

GHANA FOOD SYSTEMS SYNTHESIS PAPER

From Dialogues to Action:

Ghana's food systems actors identify principal food systems challenges and opportunities for transformation

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Executive summary

Background

With over 600 million people estimated to be hungry globally (SOFI, 2020), nearly 2 billion estimated to be overweight or obese, and approximately 2 billion experiencing micronutrient deficiencies (REF), the world is undoubtedly suffering from a multiple burden of malnutrition. Recent analysis indicate that the world is not on track to achieve the Global Nutrition Targets as set by the World Health Assembly¹, let alone eradicate malnutrition in all its forms – as envisioned in Agenda 2030 (REF). The 2020 SOFI estimates that almost 690 million people went hungry in 2019 - up by 10 million from 2018, and by nearly 60 million in the last five years (REF). Climate change, is also affecting food production and consumption patterns, leading to undernutrition and overall development. Thus, there is urgent need to review our food systems, to ensure food and nutrition security and to promote sustainable development. The food security and nutrition status of most vulnerable population groups is likely to deteriorate further due to the health and socio-economic impacts of the COVID-19 pandemic (REF).

In sub-Saharan Africa, food and nutrition security situation is dire and predicts serious consequences for public health and sustainable development. By 2030, NCDs are predicted to become the leading cause of death in Africa (GBD Obesity Collaborators, 2017). The rate at which these are increasing in sub-Saharan Africa (SSA) is alarming. An analysis spanning 1975-2016 showed that six of 60 nations in the world with the fastest-rising rates of adult obesity are in Africa (NCD Risk Factor Collaboration, 2016). Currently experiencing a surge in obesity and other diet-related NCDs while undernutrition and micronutrient deficiencies persist, Africa faces a new challenge of the coexistence of a double burden of malnutrition.

In Ghana for instance, one in every three women of childbearing age is anemic which begins the vicious cycle of undernutrition in children, jeopardizing the achievement of the Zero Hunger Goal by 2030. Like other countries in the sub-region, Ghana is grappling with multiple burdens of malnutrition. While food insecurity, and undernutrition (e.g. stunting, micronutrient deficiencies) persist, obesity and diet-related non-communicable diseases are rising rapidly. . General nutrition situation and identification of the highest priority nutrition problems The 2014 Ghana Demographic and Health Survey (DHS) (REF) showed that among children 6-59 months of age living in Ghana, 19% were stunted, 5% were wasted, and 11% were underweight. In 2018, the Multiple Indicator Cluster Survey (MICS) (REF) showed nearly similar rates of stunting (18%), wasting (7%) and underweight (13%), suggesting that stunting prevalence improved only marginally during the last 5-6 years, whereas child wasting and underweight worsened during the period. Other significant problems of undernutrition in Ghana include a high prevalence anemia in children 6-59 months (55%), adolescent girls (48%) and women of reproductive

age (42%). It is likely that deficiencies of other micronutrient such as folate, and the B vitamins are widely prevalent (ref27). Among school children (10 – 12 years of age), between 11% and 21% are overweight or obese (REFWHO, Ganle). Among WRA, 25% are overweight and at least 15% are obese (REFDHS).

HPNSs currently faced in Ghana, namely: Stunting and wasting in children < 5 years of age; Anemia in children 6-59 months of age, adolescent girls, and women of reproductive age; Overweight and obesity in school-age children and younger adolescents; and Overweight and obesity in women of reproductive age (15-49 y of age). The Demographic and Health Surveys conducted since the late 1980s, show a significant increase in adult obesity – from 10% in 1993 to in 40% in 2015 [REF]. Currently, the Ghanaian food environments (particularly in the urban areas) is characterised by low-cost highly-processed foods, with nutrient-dense foods such fruits and vegetables lacking in meals because it is increasingly expensive (REF).

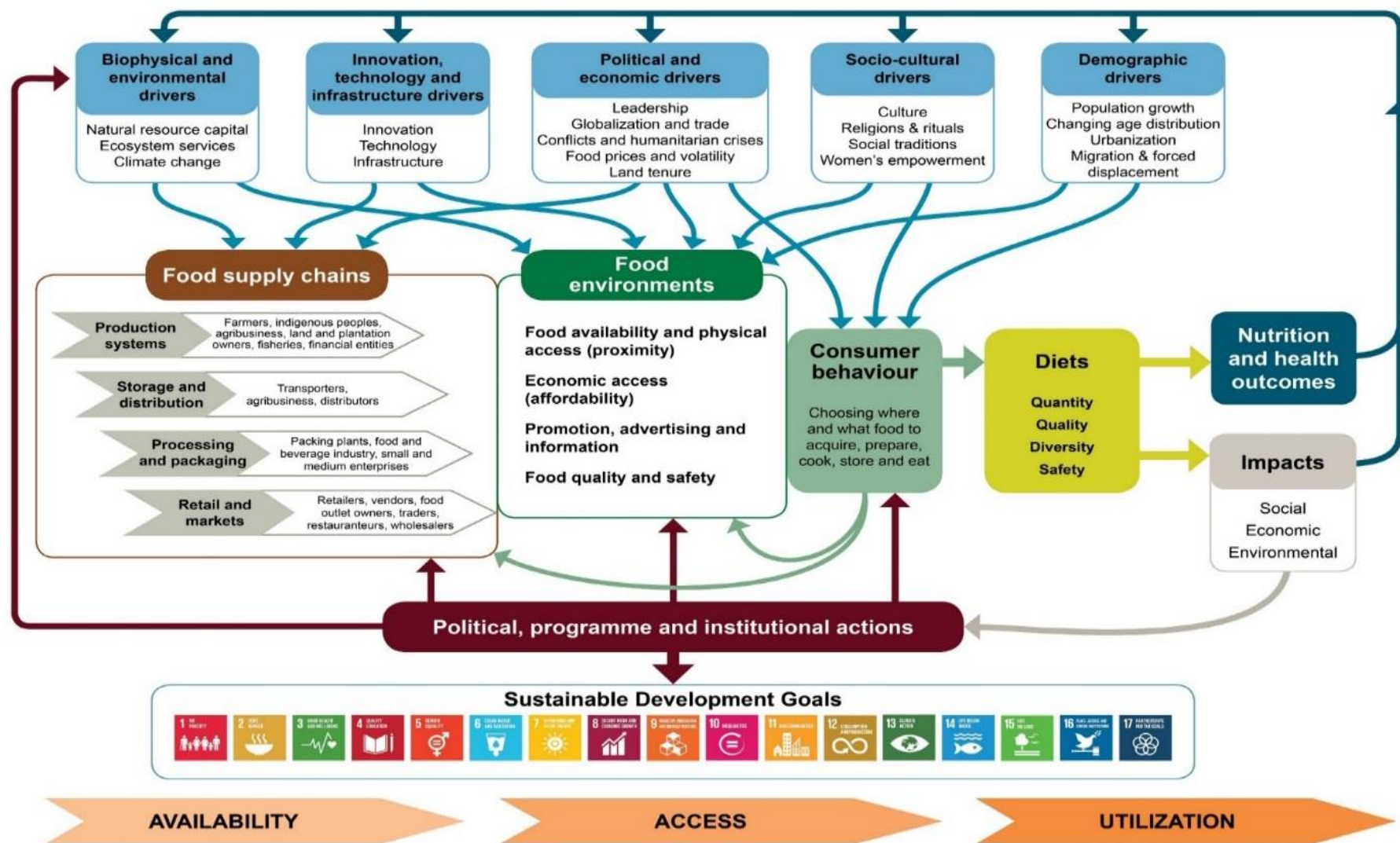
This high and rising burden of malnutrition in all its forms (including micro- and macro-nutrient deficiencies, obesity, and diet related non-communicable diseases) requires deployment of multipronged actions to address these challenges and therefore the sustainable development goals (SDGs). Due to the multidisciplinary and cross-sectoral nature of malnutrition, multiple food systems actors, stakeholders, and sectors will need to be meaningfully and sufficiently involved. For instance, good nutrition results from a healthy diet as well as proper hygiene and healthcare. Access to a healthy diet depends on decent employment, education, and transportation and connections to a thriving, resilient, sustainable food system (REF). Proper hygiene and healthcare rely on income, education, and transport, along with provision of quality health services, safe water, and adequate sanitation. Thus, efforts to address these drivers of malnutrition would require a food systems approach. The food system has been conceptualized to encompass the entire range of activities involved in the production, processing, marketing, consumption and disposal of goods that originate from agriculture, forestry or fisheries, including the inputs needed and the outputs generated at each of these steps (REF). Food systems also involve the people and institutions that initiate or inhibit change in the system as well as the sociopolitical, economic, and technological environment in which these activities take place [REF]. These subsystems and drivers of the food systems influence the food environments in which people make their dietary choices:

- Agricultural production subsystems: affect food availability and relative prices via investment agendas, for example by prioritizing a small number of staple cereals over legumes, indigenous grains, and other crops.

- Food storage and transport subsystems: encourage or restrict domestic availability of affordable, nutrient-dense foods through export and import policies or influence toxin and pathogen-borne contamination through food safety regulations.
- Food transformation subsystems: increase availability of nutritious foods through fortification and limited processing (e.g. canning), or may reduce the nutrient content of foods through heavy processing (e.g. addition sugars, salt, saturated fatty acids).
- Food retail subsystems: increase or reduce availability of highly processed foods relative to whole, nutrient dense foods through food promotion [REFS]

Across these sub-systems, the food environments mitigate the impact of these subsystems on individual diet choice and diet quality via a variety of factors, including food labelling, food promotion, food prices, physical access and nutrient quality and taste (REF). The High-Level Panel of Experts on Food Security and Nutrition (HLPE) 2017 elaborates on these components as well as drivers of the food system as in Figure 1 below.

Figure 1. The Food systems: drivers, sub-systems and their impacts on consumer behaviour, diets, nutrition and health



Source: UN High Level Panel of Experts Report on Food Systems and Nutrition 2017

As shown above (Figure 1), the food system is composed of multiple sub-systems (e.g. farming system, waste management system, input supply system, etc.) which interacts with other key systems (e.g. energy system, trade system, health system, etc.), and gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes. Given their interrelatedness, a structural change in the food system might originate from a change in another system.

Cognizant of the above, many calls exist for partnership and collaboratively delivered solutions. In this light, in September 2021, United Nations (UN) Secretary-General António Guterres will convene a Food Systems Summit (FSS) as part of the Decade of Action to achieve the SDGs by 2030. The Summit will launch bold new actions to deliver progress on all 17 SDGs, each of which relies to some degree on healthier, more sustainable and equitable food systems. The UN Food Systems Summit offers a singular opportunity for Ghana to accelerate its food system transformation journey to achieve sustainable healthy diets for all Ghanaians. This historic event has catalysed our clarity on the need and timeliness for such a transformation involving all sectors and stakeholders. To this end, a series of consultative processes have been conducted to understand the state of Ghana's food system. Government commissioned dialogues (one at the national level, and four sub-national food system dialogues) were conducted in the spirit of the FSS principles of engagement. Several Independent Dialogues and the Food Systems Transformative Integrated Policy (FS-TIP) diagnostic and landscaping analysis – analyzed Ghana's food system based using existing frameworks. .

