

Where Business and Nutrition Meet

Review of approaches and evidence on private sector engagement in nutrition

15 June 2018

About MQSUN+

Maximising the Quality of Scaling Up Nutrition Plus (MQSUN+) aims to provide the Department for International Development (DFID) with technical services to improve the quality of nutrition-specific and nutrition-sensitive programmes. The project is resourced by a consortium of five leading non-state organisations working on nutrition. The consortium is led by PATH.

The group is committed to:

- Expanding the evidence base on the causes of undernutrition
- Enhancing skills and capacity to support scaling up of nutrition-specific and nutrition-sensitive programmes
- Providing the best guidance available to support programme design, implementation, monitoring and evaluation
- Increasing innovation in nutrition programmes
- Knowledge-sharing to ensure lessons are learnt across DFID and beyond.

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About this publication

This report was produced by PATH through the MQSUN+ programme to review lessons learned from business initiatives to address malnutrition. Though this document was produced through support provided by UK aid and the UK Government, the views expressed are those of the authors and do not necessarily reflect the UK Government's position, policies, or views. For instance, an example in this report does not imply any support or validation of the company, its products or projects by the UK Government.



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Abbreviations

2SCALE	Toward Sustainable Clusters in Agribusiness through Learning in Entrepreneurship
AECF	Africa Enterprise Challenge Fund
AGRA	Alliance for a Green Revolution in Africa
AIF	Africa Improved Foods Rwanda Limited
ANF4W	Affordable Nutritious Foods for Women
B2B	business-to-business
BOP	base of the pyramid
BSR	Business for Social Responsibility
CIAT	International Center for Tropical Agriculture
CIP	Centro Internacional de la Papa (International Potato Centre)
CSR	corporate social responsibility
DALY	disability-adjusted life-year
DFID	Department for International Development (United Kingdom)
EDTA	ethylenediaminetetraacetate
FACT	fortification assessment coverage toolkit
FReSH	Food Reform for Sustainability and Health
GAIN	Global Alliance for Improved Nutrition
GDFL	Grameen Danone Foods Ltd.
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLOPAN	Global Panel on Agriculture and Food Systems for Nutrition
GNA	Good Nature Agro
IDH	Sustainable Trade Initiative
IDS	Institute of Development Studies
IFC	International Finance Corporation (World Bank)
IFDC	International Fertilizer Development Center
LMIC	low and middle-income country
M&S	Marks and Spencer
mCommerce	mobile commerce
MNC	multinational corporation

MNP	micronutrient powder
mNutrition	mobile nutrition
MQSUN+	Maximising the Quality of Scaling Up Nutrition Plus
N4G	Nutrition for Growth
NCD	noncommunicable disease
NGO	nongovernmental organisation
OFSP	orange-fleshed sweet potato
PEA	Private Extension Agent
PLAN	Postharvest Loss Alliance for Nutrition
PPP	public-private partnership
QA	quality assurance
QC	quality control
RUTF	ready-to-use therapeutic food
SAFE	Solutions for African Food Enterprises
SBCC	social and behaviour change communication
SBN	Scaling Up Nutrition Business Network
SMART	specific, measurable, achievable, relevant and time-bound
SME	small and medium-sized enterprise
SUN	Scaling Up Nutrition
SUSTAIN	Scaling Up Sweetpotato through Agriculture and Nutrition
UK	United Kingdom
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USI	universal salt iodisation
WASH	water, sanitation and hygiene
WFP	World Food Programme
WHO	World Health Organization

Executive Summary

The 2030 Global Goals commit to end all forms of malnutrition and state the responsibility of governments, development organisations, donors, civil society and the private sector for this goal. There is scope to enhance food systems and markets by leveraging the skills, expertise and resources of the private sector, which produces most of the world's food. The United Kingdom Department for International Development encourages private sector investment in strengthening 'national and global food systems to make nutritious diets more affordable and accessible to the poor, in particular for women, adolescent girls and children' and in 'healthier and more productive workforces [...] as part of [...] responsible and sustainable growth strategies' (DFID, 2017a).

This report's overall objective is to increase understanding of business initiatives aimed at reducing malnutrition, by mapping and assessing evidence and lessons learned, identifying good practices and opportunities for further engagement in nutrition, and making recommendations to promote and support sustainable business action on nutrition.

MQSUN+ collected information through desk research and interviews with 85 people who represented 65 organisations, of which 33 were for-profit businesses, 22 development organisations, 6 donor agencies and 4 research organisations. Of the 33 businesses, 17 were multinational corporations (MNC), 7 regional businesses, and 9 small and medium-sized enterprises (SMEs). Overall, MQSUN+ contacted 126 organisations, of which 50 percent did not respond or could not be reached. However, the individuals who did provide interviews provided invaluable information.

The review looked at three pillars through which the private sector may have directly or indirectly impacted nutrition outcomes: (1) access to naturally nutritious foods, (2) scale up of fortified foods, and (3) strengthening of workforce nutrition actions. For each pillar, one or more pathways laid out actions along private sector value chains, in product development, sourcing, production, marketing, distribution and sales. The review found great variation in the strength of evidence for the impact pathways in each pillar, depending on the period over which investments had been made by both the private and public sectors. The evidence base for fortified staple foods is strong, as investments in this pathway started over 60 years ago and accelerated over the past 25 years. Investments to scale up research and delivery through biofortification or naturally nutrient-dense foods are more recent, so the evidence base on the pathway to scale is just beginning to grow.

MQSUN+ found that the size and type of company influenced its rationale, capacity and opportunity to invest in nutrition and that the type of engagement may change over time. Many MNCs had extensive reach and sizeable corporate social responsibility programmes. However, shareholders' expectations of a sizable return on investment constituted a considerable barrier to developing affordable nutrition solutions to serve the poor; though some MNCs have taken up this challenge. Most MNCs stated that they saw investments in nutrition solutions for low-income consumers more as developing a future market rather than as corporate social responsibility. Many large regional and national companies also recognised nutrition as an opportunity, often leading in their markets, especially for fortified staple foods and condiments. However, most poor consumers have been



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served by SMEs, micro-entrepreneurs and informal vendors, who are constrained by cash flow, access to finance, technical expertise, and quality issues. All types of companies would benefit from support to expand business models targeting low-income consumers with better nutrition solutions.

