



# Making food systems work for complementary feeding in low- and middle-income countries

## Meeting Report

Expert Consultation  
4–5 December 2023

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## Acronyms

4 As	availability, affordability, accessibility, and aspiration
AINFP	Alliance for Inclusive and Nutritious Food Processing
ATNI	Access to Nutrition Index
B2C	business to consumer
CEO	chief executive officer
CHANGE	Creating Homestead Agriculture for Nutrition and Gender Equity
ComFA	Complementary Food for Africa
DDS	dietary diversity score
EaaS	Expertise as a Service
FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administration
GAIN	Global Alliance for Improved Nutrition
GRET	Groupe de recherches et d'échanges technologiques
HKI	Helen Keller International
IFPRI	International Food Policy Research Institute
KAP	knowledge, attitude, and practices
LMICs	low- and middle-income countries
NGO	nongovernmental organization
R&D	research and development
SHiFT	Sustainable Healthy Diets through Food Systems Transformation
SIL	Soybean Innovation Lab
SME	small and medium enterprises
SQ-LNS	small-quantity lipid-based nutrient supplement
SUN	Scaling Up Nutrition
UNICEF	United Nations Children's Fund
UNFSS	United Nations Food Security Summit
USAID	United States Agency for International Development
WFP	World Food Program
WHO	World Health Organization



## Glossary

**Fresh nutrient-dense foods:** These are fresh foods appropriate for complementary feeding of children 6-23 months old. Specific food groups are dark-green leafy vegetables; peas and beans; orange and red fruits and vegetables; nuts; and animal source foods such as liver, dairy, eggs; and aquatic foods.

**Minimally processed nutrient-dense foods:** Fresh nutrient-dense foods that have undergone light processing (e.g., drying, fermentation, pasteurization) such that it does not significantly alter their nutritional content. These foods can be consumed in their natural state, with minimal preparation or combined with other foods to improve the overall nutritional value of the food. Examples include dried fish powder, egg powder, fruit puree.

**Fortified complementary foods:** These are complementary foods specifically designed for 6-23 months old children by local, regional, or multinational food companies, lipid-based and/or cereal-based, and are enriched with additional micronutrients to improve their nutritional quality.

**Available:** The degree to which safe and nutritious complementary foods are consistently and physically available in desired quantities, shaped by the production, distribution, trade.

**Affordable:** This is a relative concept reflecting both price and income. It is the ability of the low-income households to purchase enough safe and nutritious complementary foods considering demands on income.

**Accessible:** The ability of the low-income households to obtain safe and quality complementary foods, free from economic and physical barriers such as distance to market, safety, physical features of the area and/or store, transportation costs.

**Aspirational:** This is related to the aspirations of low-income households to provide 'the best' for young children, aiming for their healthy growth, and those that symbolize higher social status, driven by desires for social acceptance and mobility. It involves striving for product and services of similar attributes, quality, and safety as those of more affluent segment, offering added value such as convenience and cultural relevance.

**Last-mile delivery:** It denotes the final step in the supply chain: the delivery of a product or service to the destination or end-consumer. In the context of low-income consumers or base-of-pyramid, this refers to delivery of a product or service to the destination or end-consumer in areas that are remote and/or lacking adequate infrastructure.

**Patient capital:** A term used to describe long-term investment in form of funding or project cycles, where sustainable growth is prioritised alongside financial returns.



## Executive Summary

Food systems currently are not meeting the needs of children in low- and middle-income countries (LMICs) across the globe. In these countries, two in three children between the ages of 6 and 23 months lack the diverse diets they need for healthy growth, development, and future economic success. Nutrient requirements of children in this age group are high due to rapid growth and development while the quantities of food they can consume to meet these requirements is small, highlighting the need for locally grown nutrient-dense foods and in contexts where these are not available, fortified complementary foods. Low availability and unaffordability of diverse foods appropriate for young children limit access to a nutritious diet. Bold actions are needed to ensure that food systems and more particularly, agricultural production, food supply chains, and food environments sustainably provide healthier and more nutritious diets for this vulnerable age group.

On behalf of the United States Agency for International Development (USAID), the Micronutrient Forum (the “Forum”) and USAID Advancing Nutrition organized an expert consultation on December 4–5, 2023 on food system approaches to discuss strategies to increase the availability, affordability, accessibility, and aspirational aspects of nutritious and safe foods appropriate for complementary feeding that can be purchased by low-income households. The 43 participants’ expertise covered nutrition, food systems from local to global levels, policy and business expertise and represented research, bilateral, technical, and implementing organizations, United Nations agencies, and the private sector.

The main objectives of the consultation were to:

1. Discuss and agree on key evidence, knowledge, and implementation gaps on approaches to leverage food systems to deliver nutrient-dense foods appropriate for complementary feeding<sup>1</sup> and fortified complementary foods.
2. Identify the opportunities and priorities for investment to effectively strengthen collective action of food system actors and stakeholders to increase availability, affordability, accessibility, and aspiration (4 As) for nutrient-dense and fortified complementary foods.

The consultation focused on challenges and opportunities within the food system, and more specifically, with the supply, production, and distribution of nutritious and safe complementary foods encompassing:

- fresh nutrient-dense foods appropriate for complementary feeding of children 6-23 months age such as animal source foods (eggs, fish, and meat), fruits and vegetables, pulses, nuts, and seeds<sup>1</sup>,
- minimally processed nutrient-dense foods (e.g. dried, fermented, pasteurized) such that it does significantly alter their nutritional content<sup>1</sup>, and
- fortified complementary foods designed for young children to be used in contexts where nutrient requirements cannot be met with unfortified foods alone.

Key to the dialogue was the exploration of innovative approaches and strategies for enhancing the reach of nutritious and safe complementary foods especially for low-income households with children 6–23 months old. However, this consultation did not include discussions on home fortificants, which are mainly distributed through health or social protection programs, nor on consumer demand creation approaches such as social and behavior change communication, or government subsidies to increase affordability.

Limited national supply, high prices relative to household incomes, low appeal, and safety concerns reduce accessibility and desirability of nutrient-dense foods. Additionally, economic factors such as prices, income, and preferences, and the challenges posed by perishability, which impacts both transaction costs and food safety, influence consumer preferences and demand. Experts suggested a multi-faceted approach to transform and strengthen local food systems, which includes: enhancing agricultural productivity through

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<sup>1</sup> Throughout the report, the term ‘nutrient-dense foods’ refers to fresh and minimally processed fresh foods that are appropriate for complementary feeding of children 6-23 months old but also consumed by the general population.



access to inputs; capacity strengthening of producers through farmer groups and agricultural extension programs; infrastructural development such as cold and dry chains; farm subsidies and financial incentives to make nutrient-dense foods more affordable; efforts to reduce food loss and waste and for minimizing the risks for local farmers and enterprises; and investing in understanding what constitutes value for the consumer. The experts examined the complex interplay between production, market availability, access, and consumption of nutrient-dense foods, emphasizing the role of gender dynamics and the importance of local and context-specific approaches.

The development, distribution, and marketing of fortified complementary foods present unique challenges, some of which mirror those associated with nutrient-dense foods. A key challenge is integrating fortified complementary foods into the broader food system to enhance their accessibility and affordability, particularly for low-income households, while ensuring that they provide the right nutrient composition and quality and are promoted in line with the International Code of Marketing Breastmilk Substitutes and other recommendations regarding marketing of foods to infants and young children. According to the recent World Health Organization (WHO) Guidelines for Complementary Feeding (2023), fortified food products may be recommended, i.e., *“in some contexts where nutrient requirements cannot be met with unfortified foods alone, children 6-23 months of age may benefit from nutrient supplements or fortified products.”*

Participants suggested several strategies and approaches to overcome these challenges, such as developing and adopting regional or national product standards enforced through product quality monitoring for quality assurance, improving reach through cross-subsidization, product, or market segmentation (offering different product lines at varying price points), and last-mile delivery platforms. The roles of public and private sectors in improving the availability, accessibility, affordability, and aspiration (4 As) of safe and nutritious fortified complementary food are complex due to trust issues and divergent interests. Aligning the distinct roles of these sectors and leveraging their strengths and expertise is key to improving the reach and quality of fortified complementary foods. Strategies to engage more actively with the food industry, including small and medium enterprises (SMEs), are essential for successfully integrating fortified complementary foods in the food system.

The consultation underscored the need to monitor the progress of food systems to deliver accessible, affordable, and aspirational nutrient-dense and fortified complementary foods. This is, however, hindered by the lack of standardized and comparable metrics specific to complementary feeding. Recommendations focused on adapting existing metrics for tracking progress on delivery of nutrient-dense and fortified complementary foods, and systematically collecting and analyzing data across different levels of the food system, ensuring a comprehensive understanding of the issue at a broader, national perspective down to more localized contexts. The emphasis on nationally and sub-nationally representative metrics underscores the importance of having data that accurately reflects conditions across an entire country, providing a foundation for informed decision-making and policy development in the realm of food systems to deliver nutrient-dense foods and fortified complementary foods.

Throughout the two-day consultation, experts identified four core areas that hindered the 4 As of safe and nutritious complementary foods: **knowledge and evidence gaps, limited local capabilities and capacity, implementation barriers related to business constraints and supply chain inefficiencies, and lack of a favorable enabling environment.** For each of these four core areas, they proposed a set of recommendations to effectively strengthen collective action of food system actors and stakeholders to increase the 4 As for nutritious complementary foods for children 6 to 23 months old and their caregivers. In total, 13 recommendations were put forth, of which the experts prioritized six specific actions, warranting urgent action by implementers and investment by donors to transform food systems to support safe and nutritious diets for young children.

### **Core Area 1: Fill the Knowledge Gaps**

Local and global initiatives exist, but information on successes, challenges, and opportunities to increase the 4 As of nutrient-dense foods and fortified complementary foods is not consistently reported and disseminated. The experts agreed that there is insufficient robust evidence on the impact of food system



approaches and viable business models that measurably improve complementary feeding practices. Lack of knowledge can act as a barrier for targeting new funding or sustaining prior investments, capacity strengthening and technical assistance, as well as in scaling up initiatives. The following recommendations aim to fill this critical gap:

1. **PRIORITY: Create compendiums of successes and failures in approaches, policies, and business models to prevent food loss and waste and improve supply chain efficiencies for nutrient-dense foods and commercialized fortified complementary foods.** Experts identified three specific themes for which a compendium could be created, capturing what works and what does not work in:
  - a. post-harvest food loss and waste and shelf-stability approaches such as cold and dry chains.
  - b. government policies and incentives to make nutrient-dense foods available, affordable, and accessible.
  - c. viable business models (including hybrid models) for nutrient-dense foods and commercialized fortified complementary foods, exploring business data on profitability and sustainability.
2. **PRIORITY: Build a robust evidence base on consumption and purchase of complementary foods and the impact of food system approaches on the 4As of complementary foods and business viability.** Experts recommended investments in research for the following topics:
  - a. Adapt existing metrics or develop new simple metrics to improve data collection on the types and amounts of complementary foods consumed by children; where caregivers purchased them; how they are prepared; and the impact of efforts that enhance the availability, affordability, accessibility, and aspirational dimensions of nutritious and safe complementary foods.
  - b. Understand the impact of different business models for complementary foods (including hybrid models that combine retail and institutional markets) on child diets and business indicators, such as market size, sales volume, cost of retail, and break-even-points.
3. **Conduct research to better understand low-income consumers, their needs, and aspirations.** There is dearth of information on the aspirational aspects of foods appropriate for complementary feeding, and more specifically, on the drivers and motivators for the choices of the caregivers. Experts recommended investing in researching the aspirational aspects of complementary foods and how these can be leveraged to influence caregivers to make better and healthier choices.
4. **Communicate effectively and with one voice on child diet considerations to guide food system transformation.**
  - a. Publish a paper (series) focused on the considerations for making food systems work for young child diets. For instance, highlight the importance of processing and packaging on nutrient density and food safety, and how these can impact children’s diet quality and health.
  - b. Share and integrate the recommendations from this consultation into WHO implementation guidelines and into the work of the Global Collective on Complementary Feeding.

## **Core Area 2: Build Capacity across Food System Actors**

The experts voiced a need for cultivating a market for services such as technical support, food safety trainings and product quality validation and make these affordable and accessible especially to SMEs. They recommended the following actions:

5. **PRIORITY: Adopt “R&D-as-a-service” model and provide expertise, capacity strengthening, and technical assistance to food system actors (particularly SMEs) to develop safe, nutritious, and aspirational complementary foods.** In many cases, public and private sector actors either lack the technical expertise and capacity or cannot afford the R&D costs to develop safe, nutritious, and aspirational complementary foods. “R&D-as-a-service” model, often provided by suppliers (e.g., of ingredients or packaging) aims to reduce the cost of research and development and serves as a pathway to markets by providing technical assistance and capacity strengthening to all SMEs willing to engage in complementary feeding.





- 6. Analyze food systems' readiness for improving complementary feeding at (sub)-national levels.** Contextualizing the entry points is an essential first step to developing a full, child-centered food systems approach to drive multi-level action within a country. This involves, but is not limited to, analyzing the national nutrition strategies; policies; regulatory environments; capacity (infrastructure, capabilities); and mapping existing networks and key actors that can be leveraged to improve complementary feeding.