1.1 Objectives of the paper

This paper is a synthesis of insights from the food systems dialogues convened by the government of Ghana as part of the United Nations Food Systems Summit. The paper includes the outcome of independent (non-government) dialogues of food systems, as well as a compressive landscaping and diagnostic analysis implemented by the FS-TIP. Publicizing these important insights will afford Ghana's food systems stakeholders the opportunity to become aware of, and to elevate the public discourse on food systems. The paper seeks to inform policy and action on how to reform, and transform Ghana's food systems. In this regard, the paper examines the identified challenges, and opportunities for reform and transformation of Ghana's food systems, as well as tradeoffs associated with systems transformation.

2.0 Approaches deployed in generating the paper

This paper draws from several food systems dialogues organized by the government of Ghana (n = 5), independent dialogues organized in Ghana (n = 30; 9 with feedback reports included), and the FS-TIP landscape and diagnostic analysis. The organization of the food systems principally adhered to the Principles of Engagement and Dialogues organization as outlined in Member States and Independent Dialogues Conveners' Manuals [REFs]. Both the government-led and independent dialogues were guided by dialogue-specific concept notes - detailing the relevance of the dialogue, objectives, approaches, and expected outcomes. To ensure multi-stakeholder inclusivity, dialogues curators and facilitators – reflecting diverse food systems expertise (e.g. from academia, government, private independent experts, media and civil society organizations) – provided their unique inputs. The lead curators of the National Dialogues received training organized by UN Food Systems Summit Secretariat for Dialogue Conveners, Curators, and Facilitators.

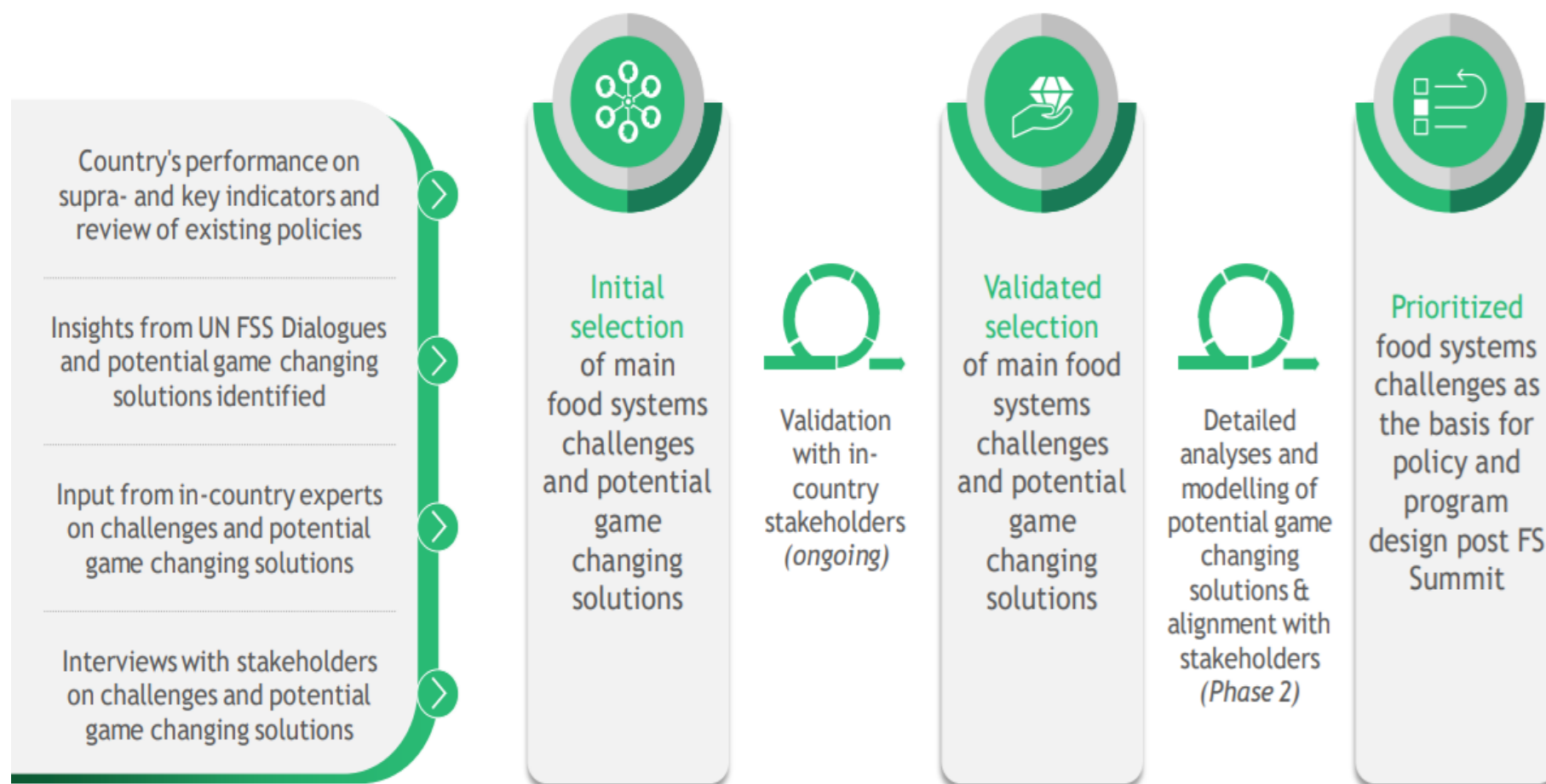
A highly visible launch of the Dialogues Chaired by the First Lady of the Republic of Ghana, with participation from all food systems actors (e.g. government officials, academia, private sectors, food system actors and civil society organizations) preceded implementation of the dialogues. Rigorous publicity about the dialogues using various media platforms was done. The independent dialogues referred to above, were organized using the same principles, and approaches and responded to the Dialogue Tracks 1-5

- Action track 1: Ensuring access to safe and nutritious food for all
 - Action track 2: Shifting to sustainable consumption patterns
 - Action track 3: Boosting nature-positive production at scale
 - Action track 4: Advancing equitable livelihoods
 - Action track 5: Building resilience to vulnerabilities, shocks and stresses
- Ghana introduced an extra track.
- Action track 6: Integrating nutrition into primary healthcare delivery systems

The FS-TIP landscape and diagnostic analyses diagnosed, synthesized and coalesced relevant insights from the dialogues, and from key food systems actors. The entire process was informed by extensive research (secondary analysis of existing evidence) and an iterative process with food systems stakeholders and experts. It included a cross-section of Ghana's food system actors (e.g. Ministry of Health, the National Development Planning Commission, the Ministry of Food and Agriculture, World Food Programme, Ghana's Environmental Protection Agency). The evidence from previously conducted research on Ghana's key food systems elements (e.g. food environment, food supply) was completed by current research (on stakeholder and policy landscape), and on relevant food system

elements – adopting the 5-part framework on food systems – based on the HLPE framework. With inputs from local and international food systems experts, the FS-TIP constructed 22 supra-indicators – across the 5 UN Food Systems Summit action tracks and 50+ key indicators. The emerging insights from the FS-TIP Diagnostic analysis and the national, and sub-national dialogues were subjected to a review and validation (see summary in Figure 2). Additionally, findings and recommendations from a project aimed at facilitating strengthening the integration of nutrition within primary health care delivery systems in Ghana (relevant to Dialogue Action Track 6) have been incorporated into this synthesis paper: The project conducted a situational analysis to identify the highest priority nutritional problems (HPNPs) in Ghana; describe the trends and variations of the NPNPs and their immediate, underlying, and basic determinants; establish the policy and enabling environment for the scale-up of interventions for addressing the HPNPs, and to identify the gaps/bottlenecks in the policy and institutional environment for nutrition action.

Figure 2 Pictorial summary of Ghana FS-TIP process



Source: Ghana FS-TIP Diagnostic Analysis, 2021

3.0 Food systems challenges identified by Ghana's food systems actors

The complementary processes (the food systems dialogues, and the FS-TIP diagnostic analysis/landscaping exercise) as well as validation with in-country stakeholders led to a synthesis of priority challenges and potential game changing solutions (a synopsis is presented in Figure 3). The process also generated a path from diagnosis to action - potential governance, coordination and delivery mechanisms to accelerate Ghana's food systems transformation.

Challenges related to food production:

- Most government- and donor-sponsored programmes and projects do not promote the production of nutritious local/traditional foodstuffs (e.g. kontomire), .
- Illegal mining (galamsey) and is affecting the quantity, quality, and safety of food produced, while improper use of agrochemicals in farming, processing, and retail makes food unsafe.
- Food retailers do not adhere to safe practices resulting in microbial contamination, and foodborne diseases
- Post-harvest level challenges include food loss, fragmented food chain, poor transport, poor road linkages from farm to market.
- A lack of spatial planning in the city: a lack of spatial planning means that there are no areas specifically designated for urban agriculture.
- Poor legal framework on land scheme: lands do not belong to the state. It is the responsibility of the government to acquire these areas from traditional authorities and acquire land fully that can be utilised for planned for activities on the city masterplan.
- Limited access to productive resources: Women smallholder farmers have limited access to land, capital, labor, etc resources. .
- Climate-smart agriculture has been leading the way. However, we should not treat farmers as a homogenous group. Different categories of farmers have different needs which must be studied/addressed
- A lack of storage facilities. Storage facilities such as sheds for livestock are needed to protect livestock from impacts of weather changes
- Land encroachment: there is restriction in agricultural production in the city region as land tenure systems belong to scheme lands. This limits access to land for food system related activities.
- There is an increase of waste to landfills increases GHG emissions in the atmosphere which negatively impact on climate, promoting droughts or heavy rainfalls leading to floods.
- Low capacity of local farmers to produce healthy and sustainable food.

- Constraints to accessing finance and loan credit for the production of healthy and sustainable foods.
- Difficulty of some professionals whose work relate to land to mainstream the land tenure agenda in their work.
- Much attention is given to cocoa which is a major cash crop in the Ashanti region and main source of income to farmers, hence low production of food crops causing food insecurity.
- Local fishermen use a lot of chemicals in the fishing activities and this, coupled with other factors have caused a decline in the fish stock.
- Over dependency on rain fed agriculture
- Lack of access to gender-sensitive equipment especially to women for small scale processing of food
- Lack of stability in terms of pricing.
- Sand winning and urbanization with no compensation for the farmers and lack of proper restoration of land properties after winning the sand Lack of support for farming and fishing
- High cost of production

- There is a good system of generating policies but not implementing them.

Challenges related to healthy and sustainable food consumption:

- Absence of food-based dietary guidelines and few standards for nutritional requirements for different age groups
- Little to no effort to valorize nutritious local, indigenous, traditional foods.
- Vulnerable local (small-scale) farmers are not protected from the inflow of foreign goods that infiltrate the market.
- Poverty is pervasive and dictates access to food.
- Influx of imported foods that are cheap but unhealthy
- Food fraud (which includes adulteration, substitution, dilution, tampering, counterfeiting, and misrepresentation of the ingredients of food or composition of food).
- Food waste and loss – significant post-harvest losses
- There are cultural and social misperceptions of what constitutes healthy foods e.g. people who consume meat are seen as rich people.
- Low nutrition literacy of the populace.