What worked well in private sector engagement on naturally nutrient-rich foods? The most successful pathways were support to SMEs through vertical integration in global value chains, partnerships between smallholder farmers and larger companies and technology solutions to increase farmers' access to inputs such as fertilisers, seeds, storage, digital technology services and technical advice. On-farm consumption of nutrient-rich crops can be encouraged through business agreements and behaviour change interventions. Sharing low-tech or proximity services and solutions for cold storage or processing reduced nutritious food losses. Mobile phone services increased access to market information and extension services. Publicly funded entities and business accelerators supported investments to de-risk early-stage innovative approaches. Established companies, regardless of size, with mature, viable portfolios were better positioned than start-ups to reach poor consumers or support smallholder farmers to scale innovations. Work needs to be done to define appropriate metrics and to generate evidence with respect to the sustainability and nutrition impact in this pillar.

What worked well in private sector engagement in scaling up fortification solutions? Fortification of staple foods and condiments was the most successful pathway, thanks to decades of experience, advocacy, legislation, technical assistance and capacity building. Mandatory fortification legislation is necessary to achieve scale and reach poor consumers, but it requires enforcement capacity. Over 90 percent of business respondents in this area indicated that they worked with a technical nutrition partner, providing legitimacy, insight and direction. Public sector investments in pre-competitive research and development have kick-started fortification. Tax waivers were another example of how governments created a favourable enabling environment for fortification. Large businesses can apply efficient and smart sourcing strategies, combining inputs from local, regional and global supply chains, but this has remained a challenge for small firms. Partners working on technology solutions to enable participation of small- and medium-scale producers. Proximity distribution channels can be strengthened to facilitate fortified foods reaching the poor; these channels can use vouchers, mobile technology or incentives to create demand and consider different ways that households source food. Complex issues in the arguments for and against industrially processed complementary foods for children have hindered progress in increasing access for that vulnerable group.

What about private sector engagement in scaling up nutrition in the workforce? Workforce nutrition has been a new focus area since the 2013 Nutrition for Growth summit. This focus area has been picked up by a few companies operating in developing countries thanks to the advocacy and technical support of public sector nutrition organisations. Multinationals have generated evidence of the positive impact of comprehensive employee health and well-being programmes. There also was some evidence of the positive impact of iron supplementation in workers in developing countries. Nutrition and food security interventions were sometimes integral parts of global suppliers' responsible sourcing strategies. Nutrition behaviour change interventions were implemented by both MNCs and SMEs; but intervention quality, frequency and duration varied widely, as did their impact.

Overall, it was determined that the following worked well for business engagement in nutrition:

- **Joining of forces** through creating partnerships between businesses and nongovernmental organisations or technical agencies, de-risking private sector investments by public sector support mechanisms and establishing national nutrition platforms to expose business to nutrition solutions.
- **Vertical integration** of smallholder farmers and other actors in global supply chains via deep engagement with suppliers who provide technical advice and inputs. This engenders better agricultural practices and higher-quality produce that is delivered more efficiently to market

to minimise losses as foods move off the farm and into markets. It also fosters measures to improve the nutrition and food security of the farmer families themselves.

- **Sharing of resources**, such as cold storage facilities, processing units and the like, through lease or pay-as-you-use mechanisms.
- **Proximity solutions** that bring technologies or services (e.g. solar drying or on-farm processing) to the farmer's doorstep, or nutritious foods in appropriate package sizes for on-demand purchase by the low-income consumer. These overcome infrastructure and geographical challenges.
- **Innovative use of existing technologies** to reach low-income consumers with information, products or services through mobile phone or other digital technology, solar energy or vacuum solutions.

What has not yet worked well across all pathways was creating demand for nutritious foods with poor consumers. Businesses could justify investing in the promotion of their branded nutritious products, since this created demand for nutritious foods. However, focusing on motivating consumers to generally value benefits derived from better nutrition was beyond the means of most companies. Additionally, it was a major barrier to building a viable business in this area. Whilst some of the largest MNCs have invested in promoting nutrition and health messages, micro-, small-, medium- and large-sized national companies that served most of the market did not have the means nor the credibility to do so.

There is an urgent need for the public sector to collaborate with business to invest in large-scale, continuous and innovative efforts to establish population-wide norms and preferences for healthy eating. Moreover, such a collaboration should support poor populations in the food choices that they must make daily—to choose naturally nutrient-dense as well as fortified foods.

Despite the enticement of the potential market inherent in a large number of poor consumers, investing in reaching the poorest of the poor is a large barrier for most companies. Nutritional quality comes at a cost, and nutritious foods cannot always be produced and/or sold at volumes that would bring affordable prices. Distributing these foods at subsidised cost or for free requires public sector collaboration—for example, through cash transfers or vouchers. Additionally, the poor may not have access to distribution channels such as modern retail. Proximity distribution networks of a community sales force could help ensure distribution to the most hard-to-reach consumers.

Evidence and knowledge gaps. This review underlined the fact that commercial marketing of nutritious foods to low-income consumers does not yet lead to profits in the short or medium term. Companies therefore use hybrid and social business models to develop future market opportunities. They also invest in sustainable supply chains, including improving nutrition of their workers, with the expectation of a longer-term return on investments. Except for staple food fortification, for which the evidence is strong, there is no or only weak evidence for the nutrition impact of the other business engagement pathways. Though the efficacy of multiple nutritious products developed by the private sector has been proven, data to substantiate nutrition or business impact of these solutions are currently not being collected in any systematic or meaningful way. Metrics and methodologies to estimate business and nutrition success need to be defined; value chains and pathways are long, and impact on nutrition indicators cannot be attributed easily to individual interventions or products.

Multiple knowledge gaps have been identified in the report, ranging from cost effectiveness of demand-creation approaches to effectiveness of policies and legislation to create an enabling environment for a nutritious foods market that especially targets poor mothers and children. Particularly in workforce nutrition, there is an evidence gap on cost-effective interventions impacting employees' food and nutrition security.

Chapter 1: Introduction



PATH

Under the [2030 Global Goals](#), the world has committed to end all forms of malnutrition, one or more of which affect one in three people globally. One and a half billion people experience deficiencies in essential vitamins and minerals and of children under five years, 155 million are stunted, 52 million are wasted and 41 million are overweight (Development Initiatives, 2017). Childhood undernutrition accounts for 45 per cent of child deaths (Black *et al.*, 2013). It carries the 4th highest global risk for disability-adjusted life-years—DALYs (Forouzanfar *et al.*, 2015).