### **Core Area 3: Address the Barriers to Implementation**

The discussions highlighted financial constraints, lack of quality raw materials, supply chain inefficiencies and short-term business planning as key barriers to achieving scale. Hence, the following actions are recommended:

- 7. PRIORITY: Develop and align financing strategies at the national and organizational levels to mobilize a pipeline of investments that support individual SMEs in bringing more high-quality and safe complementary foods to market at an affordable price.** Access to capital at reasonable interest rates continues to be the biggest obstacle to the growth of SMEs. At the same time, experts indicate that substantial capital is available in countries for good investment opportunities. A country-level platform (e.g., SUN Business Network) could support the development of a comprehensive financing strategy and create a pipeline of capital investments to support individual SMEs in bringing more high-quality and safe complementary foods to market at an affordable price, according to well-established rules of engagement for public-private partnerships.
- 8. Collaborate with business strategy and innovation experts to carry out in-country market assessments and business case analysis and to develop viable business models, for safe and nutritious complementary foods.** Despite a growing number of initiatives and SMEs focused on delivering safe and nutritious complementary foods to low-income households, challenges remain in sustaining a financially viable business model. Business expertise is needed to understand the country-specific markets, identify local supply chain inefficiencies and strategic planning to achieve scale.
- 9. Address inefficiencies in the food supply chains between post-production and consumption to reduce food loss and waste and improve affordability of nutrient-dense foods and fortified complementary foods.** Considerable efforts have been devoted to improving the production side of the supply chain at one end or increasing food consumption at the other. However, more needs to be done to improve the efficiency of the middle of the food supply chain in reducing food loss and waste. Increased investments to enhance efficiencies in processing, packaging, distribution, and retailing of nutrient-dense foods, will have a positive impact on food availability and prices, and indirectly impact young children's diet quality and health.
- 10. Promote the use of native, underutilized and biofortified crops as a part of complementary feeding.** Native and underutilized crops, such as baobab grains or moringa leaves as well as biofortified crops, such as orange-fleshed sweet potatoes, offer a culturally acceptable opportunity to improve nutrient density of complementary foods. Further investment is needed to increase availability to these climate-resilient crops, potentially giving greater access to quality raw materials.

### **Core Area 4: Strengthen the Enabling Environment**

While the importance of public-private partnerships was widely acknowledged, concerns related to issues of trust, repeated violations of the International Code of Marketing of Breastmilk Substitutes and other recommendations regarding marketing of foods to infants and young children, governance issues, different timelines, and challenges in business viability warrant attention. Experts, therefore, recommended the following for action:

- 11. PRIORITY: Organize expert consultations to discuss recommendations for product standards for fortified complementary foods and appropriate monitoring mechanisms.** There is a distinct lack of guidance on nutritional composition standards, product requirements, labeling, and promotion of fortified complementary foods, along with challenges in implementing and monitoring these standards.



To address this, experts recommended organizing additional globally representative consultations that focus on the following topics:

- a. Recommendations for the formulation of fortified complementary foods and the development of a product standard
  - b. Sharing challenges and successes in production, distribution, and marketing of fortified complementary foods that meet the product standard and align with the WHO complementary feeding implementation guidance.
12. **PRIORITY: Develop unified standards and tools to inform decisions and guide engagement with food system stakeholders, including the food industry, on appropriate formulation of complementary foods.** There is an urgent need for international, regional, and national standards to guide companies involved in the production, distribution, and marketing of complementary foods. Insights from the expert consultations (recommendation #11) should inform the development and implementation of comprehensive frameworks and tools to promote standardized, high quality production practices of (fortified) complementary foods. This approach can level the playing field for companies of all sizes and foster a competitive market that prioritizes the nutrition and well-being of young children.
13. **Create accountability networks at national level to strengthen the enabling environment in support of the development and distribution of nutritious and safe complementary foods.** Trust was reiterated as a key barrier in public-private partnerships. Accountability networks and forums (e.g., SUN Business Network, industry networks, CEO forums, Food and Drug Administration) offer a platform for dialogue between private and public sector actors within a framework that holds all parties accountable to transparent communication and ethical practices. These networks can serve as the entry point to discuss and advocate for positive changes in policy, standards, and regulations in support of the development and distribution of nutritious and safe complementary foods. Moreover, they can provide opportunities to accelerate pathways to markets.



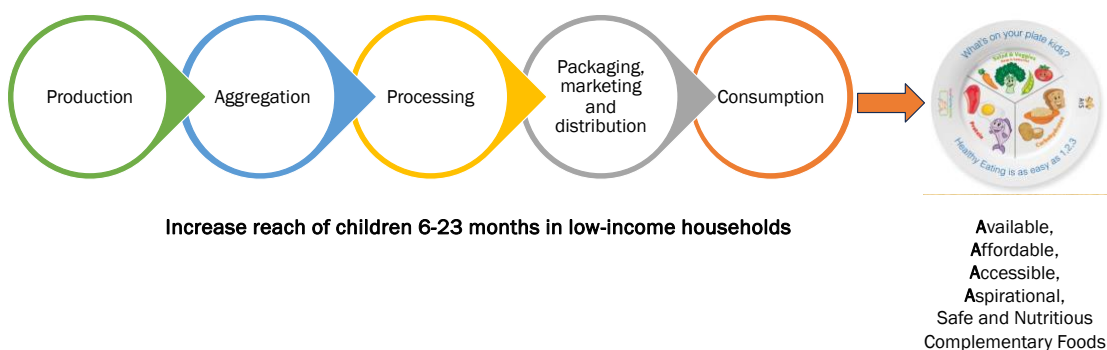
## Introduction

Food systems across the world are currently failing to meet the nutritional needs of children, particularly those between 6 and 23 months. Two in three children in this age range in low- and middle-income countries (LMICs) are deprived of the diets they need when it matters the most, impacting their growth, development, and future educational and professional achievements (Aguayo and Morris, 2020; UNICEF, 2021). The diets of this particularly nutritionally vulnerable age group, which should complement continued breastfeeding, are often insufficient both in quantity and quality (WHO, 2023; UNICEF, 2022). This inadequacy stems from the high nutrient requirements of young children during periods of rapid growth and development, juxtaposed against the limited quantities of food they can consume to provide these nutrients. Evidence shows that it is challenging to meet all nutrient needs of children, especially for iron, and that nutrient supplements or fortified food products can contribute to filling nutrient gaps (Vitta and Dewey, 2012). The need for young children to consume highly nutrient-dense foods is well recognized, but multiple barriers in the food system make these foods largely unavailable and unaffordable to low-income households in LMICs. Therefore, in these contexts, many children 6-23 months of age could benefit from nutrient supplements or fortified complementary foods.

The inefficiencies within the food system, especially within the upstream modalities of production, processing, distribution, and retail, can affect the quality as well as lead to high costs of nutrient-dense foods and fortified complementary foods. This calls for innovative, cost-effective methods to develop and deliver nutrient-dense foods to improve complementary feeding diets. (Bai et al., 2022; Aguayo and Morris, 2020). The challenge, however, extends beyond affordability. The Global Alliance for Improved Nutrition (GAIN) and UNICEF (2021) note that accessibility of these foods through market-based distribution and retail channels, especially for low-income consumers, remains a significant challenge. Moreover, for some nutrient-dense foods, low appeal compounds the problem. These barriers exist for all populations and age groups, but the impact is even greater on young children who have the highest nutritional needs. Hawkes et al. (2020) and Nordhagen (2020) argue that food systems, and notably food value chains, should become more child-centered to provide nutritious foods that are not only affordable and accessible but also available and aspirational (4 As)<sup>2</sup>.

While these challenges are daunting, they also present an opportunity for innovation and bold, transformative actions within food systems on both the supply and demand side to enhance the dietary diversity and quality of foods appropriate for children 6 to 23 months old (United Nations Food Systems Summit [UNFSS] 2021; UNFSS 2023). Examining effective approaches and opportunities across the food system, particularly in food supply chain and food environment (Figure 1), could provide insights into increasing the 4 As of nutrient-dense foods and fortified complementary foods (Bai et al., 2023; Nordhagen 2020; Nordhagen and Demmler 2022).

**Figure 1.** Opportunities across the Food System Elements to Impact Complementary Feeding



<sup>2</sup> The role of factors other than availability, accessibility, and affordability of foods in influencing choices and decisions for complementary feeding diets includes cultural factors, behavioral aspects, social norms, product desirability as well as caregivers' aspirations for "what is best" for the child and for themselves (convenience, status perception).



Over the past decade, innovative approaches in supply chain optimization and business models have been developed to increase reach among low-income consumers, including those focused on improving high-quality complementary foods. Initiatives such as 2Scale, HarvestPlus, and Eggciting Innovations have developed and implemented new distribution models and improved market access of nutrient-dense foods for these consumers. Additionally, Nutri'zazza, Mile for the Brain, E'pap, and Protein-Kissée-La have developed and marketed locally produced and commercialized fortified complementary foods (see Annex 1a for an overview of these initiatives). Despite these promising strategies, achieving a viable, sustainable business model and scale remains a challenge. To make food systems more child-centered, it is paramount to better understand the barriers and enablers that influence production, development, and delivery of complementary foods, and to understand what constitutes value for the caregivers of the children.

Therefore, on behalf of the United States Agency for International Development (USAID), the Micronutrient Forum and USAID Advancing Nutrition organized an expert consultation to improve understanding on how to increase the 4 As and reach more 6 to 23-months old children and their caregivers in low-income households in LMICs with nutritious and safe complementary foods through food system approaches.

## Scope of the Consultation

The consultation focused on aspects of food system that can contribute to increasing the 4As (Box 1) of nutritious complementary foods for low-income households. Improving the 4 As is expected to increase supply and demand of nutritious complementary foods leading to increased reach of the target population (Figure 2).

### **Box 1. Definitions: Available, Affordable, Accessible, and Aspirational (4 As)**

**Available:** The degree to which safe and nutritious complementary foods are consistently and physically available in desired quantities, shaped by the production, distribution, trade.

**Affordable:** This is a relative concept reflecting both price and income. It is the ability of the low-income households to purchase enough safe and nutritious complementary foods considering demands on income.

**Accessible:** The ability of the low-income households to obtain safe and quality complementary foods, free from economic and physical barriers such as distance to market, safety, physical features of the area and/or store, transportation costs

**Aspirational:** This is related to the aspirations of low-income households to provide 'the best' for young children, aiming for their healthy growth, and those that symbolize higher social status, driven by desires for social acceptance and mobility. It involves striving for product and services of similar attributes, quality, and safety as those of more affluent segment, whilst offering added value such as convenience and cultural relevance.

(Definitions synthesized from Hawkes et al., 2020; Nordhagen, 2020; Shrivastava et al., 2020; World Bank, 2006)



Based on the recommendations of a previous expert consultation (Micronutrient Forum, 2023) held in June 2023, this meeting focused on the following food categories:

- **fresh nutrient-dense foods:** These include fresh foods appropriate for complementary feeding of children 6-23 months age. Specific food groups are dark-green leafy vegetables; peas and beans; orange and red fruits and vegetables; nuts; and animal source foods such as liver, dairy, eggs; and aquatic foods.
- **minimally processed nutrient-dense foods:** These include fresh nutrient-dense foods that have undergone light processing (e.g., drying, fermentation, pasteurization) such that it does not significantly alter their nutritional content. These foods can be consumed in their natural state, with minimal preparation or combined with other foods to improve the overall nutritional value of the food. Examples include dried fish powder, egg powder, fruit puree.
- **fortified complementary foods:** These are complementary foods specifically designed for 6-23 months old children by local, regional, or multinational food companies, lipid-based and/or cereal-based, and are enriched with additional micronutrients to improve their nutritional quality.

**Figure 2.** All 4 As are Relevant for Increasing Reach among Children 6 to 23 Months Old



This report uses the term ‘nutrient-dense foods’, unless otherwise specified, for both fresh and minimally processed foods that are appropriate for complementary feeding of children 6-23 months age.

To narrow down the scope of this meeting, participants agreed to the following:

- to concentrate on aspects of two specific elements in the Food System Conceptual Framework (USAID 2021; Annex 2) notably **food supply chains** and **food environment** (Table 1), and not to address food and water utilization.
- to not address home fortificants (e.g., micronutrient powders) mainly distributed through health or social protection programs.
- to not address demand creation approaches such as social and behavior change communication and subsidies to increase affordability, for which the June 2023 consultation participants recommended a separate expert meeting.

**Table 1.** Scope of the Consultation

In Scope	Out of Scope
<p><b>Food supply:</b> agricultural production and loss; transport, storage, and distribution; processing and packaging</p> <p><b>Food environment:</b> availability and affordability; markets and access; promotion, advertising, and information*; food and water quality and safety*</p>	<p><b>Food supply:</b> land and water resources; input and water supply</p> <p><b>Food environment:</b> prices</p>

## Discussion Themes and Expected Outputs

This expert consultation brought together 43 experts (Annex 3) from a variety of disciplines and agencies for two-days. Four discussion themes were identified across the food supply and food environment for their



potential to, directly or indirectly, influence reach among low-income households of children 6–23 months old with nutritious and safe complementary foods:

1. Encouraging continuous supply of nutrient-dense foods
2. Consumer-centered product development and delivery
3. Innovative approaches and sustainable business models
4. Strengthening collective action of food system actors.

For each of these areas, four core questions guided the sessions:

- a. What works well? What are examples of successes? Where are the knowledge and implementation gaps?
- b. What are the barriers to scaling up these successes and how can they be overcome?
- c. What are the priorities for action and what collective action is needed to progress in this area?
- d. What metrics are needed to monitor progress?

This consultation was expected to contribute to:

- creating a shared understanding of knowledge and implementation gaps from promising initiatives addressing food systems and more specifically, food supply chains and food environments for nutrient-dense foods groups and fortified complementary foods.
- identifying opportunities and priorities for investment to effectively strengthen collective action of food system actors and stakeholders to increase the 4 As for nutritious complementary foods for children 6 to 23 months old and their caregivers.

## Report Structure

This report provides a summary of presentations, working group contributions, discussions, and recommendations, including those made during the plenary and among participants in the virtual chat.

The report contains five sections:

<b>1. Setting the Context</b>	This section provides an overview of principles, progress, and guidelines of complementary feeding; the role of food systems in achieving 4 As for safe and nutritious complementary foods; and the considerations for increasing reach among low-income consumers.
<b>2. Encouraging Continuous Supply of Nutrient-Dense Foods</b>	This section examines challenges, strategies, and approaches for improving availability, affordability, and accessibility of nutrient-dense foods, taking a food systems lens.
<b>3. Consumer-Centered Product Development and Delivery of Fortified Complementary Foods</b>	This part focuses on fortified complementary foods. It describes challenges, strategies, and approaches to improve consumer-centered product development and delivery and identifies key drivers and considerations in business models for increasing consumer reach.
<b>4. Monitoring Progress</b>	This section describes some of the existing methods, tools, and metrics to monitor progress on food system actions, and discusses what needs to be developed or adapted for use in complementary feeding.
<b>5. Recommendations for Action</b>	This section presents a comprehensive list of recommendations of actions for re-orienting food systems.