- Unhealthy packaging practices: everything is going into plastics instead of the leaves, earthen ware bowl and calabashes
- Poor water quality is a challenge as access to safe water is important for food cultivation and preparation.
- “Unattractiveness of agriculture” – as a vocation to the populace – people do not consider training in agriculture necessary to become farmers.
- Chemicalization of foods from farm to fork and port: Inappropriate uses of various chemicals by food systems actors
- Risk of contamination/cooking methods and duration: For instance, some people add paracetamol when cooking cowpea to cook faster.
- Bad fishing practices and trans-shipment of fish: (these have an impact on the sustainability of fish resources).
- Food waste and loss – significant post-harvest losses
- Harmful environmental practices that destroy the natural resources and some species (crops and livestock) such as deforestation, bush fires, use of destructive agrochemicals
- Poor decentralization and distribution of resources as well as implementation of policy to the grassroots level
- Foreign rather than local dietary guidelines are used or adapted in Ghana.
- Reliance on foreign rather than local dietary guidelines by dietitians and other professionals.
- Contamination of grains and legumes by aflatoxin and the lack of screening methods to ensure safe levels of aflatoxins
- Poor regulation of foods produced: there are no standards for regulating produce especially those for the local market.
- Poor storage system across the food system, production, transportation, retailing and household
- Constraints to accessing finance and loan credit for the production of healthy and sustainable foods.

4.0 Potential game-changing solutions to Ghana’s food systems challenges

Production, storage, and sustainable consumption

- Establishment of a national research fund: We need to prioritize investment in agriculture. Government should set up a dedicated fund purposely to support research. Government should

commit to make budgetary allocation to this fund. Private sector should be encouraged to invest in the research fund.

- Need for science research journalism to communicate innovations effectively to end users. The media is too silent, not communicating science-based innovation to the populace.
- Strengthen research extension farmer linkages. Extension agents should be aware of new innovation developed by researchers and disseminate innovations to farmers. Private extension has role to play in spearheading the transfer of information from the researcher to the farmers.
- There should be a national focus on developing value chains of key staple crops.
- Valorisation of nutritious local/traditional food to incentivize production and consumption
- Application of best practices including promoting good and appropriate agronomy practices, tracing, and containing contaminated produce.
- The EPA and FDA should ensure that only approved agrochemicals are imported
- Government should set up food banks and land banks (reserve lands for agriculture) to increase food production.
- Meaningfully integrate fiscal and economic measures into food systems transformation initiatives.
- Improve access, quality and services of warehousing systems and storage facilities to reduce post-harvest losses
- Promoting practices that protect the loss of biodiversity of Ghana's indigenous and traditional foods, and natural regeneration of trees
- The language used in communicating healthy and nutrient-rich food should not be abstract.
- Intensify nutrition education in school curricula: Include nutrition education in the curriculum of children at all levels of education (from kindergarten through tertiary level) as children are change agents.
- There is the need to inspect production sites as well as the levels of chemicals in foods before sale or exportation.
- Accelerate the development and use of Ghana's dietary guidelines.
- Incorporate policies that clearly define agricultural land from infrastructure land and facilitate the use of those lands reserved for urban agriculture

Solutions to current inequalities within the Ghanaian food systems

- Government should consider the deployment of mobile agricultural extension services in the digitization drive to attract the youth to agriculture

- Women should be empowered to become economically independent. They need to be presented with opportunities of accessing finances (i.e. loans) which can help them build capacity in soya production. Soya can be processed into different nutritious recipes and families will be fed
- Encourage all community members (consumers and producers) to recycle to reduce waste and promote composed manure for farming activities in the city.
- Government should buy or subsidize lands for agricultural purposes and engage traditional landholders to address land tenure challenges for easier direct access by women and youth
- Regions with high hunger index and malnutrition should have a land tenure system that will support the production of food crops rather than cash crops
- Improving access to post-harvest technologies such as cold chains to reduce postharvest losses, especially during seasons of glut, and improve traditional production/processing/preparation technologies for competitiveness
- Improved handling of agricultural commodities that will reduce bruising in transit. Also, ensure that existing measures such as mandatory use of scales at both the farm gate and in the markets facilitate trading of farm produce.
- In terms of inequalities in the access to premix by small SMEs, Government should consider subsidy or removal of import taxes to help make nutritious processed food products more affordable and available.
- Food pricing- industrial food processors should not be allowed to dictate food prices
- A policy should be enacted to provide incentives e.g. Subsidies to processors who site their firms in the rural areas especially where the road network is not good
- Food Safety Guidelines adopted at national level and localised to assist local governments with ensuring that food handling and preparation across the food value chain is safe for consumers

Promoting resilience:

- Build data on actors in the food systems value chain, their profile, location, needs and actions given the risks.
- Government and other food systems stakeholders to support and promote all-year-round production system especially through irrigation
- Protection of local farmers by supporting them with inputs, and regulation of food inflow from other countries

- Apply best practices including enforcing good agronomy practices, tracing and containing contaminated produce. The EPA and FDA should ensure that only approved agrochemicals are imported
- Training of farmers on best practices on the management of pests, chemicals, pesticides
Dialogue participants offered specific recommendations for the government, development partners, private sector and other food systems actors:
- In collaboration with academia, government should train and certify food systems stakeholders e.g. farmers and retailers
- In collaboration with development partners, government should expand and promote livelihood and income-generating activities (e.g. backyard farming, livestock rearing) targeted at women to improve household food security
- Food safety and standards policies/regulations should have clear delineation of roles and responsibilities of regulators.
- Encourage the use of traditional silos built using earth and straw grass to store maize and millet, and other produce: When produce is stored in these environmentally friendly traditional silos, they could last for more than a year without pests.
- Inclusion of men/heads of household in nutrition education discussions: Heads of families/ include men in the discussions.
- Dialogue participants emphasized that institutional reforms and arrangements are needed to address policy and strategic gaps, including inadequate and weak enforcement of food policies and regulations
- Development planning: The country should have long-term plans and then entrench in parliament. It should be legally binding on every government to continue existing agricultural projects that will enhance the sector. Parliament should pass a law binding on every govt to continue all agricultural projects. To address environmental/sustainability challenges dialogue participants indicated that
- Policies and initiatives are needed to prevent/control overexploitation of natural resources in food value chains in Ghana
- Extension officers could educate farmers focusing on the health implications of the use of hazardous chemicals.
- Spatial production patterns could be more closely linked with soil fertility maps. i. e. Soil fertility maps are published by the soil research institute of CSIR to guide choice for crop for soils

- Scientific improvements of small farmer production systems to make them more climate-smart and resilient.
- Adopting appropriate, diverse and improved farming practices, techniques to increase food production and productivity
- Increase incentives to make agriculture attractive (branding) especially to the youth, and to attract more investments into the sector. There is a need for appropriate and adequate branding of agriculture to make it attractive to the youth. Communication experts should be used to properly brand agriculture positively.
- Improve smallholder farming in Ghana by encouraging site and crop-specific fertilizer usage.
- Proper identification and selection of good varieties of crop seeds and the breeds of animal
- Development of agronomic protocols. For instance, the current fertilizer recommendation for maize was developed many years back during the operation feed yourself era. However, in recent times more efficient fertilizers have been produced and need to be communicated to the right users.
- Innovative research and strategies into controlling pests and diseases that affect crops and animals
- Identification of food security hotspot in Ghana will play very vital role in responding swiftly.
- Insurance packages tailored toward the resilience of all players in the food chain will make the food system resilient. This may be subsidized at the beginning to encourage uptake especially for smallholder farmers.
- The issue of infrastructure (poor road networks) is a key challenge

Building demand for advocacy and leadership

- Regulatory organizations need to actively be involved in communication, dissemination of information to support advocacy efforts.
- Use consumer driven advocacy: Often industry responds to public demand or the demands of the consumer. Advocacy efforts could be used to change food consumption preferences by consumers.
- Make consumers aware of the health and nutrition benefits.
- Use evidence and science to advocate to consumers: industry would respond to science by making highly nutritious foods available because that is what consumers prefer. An example was shared about the demand for organic traditional foods in Egypt by “high class” individuals.

- Industry could lead advocacy of organic foods. Avoidance can also be a strong advocacy strategy, e.g., avoid certain foods.
- Re-discovery of lost foods and cooking methods; undiscovered traditional foods ways of cooking that are healthy can be promoted. Recipes with high nutritional value e.g., Quinoa, Fonio and healthy cooking methods could be used as advocacy tools and not only scientific data.
- National agricultural transformation: we need to advocate for countries to link national agricultural transformation, trade policies, food and nutrition security policies to the nutritional needs of the population;
- Build demand advocacy: building demand within the marketplace- the consumer demand for healthy foods; there can be social marketing with celebrities to promote particular products or types of food.
- We need to rationalize, empathize, and humanize the food system conversation/narrative
- Build capacity of local leaders on various actors of the food systems value chain.
- Local experts and community food systems actors should be linked to the state institutions in a way that engages them in various planning and execution of food systems actions. The government, the private sector as well as the academia need to support this process.
- There should be a responsible and inclusive leadership so that people at the grassroots are included in policy making and also educated on the existence of these policies.
- Inclusive leadership from government, media, civil society, and public health experts is needed. This should involve the community and the people at the grassroots levels from all sectors of the food system to enhance ownership and sustainability.
- For continuity and sustainability, leaders do not have to be political leaders. All Food systems actors can play leadership roles. Leader from where you stand.
- Develop more markets beyond the local and traditional markets and enhance access to market- create/enhance market linkages between producers and off-takers/consumers
- Go beyond bulk cocoa production to specialty cocoa production
- Further and urgent actions required are concerned with re-bagging, digitalization and newer methods of irrigation, which is critical in improving Cocoa production due to recent climate change challenge.
- It is also important to include product differentiation as a way of remaining competitive
- Developing local markets while strengthening international markets

- Strengthening of internal market systems and linkages; farm and marketing inputs (e.g jute sacks) should be made readily available.
- Increase the use of mechanized farming and innovations to promote agricultural mechanization in cocoa farming especially equipment for breaking cocoa pods.

Other cross-cutting solutions

- Farming should be encouraged as a professional career from the lower educational levels through to the higher level. This will encourage more people to have the desire and passion to go into farming
- Institutional innovations such as promoting group approach to agricultural investment and cooperative structures to ensure everybody wins
- There should be deliberate efforts to engage and involve (tertiary) students of agriculture in the design and implementation of solutions to address some of the issues affecting food systems in Ghana e.g. through projects
- Agriculture affects climate change and is also affected by climate change. So crop production processes that impact climate change must be addressed. Support those farmers who adopt farming methods that are environmentally friendly.
- Promote organic farming.
- Employ technologies targeted at fruit and vegetable, which are seasonal and perishable to increase the shelf life by employing packaging environments that help to produce safe and quality food for the short to medium term. Long Term Actions
- Promote greenhouse farming among the youth in modernization of production systems
- Promote Government-Private Partnership where private partners would be engaged to handle areas where Government cannot. E.g. Government financing infrastructural projects-irrigation, silos, etc., and the private sector partaking in the distribution of farm produce in time or marketing. Development partners can also do the same as earlier mentioned. Additionally, they can partner with our research institutions to research more on our food systems and develop more improved seedlings, etc.
- Government to create an enabling environment through designing favourable policies and strategies. Government can develop more support in terms of incentives, security for those starting their own business and making sure that any type of information and education on innovating their business and using new technologies for farming and marketing.