The current rate at which malnutrition is being reduced is insufficient to achieve Sustainable

Development Goal 2.2 to reduce malnutrition in all its forms. Unless current trends can be reversed, by 2030, half of the world's population will be affected by one form of malnutrition or another (International Food Policy Research Institute, 2016). The differential needs of and impacts on boys, men, girls and women of all ages are important, as are the immediate and underlying barriers to accessing opportunities to change families' nutrition situation (Shekar *et al.*, 2017).

Amongst the long-term consequences of insufficient nutrition are poor cognition, lower school attainment and reduced labour capacity, productivity and earnings in adulthood. Malnutrition negatively impacts business performance and may contribute to as much as a 10 percent loss in gross domestic product per annum (International Food Policy Research Institute, 2016). This is in part because malnourished individuals cannot work to their full ability. Likewise, inadequate food systems perpetuate the burden and catalyse malnutrition (whether deficiencies or excesses). Urgent and concerted action by governments, donors, businesses and civil society is required to increase access to and uptake of nutritious foods, as well as to establish collective norms and standards.

The private sector produces virtually all of the food consumed in the world. Whether a large or small actor, those in the private sector are driven by profit. Profit, in turn, allows innovation and business growth, attracts investors and ensures business sustainability. Hence, the best space for intervention by the private sector is likely where business and nutrition meet, where the profit is large enough to justify investment in nutrition. Consumers will buy products in a market when a product is desirable, affordable and available to them. Markets will exist only when there is enough demand at a price that covers the costs of production, distribution, marketing and sales, and that allows for a profit. Finding this intersection is not the only challenge: companies should also protect the health and nutrition of their workforce and clients.

Businesses have made a range of commitments to reduce malnutrition. These have been at international fora, such as the 2013 Nutrition for Growth (N4G) summit where the Global Nutrition for Growth Compact was endorsed, and through groups such as the Scaling Up Nutrition (SUN) Business Network (SBN). The commitments align with the [World Health Assembly's nutrition targets for 2025](#), which focus on vulnerable groups: children under the age of 5 years and women of reproductive age (World Health Organization, 2015). It is, however, necessary to translate these commitments into concrete actions and results, broaden them to other private sector actors and build evidence on the effectiveness of this private sector engagement.

This review can lay a foundation for recommendations on business action to address nutrition. The findings may support governments, donors and civil society organisations to develop approaches to leverage business investments for more effective nutrition impact. The overall objective of this report is to increase understanding of business initiatives aimed at reducing malnutrition or taking intermediate steps to improve nutrition. The specific objectives are as follows:

- Map and assess results and lessons learned from business initiatives to address malnutrition.
- Identify good practices and opportunities for businesses to invest further or more wisely in nutrition.
- Make recommendations to effectively promote and support responsible business action on nutrition.

In recent years, various technical organisations have published grey literature reports and case studies on this topic (Chevrollier *et al.*, 2015). Companies seldom invest in scientific research on what are—to them—secondary outcomes, such as nutritional status; they focus instead on profit and market share. Given this gap in the evidence, this review aims to answer key questions on results and lessons learned regarding business engagement in nutrition, such as:

- What works, what does not and why in terms of nutrition outcomes for intended target beneficiaries and the commercial viability of the business intervention?
- What is the effectiveness of different approaches taken by businesses and donors, such as partnership models, incubators and others?
- What are the overlooked knowledge gaps?

Although this review summarises what works to improve nutrition, it is important to acknowledge that the private sector may also have a negative impact. For example, high-fat, high-sodium and high-sugar processed food and drinks may be more desirable, affordable and accessible to consumers than healthy alternatives, which contribute to the rise of obesity and diet-related noncommunicable diseases (NCDs). Additionally, infant formula and “follow-up milksⁱ”—which businesses have promoted in the media and through targeted marketing—are not a necessity for most children. They also may contribute to lower rates of exclusive breastfeeding among children from 0 to 6 months of age and continued breastfeeding thereafter. Though guidelines such as the *International Code of Marketing of Breast-milk Substitutes* (World Health Organization, 1981) are in place, and many businesses have taken action to improve their practices, more needs to be done to reduce these negative impacts and to make nutritious and safe foods more affordable, accessible and desirable.

This report is organised as follows: Chapter 2 describes the review methodology and provides key definitions. Chapter 3 explains different types of business models to deliver nutrition impact and examines various initiatives undertaken to encourage business engagement. Chapter 4 describes the role of businesses in nutrition-specific and nutrition-sensitive interventions. Chapters 5, 6 and 7 focus on “what works” in business action for nutrition (i.e. Chapter 5 summarises efforts to increase production of and access to naturally nutrient-dense foods; Chapter 6 summarises efforts to increase access to fortified foods; and Chapter 7 summarises efforts to improve nutrition of the workforce, particularly in factories and agricultural supply chains. Chapter 8 concludes with a summary of key takeaways and recommendations for different actors. Annex 1 provides a list of interviewees. Annex 2 is a glossary. Annex 3 is a summary of what works. Annex 4 provides a list of the sources of information on the examples for each chapter. Annex 5 contains a catalogue of examples. Annex 6 presents in-depth case studies.

ⁱ The Codex Alimentarius Commission (1987) defines follow-on formula or follow-up milk as “a food intended for use as a liquid part of the weaning diet for the infant from the 6th month on and for young children” (Food and Agriculture Organization, 2017). In 1986, the World Health Assembly stated that “the practice being introduced in some countries of providing infants with specially formulated milks (so-called ‘follow-up milks’) is not necessary” (World Health Organization, 2005).

Chapter 2: Methodology and Definitions

Methodology

Categorisation

The global conversation on nutrition generally categorises actions into nutrition-specific (such as provision of vitamins) and nutrition-sensitive interventions (which generally are conducted for purposes other than nutrition but have nutrition-related objectives and address underlying drivers of undernutrition). (See **Table 2.1.**) For this report, Maximising the Quality of Scaling Up Nutrition Plus (MQSUN+) built on those categories and saw levels of actions through which the private sector can impact nutrition—particularly of women, adolescent girls and children—where there are large populations of economically vulnerable people:

- Private sector engagement in **nutrition-specific interventions**: These include provision of special nutrition products and services to vulnerable groups, such as micronutrient supplements and ready-to-use therapeutic foods (RUTFs), and promotion of appropriate complementary feeding. These are generally integrated into ongoing public health initiatives.
- Private sector engagement in **nutrition-sensitive interventions**: These include business activities within the spheres of agriculture and food systems, health, education, social protection, and water, sanitation and hygiene (WASH)—for example, provision of products and services to promote the use good hygiene practices.
- Private sector engagement in **interventions that may not aim to address the underlying drivers of malnutrition nor have nutrition objectives or activities but may nonetheless improve nutrition**: These activities are not strictly nutrition-specific or nutrition-sensitive, but they may, for example, contribute to improved access to safe nutritious foods through improvements in quality, safety, affordability and availability; increase access to efficient and affordable cold chains; or develop retail channels that may reach populations of concern.