# 1. Setting the Context

## Progress, Challenges, and Guidelines for Complementary Feeding

Session presenters: Saskia Osendarp, Kathryn Dewey, and Chessa Lutter

Nutrient-dense foods in the earliest years of life are crucial to a child's growth and development. Yet, there has been little to no progress in improving the diets—in quantity and quality—of young children between the ages of 6 and 23 months. Disparities in diets persist across and within countries, with poor diets disproportionately affecting children living in rural areas, poorer households, and disadvantaged regions. According to UNICEF's flagship report *Fed to Fail*, among 50 countries with trend data for minimum dietary diversity, less than half had made significant improvements and 10 countries experienced a significant decline (UNICEF, 2021).

The prevalence of nutrient gaps in the diets of young children persist, largely due to caregivers' heavy reliance on low-cost cereal-based diets. These diets have low nutrient density, are deficient in some essential nutrients, especially iron, and are high in anti-nutrients such as phytates (which inhibit absorption of iron, zinc, and calcium). The June 2023 expert consultation reiterated the persisting gaps in intakes of iron, vitamin A, zinc, folate, vitamin B12, and calcium in the diets of young children (Micronutrient Forum, 2023). Households could fill these gaps, for a large part, by increasing intakes of energy and micronutrient-dense (i.e., non-fortified) food sources such as organ meats, ruminant meat, dairy, eggs, small fish, shellfish (bivalves and crustaceans), pulses such as groundnuts, orange and red fruits, and dark green leafy vegetables. Consumption of these foods among low-income households, however, is generally low (Beal et al., 2017).

Affordability and accessibility remain major barriers to improving the diet quality of young children in low-income households. Even when nutrient-dense foods are available, high costs can make them inaccessible to a large segment of the population. For example, one participant noted that, “while some nutrients like vitamin A may be affordable, others like iron, calcium, and zinc often are not, particularly in specific regions.” A study involving six countries in Eastern and Southern Africa found that vitamin A was affordable for most households, but only a few foods are affordable sources of iron or calcium and only in a few countries (Ryckman, Beal, Nordhagen, Chimanya et al., 2021), and zinc was ubiquitously unaffordable in South Asia (Ryckman, Beal, Nordhagen, Murira, et al., 2021).

In their *Fed to Fail?* report, UNICEF (2021, p. 3) recommends increasing “the availability and affordability of nutritious foods—including fruits, vegetables, eggs, fish, meat, and fortified foods—by incentivizing their production, distribution, and retailing”. This approach was also one of the key recommendations in the June 2023 expert consultation (Micronutrient Forum, 2023).



The availability and affordability of fortified products and nutrient supplements can significantly reduce the complementary feeding cost for caregivers and contribute to meeting children’s nutritional needs (Box 2).

The case for a synergistic approach in complementary feeding strategies is strong: there is a need to increase the use of nutrient-dense foods and complement nutrient gaps with fortified foods or nutrient supplements.

WHO recently updated its complementary feeding guidelines (WHO 2023), a pivotal development reflecting current evidence since the original guiding principles were issued 20 years ago. The updated WHO Guidelines, supersede the Pan-American Health Organization/WHO (2003) and the WHO (2005) guidelines. These consider the needs of both breastfed and non-breastfed children and include seven evidence-based recommendations on complementary feeding of infants and young children 6–23 months of age living in LMICs (Figure 3).

There are several significant and noteworthy elements in the 2023 guidelines. First, animal milk is acceptable for non-breastfed infants aged 6 to 11 months, notably “for infants 6–11 months of age who are fed milks other than breast milk, either milk formula or animal milk can be fed” (p. xi). Secondly, as part of diet diversity, the recommendations include a strong emphasis on the daily consumption of animal source foods (meat, fish and egg) and fruits and vegetables and frequent consumption of pulses, nuts and seeds particularly where meat, fish or eggs and vegetables are limited in the diets. Third, consumption of starchy cereals is not encouraged but those consumed should be fortified, notably “for populations already consuming commercial cereal grain-based complementary foods and blended flours, fortification of these cereals can improve micronutrient intake, although consumption should not be encouraged” (p. xii). Fourth, foods high in sugar, salt, and trans fats should be avoided; the intake of 100 percent fruit juice should be limited; and consumption of non-sugar sweeteners is not recommended.

Efforts are underway to translate the Guideline into implementation and policy guidance, which WHO anticipates will be available in mid-2025. Improving the quality and safety of commercially produced complementary foods and agricultural actions to improve complementary feeding are among the topics that will be addressed in the guidance.

**Box 2. Fortified Products Can Fill Nutrient Gaps and Make Complementary Feeding Diets More Affordable**

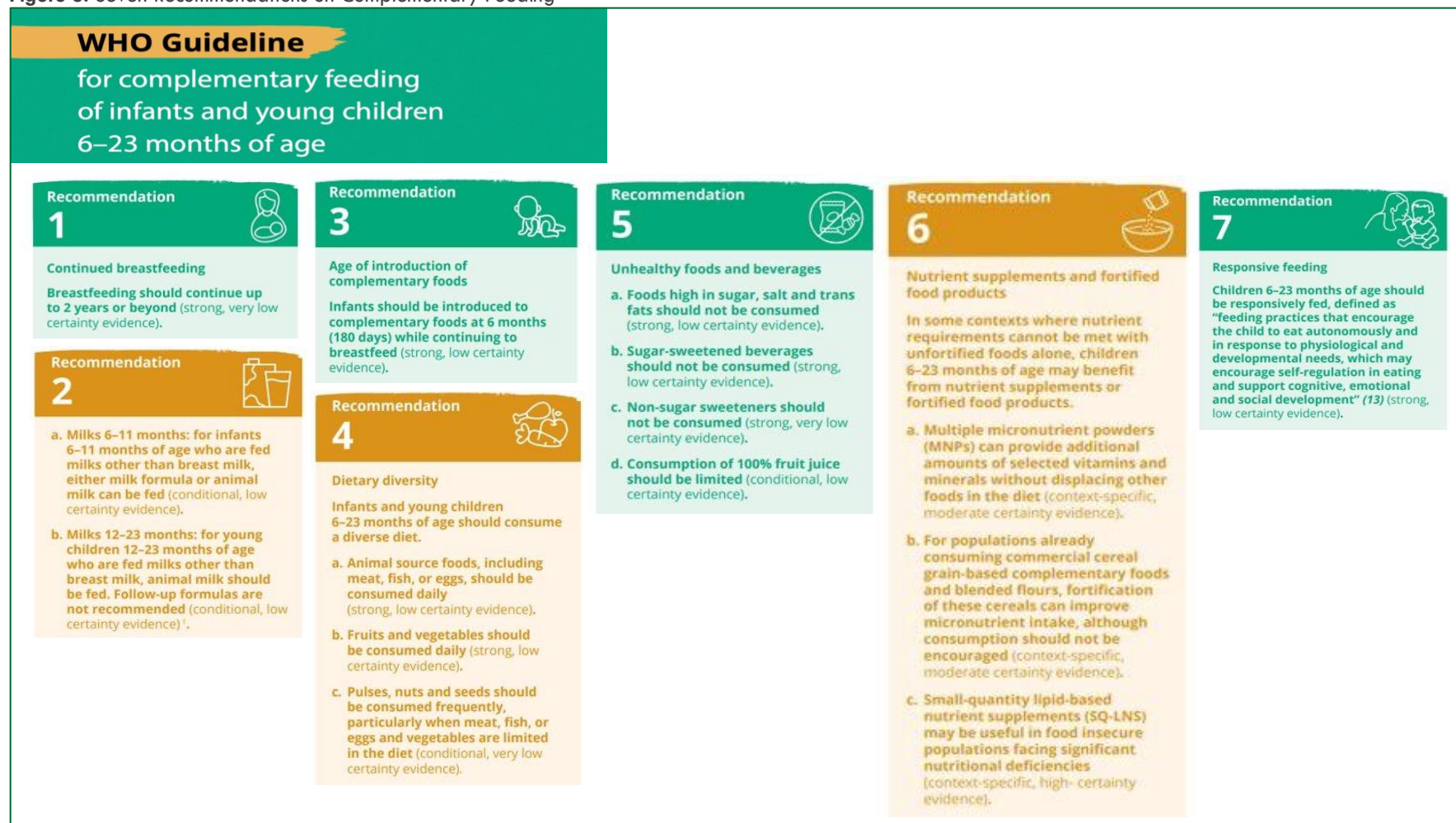
A modeling exercise using food availability and price data from over 100 countries revealed that less than 20% of the model diets were feasible (meeting the nutrient requirements) for the youngest age groups (6–9 months), and the median price of those that were feasible was \$1.90. If, however, SQ-LNS (delivered for free) was added to the mix, feasibility went up to 71% and the price went down to \$0.47. Similar impact was seen on diets for 9–12 months and 12–24 months.

(Bai et al., 2023)





Figure 3. Seven Recommendations on Complementary Feeding



(WHO 2023)



# Role of Food System in Delivering Safe and Nutritious Complementary Foods

Session presenters: Stella Nordhagen and Dominic Schofield

## Food System Considerations

A food system designed to support diets rich in safe, nutritious foods for young children needs to deliver on the 4 As. However, the current reality points to a stark scarcity of nutrient-dense foods. For instance, in some countries the national egg supply does not suffice to allow even each person to consume one egg per week. In more extreme cases, such as Burundi, the availability drops to just one egg per person every 125 days (Beekman et al., 2019). Affordability is also a big challenge, with most of the population in LMICs unable to afford a nutritious diet.

Nutrient-dense foods are frequently not perceived as desirable or aspirational, especially when compared to branded or packaged foods. This is often due to quality and safety concerns, as well as lack of convenience. For example, studies in Ethiopia have found that up to half of market vegetables are contaminated with parasites or bacteria (Gazu et al., 2023).

While there is anecdotal evidence on supply, production and distribution of nutritious foods, there is a lack of systematic consolidation and analysis of successes and challenges. Based on their experiences, experts identified the following opportunities for interventions at each stage of the food supply chain—production, handling, storage, aggregation, transport, processing, packaging, and retail—to influence the 4 As:

- *Production:* There are positive associations between household food production and child diets. However, market access tends to mediate the impact, with mixed results for livestock compared to vegetable gardening. *Potential interventions* include reducing farm losses, incentivizing production of nutrient-dense foods instead of staple foods, increasing productivity and ensuring good animal husbandry practices.
- *Handling, storage, aggregation, and transport:* There is very limited evidence of how these aspects affect the availability of nutrient-dense foods and young child diets except for the impact of storage technologies on aflatoxin contamination. Participants suggested implementing improved storage technologies (e.g., low-cost storage options like reusable plastic crates and solar powered cool drums) to reduce loss and food safety risks, enhancing market information systems and infrastructure to improve efficiency, and reducing post-harvest losses as *potential interventions*.
- *Processing and packaging:* There is limited evidence on the impact of various forms of processing and packaging on the availability of nutrient-dense foods and young child diets. Home and village-level processing often lacks scalability, quality, and marketability. *Potential interventions* suggested included increasing nutrient density while improving affordability through smaller packaging and technologies to extend shelf life, mitigating seasonal availability, and increasing convenience and appeal. To mitigate the environmental impact, the use of natural or biodegradable packaging materials must be considered for preservation such as banana leaves, as well as recycling innovations.
- *Distribution and retail:* There is a lack of evidence and information as to the type of distribution channels best suited to reach caregivers of children: modern retail (such as supermarkets), or more traditional markets or street food sellers. The social enterprise Nutri'zaza in Madagascar (Berthault et al., 2022; GRET, 2023) has been successful with their convenience proposition of ready-to-eat fortified porridge for households with young children through “baby restaurants” and door-to-door sales. However, such models face concerns of economic sustainability and cost effectiveness. More traditional retail outlets often also present food safety issues. Opportunities for *potential interventions* include strengthening traditional retail, which is more frequented by low-income consumers, and leveraging modern retail’s advantages while mitigating harms like increased exposure to ultra-processed foods.



It is important to acknowledge that food supply chain (and food system) interventions are part of a complex ecosystem of interconnected elements, which come with unique challenges:

- *Unintended consequences:* It is often unclear how the changes in one part of the supply chain impact/trickle down to the other parts. Too much emphasis on one actor in the supply chain for economic or commercial purposes may disrupt local diversification especially if local markets do not compensate for the loss in biodiversity. For instance, a livestock intervention aimed at increasing the availability of animal source foods could lead to increased demand for animal feed, potentially raising the price of grains. Higher grain prices might force low-income families to reduce their consumption of more expensive foods like animal products, ironically the opposite of the intervention's intent. Such unintended consequences could be mitigated by climate-smart circular bioeconomy approaches.
- *Specificity:* Food supply chains tend to be non-specific leverage points for improving diets of young children. For example, a program designed to increase the production of fresh vegetables does not differentiate among who consumes these vegetables. While increased vegetable availability might benefit the general population, in itself it is not sufficient to ensure that this will improve diets of young children, as other factors also influence choices and utilization of complementary foods, such as cultural and behavioral factors, convenience and aspirational aspects.
- *Business viability:* Targeting complementary foods specifically to children 6 to 23 months of age represents a small market segment. This narrow demographic makes it challenging for businesses to achieve economies of scale, maintain customer loyalty (as children quickly age out of the target range), and find a concentrated market for efficient distribution. To illustrate, in many cultures, caregivers prefer to cook one meal for the entire family rather than purchasing or preparing separate foods for young children. This cultural preference makes it challenging for businesses to market and sell specialized complementary foods, as there might be a general reluctance to buy separate products for young children unless these foods are easy to cook or ready to eat.