- The government should establish criteria for responsible agricultural investment so that PPP can be effective, and all players stand a chance of benefitting.
- Government should make a budgetary allocation to support regular testing of food throughout the food chain especially those run by public institutions to ensure food safety and food security
- We need a systems approach in dealing with food waste and increasing efficiency at each stage
- The private sector should adopt inclusive business operation models across the production, processing, and marketing segments of the food system. e.g. they can have good pro-poor financing mechanisms to support the actors in the food system
- Funding and technical support also from development partners
- Development partners need to work with government to understand our cultural issues to able to have an impact on our food system.
- Establishment of Agriculture information centers where farmers could call in or walk in at a time (where closer) for information.
- Education /advertisement on nutrient rich foods on the local TV, radio stations, community durbars, town hall meetings and every available means to counter the advertisement of junk foods on media.
- Promote agricultural intensification by using high yielding crop varieties on the current small land areas farmers' farm on, without having to expand land sizes.
- The forest areas need to be protected as farmers are encouraged to increase production on the large scale
- District Assemblies should provide proper markets for food vendors that ensure food safety.
- Establishment of a legislative instrument backing nutrition that ensures that nutrition is addressed at a high level and prevents any party from doing away with it.
- Institutional purchases by Government could create assured markets and control prices
- Value addition to foods coupled with market linkages like the school feeding programme.
- Introduce cold vans to preserve fruits and vegetables in transit.
- Hire purchase of vehicles should be promoted
- Intensify training of preparers, especially on the consequences of malnutrition and unwholesome foods.
- Enforcement of spatial planning legislation for the city and review of land tenure system to accommodate farmers to ensure balance and access to land for food production as well as other activities across the food value chain.

- Data financing. Government should allocate both institutional and financial resources; and the private sector must put together mechanisms of contributing resources to building local capacity for data.
- Collaboration among the government sectors, academia, and the private sectors should be fostered. Such collaborations can help address gaps that currently exist between these actors due to differences in their approaches.
- Making use of incentives: What are the incentives for doing the right thing? Smart incentives and disincentives need to be created to align actors in sectors of the food system.
- SMEs play large role in Africa food systems and should be provided with incentives for producing healthy, safe and sustainable food.
- The government should regulate the food retail environment. There should be regulatory standards for the food retail environment. For instance, its tax incentives, etc. in order to increase access to healthy foods.

The situational analysis (“strengthening the integration of nutrition within primary health care delivery systems in Ghana”) that aimed to identify highest priority nutritional problems (HPNPs) in Ghana reported the following bottlenecks and recommendations to address them.

Bottlenecks and gaps

- **Financial and logistical constraints:** These include inadequate financial and human capacity and governance for delivering and managing nutrition services on a large scale in the country; poor distribution of human resources for implementation of nutrition activities; limited supervision and monitoring; and limited technical capacity in child, adolescent and gender-responsive social and behavior change communication on nutrition within the health sector.
- **Weak coordination:** Weak coordination and harmonization of efforts among key sectors/institutions (health, food and agriculture, education, water and sanitation, social protection, etc.) (80) and also among non-governmental organizations (NGOs).
- **Limited integration:** Limited integration of nutrition services in the health sector, and inadequate research and integration of nutrition issues in relevant sectors (68). Poor linkages between the faculties that provide pre-service nutrition training and the public health care services that attend to children and caregivers.

- **Declining rates of key recommended infant and young child feeding practices.** There is often a low demand for nutrition information, services, and fortified foods due to limited knowledge and awareness on available services.

- **There are reported cases of abusive and humiliating treatment to clients by health providers.** These might contribute to poor quality of health care in Ghana. Furthermore, the quality of care delivery may be negatively impacted by several factors including a culture of low accountability, weak monitoring and supervision, poor attitudes of health-care providers, and a culture poor maintenance of equipment and facilities.

- **Limited market supply of nutrient-fortified foods by the food industry due to public sector's weak leadership on nutrition and lack of engagement with food industry on the need for food fortification.** The health sector has not adequately engaged the public on a regular and sustainable basis about malnutrition and its causes and available solutions to generate demand for and utilization of available services.

Recommendations

- Strengthen the integration of essential nutrition actions (ENAs) into the PHC system and increase coverage of high-impact nutrition-specific interventions towards universal coverage of essential nutrition actions; improve the quality of nutrition services at all operational levels.
- Directly address stunting, wasting, and anemia (micronutrient deficiency), such as scale up and strengthen implementation of on-going proven IYCN interventions for further reduction of stunting prevalence; intensify promotion of IYCF.
- Directly address increasing overweight and obesity through appropriate interventions, e.g., regulate unhealthy food and beverage promotion, sponsorship, and advertisement in schools and in the media.
- Strengthen coordination among agencies involved in food and nutrition issues; strengthen coordination (at higher levels) and integration of services (at lower levels) for nutritional interventions; increase the capacity of the Food and Nutrition CSPG to co-ordinate nutrition-related activities.
- Intensify actions aimed at repositioning nutrition as a priority multi-sectoral development issue in Ghana by strengthening advocacy, partnerships, and inter-sectoral collaboration at all levels.
- Ensure that leadership and management at all levels are accountable for performance, and use data to prioritize, plan and track progress.
- Government should assume the center-stage in the funding of nutrition interventions and avoid relying on donors. Invest in behaviors and an enabling environment, and infrastructure and logistics for effective nutrition intervention delivery. Make budget allocation for nutritional commodities at all levels.

Summary/synthesis of Ghana's food system challenges & potential game changing solutions

The cardinal priority challenges identified and the potential game-changing solutions are summarized below (and in Figure 3).

Challenge 1. Diet quality & nutrition security: Low production levels, affordability and demand for nutrient-dense foods among population; limited diversity of crops makes country dependent few energy-dense but nutrient poor staples, and on imports of certain expensive crops.

To address these, stakeholders recommended, among others, the following:

- Strengthen end-to-end planning for nutrition-sensitive production (including seeds, input subsidies, etc.)
- Expand the district market network
- Strengthen strategies to address consumer behaviors (including food composition tables)
- Diversify school meals

Challenge 2. Consumption of unhealthy foods: Urbanization at ~57% and rising incomes, as well as poor food environments are leading to increased consumption of unhealthy foods, resulting in higher obesity and Non-Communicable Disease (NCD) prevalence.

The following solutions were recommended:

- Improve the food environment through consumer-focused campaigns, but also upstream actions such as marketing restrictions and updating labeling regulations
- Incentivize production of nutritious healthy foods, e.g., via subsidized inputs
- Ensure 'true/fair' pricing of foods (including the use of fiscal levers such as taxation)

Challenge 3. Environmental resilience: High vulnerability to climate change in North & Southern coastal area; heavy deforestation and illegal mining contributing to climate change and biodiversity loss. Select crops highly vulnerable to climate change.

To address these, the following interventions were recommended:

- Strengthen the community-based monitoring projects against illegal logging
- Promote solar-powered irrigation systems
- Launch agroforestry programs

- Promote indigenous and nutritious, yet neglected foods

Challenge 4. Infrastructure capacity: Low use of technology, poor infrastructure, lack of processing capacity, is leading to a 20% food loss, increasing the costs for farmers and prices for consumers and limiting the ability to supply the entire country or trade.

To address these, the following interventions were recommended:

- Do end-to-end planning of infrastructure projects (including. prioritization, setting up PPPs and conducting up-front modelling)
- Incentivize credit extension for infrastructure projects

Challenge 5. Discrepancies between the north and the south: Northern Ghana is suffering from lower productivity and a difficult climate, resulting in low availability & affordability of foods, causing higher levels of malnutrition and income inequalities compared to other regions.

To address these, the following interventions were recommended:

- Strengthen input provision to farmers (including irrigation, insurance, extension services)
- Invest in agro-processing facilities and stronger supply chains to improve market access
- Scale up Livelihood Empowerment Against Poverty program

Challenge 6 . Weak coordination and limited integration: Weak coordination and harmonization of efforts among key sectors/institutions (health, food and agriculture, education, water and sanitation, social protection, etc.) and also among non-governmental organizations (NGOs). There is **limited integration** of nutrition services in the health sector, and inadequate research and integration of nutrition issues in relevant sectors (REF). Poor linkages between the faculties that provide pre-service nutrition training and the public health care services that attend to children and caregivers.

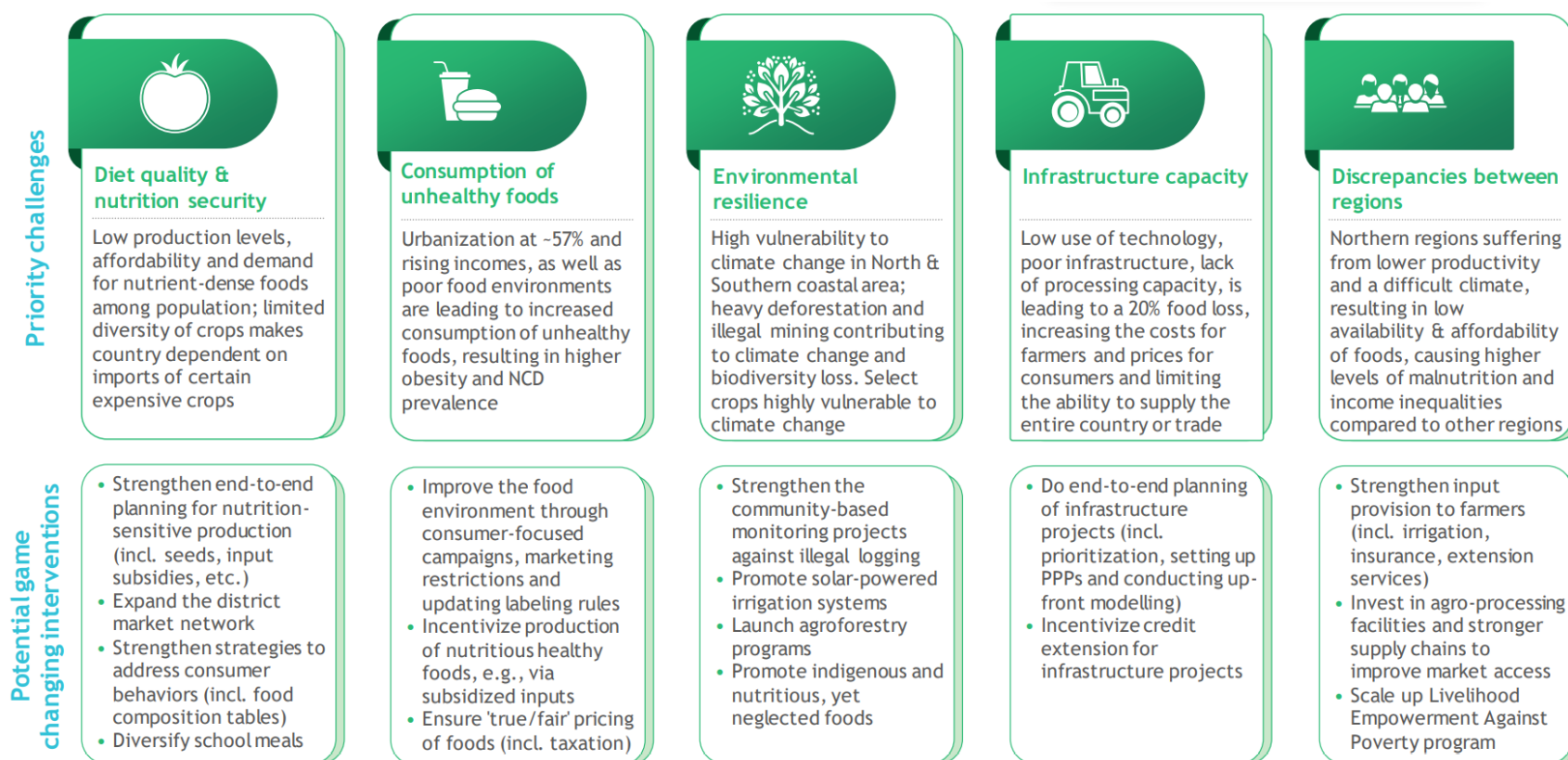
To address these, the following interventions were recommended:

- Strengthen the integration of essential nutrition actions (ENAs) into the PHC system and increase coverage of high-impact nutrition-specific interventions towards universal coverage of essential nutrition actions; improve the quality of nutrition services at all operational levels.
- Strengthen coordination among agencies involved in food and nutrition issues; strengthen coordination (at higher levels) and integration of services (at lower levels) for nutritional

interventions; increase the capacity of the Food and Nutrition CSPG to co-ordinate nutrition-related activities.

- Intensify actions aimed at repositioning nutrition as a priority multi-sectoral development issue in Ghana by strengthening advocacy, partnerships, and inter-sectoral collaboration at all levels.

Figure 3. Summary: Synthesis of Ghana's food system challenges & potential game changing solutions



• Source: Ghana Food Systems Dialogues and FS-TIP Diagnostic Analysis, 2021

5.0 Points of divergence and potential tradeoffs

- **Disruptive advocacy** (for example non-importation of certain foods) should apply to foods that are produced in or available in African countries. Advocating for this could serve to encourage the consumption of local foods. Overall, the future for Africa is to depend on itself for food supply. Others note that disruptive advocacy is not the solution. What is needed is to advocate for countries to link national agricultural transformation, trade policies, food and nutrition security policies to the nutritional needs of the population.
- **Use of technology such as artificial intelligence (AI).** Proponents note that technology will help with data capturing, e.g., AI could link farmers on the ground to food producers and buyers to help them know what is selling and what is not. But the opposing view intimated the use of AI could be very bad especially if not used properly – especially when it is not clear who/what/when/how data should or could be used.
- **Role of celebrities in food systems transformation:** Trade-offs regarding the role celebrities could play to help promote the Food System. There was a suggestion for celebrities to use their influence to promote food system transformation. However, some participants felt involving celebrities may only lead to popularization which is not necessarily transformation.
- **Engagement with private sector:** Why the private sector is not engaging as expected, and yet they have too much data that they cannot even manage. They should be more open in sharing data. However, others noted that the private sector actors are business minded; they are interested in the bottom lines, or their profits and so if engaging will not lead to this why should they? Others felt that was their responsibility to engage and serve not just their board of directors, but their clients- all humans. Participants mooted the idea of decolonialization of data and destabilization of information asymmetries if we need to truly transform our food systems. The private sector actors believe that they are doing their best to contribute to research and development whilst academia and researchers believe that the private sector has a lot more role to play in food systems transformation when it comes to setting the agenda for research and in funding research. Private sector actors intimated that researchers do not know how to deal with private sector or businesses and that research cannot be funded without profit generation as the ultimate goal in the short-medium term. Therefore, researchers must know how to work closely with the private sector in order to attract funding.
- **China's entry into the world cocoa market.** During one of the independent dialogues, a major point of divergence was whether China's entry into the world cocoa market was a threat. While the lead industry player, the Ghana Cocoa Board held the view that China's entry into

the cocoa supply chain was insignificant, so not a global threat, majority of the participants maintained the view that COCOBOD should take China serious.

- **Weak regulatory sector:** Painting a gloomy and weak outlook of the Ghanaian regulatory sector, some dialogue participants noted that food retailers do not adhere to safe practices resulting in microbial contamination, and foodborne diseases. Regulators argued that this dismal outlook may not be based on facts – contaminants could be due to poor hygiene and food handling and not organic contaminants.
- **Decentralization:** Political and structural gaps that continue to militate against Ghana’s development is blamed on decentralization. Others vehemently disagreed. With the metropolitan, municipal, district assemblies, there are some challenges but it is not widespread. A lot of MMDCE are also supporting and prioritizing agriculture.”
- **Policy on food importation:** a participant emphasized the need for a government policy on importation of foods grown locally in Ghana and enforcement of the policy. However, others noted that given Government's commitments towards AfCFTA, trade restrictions may not be practical. It would be more practical to promote a culture of consuming locally.
- **Farming Systems:** Though participants held different views on the type of farming systems in Ghana, i.e., subsistence and commercial, in the end, it was agreed that both systems are important in our attempt to achieve food and nutrition security, as well as environmental sustainability, and emphasis placed on improving and making them better and sustainable. Some participants argued for monocropping to improve the efficiency of production. Others, however, argued that monocropping is a problem in sustainability. “We should not be concerned with only economic sustainability. It is important to emphasize social and environmental sustainability as well. Mixed cropping and mixed farming systems can ensure all three types of sustainability if practiced well (scientifically). Mixed cropping and mixed farming ensures diversity of foodstuffs and thus important for both food security and nutrition security (food and nutrition security)”
- **Youth and Agriculture:** It was suggested that, Agriculture should be made attractive to youth. However, some indicated that the youth are already attracted to agriculture and face difficulty e.g. entering poultry industry. That said, the youth are not receiving the needed support from the Government including access to arable land.
- **Establishment of new government agencies:** It was suggested that Ghana establishes a Ministry for Food and Nutrition in order to guarantee budget allocation to address food and nutrition rather than leaving allocations to the discretion of Ministries such as Food and

Agriculture and Health. Another participant thought this was not necessary as nutrition issues were multi-sectoral in nature. Rather, the authority for nutrition could be placed at the Office of the President or Vice President which have the mandate to direct several sectors.

6.0 Next steps

The implementation of the dialogues, the situational analysis, the landscape and diagnostic analyses will facilitate the development of the following

- Ghana's Commitment Statement
- Ghana's Pathways to its food systems transformation
- It is envisaged that Ghana's food systems actors will prioritize key food systems challenges for short-term action (i.e. within the next 2-3 years) or medium-term action (by 2030).
- For each of the selected top challenges, a policy-program bundle consisting of mutually reinforcing game-changing solutions will be developed taking into account robust analysis – prior, during, and post implementation
- A recommendation for the establishment of a food systems transformation Presidential Initiative, led by a highly respected Executive Officer supported by a coordinating secretariat at NDPC and consisting of representatives of key ministries and agencies such as Agric, Health, Fisheries, Environment, Trade, Finance, SUN CSP representation, etc will be made to the Presidency.
- Finalize Ghana's food systems policy matrix for integration into Ghana's next Medium-Term National Development Policy Framework (see table 1).
- Propose and pursue a strategy to transform Ghana food systems – Post the UN Food Systems Summit. This path from diagnosis/dialogues to action will require a robust and governance, coordination and delivery mechanisms.

Proposed Strategy to Transform Ghana Food Systems – Post Summit

Throughout the UN Food Systems Summit Dialogues and the FS-TIP Diagnostic Analysis, stakeholders have increasingly expressed the need to develop a clear plan for action post the UN Food Systems Summit 2021 in September. This plan should include the national pathways to develop integrated and transformative policies as well as the route to establish governance, coordination and delivery mechanisms that can effectively implement and monitor these policies. The following actions might be part of the national pathways for Ghana.

- a. Agree on Ghana-Specific Deliverables for 2-3 national scale initiatives in the next 1-3 years
- b. Consolidate Summit-Preparatory structures and emerging Collaborations
- c. Build on Existing Structures to design a Governance, Coordination and Delivery Structure, and Operating Model comprising four functions:
 - Executive Function
 - Coordination mechanisms
 - Analysis, Project management and delivery capabilities
 - Data Custodian and Progress Reviewing Function
 - Inclusive Participation Function
 - Thinking and Advisory Function

Governance, Coordination and Delivery Options to Consider

For any post-summit actions to be feasible and sustainable, it is essential that governance, coordination and delivery options are examined and the most suitable one selected to lead and guide implementation. Since any initiative for rejuvenating and growing Ghana's Food Systems will be multi-sectorial and multifaceted, it is important that the following conditions be met.

- a. Enlisting Government Support/Access at the Highest Level – *A Presidentially Appointed Food Systems Champion*
- b. Having Highly Capable, Independent and Leadership that can work to lead national scale initiatives, that is highly respected by key Ministers and that can lead a high – performance delivery team to coordinate and support key line ministries, and where necessary develop specific strategic projects.
- c. Having, a Strong Multidisciplinary Team in place
- d. Having the Ability to coordinate, implement and manage multi-sectoral programmes and projects

Option One – Using a New State Agency

The first potential governance, coordination and delivery option for the Ghana Food Systems transformation agenda is to establish a State Agency (*i.e. Ghana Food Systems Transformation Agency, (the exact nomenclature to be determined using State guidelines and processes)*). The mandate of the Agency will be to address systemic bottlenecks in the Ghanaian Food chain (*i.e. from farm to the dining table*) by supporting and enhancing the capability of the existing Ministries, Departments and Agencies

(MDAs) and private and non-governmental implementing partners. The Agency may become the Secretariat of a Food Systems Transformation Council chaired by a prominent Ghanaian

It will do this by:

- **Leading problem solving efforts** to facilitate identification of solutions to address systemic bottlenecks in priority areas that is expected as an output from the ongoing dialogues and studies.
- **Supporting implementation** of identified solutions in high priority areas by providing project management, capability building, technical assistance and knowledge sharing to implementing partners.
- **Enhancing linkages and coordination** among key stakeholders in high priority areas to reach agreed upon milestones and objectives that transform the Food Systems of Ghana and lead Ghana to high-income country status.
- **Taking ownership of all completed GoG Food System projects** and ensuring that the institutional records, memories and results are sustained and internalized in all subsequent plans to ensure sustainable development of the country.

The function of the Agency is not to replace or supplant any MDA or any other public sector partner. In contrast, the Agency is to help build sufficient FS capacity and ability among its public sector partners and other stakeholders so that it will cease to exist in the future. The programs, staffing model and operating principles of the Agency will all be explicitly designed with this exit strategy goal in mind.

To serve as a catalyst for positive, transformational, and sustainable change in Ghana's Food System, the Food Systems Transformation and Sustainability Agency will engage stakeholders in three specific activities:

- Problem Solving;
- Implementation Support; and
- Assuring Sustainability of Completed Projects.