In this report, MQSUN+ examined business action that may be nutrition-specific (e.g. fortification), be nutrition-sensitive (e.g. biofortification) or be beneficial to nutrition despite not having nutrition-related objectives. Independent of nutrition-specificity or sensitivity, three pillars of business actions were categorised that potentially benefit nutrition:

1. Increasing access to a nutritious, diverse and healthy diet by improving the affordability and availability of **naturally nutrient-rich foods**, as well as increasing demand for those foods, particularly amongst low-income consumers.
2. Scaling up **fortification** solutions, such as biofortification, fortified foods and condiments, special fortified foods for women and children and home fortification with micronutrient powders (MNPs).
3. Strengthening **workforce** policies, programmes and practices to support and protect the nutrition of workers and their families.



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Distinguishing these levels and “pillars” of action helped to identify a wide variety of actions to review to illuminate business engagement in and possible impact on nutrition.ⁱⁱ

Data collection methods

To explore the dynamics of each of these three pillars of business action (access to nutritious foods, scale up of fortified foods and workforce nutrition), MQSUN+ followed this iterative process:

1. **Contact consultations.** MQSUN+ spoke with donor, nongovernmental organisation (NGO) and other experts and key actors who recommended examples of businesses that engage in positive nutrition actions and who provided key background documents.
2. **Desk review.** MQSUN+ then reviewed those documents; N4G and SBN reports, including their information regarding nutrition commitments; and other open-access grey literature (e.g. those obtained by searching business websites for additional reports).
3. **Identification of individuals to interview.** MQSUN+ made a purposeful selection of individuals and private sector entities that were engaged in nutrition, as recommended by the UK Department for International Development (DFID) and other stakeholders, or based on them being N4G signatories or SBN members. The selection process sought experience along all elements of the value chain, which represented different geographies and business types and sizes. MQSUN+ prioritised interviews that would cover all the three pillars. See **Annex 1** for the list of entities from which an individual provided an interview.
4. **Interviews.** MQSUN+ conducted interviews with 85 individuals who represented 65 organisations—33 businesses, 22 NGOs or international organisations, 6 donor agencies and 4 research organisations. All interviewees provided informed consent. An interview guide and a template for note-taking to facilitate analysis and comparison were used.
5. **Data processing:** MQSUN+ uploaded all data sets and notes from the desk review and interviews to a common platform. To protect privacy, raw data was not made publically available. Moreover, potentially attributable quotes were only used after having obtained permission from the interviewee.
6. **Analysis.** MQSUN+ engaged in a consultative process, discussing and triangulating findings for consistency and accuracy and updating the proposed pathway for each pillar. Any discrepancies in interpretation were also identified and resolved. The selection of the case studies was both **opportunistic**, depending on the availability of willing interviewees to share sufficient in-depth information, and **purposeful**, hinging upon the intrinsic value in illustrating:ⁱⁱⁱ
 - The three pillars (access to nutritious food, scale up of fortified foods and workforce nutrition).
 - Different elements of the private sector value chain.
 - Geographical distribution—examples from Africa, Asia and Latin America.
 - Variation in types of business (size, country origin and industry/subsector).
 - Innovative approaches.
 - New case studies, as in those not previously reported.
 - Businesses’ own initiatives (without public sector funding or other support) as well as donor-funded examples or other types of public-private collaboration.
 - Successes and failures in terms of commercial viability and nutrition results.

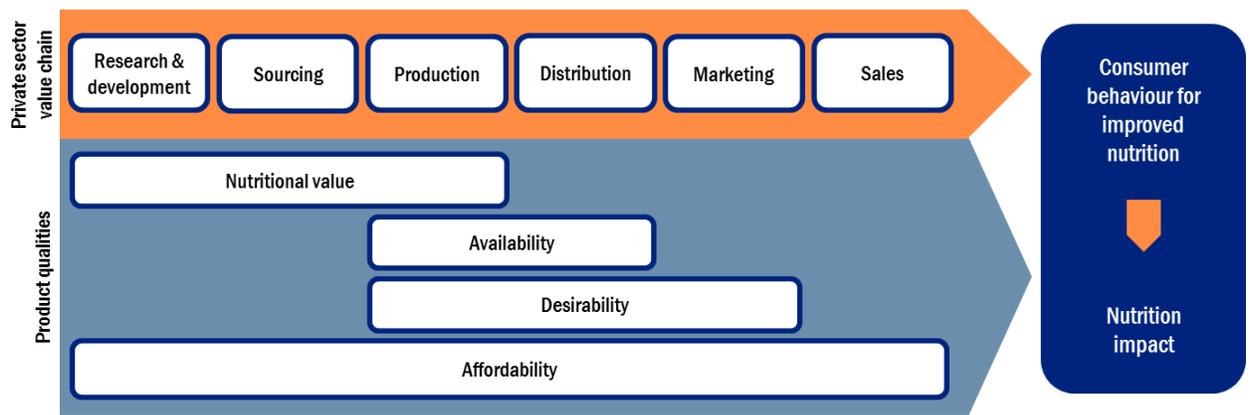
ⁱⁱThroughout the review, MQSUN+ meaningfully addressed gender consideration, as per the Gender Equality Act of 2014.

ⁱⁱⁱThis report does not provide a full stocktaking but aims to present relevant examples of the aforementioned dimensions.

Conceptual framework

The review aims to understand how private sector investments may impact consumption of a more nutritious diet and otherwise lead to positive nutrition outcomes. Business choices and activities along this pathway from research and development through distribution and sales define a food product’s characteristics, e.g. its nutritional quality, its availability and affordability (together defined as accessibility) and its desirability to the consumer (including aspects of cultural acceptability and the consumer’s aspirations). See **Figure 2.1**. Jointly, these characteristics ultimately influence the consumer’s choice and consumption, as well as nutrition impact. Therefore, as noted, in selecting interviewees, the aim was to represent action along the private sector value chain.