At the same time, there are several key opportunities to enhance the impact of food supply chain interventions on the diets of young children:

- First, safe and nutritious foods ideal for complementary feeding, such as animal source foods, dark leafy greens, vitamin A-rich vegetables, pulses and nuts, are also essential for a healthy diet at any age, particularly for groups at risk of micronutrient deficiencies. Broadening the focus to target a larger population group will increase support for these interventions and increase the likelihood of developing sustainable business models.
- Second, prioritize food safety throughout supply chains. Children under age five make up 30 percent of deaths from foodborne illness—despite being only 9 percent of the population (Jaffee et al., 2019). Food safety improvements (especially those that address microbial sources of foodborne illness) will have an outsized positive impact on them.
- Finally, an often-overlooked aspect is the appeal and aspirational qualities of food, especially in the processing, packaging, and retail stages. Traditionally, efforts have not focused on enhancing the appeal and aspirational attributes of the foods, such as the convenience and status aspects, suggesting untapped opportunities. By addressing these, caregivers may be more inclined to purchase them, even with slightly higher prices.
- In addition to exploring how the food supply chain can deliver nutritious complementary foods, there is a need to better understand what comprises “value” for low-income consumers and how to reach them.

### Business Considerations

Understanding and directing business investment in the food processing industry in LMICs will be key to reaching more consumers. By aligning business investments with developmental goals, a mutually beneficial



scenario can be achieved where businesses achieve profitability while contributing to social and economic development of the region. For this to be effective, experts identified the need for strengthening the enabling environment, building capacity across the food system actors, and improving public-private partnerships. Key considerations for taking such an enterprise-centric approach include:

- Creating a level playing field through legislation or regulations and the enforcement of food standards, while also ranking businesses (such as the Access to Nutrition Index [ATNI]) to mitigate the disadvantages for companies that invest in high quality and nutritious foods (ATNI, 2023).
- Optimizing efficiency through customized technical assistance, which extends beyond production to include business processes like procurement and inventory management.
- Leveraging brand equity as a currency, particularly around product quality, that can draw investment and attract consumer loyalty.
- Encouraging CEO leadership in driving company policies for better product quality and more nutrition; this can play a critical role in how budgets are allocated, particularly in terms of balancing profitability with nutrition and quality.
- Simplifying good practices across the product development cycle, from food production to packaging, and for marketing by providing simple tools such as software systems for supply chain management, checklists for production scheduling, or standard operating procedures (SOP) for quality control systems.
- Guiding or coordinating business investments strategically to utilize their full potential to achieve broader development outcomes. Business investments (US\$145 billion) far outweigh the foreign aid (US\$96 billion) provided in LMICs (World Bank, 2018).

A typical curve for the introduction of food products follows the S-curve: market entry after 3–5 years of investment in product development, growth after five years, and maturity after 6–7 years. Yet there are no examples where this was achieved in LMICs; this is due to challenging external environments exerting significant pressure on the commercial viability of a business, outside of the control of the business itself.

The food processing sector is diverse, and contains multiple layers of complexity:

- *Different types of businesses* face their own unique challenges at different stages ranging from quality raw material sourcing, product formulation, packaging, and labeling to navigating complex regulations and legislation. An example might be small-scale companies who struggle with quality assurance and market access compared to larger, more established larger ones.
- *Different business models* ranging from fully commercially viable to a via a range of hybrid models to a 100 percent charity model. The choice of the business model needs to be highly contextualized to the opportunities that might exist in a community or at country level.
- *Different types of consumers* necessitate different business strategies and product offerings, complicating market dynamics and investment decisions. For instance, some consumers can afford to purchase foods with higher nutrition standards, while others cannot (Food and Agriculture Organization et al., 2023).

There is no one template to address these complexities or to support the companies in this sector. Some suggestions on practical and technical support that may be useful to companies are:

- *Be responsive to business' unique needs.* Businesses have an intrinsic understanding of their own needs, challenges, and opportunities, and are well placed to identify the support they need in their situation. Tailor solutions to the specific needs and contexts of the individual businesses.
- *Provide services to test product quality* and use the results to have a dialogue with companies around improving quality.



- *Build trust and traceability* across all aspects and stakeholders of the business. For instance, a food processing company needs to trust its suppliers for quality raw materials, while consumers need to trust the company and brand to drive purchase. Use of technologies such as blockchain can help in verifying compliance of food handling in the supply chain and digitalization can help improve traceability. A CEO might prioritize investments in sustainable sourcing or environmentally friendly packaging to appeal to a growing market segment concerned with environmental issues.
- *Cost sharing is risk sharing.* Identify approaches that enable balancing the interests of providing nutritious foods of high quality with business interests.
- *Leverage or set up networks and coalitions* to provide an ecosystem that supports operation efficiencies, growth, innovation, and sustainability for businesses, such as AINFP (Box 3) (AINFP, 2023).
- *Adopt benchmarking tools* such as the Access to Nutrition Index, which can be useful for evaluating and motivating improvements in nutritional quality of food products, promoting transparency and accountability in the food industry, guiding investment and policy decisions (ATNI, 2023).

**Box 3. The Alliance for Inclusive and Nutritious Food Processing (AINFP): Boosting Nutrition through Partnerships**

AINFP is a partnership between USAID, TechnoServe and Partners in Food Solutions. It was established to leverage the strengths of private sector for improving reach among low-income consumers and at the same time, create profitable market opportunities for local farmers in Ethiopia, Kenya, Malawi, Tanzania, and Zambia. They do this by bringing together different actors in the food system that have the technical capabilities, access to businesses, and especially that currency of trust, to provide technical assistance, transfer knowledge and technology based on the needs of individual companies/food processors.

Overall, taking a food systems approach, planning strategically, systematically building knowledge, and creating an enabling environment that fosters an open multi-sectorial dialogue can help address the complex challenges of reaching more consumers with safe and nutritious foods appropriate for complementary feeding.



## 2. Encouraging Continuous Supply of Nutrient-Dense Foods

### Food system Innovations and Best Practices

Session presenters: Alan de Brauw, Mark Lawrence

This section examines implementation challenges, strategies, and approaches to overcome these barriers for improving availability, affordability, and accessibility of nutrient-dense (animal and plant source) foods, using a food systems lens.

#### Economic Considerations

Three key economic factors govern consumer demand: prices, income, and preferences.

*Price* of a product includes the transaction costs that it takes to obtain that product, hence price not only refers to affordability, but also accessibility. Overcoming barriers, such as lack of adequate infrastructure, is crucial to reducing these costs and improving accessibility. To illustrate, establishing a cold chain in an area with very poor roads or limited electricity grids is likely to lead to rapid breakdowns of the cold chain system, which will result in increased transaction costs for producers selling nutrient-dense products like vegetables, fruits, eggs, or milk. Another factor that can influence the transaction costs for nutrient-dense foods is their *perishability*. There is a need for short supply chains that focus on increasing the shelf-life and affordability of these nutrient-dense products for local markets. Innovative technologies can also offer viable solutions for keeping nutrient-dense foods safe and fresh. For instance, the use of improved processing and preservation methods such as advanced smoking technologies and using buffered vinegars can help mitigate the lack of cold chain infrastructure for keeping fish fresh from harvest to market. Investments in good infrastructure and novel technologies are, therefore, crucial to improve both the accessibility and affordability of nutrient-dense foods.

*Productivity improvements and increased value chain efficiencies* will also reduce (relative) prices of nutrient-dense foods. For instance, integrating local production of rice fish farming in Nigeria, promoting efficient “fish movement” through the market chain by training local processors in improved preservation methods in Nigeria and Cambodia (Adegoya et al., 2023), and by drying and grinding fish into fish powders for use in local dishes in Zambia (Ragsdale et al., 2023) (Annex 1b).

Addressing barriers to affordability and accessibility will impact the demand for nutrient-dense foods, especially among low-income consumers. Various approaches have been tried to *create demand* such as subsidizing costs through “coupons” with mixed results (Box 4) (Pastori, Brouwer, Siemonsma, et al., 2023).

#### Box 4. Creating Demand through Cost Subsidization

Through the Fruits and Vegetables for Viet Nam and Nigeria project under the International Food Policy Research Institute (IFPRI)-led Agriculture for Nutrition and Health research program, coupons were distributed to encourage purchase of fruits and vegetables in households with low consumption patterns. In Vietnam, this led to habit formation and \$1/week/household higher spend on fruits, while in Nigeria no habit formation was noted, suggesting financial constraints beyond the intervention. A similar coupon approach focusing on animal source foods (i.e., eggs, shelf-stable milk, and yogurt) is currently being piloted in Tanzania.

(Pastori, Brouwer, Siemonsma, et al., 2023)

Experts contend that affordability may not be the main barrier to consuming nutrient-dense foods. A recent analysis revealed that the income elasticity for fruits and vegetables was close to one, meaning that higher income didn't necessarily lead to increased fruit and vegetable consumption relative to other foods (Almas et al., 2023). This suggests that factors beyond cost, such as preferences, cultural norms, or lack of appreciation for vegetables also likely play a role. For example, in Vietnam, vegetables are widely consumed, albeit in small quantities. Similarly, the elasticity for fruits is



also lower than anticipated; for example, in Eastern and Southern Africa, there is less consumption despite abundance of fruits (Ryckman, Beal, Nordhagen, Chimanya et al., 2021). Elasticities for eggs varies, with demand being elastic to both price and income in China (Xu & Lu., 2017; Yen et al., 2004) and Tamil Nadu (India) (Felix & Navin Kumar., 2020), highly elastic in response to price but not income in Viet Nam (Bairagi et al., 2020), and non-significantly elastic to price and income in one study in Nairobi, Kenya (Cornelsen et al., 2016; Chege et al., 2021). This implies that addressing cost alone will not suffice and that strategies like social and behavioral change communication are vital to encourage consumption of nutrient-dense foods.

## Effective Strategies to Improve Continuous Availability and Affordability of Nutrient-Dense Complementary Foods

Discussion: All

Experts shared their experiences and insights on the interplay between market access and production of nutrient-dense foods; homestead production; gender and access to key resources; supply chain efficiencies; and various business models and strategies that influence availability, affordability, and accessibility of nutrient-dense foods.

The role of *homestead food production* in improving dietary diversity of households with nutrient-dense foods showed mixed results so far. Evaluations show modest successes of home gardening, particularly for vegetable production, in improving dietary diversity especially in more remote areas (Helen Keller International [HKI], 2016) and where market access is poor (Hirvonen & Hoddinott, 2017). In contrast, Van den Bold et al (2013) found very little impact of home gardening and dairy projects on nutrition.

Experts also identified challenges in scaling up animal source food production particularly within community-based models. While individual or small-scale initiatives may thrive, expanding these initiatives seems more difficult. This could be due to factors like rural-urban context, local climate conditions, resource availability, cultural preferences, or technical know-how (Box 5) (HKI, 2016; Beesabathuni et al., 2018).

### **Box 5. Poultry and Egg Production**

Sustainable chicken and egg production is especially challenging at the community level but has proven successful in some contexts.

The Creating Homestead Agriculture for Nutrition and Gender Equity (CHANGE) project, led by Helen Keller International in Senegal and Cote d'Ivoire revealed that chicken production as a group activity, but not as an individual activity, faltered without ongoing support after the life of the project. This was largely due to the narrow margin for error in caretaking for the chicken, notably related to the quality of feed and water access. Urban settings like Dakar, Senegal, saw successful chicken rearing due to better access to resources, indicating that local context significantly affects program success.

The [Egg Hub](#) model, developed by Sight and Life and implemented with partners, in Ethiopia, Kenya, Malawi, and India is a centralized unit offering farmers high-quality, affordable inputs, extension services, training, and market access. Egg hubs solve the supply-side challenges typically faced by small- and medium-scale poultry farms. They can help countries with low-yield production systems make the transition to the efficient, high-yield systems that are associated with much lower market prices.

(Nordhagen & Traore., 2021; Nordhagen et al., 2019; Beesabathuni et al., 2018)

Participants acknowledged that while homestead production may boost food availability, translating this into improved nutrition requires consideration of other relevant factors such as food preparation practices,



overall dietary patterns, and market dynamics. *Gender* was highlighted as one of the key factors, as homestead production is mainly done by women, who face considerable challenges in accessing key resources like land and water. Empowering women and ensuring they have access to critical inputs and resources could significantly boost the production of nutrient-dense foods (HKI, 2016).

*Access to and characteristics of local markets* significantly influence whether households use homegrown nutrient-dense foods for family consumption or sell them for income. In areas with good market access, farmers often sell their diverse produce rather than consuming it; in contrast, in with areas lacking strong markets, where farmers are more likely to consume their excess production, leading to more varied diets (Hirvonen & Hoddinott, 2017). This is particularly evident in studies exploring home production of milk and its impact on children’s diets, suggesting that market availability often leads to selling the milk for less nutritious alternatives. Similar observations are also reported from fishing families in coastal Kenya in the Samaki Salama project (Kamau-Mbuthia et al., 2023). This implies that where markets are functioning, producers should be educated on the importance of feeding some of the nutrient rich foods they produce to their children; or at least that if they sell nutritious foods, ensure that they are aware of the importance of purchasing appropriate nutrient dense foods for the young children. The role of *market dynamics* in influencing food prices and availability was also recognized, including how fluctuations in market supply and demand can affect the affordability of nutritious foods for populations vulnerable to undernutrition.

### Strategies and Business Models

Participants proposed *transforming supply chains* and fostering market-driven changes as potential approaches to improve the availability, affordability, and accessibility of nutrient-dense foods, particularly for young children. One key example mentioned was Fresh KTM—a fresh produce company in Nepal, that impacted the market by improving efficiency and reducing losses (Box 6). Other examples of businesses effectively impacting the supply chain to deliver nutrient-dense foods to markets such as Twiga Foods (Kenya) and InstaFoods (Kenya) which merit attention (Annex 1b).