Although the team found the agency as a suitable option that satisfies all the requirements of an effective governance, coordinating and delivery mechanism for transforming Ghana's Food System, it also realized that this solution could do for the medium to long term. Setup time could be as long as a year or more. It therefore became necessary to look at a solution that could be relied upon to deliver in the short-medium-long terms. This led to a proposition that is discussed outlined below.

Option Two – Using existing structures, systems and entities and retooling and resourcing them to deliver food systems transformation - NDPC Plus

The alternate governance, coordination and delivery option considered is what we call the NDPC Plus. This arrangement starts from the existing NDPC and eventually births a unit that leads the transformation process. The NDPC Plus model encapsulates all the initial modalities and conditions stipulated to guide the formation of a good governance, coordination and delivery structure (working very closely with all relevant MDAs). One of the existing and well-structured institution that fits the role is the National Development Planning Commission (NDPC).

The NDPC is a state agency established to work closely with every President of the Fourth republic of Ghana, with the mandate to make provisions for coordinated program of Economic and Social Development policies, which the President of Ghana under the constitution is required to submit to parliament within two years of assumption of office. The NDPC was set up under Articles 86 and 87 of the 1992 constitution of Ghana. Article 86 of the constitution stipulates the composition of the commission whereas Article 87 outlines the functions of the commission. The National Development Planning Act, 1994, (Act 479), formally establishes the NDPC under the office of the President and the National Development Planning (System), Act, 1994; (Act 480) makes NDPC the national coordinating body of the Decentralized Development Planning System in Ghana. These provisions lay out the core legal framework of the commission - *To promote sustainable and stable development to eliminate poverty, reduce inequalities in deprived areas and improve people's quality of life*. Per the constitution of Ghana, the commission is to perform these functions:

1. The Commission shall advise the President on development planning policy and strategy.
2. The Commission shall, at the request of the President or Parliament, or on its own initiative- (a) study and make strategic analyses of macro-economic and structural reform options; (b) make proposals for the development of multi-year rolling plans taking into consideration the resource potential and comparative advantage of the different districts in Ghana; (c) make proposals for the protection of the natural and physical environment; (d) make proposals for ensuring the even development of the districts of Ghana by the effective utilization of available resources; and (e) monitor, evaluate and co-ordinate development policies, programs and projects.
3. The commission shall also perform such other functions relating to development planning as the President may direct.

With the MDAs working intensively with the NDPC, it is anticipated that the following expanded functional Mandates will apply:

- To perform all three functions of NDPC listed above;
- Support to Implement all the programmes and projects planned to transform the Ghana Food Systems; and
- Ensure that all the development solutions proffered are long lasting and sustainable.

It is also envisaged that under this arrangement, the Food Systems transformation agenda will be mainstreamed across all sectors of the economy. The NDPC Plus Option is recommended as it builds on an existing institution, and addresses all the functional gaps. It will bring together a coalition of diverse stakeholders/partners that will help articulate the Ghanaian Food System gaps and aspirational outcomes and ensure they are moved from discussion to action. This approach will ensure that institutional capacities are built at both NDPC and the MDAs and all the coalitions built during summit preparations are carried over and sustained.

Table 1. Ghana's food systems policy matrix

FOCUS AREA	KEY ISSUES	POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	LINKAGES TO MTNDPF
Action Track 1 - Ensure access to safe and nutritious food for all					
1. Diet Quality	<ul style="list-style-type: none"> Low frequency of consumption of fruits or vegetables and frequent consumption of foods with high content of added sugar and sodium 	Ensure access to safe and nutritious food for all	<ol style="list-style-type: none"> Diversify and make healthier meals for school feeding programs by removing any unhealthy foods and creating an overall healthier food environment Establish food composition tables, food-based dietary guidelines, and subsequent nutrient profiling of foods and beverages, which can facilitate better labelling 	MOH, GHS, MOFA, FDA, MOFAD	Social Development (FNS)
	<ul style="list-style-type: none"> Food-based dietary guidelines are not yet in place, which leads to misconceptions about what constitutes a healthy and nutritious diet and increases consumption of unhealthy foods 		<ol style="list-style-type: none"> Increase knowledge on nutrition by informing consumers on appropriate combinations of available food (e.g., through nutrition sensitization campaigns, educational programs) 	MOH, GHS, MOFA,	Social Development (FNS)/ Implementation
	<ul style="list-style-type: none"> High cost of a healthy diet at 283% of household expenditure 		<ol style="list-style-type: none"> Encourage producers and processors to increase production of nutrient rich foods for the domestic market Subsidize healthy foods include input subsidies for healthy foods 	MOF, MOFA, MOFAD	Social Development (FNS)/ Economic Development (Agriculture)
2. Nutrient Supply	<ul style="list-style-type: none"> Extensive micro and macro-nutrient supply deficiency 		<ol style="list-style-type: none"> Encourage producers and processors to increase production of nutrient rich foods for the domestic market 	MOF, MOFA, MOFAD	Economic Development (Agriculture)
	<ul style="list-style-type: none"> Reliance on expensive imports of poultry and meat to fill the dietary gaps 		<ol style="list-style-type: none"> Develop alternative animal and plant source of proteins that can be produced in country 	MOFA, MESTI, MOFAD	Social Development (FNS – Research)
	<ul style="list-style-type: none"> Commodity approach to food production has negative effective on dietary diversity and overall diet quality 		<ol style="list-style-type: none"> Improve population's nutrition literacy – through food based dietary guidelines and other interventions so that food producers and consumers recognize the need to limit intake of nutrients of concern, and promote consumption of nutrients as protein, fiber, vitamins A, C & E, Calcium, Iron, Potassium and Magnesium; folate and zinc 	MESTI, MOFA, MOH, GHS, FDA,	Social Development (FNS)
	<ul style="list-style-type: none"> Large discrepancies in supply of micro and macro-nutrients between urban and rural areas; with substantial nutrient gaps in rural areas 		<ol style="list-style-type: none"> Peruse strategies to improve the traditional (local) food system rather than replacing it 	MOCD, MOFA, MOH, MOFAD, MOGCSF	Social Development (FNS)

3.Undernourish-ment	<ul style="list-style-type: none"> 19% of children (<5y) are stunted, 5% are wasted and 11% underweight 		3. Improv food distribution to vulnerable groups to enhance food and nutrition security status of poor and disadvantaged groups	MOFA, MOT, MOGCSP, MOH	Emergency Planning and response
4.Overweight & Obesity	<ul style="list-style-type: none"> 3% children (<5y) are overweight or obese (weight-for-height) with higher prevalence in urban areas (3.4%) than rural areas (1.9%) 		<ol style="list-style-type: none"> Strengthen guidelines on food marketing & messaging Targeted campaigns for individuals & households focusing on both overweight/obesity & undernutrition, promoting healthy diets and physical activity for urban & peri-urban populations 	MOCD, MOH, GHS, FDA	Social Development (FNS)/Economic development
	<ul style="list-style-type: none"> Economic development and rapid urbanization have resulted in dietary patterns shifting from traditional diets to energy-rich foods high in fat and sweeteners 		<ol style="list-style-type: none"> Make the benefits of affordable healthy food visible and revealing the costs of damage to the environment. and human health 	MOF, MOFA, MOH,	Social Development (FNS)/Economic development
	<ul style="list-style-type: none"> Unhealthy foods often more affordable 		<ol style="list-style-type: none"> Implement policies that make unhealthy foods less affordable and less attractive while making healthy foods attractive and affordable 	MOFA, MOH, GHS, MOTI, MLGRD	Social Development (FNS)/Economic development/Governance/Implementation
	<ul style="list-style-type: none"> Increased sedentary lifestyle 		<ol style="list-style-type: none"> Ensure true pricing of food so that affordable and healthy food is accessible to all 	MOTI,	Social Development (FNS)/Economic development/Governance/Implementation
5. Food safety	<ul style="list-style-type: none"> Food adulteration & contamination and poor hygiene practices particularly in informal food outlets Widespread informality driven by cumbersome licensing procedure Low food hygiene 		<ol style="list-style-type: none"> Implement and update regulatory framework on food safety and ensure dissemination and implementation Collaborate with Environmental Health Officers to develop and maintain a database of street food and motivating street food vendors to register in a public database Conduct regular surveys to strengthen public education and enable consumers to make informed and safer food choices (e.g., conduct surveys and create a database on salt or sugar content of street foods) Strengthen the Healthy Street Food Incentives (HSFI) and implementing the WHO Global Strategy for Diet, Physical Activity and Health Enhance legislation on mandatory nutrition labelling of food including Street vended food 	MOFA, MOTI MOFAD, MOH, GHS, EPA, FDA, MLGRD	Social Development (FNS)/ Economic Development (Agriculture)/ Governance/Implementation

	<ul style="list-style-type: none"> Aflatoxins are common in maize production 		<ol style="list-style-type: none"> Conduct regular surveys to strengthen public education and enable consumers to make informed and safer food choices (e.g., conduct surveys and create a database on salt or sugar content of street foods) 	MOH, MLGRD, GHS	Economic Development (Agriculture), Governance/Implementation
	<ul style="list-style-type: none"> Inadequate funding to increase coverage of interventions and limited resources to effectively inspect and monitor 		<ol style="list-style-type: none"> Develop a resource-efficient food monitoring and inspection system 	GHS, MOH, MLGRD	Economic Development (Agriculture)

FOCUS AREA	KEY ISSUES	POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	LINKAGES TO MTNDPF
Action Track 2 - Shift to sustainable consumption patterns					
6. Affordability	<ul style="list-style-type: none"> High costs of imported substitutes for foods such as rice, poultry and meat which are in low production 	Shift to sustainable consumption patterns	3. Reducing trade barriers (both tariff and non-tariff)	MOTI, MOFA, MOFAD, MOF	Economic Development (Agriculture)
	<ul style="list-style-type: none"> Low affordability and availability of healthy foods 		<ol style="list-style-type: none"> Ensure 'true/fair' pricing of foods (incl. taxation) Subsidize inputs for nutrient rich foods Investigate and expand district market networks to increase availability and affordability of nutrient rich foods Promote production and sale of nutrient rich indigenous foods 	MOFA, MOF, MOFAD, MOTI, MOT, MLGRD	Economic Development (Agriculture)
7. Sustainability of Diets	<ul style="list-style-type: none"> Low availability of nutrient rich foods like fruits and vegetables in the north 		<ol style="list-style-type: none"> Encourage production of nutrient rich indigenous foods and small livestock rearing Scale up LEAP and GSFP in northern regions to make them more nutrition sensitive 	MOFA, MOGCSP, MOLGRD	Economic Development (Agriculture)
	<ul style="list-style-type: none"> Low production of livestock (poultry and meat) which are have higher environment impact in processing, storage and transportation 		1. Invest in production of sustainable animal-based food alternatives as sources of protein	MOFA, MESTI, MOFAD, MOH	Economic Development (Agriculture)/ Environmental
	<ul style="list-style-type: none"> Limited guidelines on the application of fertilizers 		1. Implement a more circular food system e.g., organic compost to reduce the use of fertilizers	MOFA, MESTI, MOCD	Economic Development (Agriculture)/ Environmental
	<ul style="list-style-type: none"> Unpredictable rainfall in the north resulting in availability fluctuations 		1. Develop understanding of soil, seasonal and climatic conditions through local training and utilizing technology (early warning system)	MOFA, MESTI, MOCD	Economic Development (Agriculture)/ Environmental, Emergency Planning
	<ul style="list-style-type: none"> Relatively high levels of food waste contributing to high emissions 		1. Encourage households and producers to adopt more storage and cooling systems that prolong the life of food.	MESTI, EPA, MLGRD	Environmental, infrastructure and Spatial Development, I
8. Food Waste	<ul style="list-style-type: none"> Increased production of staple crops such as roots and tubers, resulting in surpluses 		<ol style="list-style-type: none"> Invest in food waste aggregation and valorization Increase the use of organic waste to improve agriculture productivity 	MOFA	Economic Development (Agriculture)/ Environmental
	<ul style="list-style-type: none"> Increasing penetration of retail and food service outlets where it is typical to have high 		1. Review and enforce standards on reduction of food waste (incl. among retail institutions)	MOFA, MOTI	Economic Development (Agriculture), Environmental, Governance/Implementation