Figure 2.1: Value chain and product qualities



The interviews included questions to identify what companies have done to improve one or more food product characteristic or to influence consumer behaviours. For example:

- Has the business enhanced the nutritional quality of the foods they bring into the market or considered how these issues may impact their workers?
- How is availability increased where the target populations can purchase or access the food?
- How is the food made affordable for the target consumers?
- How is the food’s desirability increased for the target population? (This relates to an aspiration to consume a healthy diet, cultural acceptability and convenience and social norms).
- How is the target population’s uptake and consumption of the food (or use of other nutrition services or practices for that matter) influenced?
- How is adequate and effective consumption of nutritious and safe food by the target population (as per recommended frequency and quantity) encouraged?

Limitations

This report’s identification and selection process inherently led to an over-representation of companies that work in partnership with or are known to the public sector. This may have biased the findings towards companies already working in public-private partnerships (PPPs). It was challenging to obtain interviews with small and medium-sized enterprises (SMEs) due to lack of correct contact details or limited communication means. Companies were reluctant to give detailed information regarding their business models’ viability, their challenges and their results or lack thereof.

Although the initial plan was to analyse the case studies for their impact on product characteristics (availability, desirability, affordability) and consumer behaviour, it soon became clear that available information was insufficiently detailed to do so. In addition to the nutrition-related focus, questions aimed to understand the impact on the business itself, e.g. the commercial viability of marketing a nutritious food and the potential for bringing such to scale, as these factors will ultimately influence whether businesses will invest. There were limitations, however, in obtaining information in these areas as well. A key learning of this study was that impact on nutrition seemed to be rarely measured or documented, as this was not a primary objective for businesses; as such, studies were expensive undertakings. Furthermore, data on commercial viability were not shared by companies since these were competitive information.

Definitions

Several concepts required definitions at the outset to ensure common understanding amongst MQSUN+ and DFID. **Table 2.1** sets out definitions for some key terms and concepts as used in the review. See **Annex 2** for a full list of definitions.

Table 2.1: Definitions of key terms.

Term	Definition
Healthy diet, nutritious foods	A safe and diverse diet made up of plenty of fruits and vegetables, whole grains, fibre, nuts and seeds, whilst limiting free sugars, sugary snacks and beverages, processed meats and salt, and replacing saturated and industrial trans fats with unsaturated fats. (Global Panel on Agriculture and Food Systems for Nutrition, 2016; World Health Organization, 2017b).
Dietary diversity	Different foods or food groups consumed over a period (Ruel, 2003); a qualitative measure of food consumption that reflects household access to a variety of foods and, in some cases, indicates potential nutrient adequacy of the diet of individuals. Dietary diversity questionnaires can be a rapid, user-friendly and easily administered low-cost assessment tool (Kennedy, Ballard and Dop, 2010). A Minimum Dietary Diversity (MDD) indicator of four or more food groups out of seven has been internationally recommended since 2008 for infants and young children (World Health Organization, 2008). A MDD for Women (MDD-W), with a threshold of at least five food groups out of ten is now available (Food and Agriculture Organization & FHI 360, 2016).
Nutrition-specific interventions or programmes	Interventions or programmes that address the immediate determinants of foetal and child nutrition and development (i.e. adequate food and nutrient intake, feeding, caregiving and parenting practices) and reduced burden of infectious diseases. Examples of evidence-based, nutrition-specific interventions for women are folic acid, iron and calcium supplementation; multiple micronutrient supplementation; salt iodisation; balanced energy-protein supplementation. Examples of interventions for infants and children are breastfeeding promotion, complementary feeding promotion, preventive vitamin A supplementation, iron supplementation, zinc supplementation and multiple micronutrient supplementation (Maternal and Child Nutrition Study Group, 2013).
Nutrition-sensitive interventions or programmes	Interventions or programmes that address the underlying determinants of foetal and child nutrition and development, and that incorporate specific nutrition goals and actions—for example, food security; adequate caregiving resources at the maternal, household and community levels; and access to health services and a safe and hygienic environment. These can also serve as delivery platforms for nutrition-specific interventions, potentially increasing their scale, coverage and effectiveness. Examples: agriculture and food security; social safety nets; early child development; maternal mental health; women’s empowerment; child protection; schooling; water, sanitation and hygiene; health and family planning services (Maternal and Child Nutrition Study Group, 2013).

Chapter 3: Business Models and Mechanisms to Increase Business Engagement

For this review, MQSUN+ aimed to assess the evidence on business engagement in nutrition to determine whether it had any impact on access to nutritious foods or the nutritional status of low-income consumers. MQSUN+ also sought to determine whether this engagement has resulted in business benefits, such as commercial viability or sustainability. The strength of evidence for the impact pathway for each pillar was found to vary greatly, depending on the period over which investments had been made by both the private and public sectors.



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Figure 3.1 illustrates the difference in maturity of the pathways for each of the pillars; this in turn may align with the strength of the evidence base. Adoption of mandatory industrial fortification started over 60 years ago and accelerated in the past 25 years. Biofortification, fortified complementary foods and workforce nutrition are much younger pathways by comparison. The evidence base for fortification is therefore relatively strong, whereas the evidence of the impact in the other pathways is only just emerging.

Business characteristics and nature of engagement

The Foresight report on the future of diets provides insights into dietary changes across the world, resulting from critical shifts in the global food system (Global Panel on Agriculture and Food Systems for Nutrition, 2016). This understanding of nutrition as an outcome of a food system is a shift from when malnutrition was considered a problem to be addressed entirely by the public health system. With the recognition of the importance of diet and the food system's key role in providing access to a diet, whether healthy or not, there are now two main entry points for coordinated action: health structures and the food system. Including smallholder farms that produce and sell food, the private sector can be considered the largest producer and provider of foods.

There is still much ground to be covered, but engagement with the private sector has become more common and actors in the development sector are working to strengthen this collaboration for renewed investment in nutrition. Organisations such as the Global Alliance for Improved Nutrition (GAIN) and initiatives such as the SUN Movement and the N4G summit play important roles in advocating for private sector involvement.