Experts discussed their experiences with a variety of other *business models and strategies* (Box 7) based on their potential to overcome the challenges of affordability and accessibility of nutrient-dense foods and reach more low-income consumers:

- *Cross-subsidize* one product line with the profits from another or subsidizing one consumer group with revenue from other: For instance, if a company markets a premium product line to higher-income consumers at a higher price point, this surplus can be used to cross-subsidize products sold directly to lower-income consumers.
- *Offer different product lines at varying price points* can make them affordable to different consumer groups. Segmenting products based on quality grading, and diverting those to different markets, with lower-quality versions sold at local markets at lower costs (and possibly, with lower margins) and higher quality products sold at supermarkets or urban markets with higher costs, higher margins. For instance, marketing ‘ugly’ fruits and vegetables to reduce food waste and improve the affordability of nutritious safe products for lower income families.
- *Use less expensive ingredients or by-products* of other processes to lower costs of production. An interesting case mentioned was that of soy-based meat replacements in rural areas in African countries such as Benin (Shimeles et al., n.d.). Considered niche products geared towards high-income consumers or vegetarians, these are produced from byproducts of existing agricultural processes and

#### Box 7. Business Strategies to Reach Low-Income Consumers

- Cross-subsidization
- Segmentation of products
- Utilization of by-products and cheaper ingredients
- Packaging
- Localized production
- Formation of farmer clusters and government support
- Value chain optimization
- Technological innovations
- “Expertise as a Service (EaaS)”





sold at significantly more affordable prices. “This trend indicates a broader acceptance and utilization of such products than previously thought,” said one participant.

- *Reduce packaging costs* to help reduce the price point and reach consumers effectively, as this often represents a large of the price for many products, particularly in LMICs. The “milk ATM” model, using a unique distribution channel, was cited as example. A participant explained, “you can go up and bring your own glass, your own container, and get as little or as much milk as you want,” (Ingasia et al., 2022). Concerns related to quality and safety were, however, voiced based on experiences in replicating this model.
- Focus on *decentralized, local production* close to consumption to help reduce transport costs and support local economies.
- *Form farmer clusters* with their own social capital and market reach that can receive government support. In Latin America and the Caribbean, these clusters have a viable system for supplying local supermarkets, for exporting fruits and vegetables and access to local markets with the support of the government.
- Use *technological innovations and solutions* such as drying to help reduce perishability, improve year-round availability, and potentially, increase reach of nutrient-dense foods among consumers. Some examples are dried meats in Senegal or egg powders in India (Annex 1 b). At the same time, some sensory challenges in the dried food sector are also reported. For instance, there are issues related to the drying process for dried and smoked fish, which is widely sold and commonly consumed in West Africa. Specifically, the concern is the use of materials that produce harmful by-products like polycyclic aromatic hydrocarbons, often linked to the burning of plastics.
- Leverage the *Expertise-as-a Service (EaaS)* model to strengthen technical capacity and help scale up small businesses more efficiently. An interesting example shared was [Carvi Foods](#), a Senegalese enterprise specializing in dried meat products. Initially a local vendor selling small quantities, the SME was able to scale up its operations to supply to one of the larger grocery stores, Auchan, with technical assistance such as food safety training, inspection, and verification of production facilities from Food Enterprise Solutions.

While there is a vast amount of anecdotal evidence available, experts agreed on the need to systematically consolidate the evidence and assess the impact of above-mentioned approaches. This can serve as key input for developing viable business models for improving the 4 As of nutritious complementary foods.

### Success Criteria

The definition of an appropriate business model for nutrient-dense foods, particularly when targeting low-income households, must ensure both the sustainability of the business as well as its scalability and effectiveness in meeting the consumer needs. Some critical considerations for such a model include:<sup>3</sup>

- *Understanding consumer needs and preferences* for acceptance of the product and the success of the business model.
- *Identifying the minimum viable unit* as this is closely tied to achieving economies of scale. It is the point where production or operation becomes cost-effective. This was illustrated using an example from the poultry sector. “The minimum viable unit we found that works is at least a farm size of 800 chickens and anything below that means that we have to continuously either subsidize it or support it beyond the project period,” explained one expert.
- *Establishing virtuous cycles* for positive reinforcement of the various components of the business model. Virtuous cycles can lead to increased efficiency, better product offering, higher customer satisfaction, and improved financial performance.

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<sup>3</sup> Other considerations touched upon during the consultation included local capacity and demand, production risk, capital and investment considerations, government policies and regulations. These are acknowledged as relevant but not detailed in this section.



- *Standardizing* the minimum viable unit and setting up virtuous cycles. Standardizing processes and inputs can help lower costs and increase efficiency, making smaller scale operations viable as one expert explained using examples from the poultry sector. “The more we standardize several elements of the business model, the lower the cost.”
- *Understanding the context* matters. There is no one-size-fits-all model and adaptations are necessary based on the local context, type of product, and market dynamics.
- While understanding and addressing these factors are a prerequisite to developing a profitable business model that also impacts the 4 As of nutrient-dense foods for low-income households with young children, this may not be sufficient.

#### Box 8. Key Challenges Faced by SMEs

- Access to capital and high interest rates
- High dependency on donor support
- Partnerships and selection process
- Securing patient capital (time constraints and project cycles)
- Risk tolerance
- Bottlenecks in supply chains
- Vastness and diversity of markets

#### Key Challenges

There is a general recognition that businesses (particularly SMEs) operate in a complex environment and are faced with numerous challenges or barriers in sustaining and/or scaling their business (Box 8). The key challenges are:

- *Accessing the necessary capital* to start or scale business operations may come with high interest rates, making it challenging for businesses to sustain themselves financially. For instance, in the context of Ghana, one expert mentioned, “the USAID Mission had about \$15 million in one program as a financing facility with an interest rate of around 22 percent.”
- *High dependency on donor support* can be an impediment for SMEs to operate independently and develop a viable business model. This is particularly a concern for “donor darlings” (i.e., SMEs who continuously received project support but struggled to be financially viable independently).
- *Skewed selection process* of choosing businesses to work with or organizations to fund, frequently through a lens of short-term success. “For every SME that fails, there are several others that succeed but go unnoticed,” said one expert. A significant issue is the “pick winners” method that seeks out only those companies with innovative ideas or promising prospects and heavily invests in them but failing to assess their business plans or desire to succeed. As one expert explained, “we’re trying to pick winners and oftentimes in picking winners we actually end up perhaps overinvesting beyond their means and capacity.”
- *Securing patient capital* related to time management and project cycles. SMEs often operate within the constraints of time-bound project cycles, which may not align with the time required for a business to mature and become profitable, or the timelines of the donors.
- *Low risk tolerance in the development sector* is related to failure of businesses due to factors such as market volatility, interest rate fluctuations or economic downturns, with the donors or technical agencies often being averse to accepting failures.
- *Bottlenecks in supply chains* affect the success of SMEs and necessitates acting across the entire chain to create impact. For example, in the poultry sector, the availability and cost of feed can impede success.
- *Vastness and diversity of markets* is a critical success factor for achieving scale. “When you look at the scale of a particular geography and a particular market, it’s really just a drop in the bucket,” said one expert.

These challenges underscore the need for a more nuanced understanding of these enterprises’ needs and the creation of an enabling environment and supportive ecosystem that can cater to these effectively.



Experts put forth the following suggestions to overcome the challenges faced by SMEs and in creating and/or scaling of effective business models:

- *Improve access to affordable financing.* Providing microfinancing or subsidized loans to SMEs can help entrepreneurs overcome the barrier of upfront costs such as those associated with production risks in the animal source food value chains. For instance, this provision can help SMEs or input suppliers in the poultry sector in sourcing vaccines, feeding, and rearing healthy chickens, taking away the production risk from the farmers and aggregators.
- *Diversify revenue streams* by branching into different but related products or services can help create additional income streams, thus reducing reliance on a single market or product. For example, [Twiga Foods](#) (Kenya) initially established a business model focused on delivering vegetables from smallholder farmers to the slums around Nairobi. They gradually shifted towards sourcing from larger farms, and eventually beyond foods to a broader product range such as diapers to manage profitability. This diversification into other products potentially enhanced their profitability and sustained their vegetable business (Chege et al., 2023).
- *Form strategic partnerships and participating in local networks* can provide SMEs with better market insights, distribution networks and enhance their credibility among consumers.
- *Improve consumer understanding*, their preferences, behaviors, and needs is essential to inform product and pricing strategies, as well as designing appropriate distribution strategies.
- *Develop a market analysis and a robust business case*, taking into consideration the entire supply chain, potential market size and long-term demand, to help with scalability and long-term sustainability.
- *Contextualize business models* to address the local, cultural, economic, and environmental contexts to ensure acceptance and a higher probability to achieve scale.



### 3. Consumer-Centered Product Development and Delivery of Fortified Complementary Foods

#### Fortified Complementary Foods: Opportunities, Challenges, and Private Sector Engagement

Session presenters: Robert Bertram, Siny Samba

Many of the contextual challenges that relate to nutrient-dense foods also apply to fortified complementary foods. At the same time, it is important to recognize and acknowledge that the development, distribution, and marketing of fortified complementary foods is a significantly more nuanced and complex endeavor.

##### Key Challenges

While in many contexts fortified complementary foods may be required to fill nutrient gaps that households cannot fill otherwise, significant challenges and questions need to be overcome to enhance the 4 As:

- *Ensuring quality and safety standards* for fortified complementary foods is crucial not only for their safety and effectiveness but also for consumer trust. For example, in Malawi, there were significant inconsistencies between what was in the product versus what businesses declared on the labels and concerning levels of mycotoxins have been reported from various other countries (Gilbert et al., 2019). There is an urgent need for the formulation of a quality standard for fortified complementary foods. Developing a one-size-fits-all standard for fortified complementary foods is a long, time-consuming process and may not address specific regional micronutrient deficiencies effectively (WHO, 2023). In the interim, the experts suggest the development of regional standards, which governments can adapt to national contexts. Reinforcing quality standards through regulatory frameworks and communicating to consumers using appropriate marketing strategies or certification is paramount to assure consumers of product quality.
- *Improving the accessibility and aspirational attributes* of fortified complementary foods often increases their price, putting them out of reach for low-income households, particularly in LMICs where a significant portion lives below the poverty line or in remote, hard-to-reach areas. “Mainstreaming” or integrating fortified complementary foods into the food system more broadly can offer a higher opportunity to benefit all segments of the population effectively, and warrant exploration. Developing a stratified business model to reach not only the low-income consumer, but also non-poor and middle-class consumers will achieve economies of scale and contributes to the viability and sustainability of this business model. At the same time, it is also critical to (1) evaluate and assess the potential risks and challenges of making fortified complementary foods more easily accessible and widely promoted with the broader food system, and (2) develop food system safety nets that are effective, if not perfect, to distinguish complementary foods from breast milk substitutes.
- *Fostering public and private sector partnerships* in the area of fortified complementary foods remains sensitive due to long-standing challenges of trust and divergent interests related to the inappropriate marketing of breast-milk substitutes. At the same time, to improve the 4 As for fortified complementary foods and positively impact young child diets, it is important to leverage the strengths and expertise of all actors. For example, the private sector is instrumental in developing products that are nutritious, safe, and appealing, and is experienced in effective marketing and distribution to diverse groups, while the public sector is knowledgeable in advocacy and setting up and implementing standards and regulatory frameworks. The key to successfully reaching young children in low-income households will be in identifying (1) the distinct roles of the public and private sectors in this space, and how to best leverage resources and expertise from both, and (2) strategies to engage



more actively with the food industry, including SMEs, to improve the delivery and quality of fortified complementary foods.

- *Understanding and responding to consumer preferences requires* better and contextual insights into reasons behind consumers' willingness to pay high prices for certain branded fortified complementary foods, and their trust in these products. Possible factors to consider are trust in product quality, perceived prestige, effective marketing strategies, as well as convenience, which is a significant, yet often undervalued, factor that drives purchase.
- *Assessing economic gains from improved nutrition* with fortified complementary foods to use in advocacy for public sector investment and provide a better understanding of the impact of fortified complementary foods in improving young child diets. While there is some evidence, further work is needed.

Box 9 presents an SME perspective on how to address some of these complexities and challenges in producing and marketing complementary foods.



### **Box 9. Le Lionceau: Valorizing Local Resources to Provide Nutritious, Safe, and Affordable Complementary Foods to Senegalese Children**

Le Lionceau, a Senegalese SME founded in 2018, produces baby foods suitable for children aged 6 to 23 months to provide diverse and nutrient-rich options for young children. It uses locally sourced raw materials, such as baobab fruits and moringa leaves and seeds, primarily from smallholder farmers. Le Lionceau has a production capacity of 800 puree jars and 1,000 boxes of infant flour per day, and sells products in over 60 sales points across supermarkets, pharmacies, groceries, business to consumer (B2C) channels, and online platforms.

Key challenges faced in developing, distribution, and marketing of the products, and approaches used to address these include:

- *Sourcing quality raw material* due to the use of pesticides and chemicals by local smallholders: To mitigate this, Le Lionceau collaborates only with farmers who practice sustainable and organic farming.
- *Relying on imported packaging materials* such as jars, impacts the product's price point: Bulk importing, targeting middle and upper-class and implementing online subscription models allowing them to reuse the jars are some approaches used to make products more affordable.
- *Fluctuating raw material prices* which are largely dependent on the farmer: Le Lionceau navigates this volatility by building strong relationships with suppliers. "The contract is good, but the trust is better," said one participant.
- *Managing high retail and distribution margins*: These are demanded by supermarkets and shops and managed, in part, by a multi-channel distribution strategy.
- *Mitigating complexities in product development*: R&D investments to ensure balance in nutrition, taste, and cost—all crucial for consumer acceptance and business sustainability.

Elements of the winning strategy:

- *Producing localized products* using indigenous grains, legumes, millets, vegetables, and fruits
- *Segmenting product and employing a diverse distribution strategy* to cater to different economic classes. For example, purées in glass jars for middle and upper classes, while infant flour are accessible to all.
- *Taking a multi-channel approach with their marketing strategy*, including social media, collaborations with influencers and bloggers, and promotional events.
- *Collaborating and fostering trust* with frequent interactions and engagement activities.
- *Building brand equity* using a food safety badge, assuring quality to the consumers.
- *Engaging and educating communities* on nutrition, which helps create loyal customer base.