	levels of food waste than at home				
9. Food environment	<ul style="list-style-type: none"> Inadequate coordination in the formulation of policies for supply and demand creation 		<ol style="list-style-type: none"> Strengthen planning for nutrition-sensitive production Increase the district market network expansion, specifically for nutrient rich foods Build value-added agro-businesses around nutrient rich foods 	MOFA	Social Development (FNS) / Economic Development (Agriculture)/Infrastructure
	<ul style="list-style-type: none"> Limited action on food prices, food retail, food provision and unhealthy food (salt, sodium, fatty acids) promotion to children 		<ol style="list-style-type: none"> Pass legislation to regulate the advantages of foods and drinks with nutrients of concern in child-laden settings and the media Establish and enforce a requirement that caterers involved in the School Feeding Programmes should pass a training course on healthy meal planning 	MOFA, MoF	Social Development (FNS)
	<ul style="list-style-type: none"> Limited funded research on food environments and NCD control 		<ol style="list-style-type: none"> Provide sufficient funds for nationally relevant research on nutrition and NCDs 	MOH, GHS, MOFA	Social Development (FNS, Health and Health services)
	<ul style="list-style-type: none"> Growing population with changing diets and changing food preferences Rising adult and child obesity especially in urban areas Limited knowledge of the importance of nutritious diets and the risks of processed and unhealthy foods 		<ol style="list-style-type: none"> Create sensitization campaigns on nutritious, indigenous foods and the risk of processed foods using understandable dialect Explore taxation/import tax (ban) of unhealthy foods Define and implement clear marketing restrictions of unhealthy foods and drinks Update Ghana's General Labelling Rules with mandatory nutrition information and FBDG 	MOH, GHS, MOFA	Social Development (FNS Health and Health services)
	<ul style="list-style-type: none"> Limited research on how to effectively change consumer behaviour 		<ol style="list-style-type: none"> Conduct research on what strategies would be effective in changing consumer behaviour. 	MOTI, MOFA, MOH, GHS	Social Development (FNS, Health and Health services)
	<ul style="list-style-type: none"> Limited action to establish ingredient lists/nutrient declarations 		<ol style="list-style-type: none"> Create a food labeling policy to support nutrition advocacy. Establish food consumption tables. Finalise and disseminate the FBDG. 	FDA, MOTI, MOFA	Social Development (FNS)

FOCUS AREA	KEY ISSUES	POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	LINKAGES TO MTNDPF
Action Track 3 - Boosting Nature-Positive Production at Scale					
Production System Supra-indicators (10 – GHG emissions from Agriculture, 12 – Food loss and 13 – Biodiversity and habitat index)	<ul style="list-style-type: none"> Indiscriminate use of fertilizer (application at wrong time, in incorrect quantities) due to free/subsidized availability of this input 	Boosting Nature-Positive Production at Scale	1. Avail the right types of fertilizer, in good time, with messaging on correct usage for each season and region	MOFA, MESTI, EPA, MOCD, MLGRD	Economic Development (Agriculture)/ Environment Infrastructure
	<ul style="list-style-type: none"> Fruit fly presence and poor fruit handling practices 		1. Explore scaling up of models that reduce farm-based post-harvest activities	MOFA, MOF, MESTI, MLGRD	Economic Development (Agriculture)/ Environmental
	<ul style="list-style-type: none"> Limited access to on-farm power and poor water quality 		1. Invest in transportation and logistics system e.g., cold chain vehicles, feeder roads to lower costs of aggregation	EPA, MSWR, MOTI, MOT	Environment, infrastructure and Spatial Development
	<ul style="list-style-type: none"> Limited knowledge of production potential, available varieties, and post-harvest practices 		<ol style="list-style-type: none"> Introduce programs to disseminate knowledge about best practices in the supply chain Disseminate agriculture extension services including, solar powered irrigation 	MOFA, MOF, MOCD, MLGRD, MESTI	Economic Development (Agriculture)/ Environment, Infrastructure
	<ul style="list-style-type: none"> Lack of cold chain facilities, inadequate transportation and long transit time 		1. Introduce new, affordable on-farm storage & handling technologies to farmers as well as training on early warning systems, monitoring & management of pests	MOT, MOTI, MLGRD, MOFA	Environment, infrastructure and Spatial Development
	<ul style="list-style-type: none"> Introduction of plant species replaced indigenous land races, which were crops used by local farmers for long periods, in a subtle way 		1. Articulate biodiversity goals	MOFA, MOF	Economic Development (Agriculture)/ Environmental / Governance/Implementation
	<ul style="list-style-type: none"> Farming practices including slash and burn 		1. Devise and apply nature-based solutions such as agroforestry and payments for ecosystem services	MOFA, MOF	Economic Development (Agriculture)
	<ul style="list-style-type: none"> Excessive use of pesticides which kills pollinators (e.g., bees) 		1. Devise and apply nature-based solutions	MOFA, MOF	Economic Development (Agriculture)
Land Utilization Supra-indicator 11	<ul style="list-style-type: none"> Land clearing 		<ol style="list-style-type: none"> Strengthen institutional capacity to improve forest govern. Improve wood harvesting practices Implement legislative reforms to clarify land tenure and regulate the timber and mining sectors 	MESTI, EPA	Environment, infrastructure and Spatial Development

	<ul style="list-style-type: none"> Logging and illegal activities in forest reserves is common practice 		<ol style="list-style-type: none"> Engage members of the public, particularly those living around the reserves, to fight illegal logging 	MESTI, EPA	Environment, infrastructure and Spatial Development/ Governance/ Implementation
	<ul style="list-style-type: none"> Community-based monitoring project has helped curtail illegal logging in some reserves, but additional buy-in from other communities is needed to scale up its results 		<ol style="list-style-type: none"> Increase number of Forestry Commission officials and monitoring mechanisms 	EPA, MESTI	Environment, infrastructure and Spatial Development/ Governance/ Implementation
	<ul style="list-style-type: none"> Increase in land brought into cultivation & expansion of cocoa farms 		<ol style="list-style-type: none"> Increase awareness and need for afforestation programs and campaigns Train farmers on conservation agriculture and agroforestry 	EPA, MESTI, MOCD	Environment, infrastructure and Spatial Development/ Governance/ Implementation
	<ul style="list-style-type: none"> Deforestation for agriculture, mining & logging 		<ol style="list-style-type: none"> Manage forest reserves and creating protected areas with clear monitoring mechanisms 	EPA, MLNR, MESTI, MOCD, MLGRD	Environment, infrastructure and Spatial Development, Governance/ Implementation
	<ul style="list-style-type: none"> Bush fires, set to clear land and aided by the dry harmattan season, have consumed large swaths of forest 		<ol style="list-style-type: none"> Train farmers on conservation agriculture and agroforestry Promote sustainable clearing practices 	MLNR, MESTI, EPA	Environment, infrastructure and Spatial Development, Governance/ Implementation
	<ul style="list-style-type: none"> Rise in the number of livestock and frequent burning of biomass 		<ol style="list-style-type: none"> Include indicators to monitor implementation of policy actions for agriculture emission reduction Provide resources for local government bodies and communities to bid for more REDD+ and clean energy Implement development Mechanism projects 	EPA, MLNR, MESTI, MOFA, MGLDR, MOTI, MLNR	Environment, infrastructure and Spatial Development

FOCUS AREA	KEY ISSUES	POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	LINKAGES TO MTNDPF
Action Track 4 - Ensure advanced equitable Livelihood					
14. Gini Coefficient – Income inequality	<ul style="list-style-type: none"> High urbanization rates with limited livelihood opportunities Lack of income-generating opportunities outside farming in rural areas High levels of income inequality across the country 		<ol style="list-style-type: none"> Invest in processing to increase value add and increase livelihood opportunities for agricultural workers Direct poverty reduction strategies towards specific income components Accelerate creation of jobs in other sectors, allowing people to graduate from subsistence farming Formalize informal sectors of the economy to increase the number of workers who are wage earners Formalize informal sectors of the economy to increase the number of workers who are wage earners 	MOTI, MOFA, MOFAD, MOGCSP	Reducing Poverty and Inequality Focus Area (Objective 1.1 & 1.2)
	<ul style="list-style-type: none"> High costs of a healthy diet in the north due to unpredictable rainfall patters and low purchasing power due to income inequalities 		<ol style="list-style-type: none"> Increase the focus in the northern & rural regions to improve livelihoods and inequalities Invest in early detection and mitigation (storage) systems 	MOFA, MOTI, MGLDR,	Reducing Poverty and Inequality Focus Area (Objective 1.1 & 1.2)
15. Income inequality – farmgate vs retail gate price	<ul style="list-style-type: none"> Low yields and limited market information, limit the participation and decision-making power of small holder farmers Limited bargaining power for farmers, with aggregators/ “middle-men” with access to better infrastructure/information dictate the prices 		<ol style="list-style-type: none"> Explore the impact on prices as well as the effect of price control policies on farmer incomes Provide market information on pricing Create policies that enhance productivity of small holder farmers 	MOCD, MOFA, MOTI, MOLGDR	Agriculture and Rural development focus area (Economic dimension)
	<ul style="list-style-type: none"> Seasonality impacting gap as farmgate prices are lower than other selling points during harvesting 		<ol style="list-style-type: none"> Improve storage facilities so smallholder farms can store their produce in harvest periods when there is excess production and sell during lean seasons when prices are higher 	MOTI, MOT, MOFA, MOF	
16. Gender inequality	<ul style="list-style-type: none"> Lack of strong and influential networks by women 		<ol style="list-style-type: none"> Develop deeper understanding of gender issues among practitioners followed by commitments to action 	MGCSP, MOF, MGLDR	
	<ul style="list-style-type: none"> Limited or unfair accessibility to finance by women 		<ol style="list-style-type: none"> Ensure inclusive and adequate budgeting levels for gender mainstreaming across key policies and institutions 	MGCSP, MOF, MLGRD, MOFAD, MOTI, MOCD, MESTI, MOE	Agriculture and Rural development focus area (Objective 4.1: Create an enabling

					agribusiness environment)
	<ul style="list-style-type: none"> • Women face land, property, business, and labour rights' issues 		<ol style="list-style-type: none"> 5. Develop gender-responsive reporting and accountability mechanisms, especially around levels of representation in agriculture value chains 6. Develop deeper understanding of gender issues among practitioners followed by commitments to action 7. Develop a long-term vision of supporting food systems to become more equitable, and inclusive of women smallholder farmers, in the national response to food and nutrition security 8. Leverage benefits of technologies to empowerment to sustain the role women play in agricultural development 		Agriculture and Rural development focus area (Objective 4.1: Create an enabling agribusiness environment)Economic dimension (Private sector development focus area) Objective 3.5