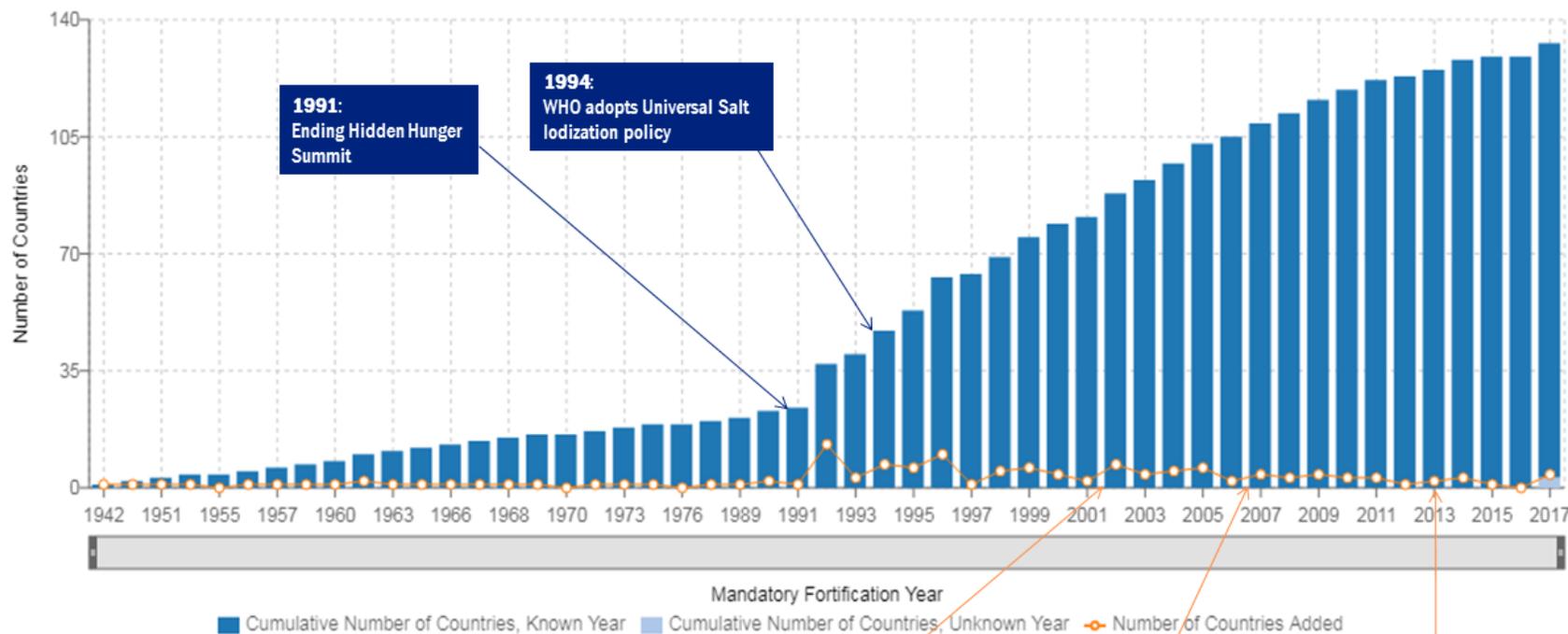
This chapter discusses the different types of businesses and the different ways in which business activities can contribute to improving or worsening nutrition. It also outlines tools and mechanisms in place to encourage, support and track business engagement in nutrition.

Figure 3.1: Year and number of countries when large-scale food fortification was mandated,* and start of global initiatives related to biofortification, fortification of complementary foods for children, nutrition-sensitive agriculture and workforce nutrition in low- and middle-income countries.

Cumulative Count of Countries with Mandatory Fortification, by Year

Last updated: 27-Nov-2017

Country has legal documentation that has the effect of mandating food fortification



Source: Fortificationdata.org

BMGF = Bill & Melinda Gates Foundation
 LMIC = Low and Middle Income Countries
 N4G = Nutrition for Growth

2002:
CGIAR fast tracks biofortification programme

2007:
BMGF grant for fortified complementary foods

2013:

- Lancet highlights nutrition-sensitive interventions
- N4G commitments on workforce nutrition

Diverse businesses can have direct and/or indirect impact(s) on access to nutritious and safe foods. They include farmers (from smallholder to plantation), millers (from small to national), domestic food processors, multinational food and beverage companies, ingredient or cold chain suppliers, modern and traditional retailers and wholesalers, local food vendors and technology companies. Companies were grouped into three categories related to their size and scope of operation:

- Multinational corporations (MNCs)
- Large regional and national companies
- SMEs and informal and micro-entrepreneurs.

Each of these types of businesses has different rationales, capacities and opportunities for investing in nutrition, and each needs different support to engage.

Multinational corporations

MNCs have extensive reach (operations or sales) in multiple countries and large internal workforces. They may have sizeable corporate social responsibility (CSR)^{iv} operations and budgets. MNCs often invest simultaneously in multiple approaches to social responsibility, and they are frontrunners in participating in global platforms and public commitments. For example, BASF and DSM (both chemical companies) are champions of food fortification. They offer technical support to build the capacity of local food producers. They also are engaged in multiple partnerships that aim to have nutrition impact and participate in the Business Platform for Nutrition Research.^v Unilever played a key role in the initiation of the SBN and developed double-fortified bouillon cubes. The company fortifies many of its products, and it is integrating nutrition into its employee health and wellness programme (INTERVIEWS: BASF, DSM, UNILEVER).

Though MNCs have financial and human resources to invest in nutrition, shareholders exert considerable pressure to provide attractive returns on investment, which can create barriers to affordable nutrition solutions for low-income groups in developing countries. Additionally, successful solutions hinge upon the ability to ensure internal buy-in and to create alignment amongst different parts of the business, which each have their own targets, objectives and interests.

Large regional and national companies

Large regional and national companies often lead in their market(s) and have strong brands, high-quality facilities compatible with international standards, strong technical skills and leaders who recognise nutrition as an opportunity (for example, Dangote Group in Nigeria and Indofood in Indonesia). They may be constrained by difficult enabling environments. However, they may be better-placed than SMEs to overcome market challenges. They also may excel at launching products quickly and de-investing when a new product does not appear successful, at balancing input costs, at reaching volume in their markets and at tightening profit margins to price products for accessibility. In some markets, these companies are family businesses with a strong sense of purpose, national pride and desire to ‘give back’ to their country. And many have invested in nutrition regardless of global NGO or donor focus.

Like MNCs, these businesses engage at multiple levels to improve nutrition. An example is Nutrifood, another Indonesian company, which markets a large portfolio of ‘healthy food products’ in 33

^{iv} MQSUN+ defines CSR as a company’s effort to assess and take responsibility for its effects on environmental and social well-being.