## Consumer-Centered Product Development and Delivery to Improve Availability, Affordability, and Acceptability

Session presenter: Juan Andrade; Discussion: All

Consumer-centric product development is an approach to developing products that place consumers at the center. It prioritizes their needs and preferences and ensures that the product adds value to them. The relevance of and key considerations for this are highlighted through the learnings of the Feed the Future Innovation Lab for Soybean Value Chain (SIL) in advancing this nutrient-dense legume in Africa, as well as the Complementary Feeding for Africa (ComFA) project (Box 10) (Annex 1b):

- *Align the product to the tastes, cultural practices, and needs of the consumer to facilitate its acceptance and consumption.* This involves conducting market research to understand what consumers prefer, what they can afford, and how they use food products in their daily lives. For instance, the development of soy-based complementary foods (ComFA; Box 9) is tailored to be not only nutritious but also desirable and easy to prepare, considering the local dietary habits, and food ingredients available in households. At the same time, the combination of ComFA with fish powder was considered less desirable due to safety concerns about fish processing and adulteration, and hence, not pursued.
- *Develop nutrient-dense and safe products addressing the needs of the local consumers.* Ensuring products are free from contaminants and safe for consumption, is equally crucial and creating products less prone to such risks is essential. As highlighted by one expert using a quote from FAO (2019), “If it is not safe, it is not food.” The necessity of frequent safety testing and setting up appropriate testing facilities was underscored.
- *Develop convenient and accessible products* that are quick and easy to prepare, have long shelf-lives, and are readily available in local markets. There is a high need for *convenience*, recognizing the time constraints and busy lifestyles of the consumers, particularly mothers and caregivers.
- *Consider the economic realities* across the food production chain as the costs incurred by producers often trickle down to consumers, impacting the *affordability* of the product. For example, in Uganda, the costs of reformulating or expanding the line of products and obtaining certifications can be prohibitively high for producers, particularly SMEs, limiting their ability to innovate or adapt their products to meet the needs of lower-income consumers (Eton et al., 2021).
- *Innovate with products and technology* to help enhance the nutrition, appeal, and value for the consumers. For example, by modifying soy flour and soy cake, SIL developed a more versatile product, known as soy protein concentrate, which has a higher protein content, a milder flavor, and can be incorporated into a variety of different food applications (Gulkirpik et al., 2023). The use of extrusion technology, which is coming of age in Sub-Saharan Africa, offers opportunities to create a variety of soy-based products that are nutritious, safe, shelf-stable, and appealing.

### **Box 10. Complementary Food for Africa: Addressing the Needs of Ghanaian Mothers for safe and Nutritious Complementary Food**

ComFA is a locally sourced, nutrient-enhanced complementary food, initially developed by dr. Amagloh and dr. Coad, and further elaborated by the partners of the Soybean Innovation lab (SIL). It combines the high-quality protein of soybean with the energy- and provitamin A rich, orange-fleshed sweet potato. Its key features include:

- Locally sourced ingredients eliminate the need to import lower quality and more expensive food ingredients.
- It is nutritious, naturally sweet, easier to prepare, requires less energy and water than other commercial products, offering convenience to mothers.
- It is more affordable than other products available on the market.
- It has high acceptability by local mothers, due to its sensorial attributes and convenience.

(Amagloh et al., 2012; Amagloh et al., 2018)



- *Work with and strengthen the capacity of the local processors* to innovate, maintain quality and safety standards, and contextualize the products to specific market needs and challenges. For instance, local processors are the forefront of implementing the quality and safety standards during product development process, and they have direct influence on and understanding of local preferences. Furthermore, by optimizing production processes and leveraging local resources, they can also help reduce costs, ensuring affordability.

Experts highlighted the need of local and regional SMEs for technical support and capacity building to develop safe and nutritious foods suitable for complementary feeding.

### Enabling Environment

A *supportive, enabling environment* is equally essential for these products to reach markets, reach consumers, and bring nutrition to scale. This requires assertive, bold, and yet, flexible policies that allows small, medium, and large companies to be able to compete to achieve the 4 As for fortified complementary foods:

- *Product standards:* Participants identified clear standards for formulating and producing fortified complementary foods as an important enabler. Inter-agency specifications are being used by WFP and UNICEF, and the current guidance on formulated complementary foods by Codex Alimentarius (Codex Alimentarius., 2013), may need to be updated as per the latest WHO guidance. The development and adoption of such standards, including the definition of standard operating procedures, is essential to improve the quality of fortified complementary foods.
- *Capacity strengthening for governance:* Along with the development of standards, there is also the need to strengthen the capacity for monitoring and enforcement of these standards.
- *Quality control:* Monitoring adherence to these standards will ensure compliance and protect SMEs from unfair competition from bad actors in the system offering similar or imitation products of much lower quality.

## Viable Business Models to Increase Consumer Reach Sustainably

Presenter: Nick van der Velde, Discussion: All

Experts deliberated on innovative approaches and distribution strategies being employed to reach low-income consumers, identifying the key factors behind their successes and challenges. While the experts acknowledged that there is a dearth of published evidence, lessons shared were based on the experiences from the [2Scale](#) agribusiness incubator, led by BopInc (Box 11).

### **Box 11. 2Scale: Incubating Inclusive Business through Public-Private Partnerships**

[2Scale](#) establishes agribusiness clusters built around business champions, either entrepreneurial producer organizations or local SMEs that trade or process the produce of farmers. By providing support to these clusters, 2Scale develops products and markets for local consumer markets, preferably at the base of the pyramid. Key factors for success include:

- Focusing on the entire agricultural value chain through a farm-to-fork approach.
- Building an ecosystem of networks and clusters before the start of the program.
- Providing technical assistance and capacity strengthening to improve food safety and commercial viability.

Impact of 2Scale include:

- 1.5 million consumers and 1,000,000 smallholder farmers reached; inclusive business developed with 15,000 micro, small and medium enterprises.
- Replicated in nine different countries, demonstrates scaling in local contexts.





## Effective Consumer-Reach Strategies

- *Engaging across the entire food system with farm-to-fork* involves not just focusing on the production aspect (farm) but also on the processing, distribution, and retail aspects, reaching the consumer (fork).
- *Adopting a bottom-up approach* ensures that strategies and solutions are grounded in local realities and therefore, likely to be more sustainable and impactful. This involves understanding and starting from the grassroots levels, for example identifying successful local initiatives and scaling.
- *Analyzing a country's food system readiness* requires attention to the context-specific factors that determine the success or failure of a strategy. A framework for analyzing readiness to improve complementary feeding could capture, amongst other things, information on potential demand from institutional buyers, existing actors in the country and their level of capacity, market size and viability, existing regulations and standards, and level of regulations enforcement.
- *Collaborating effectively* is a key success factor of programs (particularly private sector-led) bringing together various stakeholders including governments, nongovernmental organizations (NGOs), and local communities. For example, the Global Distributors Collective enables a broader reach and addresses the gap often overlooked by traditional funding and distribution channels (Annex 1b). Participants suggested leveraging existing networks like the SUN Business Network, CEO forums, AINFP, ATNI to advocate for a better enabling and regulatory environment for fortified complementary foods (Annex 1b).
- *Utilizing diverse distribution strategies*—retailer-based, agent-based, direct-to-consumer, and hybrid partnerships with NGOs (Box 12) can help reach more consumers. Each model has its unique advantages and applicability depending on the context and need.

### Box 12. Five Distribution Models Commonly Used to Reach Low-Income Consumers

- **Retailer-based:** This is the traditional model where products are distributed through retailers.
  - **Agent model:** Agents go door-to-door or work in public markets, offering a high-touch interaction with consumers while supplying and selling products; it is particularly effective in reaching consumers in remote or underserved areas who might not have access to traditional retail outlets.
  - **Direct-to-consumer:** With the rise of e-commerce channels, this model leverages digital developments to reach low-income consumers; it can reduce distribution costs and make products more affordable.
  - **Hybrid partnerships:** Collaboration with institutional organizations and NGOs to reach consumers can extend reach of distribution networks, particularly in areas that are difficult for commercial entities to penetrate effectively.
  - **Franchise models:** Because these businesses are linked to reputable organizations, this model can help maintain quality control and ensure a guaranteed purchase of inputs.
- 
- *Combining institutional and retail demand* allows companies to serve institutional buyers while developing their retail market for fortified complementary foods, as the latter takes a long time to grow (five to eight years depending on the context). By combining demands, companies can reliably strengthen capacity while taking the time to grow the slower, less volatile retail demand.
  - *Innovative funding models* such as a one-to-one contribution, where stakeholder contributions match a program's funding can mobilize additional resources and investment from the private sector, making programs more sustainable and scalable. For example, with 2Scale, "the total program was \$50 million and it was another \$50 million [in] contributions as well from the stakeholders involved" explained one participant (2Scale., 2023).
  - *Measuring impact and adjusting strategies* is critical to ensure programs are effectively addressing the needs of their target populations and making the best use of available resources.



## Key Challenges

Scaling and replicating successful business is essential for impact but presents significant challenges, particularly when addressing low-income consumers or populations in remote areas:

- *Ensuring supply chain stability and adequacy:* As businesses grow, their demand for raw materials and inputs increases. In some cases, an inadequate supply cannot keep up with this growing demand, hindering the company's ability to scale, especially in areas with underdeveloped or unstable supply chain infrastructure.
- *Adapting distribution channels to diverse market demands:* For instance, the transition from supplying to organizations like WFP to exploring B2C channels requires strategic shifts in distribution models. Navigating these changing market demands and identifying efficient distribution channels is a critical challenge for successful scaling.
- *Aligning business strategies with real-world conditions:* This involves understanding and adapting to the dynamic nature of markets, customer preferences, and supply chain conditions. It requires businesses to be flexible and responsive to external changes, which can be a significant challenge, especially for smaller enterprises with limited resources.
- *Adapting to cultural and regional differences:* Regions have varied cultural, social, and economic contexts. Programs and strategies that work well in one region may not necessarily be effective in another. For instance, the [2Scale](#) program, currently successful in one African country, might face different challenges when replicated in another due to varying local practices, market conditions, or consumer preferences.
- *Increasing the reliability of institutional demand:* Institutional buyers are dependent on funding cycles (from donors or governments) characterized by huge peaks in demand, possibly followed by long periods of low demand. These erratic demand cycles can put companies at risk as they expand capacity during peak periods only to face drastic downturns. To mitigate these issues, the experts suggest institutional partners adopt longer, more consistent procurement timelines to provide a steadier market for businesses.
- *Addressing financial constraints and access to capital:* Access to suitable financing is a major impediment to small businesses aiming to scale up. The insufficiency of microfinance and the inaccessibility of larger-scale financing can hinder their ability to invest in essential resources and expansion activities like Hazard Analysis Critical Control Point accreditation.
- *Lacking human and material resources:* These can be significant constraints for SMEs wanting to expand to new regions or scale up operations.
- *Maintaining quality and standards:* Ensuring consistent quality and maintaining standards becomes a challenge when scaling up, especially with the farm-to-fork approach that requires control over the entire value chain. Replicating this approach in different regions requires establishing and maintaining standards across diverse settings, further adding complexity.
- *Securing local services, capacity strengthening and technical assistance:* Scaling up also involves challenges related to accessing local services, strengthening in-house capacity and technical support. Developing a market for these services and ensuring they are affordable and accessible to SMEs is crucial. This includes services like training, product quality assurance, and business planning.
- These challenges highlight the need for capacity building, developing local and contextualized consumer insights, resource mobilization, and systematic evidence generation to ensure effectiveness and scale across different regions and communities.



## 4. Monitoring Progress

### Tools and Metrics to Monitor Progress on Transforming Food Systems

Session presenters: Stella Nordhagen, Alan de Brauw

The experts presented an overview of existing methods, tools, and metrics to monitor food systems, particularly for food supply chains and food environment, and how to adapt these to address the challenge of achieving the 4 As for safe and nutritious complementary foods.

While *nationally representative* (i.e. “broad”) metrics for availability and affordability are relatively well-defined, gaps remain for the food environment. Gaps to monitor or assess for availability and affordability include missing data on seasonality, availability of certain foods such as organ meats, lack of data on the price of nutrient-rich foods most relevant to complementary feeding, prices in local markets (as opposed to national-level price data), and a lack of a better understanding of required expenditures on costs other than food. Gaps for accessibility include data on hours of operation, norms and safety issues that limit women’s access to markets, and lack of defined metrics for e-commerce, increasingly important in LMICs. Metrics on vendors’ characteristics and messaging and promotion are poorly developed and lack standardization.

For food supply chains, there is limited data on almost all aspects except production (Nordhagen, 2020). Aggregation and storage, food safety, processing and packaging, business performance, and assessment of impact across the chain need more practical and feasible indicators adapted to the context of LMICs. Annexes 4 and 5 provide a detailed overview of the status and gaps in food environment and food supply metrics, respectively.

Experts acknowledge that currently there are almost no standardized and comparable metrics specific to foods appropriate for complementary feeding in the food system. This makes it challenging to use existing tools that collect representative food system data at the national level, such as the [Food Systems Dashboard](#) or the [Food Systems Countdown](#) initiative (Schneider et al., 2023). For instance, the Food Systems Dashboard relies on a wide array of standardized metrics for cross-country comparisons. Presently, the only data related to complementary feeding is available from Demographic and Health Surveys, focusing on aspects such as minimum dietary diversity and meal frequency. However, enumerators do not consistently or systematically collect crucial details such as the types of nutrient-dense foods consumed by children, or food environment metrics such as the availability or accessibility of complementary foods. This results in a lack of comparable data across countries. While researchers acknowledge the need to expand these indicators to include more detailed information on complementary foods, integrating additional indicators for complementary foods to the dashboard presents a complex challenge.

Attendees also highlighted the importance of *understanding and collecting data on business performance in food systems* such as costs, profits, value chain dynamics, especially for those involved in producing, processing, and distributing foods relevant for complementary feeding. This information can allow for a better understanding of the economic and operational challenges within the food system. By understanding where costs are added, how profits are generated, and the overall viability of business models in the food sector, stakeholders can make more informed decisions and develop strategies that support both nutritional goals and economic sustainability.