FOCUS AREA	KEY ISSUES	POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	LINKAGES TO MTNDPF
Action Track 5 - Building Resilience to Vulnerabilities, Shocks and Stresses					
Household Resilience (Supra-indicator 17)	<ul style="list-style-type: none"> Low household resilience - increasing poverty among disadvantaged food crop farmers due to neoliberal policies 	Building Resilience to Vulnerabilities, Shocks and Stresses	<ol style="list-style-type: none"> Adopt practices that protect vulnerable people for diversification of income sources, ensuring the existence of livelihood systems Deal forcefully with the critical issues in food production and food security, including population growth, widespread poverty and income disparity, climate change, water scarcity, land degradation and energy and food price inflation 	MOFA, LEAP, MOGCSP	Economic Development (Agriculture)/ Emergency Planning
	<ul style="list-style-type: none"> Women access to credit is obstructed by cultural norms, relegating them to the background and giving opportunities for men to act as guarantors. When credit application becomes successful, men prefer to exercise control 		<ol style="list-style-type: none"> Educate women on access to credit and existing mechanisms for guarantors 	NCWD, MOF, MOGCSP, MOFA, MOE, MESTI	Social Development (Gender Equality) / Emergency Planning
	<ul style="list-style-type: none"> Relatively high rates of economic growth have not benefited the population equally, resulting in persistently high levels of poverty in particular the rural savannah and coastal regions 		<ol style="list-style-type: none"> Create specific credit programs targeted at women 	NCWD, MOF	Social Development (Gender Equality)/ Emergency Planning
Social Protection Programmes (Supra-indicator 18-19)	<ul style="list-style-type: none"> Existing social protection programmes (LEAP, NHIS, School Feeding Program, Free maternal health program) have coverage gaps, in addition to fragmentation/duplication of the social protection system 		<ol style="list-style-type: none"> Increase access to formal social security and social insurance for all Ghanaian Intensify and scale implementation of the national social protection strategy Improve coordination of various programmes and policies within national social protection framework amongst to ensure overall policy coherence and efficiency 	LEAP, MOF,	Social Development (Social Protection)/ Emergency Planning/Governance/ Implementation
Environmental Conditions	<ul style="list-style-type: none"> Increasing uncertainty about rainfall events; predicted possible changes in rain patterns, vulnerable to intermittent floods, and dry 		<ol style="list-style-type: none"> Raise awareness on climate change and potential consequences Improve water resources conservation, accessibility, availability and quality 	MESTI, MOTI, MOFA, MLGRD, MLNR	Environment, infrastructure and Spatial Development/ Emergency Planning

	spells with water stress				
	<ul style="list-style-type: none"> Desertification and loss of arable land for agricultural production 		1. Promote agricultural biodiversity, crops and animals adapted to climatic change1	MOFA, MESTI, MLNR	Environment, infrastructure and Spatial Development/ Emergency Planning
	<ul style="list-style-type: none"> Outbreaks of crop/livestock pests/diseases due to high temperatures and/or standing water 		1. Monitor and assessment of risk vulnerability, paired with timely risk information sharing	MOFA, MESTI, MLNR	Environment, infrastructure and Spatial Development/ Emergency Planning
	<ul style="list-style-type: none"> Economic growth and urbanization are shifting the agriculture sector towards commercial farming that emphasizes increased outputs and undermines farm diversity 		1. Create awareness that diverse intercropping patterns contribute to higher yields and income while improving soil fertility and pest management	MOFA, MESTI, MLNR	Environment, infrastructure and Spatial Development/ Emergency Planning
Infrastructure Development in terms of Roads, wrahousing facilities, irrigation systems etc	<ul style="list-style-type: none"> 		2.		

FOCUS AREA	KEY ISSUES	POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	LINKAGES TO MTNDPF
Action Track 7 - Effective Governance/Implementation, coordination and delivery mechanism					
Governance/Implementation	<ul style="list-style-type: none"> • No explicit long-term goals on food systems' transformation • No framework in place to investigate food systems' transformation and prioritize key challenge • Implementation challenges driven by human capacity and finance resource constraints Limited efforts to protect regulatory capacities regarding nutrition Poor enforcement of policies • Challenge in ensuring all stakeholders involved in the food system are consulted, involved and coordinated effectively • Not all FS related indicators are tracked at national level 	Building Resilience to Vulnerabilities, Shocks and Stresses	<ol style="list-style-type: none"> 1. Define long-term goals on food systems' transformation and a framework to achieve them 2. Assign a champion that is empowered/mandated to make executive decisions with a food system lens 3. Build effective human capacity till the decentralized level, and prioritize programs to fund and implement 4. Expand CSPGs to ensure all relevant stakeholders related to the FS are involved 5. Incorporate proposed supra-indicators in the M&E/results framework and identify institution to track them 	MOFA, LEAP, MOH, GHS, MOFAD, MOTI, MLGRD	Economic Development (Agriculture)/ Social Development (FNS)/ Environment, Infrastructure/ Emergency Planning/ Governance/ Implementation

7.0 Appendices

FS-TIP Diagnostic Report – Supra Indicators

SUPRA INDICATOR	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE		TARGETS				DATA SOURCE	RELEVANT DIMENSION AND FOCUS AREA IN MTNDPF	RELEVANT POLICY OBJECTIVE IN MTNDPF
			Year	Data	2022	2023	2024	2025			
1. Diet quality	Global Dietary Recommendation plus - GDR+	Outcome	2020	13.8					World Gallup Poll	Social Development (FNS)/ Economic Development (Agriculture)	3.1 Promote nutrition-specific and sensitive programmes and interventions
2. Nutrient Supply Adequacy: Net supply in country of key macro and micronutrients as a share of total consumption requirements for a healthy diet	Net supply in country of key macro and micronutrients as a share of total consumption requirements for healthy diet.	Outcome	2020	<i>See meta-data file for details</i>					National Survey	Social Development (FNS)/ Economic Development (Agriculture)	
3. Undernourished: % of population undernourished	Percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously	Outcome	2018	6.5					World Bank	Social Development (FNS)/ Economic Development (Agriculture)	
4. Overweight and obesity: % of population overweight or obese	Abnormal or excessive fat accumulation that presents a risk to health	Outcome	2016	29.3					WHO	Social Development (FNS, Health)/ Economic	

										Development (Agriculture)	
5. Food safety: Africa Food Safety Index	Combines three food safety indices; Food Safety Systems Index, Food Safety Health Index and Food Safety Trade Index	Outcome	2017	86.67					WHO	Social Development (FNS, Health)/ Economic Development (Agriculture)	
6. Affordability: Cost of a healthy diet as a percentage of household food expenditure (%)	It is the cost of acquiring a healthy diet as a share of total household expenditure being spent on food	Outcome	2020	283					FAO-SOFI	Social Development (FNS)/ Economic Development (Agriculture)	
7. Sustainability of diets: Per capita GHG emissions of food consumption	It is the total of emissions arising along the entire food value chain from agricultural production to the end consumer and including food waste management.	Outcome	2010	2298					WWF		
8. Food waste: Food waste index	Food that completes the food supply chain up to a final product, of good quality and fit for consumption, but still doesn't get consumed because it is discarded, whether after it is left to spoil or	Outcome	2021	127					UNEP		

	expire. It takes place at retail and consumption stages in the food supply chain									
9. Food environment: Composite index of the implementation of food environment policies	Food environment policies that encourage consumption of sustainable and healthy diets	Outcome	2021	4					WHO NCD Monitor	
10. Emissions: GHG emissions from agriculture	These are all emissions and removals occurring on 'managed land' and that are associated with the use of land for agriculture	Outcome	2018	9.73					Climate Watch	
11. Land: Average forest land being deforested in hectares for agriculture use over the past 3 years	Implies the long-term or permanent loss of forest cover and implies transformation into agricultural use. Such a loss can only be caused by a continued human induced or natural perturbation	Outcome	2019	1.42					World Bank, Forest Watch	

12. Food loss: % food loss across supply chain	Refers to food that gets spilled, spoiled or otherwise lost, or incurs reduction of quality and value during its process in the food supply chain before it reaches its final product stage. It takes place at production, post-harvest, processing, and distribution stages	Outcome	TBD	20					National sources		
13. Regeneration: Biodiversity and habitat index	Assesses countries' actions toward retaining natural ecosystems and protecting the full range of biodiversity within their borders	Outcome	2019	48.4					EPI		
<i>14. Income: Gini coefficient (specific) based on incomes in agriculture</i>	<i>Highlight's income distribution among various players in the food systems.</i>	<i>Outcome</i>	<i>No data</i>	<i>0.43</i>					<i>National survey</i>		
15. Income: Gap between farmgate price and wholesale price	Highlights the gap between farmgate price and retail price. Compares income to farmers vs prices paid by	Outcome	2018	169					CAADP Biennial Review		

	consumers. Better if narrow									
16. Gender equity: Women empowerment in agriculture index	Shows the degree to which women are empowered in their households and communities and the degree of inequality between women and men (who are married or in some other form of partnership) within the same household.	Outcome	2014	0.711					IFPRI	
<i>17. Economic: Household Resilience Capacity Index</i>	<i>Estimates household resilience to food insecurity with a quantitative approach to establish a cause effect relationship between resilience and its critical determinants</i>	<i>Outcome</i>	<i>TBD</i>	<i>N/A</i>					<i>FAO</i>	
18. Financial: Proportion of men and women engaged in agriculture with access to financial services (i.e., macro & micro credit)	Access of micro and macro credit by people involved in the agriculture sector	Outcome	2018	20%					CAADP Biennial Review	

19. Social: Government social security budget lines as a percentage of the total resource requirements for coverage of the vulnerable social groups *excluding donor community	The amount of money that the country allocates for preventive, protective, promotive or transformative assistance to farm individuals, households or communities	Outcome	2018	57.17					CAADP Biennial Review		
20. Environmental: ND-GAIN (Notre Dame Global Adaptation Initiative) Country Index	Summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience	Outcome	2018	44.35					ND- GAIN		
21. Production diversity: Percent of kilograms from top 5 crops produced (%)	The proportion of production occupied by the key foods produced in the country	Outcome	2019	82					FAO		

Data availability - for Supra-indicators 14. Gini co-efficient (based on food system) and Supra-indicator 17. Household Resilience Capacity Index is not available from international data sources, however maybe available from local data sources/ M&E institutions; Calculation – for Supra-indicator 2. Nutrient Supply Adequacy – please refer to meta-data file on Methodology

Appendix 2 Potential game changing solutions to global food systems challenges (Global Dialogues Solution Clusters)

Appendix 3. List of Ghana's food systems dialogues and conveners