^v Business Platform for Nutrition Research leverages global businesses’ research capacities to define, fund and disseminate new research to improve nutrition in the developing world. In collaboration with donors (the Government of Canada primarily), academia and civil society, the Platform aims to research entry barriers for new products/technologies to improve nutrition. Ajinomoto; Arla Foods; BASF; Britannia Industries; Royal DSM; GlaxoSmithKline; Mars, Incorporated; Nutriset and PepsiCo are the founding members. It began by looking at bioavailability, biomarkers and behaviour change communication. It plans to also consider food safety, infectious disease and implementation science.

countries. The company's more than 3,000 employees benefit from a corporate health and nutrition programme. Nutrifood employs a health- and nutrition-centric CSR programme—advocating for increased nutrition awareness amongst consumers and supporting college students to educate elementary school students about food safety and a healthy lifestyle (Scaling Up Nutrition, 2015).

Many actors in this category are producers of fortified staple foods and condiments such as iodised salt, fortified flour and fortified cooking oil. The vast majority of companies that fortify staple foods do so in response to mandatory legislation. However, where fortification of a particular staple is voluntary, some companies do so to differentiate their products and strengthen their brand (Hoogendoorn *et al.*, 2016). Fortification will be explored further in Chapter 6.

Small and medium-sized enterprises, micro-entrepreneurs and informal vendors

Many people buy their food from SMEs or on local markets from micro-entrepreneurs or informal vendors. The SMEs that commit to nutrition are predominantly part of the food sector; they are motivated in general by market opportunities and the potential contribution of external partners. They target low-income consumers, often through push marketing,^{vi} which may lack the in-depth consumer insights that could be gained from preparing radio and television advertisements. They also are unlikely to have the brand recognition, which is so important to multiple layers of society. Some companies aspire to obtain contracts with large public entities, such as the World Food Programme (WFP) or government programmes; however, they may not have the capacity to fulfil the quality, quantity and cost requirements of these institutional markets. The companies are often constrained by difficult business environments and face challenges, such as limited cash flow, limited access to finance, inadequate processing equipment, limited management skills for growth and limited technical expertise in areas such as product development, quality assurance (QA) or quality control (QC) (INTERVIEWS: BOP INNOVATION CENTER, GAIN, PROTEIN KISSÉE-LA) (Schauer *et al.*, 2017). Technical organisations or NGOs sometimes partner with local SMEs to develop and market context-appropriate, affordable nutritious products. Micro-entrepreneurs and informal vendors are likely even further constrained and need an even greater level of assistance.



PATH/Wendy Stoner

Nature and models of social engagement

We distinguish models of social engagement in terms of their proximity to a company's core commercial business. The proximity includes five levels of engagement—starting at the top with the commercial core business, followed by a hybrid combination of commercial and social business interests, a focus on development of future commercial opportunities, a social business model and finally the CSR model.

Each of these different models of engagement has their own success stories, challenges and lessons learned, but they can co-exist. The type of social engagement of a business may change over time; businesses can therefore move along this continuum. The core business interest can be focused on the company's products or services, but it can also be focused on its employees. Case studies in

^{vi} 'Push marketing' refers to an approach of placing the product in retail distribution channels where target customers shop, as opposed to 'pull marketing,' which is typically advertising (radio, television) to raise consumer awareness to actively seek the product.

Chapters 5 to 7 and in the Annexes provide concrete examples and especially focus on positive business engagement in nutrition.

Table 3.1: Models of business engagement in nutrition.

Models of business engagement ^{vii}	How nutrition fits	Challenges
Commercial business (e.g. BASF, Cargill, DSM, local millers)	<ul style="list-style-type: none"> • At core of business. • Bringing profit and market growth. • Legal obligation (e.g. mandatory fortification). 	<ul style="list-style-type: none"> • Lack of demand for nutritious foods. • High promotion and distribution costs for products and services targeting low-income populations. • Often lower profit than rest of product portfolio.
Hybrid model (e.g. Africa Improved Foods Rwanda Limited; GrainPro, Inc.; Protein Kissêe-La)	<ul style="list-style-type: none"> • Bringing profit in the long term. • Supply of commercial market as well as the institutional market (NGO/government). • Products may need cross-subsidisation of low-profit product by high-profit product. 	<ul style="list-style-type: none"> • If profitable, business stream does not bring sufficient support to fund social business stream. • High promotion and distribution costs.
Business development (e.g. Arla Foods Ingredients, Ajinomoto Co., Inc.)	<ul style="list-style-type: none"> • As part of long-term business view. • Contributing to establishing network of partners and new markets. • Contributing to professional and personal development of staff. 	<ul style="list-style-type: none"> • Requires internal champion to safeguard investments.
Social business (e.g. Danone Communities, Nutri'zaza)	<ul style="list-style-type: none"> • May be non- or low-profit, but should be sustainable. • Products may need cross-subsidisation of low-profit product by high-profit product. • As an incubator of innovation. • Through demand creation and proximity marketing with partners. 	<ul style="list-style-type: none"> • Break-even points expected in approximately 10 years. • Small-scale, limited coverage. • High promotion/distribution costs. • Low quality of local raw materials.
Corporate social responsibility (e.g. Amway)	<ul style="list-style-type: none"> • Not always linked to core business. • Supports obtaining permission to operate. • Improves employer brand, employee motivation and retention. 	<ul style="list-style-type: none"> • Requires internal champion to safeguard investments. • First to be cut in times of cost reduction.
Operational improvement (workforce nutrition) (e.g. Symrise, Unilever)	<ul style="list-style-type: none"> • Strengthens core business. • No profit; cost justified by benefits (e.g. decreased absenteeism, productivity improvements, staff retention). • Can build on legislation (e.g. maternity leave and breastfeeding policies). 	<ul style="list-style-type: none"> • May add complexity to existing processes. • May require external advice to design effective interventions. • Turnover reduces impact.