To adapt existing metrics or design new metrics appropriate for complementary feeding, experts recommended to:

- Ensure disaggregation by age, and by households with/without children. This will help make data more relevant to complementary feeding, as opposed to covering all age groups without special attention to young children’s diets.



- Focus on specific foods of greatest relevance to complementary feeding such as fortified complementary foods and nutrient-dense foods like eggs, organ meats, and aquatic foods just to name a few examples.
- Incorporate gender perspectives in accessibility. Recognize the role of gender norms and understand how societal norms affect women’s ability to access markets or food sources.
- Focus on characteristics that matter to caregivers such as desirability, convenience, and price. To make food systems work for complementary feeding, all actors should keep in mind what matters most to consumers. Price has received attention, but comparatively less effort has been devoted to other attributes such as desirability and convenience, which also play a very important role in consumer choice.
- Adapt to digital and urban food environments. Given the rapid growth of digital platforms and e-commerce, particularly in urban areas, rethink the traditional geographic-based concept of food environments for them to be included.
- Develop high-frequency, real-time price data especially for foods relevant for complementary feeding.
- Standardize metrics for vendor and product properties, particularly in informal markets.
- Improve data and metrics for food safety to understand the actual safety levels of foods.
- Develop comprehensive metrics for packaging, to better monitor the role of packaging in food safety, preservation, and quality. This includes understanding how packaging influences, for instance, shelf life of products, protects against contaminants, and maintains the nutritional integrity of the complementary foods.
- Focus on intermediate outcomes and actionable indicators. The metrics chosen to judge the success or failure of food system interventions are sometimes several steps removed or downstream from implementation. To maximize the chances of success and keep investments flowing, actors should focus on intermediate outcomes and functional indicators along the path to progress.
- Modify existing dietary diversity scores to capture additional information of relevance to complementary foods. For instance, WFP modified the dietary diversity score (DDS) to include a question on fortified complementary foods. It is then counted as an animal source food in the modified DDS and used side-by-side with the original DDS.

There was also a keen interest in understanding how fortified complementary foods can prevent and/or treat malnutrition. Strategically linking interventions to nutrition outcomes is crucial, particularly in the context of limited funding. It is essential, however, to clearly define which nutrition indicator is best suited.

*The complexity of data* was a major challenge faced by experts working to improve food systems. Interpreting even the well-defined metrics, such as the cost of a healthy diet is difficult, and more so for less defined metrics such as those related to messaging and promotion. Integrating data cohesively from various aspects of the food system to inform concrete action is also a hurdle. A potential solution suggested is to focus on identifying context-specific nutritious foods appropriate for complementary feeding, understanding barriers to their consumption, and designing research and interventions accordingly. *Using consumer-centric in-depth metrics* to complement the broader metrics can help in this regard. A consumer-centered approach—starting with the consumer and working backwards to the food system—can better inform on-the-ground actions. As employed by the [Sustainable Healthy Diets through Food Systems Transformation \(SHiFT\)](#) initiative, this approach focuses on the consumer and traces back into the food system to inform intervention design. Instead of a broad national perspective, SHiFT collected detailed data in urban and peri-urban areas in Vietnam and urban and rural towns in Ethiopia. By starting from the consumer’s perspective, the in-depth metrics effectively pinpointed barriers and practical challenges families face in improving the quality of their children’s diets.



## 5. Recommendations for Action

This expert consultation involving 43 experts from a variety of disciplines and agencies shared and discussed key evidence, knowledge, and implementation gaps from promising initiatives addressing food systems for nutrient-dense food groups and fortified complementary foods.

Experts acknowledged existing sensitivities regarding private sector engagement and the real conflicts of interest between nutrition and health requirements of young children vulnerable to malnutrition and the private sector's commercial interests. These issues have been an important barrier to ensuring that nutritious complementary foods are available, affordable, accessible, and aspirational for children and their caregivers. The public sector, notably governments, technical and bilateral agencies, has a key role to play to help consumers access safe and nutritious foods. The recommendations below aim to strengthen and support both public and private sector actors in acting individually and together in responsible partnerships.

Throughout the two-day consultation, experts identified four core areas that hindered the 4 As of safe and nutritious complementary foods: **knowledge and evidence gaps, limited local capabilities and capacity, implementation barriers related to business constraints and supply chain inefficiencies, and lack of a favorable enabling environment.** For each of these four core areas, they proposed a set of recommendations to effectively strengthen collective action of food system actors and stakeholders to increase the 4 As for nutritious complementary foods for children 6 to 23 months old and their caregivers. In total, 13 recommendations were put forth, of which the experts prioritized six specific actions, warranting urgent action by implementers and investment by donors to transform food systems to support safe and nutritious diets for young children.

The complete set of recommendations, of which six are highlighted as priority actions, are presented below.

### Core Area 1: Fill the Knowledge Gaps

Local and global initiatives exist, but information on successes, challenges, and opportunities to increase the 4 As of nutrient-dense foods and fortified complementary foods is not consistently reported and disseminated. The experts agreed that there is insufficient robust evidence on the impact of food system approaches and viable business models that measurably improve complementary feeding practices. Lack of knowledge can act as a barrier for targeting new funding or sustaining prior investments, capacity strengthening and technical assistance, as well as in scaling up initiatives. The following recommendations aim to fill this critical gap:

1. **PRIORITY: Create compendiums of successes and failures in approaches, policies, and business models to prevent food loss and waste and improve supply chain efficiencies for nutrient-dense foods and commercialized fortified complementary foods.** Experts identified three specific themes for which a compendium could be created, capturing what works and what does not work in:
  - a. post-harvest food loss and waste and shelf-stability approaches such as cold and dry chains.
  - b. government policies and incentives to make nutrient-dense foods available, affordable, and accessible.
  - c. viable business models (including hybrid models) for nutrient-dense foods and commercialized fortified complementary foods, exploring business data on profitability and sustainability.
2. **PRIORITY: Build a robust evidence base on consumption and purchase of complementary foods and the impact of food system approaches on the 4As of complementary foods and business viability.** Experts recommended investments in research for the following topics:
  - a. Adapt existing metrics or develop new simple metrics to improve data collection on the types and amounts of complementary foods consumed by children; where caregivers purchased them; how they are prepared; and the impact of efforts that enhance the availability, affordability, accessibility, and aspirational dimensions of nutritious and safe complementary foods.



- b. Understand the impact of different business models for complementary foods (including hybrid models that combine retail and institutional markets) on child diets and business indicators, such as market size, sales volume, cost of retail, and break-even-points.
3. **Conduct research to better understand low-income consumers, their needs, and aspirations.** There is dearth of information on the aspirational aspects of foods appropriate for complementary feeding, and more specifically, on the drivers and motivators for the choices of the caregivers. Experts recommended investing in researching the aspirational aspects of complementary foods and how these can be leveraged to influence caregivers to make better and healthier choices.
4. **Communicate effectively and with one voice on child diet considerations to guide food system transformation.**
  - a. Publish a paper (series) focused on the considerations for making food systems work for young child diets. For instance, highlight the importance of processing and packaging on nutrient density and food safety, and how these can impact children's diet quality and health.
  - b. Share and integrate the recommendations from this consultation into WHO implementation guidelines and into the work of the Global Collective on Complementary Feeding.

#### **Core Area 2: Build Capacity across Food System Actors**

The experts voiced a need for cultivating a market for services such as technical support, food safety trainings and product quality validation and make these affordable and accessible especially to SMEs. They recommended the following actions:

5. **PRIORITY: Adopt "R&D-as-a-service" model and provide expertise, capacity strengthening, and technical assistance to food system actors (particularly SMEs) to develop safe, nutritious, and aspirational complementary foods.** In many cases, public and private sector actors either lack the technical expertise and capacity or cannot afford the R&D costs to develop safe, nutritious, and aspirational complementary foods. "R&D-as-a-service" model, often provided by suppliers (e.g., of ingredients or packaging) aims to reduce the cost of research and development and serves as a pathway to markets by providing technical assistance and capacity strengthening to all SMEs willing to engage in complementary feeding.
6. **Analyze food systems' readiness for improving complementary feeding at (sub)-national levels.** Contextualizing the entry points is an essential first step to developing a full, child-centered food systems approach to drive multi-level action within a country. This involves, but is not limited to, analyzing the national nutrition strategies; policies; regulatory environments; capacity (infrastructure, capabilities); and mapping existing networks and key actors that can be leveraged to improve complementary feeding.

#### **Core Area 3: Address the Barriers to Implementation**

The discussions highlighted financial constraints, lack of quality raw materials, supply chain inefficiencies and short-term business planning as key barriers to achieving scale. Hence, the following actions are recommended:

7. **PRIORITY: Develop and align financing strategies at the national and organizational levels to mobilize a pipeline of investments that support individual SMEs in bringing more high-quality and safe complementary foods to market at an affordable price.** Access to capital at reasonable interest rates continues to be the biggest obstacle to the growth of SMEs. At the same time, experts indicate that substantial capital is available in countries for good investment opportunities. A country-level platform (e.g., SUN Business Network) could support the development of a comprehensive financing strategy and create a pipeline of capital investments to support individual SMEs in bringing



more high-quality and safe complementary foods to market at an affordable price, according to well-established rules of engagement for public-private partnerships.

8. **Collaborate with business strategy and innovation experts to carry out in-country market assessments and business case analysis and to develop viable business models for safe and nutritious complementary foods.** Despite a growing number of initiatives and SMEs focused on delivering safe and nutritious complementary foods to low-income households, challenges remain in sustaining a financially viable business model. Business expertise is needed to understand the country-specific markets, identify local supply chain inefficiencies and strategic planning to achieve scale.
9. **Address inefficiencies in the food supply chains between post-production and consumption to reduce food loss and waste and improve affordability of nutrient-dense foods and fortified complementary foods.** Considerable efforts have been devoted to improving the production side of the supply chain at one end or increasing food consumption at the other. However, more needs to be done to improve the efficiency of the middle of the food supply chain in reducing food loss and waste. Increased investments to enhance efficiencies in processing, packaging, distribution, and retailing of nutrient-dense foods, will have a positive impact on food availability and prices, and indirectly impact young children's diet quality and health.
10. **Promote the use of native, underutilized and biofortified crops as a part of complementary feeding.** Native and underutilized crops, such as baobab grains or moringa leaves as well as biofortified crops, such as orange-fleshed sweet potatoes, offer a culturally acceptable opportunity to improve nutrient density of complementary foods. Further investment is needed to increase availability to these climate-resilient crops, potentially giving greater access to quality raw materials.

#### **Core Area 4: Strengthen the Enabling Environment**

While the importance of public-private partnerships was widely acknowledged, concerns related to issues of trust, repeated violations of the International Code of Marketing of Breastmilk Substitutes and other recommendations regarding marketing of foods to infants and young children, governance issues, different timelines, and challenges in business viability warrant attention. Experts, therefore, recommended the following for action:

11. **PRIORITY: Organize expert consultations to discuss recommendations for product standards for fortified complementary foods and appropriate monitoring mechanisms.** There is a distinct lack of guidance on nutritional composition standards, product requirements, labeling, and promotion of fortified complementary foods, along with challenges in implementing and monitoring these standards. To address this, experts recommended organizing additional globally representative consultations that focus on the following topics:
  - a. Recommendations for the formulation of fortified complementary foods and the development of a product standard
  - b. Sharing challenges and successes in production, distribution, and marketing of fortified complementary foods that meet the product standard and align with the WHO complementary feeding implementation guidance.
12. **PRIORITY: Develop unified standards and tools to inform decisions and guide engagement with food system stakeholders, including the food industry, on appropriate formulation of complementary foods.** There is an urgent need for international, regional, and national standards to guide companies involved in the production, distribution, and marketing of complementary foods. Insights from the expert consultations (recommendation #11) should inform the development and implementation of comprehensive frameworks and tools to promote standardized, high quality production practices of (fortified) complementary foods. This approach can level the playing field for companies of all sizes and foster a competitive market that prioritizes the nutrition and well-being of young children.



- 13. Create accountability networks at national level to strengthen the enabling environment in support of the development and distribution of nutritious and safe complementary foods.** Trust was reiterated as a key barrier in public-private partnerships. Accountability networks and forums (e.g., SUN Business Network, industry networks, CEO forums, Food and Drug Administration) offer a platform for dialogue between private and public sector actors within a framework that holds all parties accountable to transparent communication and ethical practices. These networks can serve as the entry point to discuss and advocate for positive changes in policy, standards, and regulations in support of the development and distribution of nutritious and safe complementary foods. Moreover, they can provide opportunities to accelerate pathways to markets.





