energy, 63.6 percent thermal and 0.5 percent of renewable energy.

The Regulatory Indicator for Sustainable Energy (RISE), used to assess the level of commitment to sustainable energy through 4 indicators related to access to electricity, access to clean cooking energy, use of renewable energy and energy efficiency, shows that that Ghana made considerable progress in policy and regulatory support. Overall, the country's global score increased by 37 points in 2019 compared to 2010, higher than the change in the average score for Africa (+28 points) and for ECOWAS (+30 points).

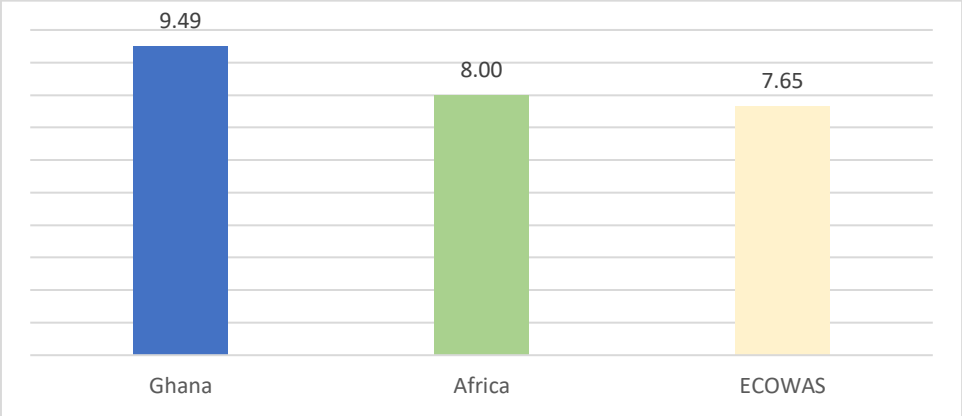
Table 13: Regulatory Indicator for Sustainable Energy (RISE) in Ghana

	Ghana		AFRICA		ECOWAS	
	2010	2019	2010	2019	2010	2019
Regulatory Indicator for Sustainable Energy (RISE)	23	60	16	44	11	41
Access to electricity	40	64	56	28	54	39
Access to clean cooking	7	62	3	31	3	33
Renewable energy	19	76	11	45	7	41
Energy efficiency	27	38	9	31	6	28

Source: World Bank (2021)

As highlighted in the Malabo Montpellier panel report on energy, the logarithm of the difference of number of the areas (pixels) of nighttime lights between 1992 and 2013 can be used as a proxy of electricity expansion indicator to assess countries' progress in energy access and use. Ghana has a higher average score than the ECOWAS region (Figure 20). It is classified in the cluster with high RISE score, higher electricity expansion and high agricultural value added per worker with Algeria,

Figure20: Expansion of electrification, log of area (1992-2013)



Source: Malabo Montpellier Panel (2019)

Burkina Faso, Egypt, Ethiopia, Ghana, Morocco, Niger, Senegal, Tanzania, Tunisia, Zambia, South Africa (Malabo Montpellier Panel, 2019).

1. Science Technology and Innovation

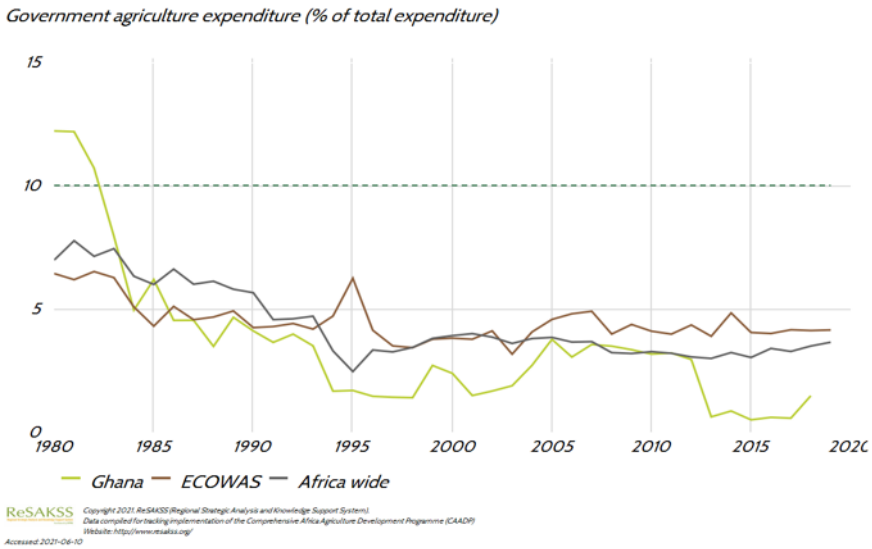
At the 2003 African Union summit in Maputo, Mozambique, African heads of states committed to allocate at least 10% of the total government expenditure to boost productivity and growth in agriculture. Not only has Ghana failed to meet that commitment, its agricultural expenditure share has declined considerably since 2010 and now amounts to less than half of the shares for ECOWAS and Africa as a whole (Figure21). The share of agriculture in public expenditure in Ghana has declined continuously from 3.7 percent in 2010 to a meager 0.6 percent in 2017. More recently, the expenditure share rise to 1.47 percent.