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## Annex 1a. Case Studies of Food Systems Approach for Delivering Safe and Nutritious Foods

Questions	Case Studies and/or Key References		
	Complementary Feeding	Other Relevant Cases	Cross-Cutting
What are the strategies or approaches to ensure continuous availability and affordability of nutrient-dense complementary foods?		<ul style="list-style-type: none"> <li>● <a href="#">Market-oriented interventions in local value chains in Malawi</a></li> <li>● <a href="#">La Laiterie du Berger</a> (a social enterprise) in Senegal</li> </ul>	<ul style="list-style-type: none"> <li>● <a href="#">2Scale</a></li> <li>● <a href="#">SHiFT</a></li> <li>● <a href="#">NutriDev</a></li> <li>● <a href="#">Nourishing fish-based solutions</a></li> <li>● <a href="#">NOURISH</a></li> <li>● <a href="#">HarvestPlus</a></li> <li>● <a href="#">Eggciting innovations</a></li> <li>● <a href="#">Nestle Golden Morn</a></li> <li>● <a href="#">MoreMilk Project</a></li> <li>● <a href="#">Pulses for the Planet</a></li> </ul>
How can consumer-centered product development and delivery improve availability, affordability, and acceptability?	<ul style="list-style-type: none"> <li>● <a href="#">Koba Aina and Hotelin-jazakely in Madagascar</a>, <a href="#">Laafi Benre</a> in Burkina Faso, <a href="#">Bobor Rong Roeung</a> in Cambodia, and <a href="#">May May Myitta</a> in Myanmar</li> <li>● <a href="#">Strengthening Capacity of Local Actors in Nutrition-Sensitive Agri-Food Value Chains</a> in Malawi and Zambia</li> <li>● <a href="#">Chao Ngon and VICA</a> in Vietnam (project brief)</li> <li>● <a href="#">Mile for the Brain</a> project in Kenya</li> <li>● <a href="#">Meriem Project</a> in Burkina Faso, Mali, Niger</li> <li>● <a href="#">E'pap from Econcom Food</a></li> <li>● <a href="#">Protein Kissee La, Cote d'Ivoire</a></li> <li>● <a href="#">KOKO Plus</a> in Ghana</li> </ul>	<ul style="list-style-type: none"> <li>● <a href="#">GAIN healthy line shops for last mile delivery</a></li> <li>● <a href="#">GAIN investment case for food systems infrastructure</a></li> </ul>	
Which business models are viable in increasing consumer reach sustainably?	<ul style="list-style-type: none"> <li>● Social enterprise projects such as <a href="#">Nutri'zaza Social Business Enterprise</a> and replicating it in other countries</li> </ul>	<ul style="list-style-type: none"> <li>● <a href="#">GUTS Agroindustry, 2Scale base of the pyramid value chain approach</a></li> <li>● <a href="#">Grameen Danone Foods</a> (case study analysis presenting challenges)</li> <li>● <a href="#">Lisabi Mills and Dala Foods</a> (case study presenting challenges and comparative approaches between the businesses)</li> <li>● <a href="#">GAIN Business Model Research project</a></li> </ul>	

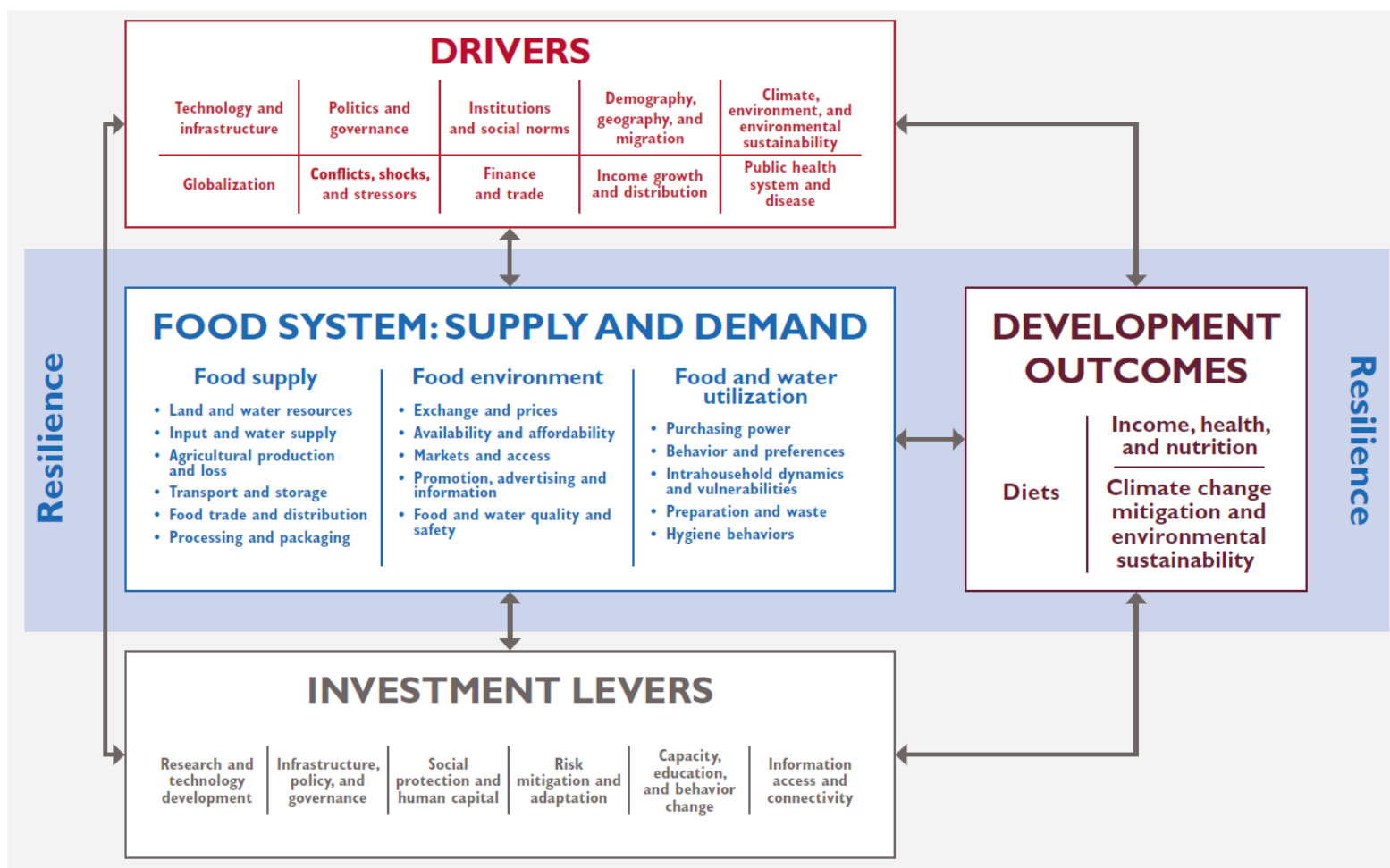


## Annex 1b. Other Relevant Examples and Cases from the Expert Consultation

Case Studies	
Nutrient-dense foods	Fortified complementary foods
<a href="#">Dried meat</a> in Senegal	<a href="#">Complementary Food for Africa</a> in Ghana
<a href="#">Egg Hub</a> in India, Ethiopia, Kenya, Malawi, Indonesia, and Rwanda	<a href="#">InstaFoods</a> in Kenya
<a href="#">Dried egg powder</a> in India, Ethiopia, and Kenya	<a href="#">Soybean-based meat replacers</a> in Benin and Ethiopia
<a href="#">Fresh KTM Nepal</a>	
<a href="#">Twiga Foods</a> and <a href="#">Twiga</a> in Kenya	
<a href="#">Milk ATM</a> in Kenya	
<a href="#">Rice-fish farming</a> in Nigeria	
<a href="#">Soy kits</a> in Malawi	
Innovation Labs	
<a href="#">Soybean Innovation Lab</a> with a focus on Sub-Saharan Africa	
<a href="#">Fish Innovation Lab</a> with a focus on East Africa, West Africa and Asia	
Research Projects	
<a href="#">Creating Homestead Agriculture for Nutrition and Gender Equity (CHANGE)</a> in Burkina Faso, Cote d'Ivoire, Senegal, and Tanzania	
<a href="#">Fruits and Vegetables for Viet Nam and Nigeria</a>	
Partnership Networks	
<a href="#">Alliance for Inclusive and Nutritious Food Processing</a> in Ethiopia, Kenya, Malawi, Tanzania, and Zambia	
<a href="#">Global Distributors Collective</a> in over 50 countries across Africa and Asia	
Accountability Networks	
<a href="#">Access to Nutrition Initiative</a>	
<a href="#">SUN Business Network</a>	
<a href="#">Food Systems Dashboard</a>	
<a href="#">Food Systems Countdown Initiative</a>	



## Annex 2. Bureau for Resilience, Environment, and Food Security Food Systems Conceptual Framework



Source: USAID 2021, p. 2



## Annex 3. List of Participants

	<b>Names</b>	<b>Affiliation</b>
1	Juan Andrade	University of Florida/Soybean Innovation Lab ( <i>virtual</i> )
2	Kalpana Beesabathuni	Sight and Life
3	Douglas Balentine	Food and Drug Administration
4	Abigail Beeson	consultant to the Micronutrient Forum
5	Robert Bertram	USAID Bureau for Resilience, Environment, and Food Security
6	Elizabeth Bontrager	USAID Bureau for Humanitarian Assistance
7	Erin Boyd	USAID Bureau for Global Health
8	Inge Brouwer	Wageningen University/International Food Policy Research Institute ( <i>virtual</i> )
9	Thoric Cederstrom	Food Enterprise Solutions
10	Kelley Cormier	USAID Bureau for Resilience, Environment, and Food Security
11	Jennifer Crum	FHI360
12	Heather Danton	USAID Advancing Nutrition
13	Omar Dary	USAID Bureau for Global Health
14	Alan de Brauw	International Food Policy Research Institute
15	Saskia de Pee	World Food Program
16	Kathryn Dewey	University of California, Davis
17	Patrizia Fracassi	Food and Agriculture Organization ( <i>virtual</i> )
18	Lora Iannotti	Washington University in St. Louis ( <i>virtual</i> )
19	Ahmed Kablan	USAID Bureau for Resilience, Environment, and Food Security
20	Tyrell Kahan	USAID Bureau for Resilience, Environment, and Food Security
21	Roberta Lauretti-Bernhard	Food Enterprise Solutions
22	Mark Lawrence	Fish Innovation Lab ( <i>virtual</i> )
23	Chessa Lutter	RTI International
24	Mduduzi Mbuya	Global Alliance for Improved Nutrition
25	Grainne Moloney	UNICEF ( <i>virtual</i> )
26	Mourad Moursi	consultant to the Micronutrient Forum
27	Stella Nordhagen	Global Alliance for Improved Nutrition
28	Saskia Osendarp	Micronutrient Forum
29	Panam Parikh	consultant to the Micronutrient Forum
30	Ruffo Perez	USAID Bureau for Humanitarian Assistance
31	Marie Ruel	International Food Policy Research Institute
32	Siny Samba	Le Lionceau
33	Emile Schmitz	BOP Inc. ( <i>virtual</i> )
34	Dominic Schofield	TechnoServe
35	Kavita Sethuraman	USAID Advancing Nutrition
36	Linda Shaker	UNICEF ( <i>virtual</i> )
37	Victor Taleon	HarvestPlus
38	Nick van der Velde	BOP Inc.
39	Marti van Liere	Micronutrient Forum ( <i>virtual</i> )
40	Tom van Mourik	Helen Keller International
41	Andrea Warren	USAID Bureau for Humanitarian Assistance
42	Russ Webster	Food Enterprise Solutions
43	Ingrid Weiss	USAID Bureau for Resilience, Environment, and Food Security





## Annex 4. Key Points Related to Food Environment Metrics

Area	State of Current Metrics	Metrics Gaps
Availability	<ul style="list-style-type: none"> <li>Reasonably well defined</li> <li>Widely collected from national to market and household level</li> <li>Expressed by food, food group, nutrient</li> </ul>	<ul style="list-style-type: none"> <li>Seasonality</li> <li>Market food diversity</li> <li>Specific foods such as organ meats, local fruits and vegetables</li> </ul>
Accessibility	Narrowly defined, usually captured in distance or time to food sources	<ul style="list-style-type: none"> <li>Opening hours</li> <li>Norms such as those preventing women from going to the market alone</li> <li>Safety</li> <li>E-commerce left out</li> </ul>
Affordability	<ul style="list-style-type: none"> <li>Many metrics developed (fill nutrient gap, cost of healthy diets, price indexes, relative costs)</li> <li>Grain prices routinely collected including through national statistical agencies</li> </ul>	<ul style="list-style-type: none"> <li>Higher frequency price data</li> <li>Seasonality</li> <li>Local markets (as opposed to looking at national level prices)</li> <li>Price data for perishable foods</li> <li>Subject to food affordability. Need to understand how consumers think about affordability and how they make decision based on this as opposed to metrics showing price/income ratio</li> <li>Better understanding of required expenditures on other costs</li> <li>How to interpret affordability metrics relative to what people are eating</li> </ul>
Vendor (types, number, key properties) and product properties (safety, appeal, convenience, desirability)	Metrics lacking development and standardization	<ul style="list-style-type: none"> <li>Informal markets and vendors</li> <li>Infrastructure</li> <li>Key vendor properties beyond credit</li> <li>Standardized metrics for appeal (convenient, aspirational)</li> <li>Understanding of food choice drivers</li> </ul>
Messaging and promotion	<ul style="list-style-type: none"> <li>Very limited data</li> <li>Focus is often on existence of policy, not implementation</li> </ul>	<ul style="list-style-type: none"> <li>Standard metrics on appropriate, aspirational advertising</li> <li>Deeper understanding of the nature of promotion as opposed to simple presence/absence of promotion</li> </ul>



## Annex 5. Key Points Related to Food Supply Chains Metrics

Area	State of Current Metrics	Gaps
Aggregation, storage, & handling	Limited data	<ul style="list-style-type: none"> <li>- Points of aggregation</li> <li>- Use of appropriate technology and effectiveness</li> <li>- Loss rates</li> <li>- Where, why, and incentives</li> </ul>
Food safety	<ul style="list-style-type: none"> <li>- Well-developed tests for many hazards (but reliant on technology and trained technicians)</li> <li>- Knowledge, attitudes, and practices (KAP) metrics widely used</li> </ul>	<ul style="list-style-type: none"> <li>- Easy to use low-resource metrics</li> <li>- Better insight into causes of contamination</li> <li>- Consistent validated methods</li> <li>- KAP need to verify correlation with actual contamination</li> </ul>
Processing and packaging	<ul style="list-style-type: none"> <li>- Currently used: fortification, processing level (NOVA)</li> <li>- Often binary</li> <li>- Very limited metrics on packaging</li> </ul>	<ul style="list-style-type: none"> <li>- Nutritional impact of processing</li> <li>- Cost of packaging as share of cost</li> <li>- Variation in price by aspects of convenience related to processing and packaging</li> </ul>
Business performance	Very limited area of focus	<ul style="list-style-type: none"> <li>- Profitability, cost structure, incentives</li> <li>- Cost added at each stage of value chain relative to value of nutrition</li> </ul>
Assessing impact across the chain	Difficult to design proper evaluation of impact	<ul style="list-style-type: none"> <li>- Capture multifaceted nature of systems</li> <li>- Tracing unbranded products through the supply chain</li> <li>- Scale of intervention vs. scale of market</li> <li>- Accessing business data</li> <li>- Attribution vs. contribution</li> </ul>



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