Agricultural Research and Development (R&D) is a crucial determinant of agricultural productivity and production and therefore food prices and poverty (Bado and Bationo 2018; Howitt and Miskelly 2017). The African Union (AU) set a target for government spending on agricultural R&D of at least 1 percent of agricultural gross domestic product as part of the continental agriculture-led development agenda. Even if country didn't met the target, Ghana significantly improved its investment in research with an increase in the agricultural R&D expenditure share rising from less than. 8 percent in 2010 to more than 0.9 percent in 2016.

Given the central role of government in the development of science and technology and innovation systems, particularly in developing African countries, the failure to boost public sector investment in the sector is certain to constitute a major constraint to food system transform. The urgent need

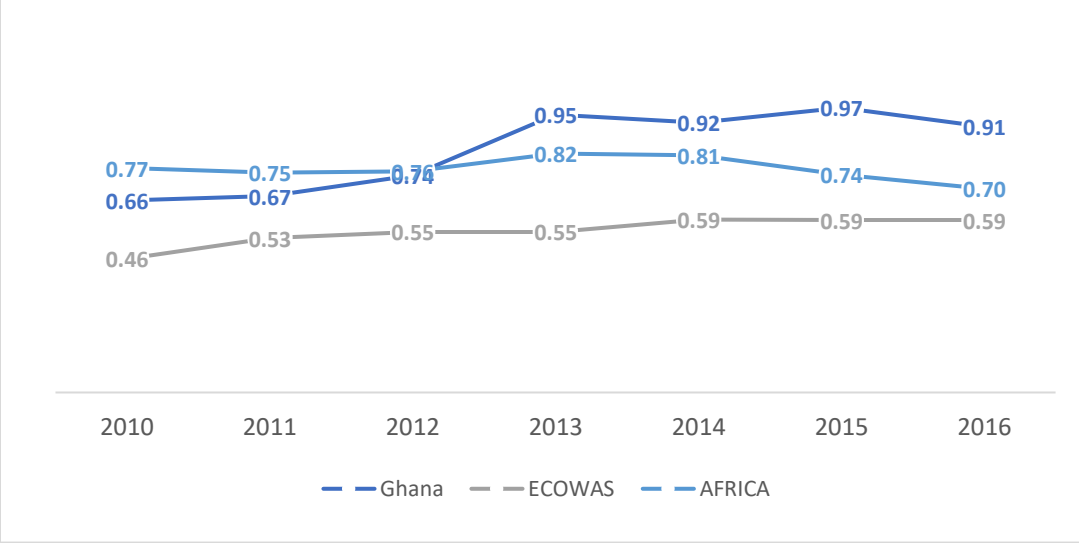
to raise investment and research and development and innovation systems is clear from the very low levels of spending shown in Figure 22. Although it does better than ECOWAS and the African average, Ghana spends less than 1 percent of agricultural GDP in agriculture R&D and innovation systems. In order to sustainably transform domestic food systems, Ghana and other African countries will have to significantly scale up investment in technology and institutional innovations to effectively address the many constraints to sustainable intensification of production systems and deal with various emerging threat to healthy diets across all segments.

Figure21: Government agriculture expenditure (% of total expenditure)



Source: ReSAKSS (2021)

Figure 22. Agriculture Research and Development Spending as share of AgGDP (%)



Source: ASTI database and IFPRI.

Note: AgGDP= Agricultural Gross Domestic Product,

2. Conclusion:

This brief assesses the status of high level drivers of the domestic food systems in Ghana. Overall, Ghana has been able to improve its performance and is general on track to achieving key Malabo targets by 2025. Furthermore, Ghana done better than the ECOWAS region in many areas, yet the country faces threats to sustainable transformation of its food system. First, there are noticeable shifts crop land, forest cover and soil temperature that constitute potential threat to sustainability of food systems. The patterns of global and regional trade, production potential, efficiency, poverty, vulnerability and inequity across communities reveal opportunities but also significant challenges that require adequate policy and investment responses to boost productivity and improve livelihoods and diets. Ghana appear to have hitherto considerably underinvested in agriculture science and institutional innovation. These trends will have to be reversed to put the country on the path to sustainable food systems and healthy diet for all.

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