Mechanisms for engaging business

Positive engagement between the global nutrition community and the private sector dates back at least to the 1994 adoption of the universal salt iodisation (USI) strategy (World Health Organization, 1994). Almost a decade later, the dialogue grew with the creation of GAIN in 2002, which then

^{vii} Listing a company under this category does not imply that the company is operating entirely at this level. The example companies mentioned for the different levels of engagement refer to the companies' development of relevant products, which are elaborated on in the subsequent chapters of this report.

mainly focused on the fortification of staple foods, such as vegetable oil and wheat flour. Within ten years, the global nutrition community was collaborating with the private sector to jointly commit to positive nutrition impact. Yet the global nutrition community has learned that the public sector must invest in advocating for business engagement and progress must be tracked. Except where there is a profit motive or a strong CSR initiative, businesses do not generally invest in improving nutrition for low-income populations.

Mechanisms to advocate for and encourage commitment

In 2010, the SUN Movement was launched to support national leadership and collective action to address malnutrition. Two years later, the SBN was launched; the SBN is one of the four global networks supporting SUN countries (along with the United Nations [UN], civil society and donor networks). This elevated the role of the private sector from observer or contributor to full-fledged partner, and its critical role in the fight against malnutrition was recognised.

The N4G summit in 2013 brought together close to 100 government, donor, civil society and business stakeholders to commit to addressing malnutrition (Nutrition for Growth, 2017). Most commitments were made by multinationals in the food and life sciences sectors; these commitments were related to workforce nutrition (e.g. support for breastfeeding mothers) or to improving access to nutrition products and services. Engagement from businesses in agricultural supply chains (e.g. post-harvest processing, transportation, storage and cold chain) or in the retail sector has been limited.

For many of these companies, the commitments constituted a formal statement of existing programmes and plans rather than a response to public advocacy efforts. For others, however, it did raise interest and drive new investments. Since 2013, progress against commitments has been reviewed annually through the 2014 to 2017 *Global Nutrition Reports*.

Other private sector advocacy and engagement efforts, such as *Every Woman Every Child*, the Clinton Global Initiative and Grow Africa, are not exclusively concerned with nutrition, but they have also convened members of the private sector and captured business commitments relevant for nutrition (Table 3.2).

Table 3.2: Commitment mechanisms.

Platform	Commitments
Nutrition for Growth summit (2013)	Brought together close to 100 government, donor, civil society and business stakeholders to make commitments to address malnutrition until 2030 (Nutrition for Growth, 2017).
The <i>Every Woman Every Child</i> initiative	Captures multisectoral commitments addressing major health challenges of women, children and adolescents, including nutrition (The Partnership for Maternal Newborn & Child Health, 2017).
Clinton Global Initiative	Captured 271 multisectoral commitments between 2005 and 2016, some of which were related to nutrition (Clinton Global Initiative, 2016).
Grow Africa	Advocates for and captures commitments to investments in agriculture, some of which are expected to positively impact nutrition. A partnership of the African Union, New Partnership for Africa’s Development and the World Economic Forum (World Economic Forum, 2016).

Mechanisms for collaboration and support

Since the SBN was conceptualised as the private sector pillar of the SUN Movement, 48 MNCs and over 300 national companies have committed to it. Nationally, 15 country-level SBN networks in Africa, Asia and Central America have moved from advocacy towards concrete support for business engagement. In each country, the SBN format and strategy reflect the local context. Most of the SBN networks in these countries have established membership platforms to provide networking

opportunities for companies that are engaged in nutrition, advocate for an enabling environment and work towards linking companies with necessary technical assistance and access to finance (SUN Business Network, 2017).

Other mechanisms that stimulate, and provide financial and technical support for, private sector nutrition engagement have been donor-driven and donor-funded business innovation and development initiatives. These have sometimes received co-funding from the private sector, such as the multidonor Africa Enterprise Challenge Fund, which stimulates innovation in agribusiness. **Table 3.3** gives a few examples but does not pretend to provide a comprehensive list.

Private sector-driven platforms are also taking up the challenge. They are holding discussions of issues around nutrition, diet and food systems—for instance at the World Economic Forum, the EAT Forum and the World Business Council for Sustainable Development. The latter two organisations recently established the Food Reform for Sustainability and Health (FRSH) partnership, which brings 35 global companies together across sectors, regions and value chains to develop, implement and scale business solutions that deliver on science-based targets for healthier and more sustainable diets.

Table 3.3: Illustrative listing of donor-funded collaboration and support mechanisms.

Mechanism	Focus
Africa Enterprise Challenge Fund	The Africa Enterprise Challenge Fund is supported by donor governments of Australia, Canada, Denmark, the Netherlands, Sweden and the United Kingdom, and international finance institutions, such as the Consultative Group to Assist the Poor and the International Fund for Agricultural Development. It aims to reduce rural poverty, create jobs and promote resilience in rural communities across Africa through catalytic funding to develop innovative commercial enterprises in agribusiness, renewable energy and adaptation to climate change. It does not specifically target nutrition, but it supports many agribusinesses investing in nutritious foods (OECD, 2016).
Amsterdam Initiative against Malnutrition	Led by the Global Alliance for Improved Nutrition Netherlands and co-financed by the Dutch Ministry of Foreign Affairs, the Amsterdam Initiative against Malnutrition brings Netherlands-based companies (e.g. Unilever, DSM, AkzoNobel, SPAR and Rijk Zwaan) and academics together with local African companies to improve food and nutrition security by developing innovative, market-based solutions to reduce malnutrition. The Dutch government plays the role of convenor and innovation stimulator, whilst the companies bring expertise in developing, marketing and selling safe and high-quality products—from seeds to food supplements (GAIN, 2015a); (INTERVIEWS: GAIN & INTERNATIONAL COOPERATION, MINISTRY OF FOREIGN AFFAIRS, NETHERLANDS).
Marketplace for Nutritious Foods	A Global Alliance for Improved Nutrition (GAIN) initiative, funded by different donors, to support small businesses to launch and scale up the production of nutrient-dense foods. In Kenya, Mozambique, Rwanda and Tanzania, Marketplace for Nutritious Foods aims to increase the availability of nutritious foods (e.g. dairy, legumes, meat, fish, fruits and vegetables) for low-income consumers in rural and urban areas. Small and medium-sized enterprises receive technical assistance to improve their business models, marketing strategies and management capacity, as well as financial assistance to procure and install modern equipment (GAIN, 2015a); (INTERVIEW: GAIN).
SPRING Accelerator	This programme is backed by DFID, USAID and the Australian Department of Foreign Affairs and Trade, with advisory support from Girl Effect. Supported businesses use innovative ways to help adolescent girls meet their needs for improved sanitation, health, family planning and nutritious foods (INTERVIEW: SPRING ACCELERATOR).

Tools to monitor business commitments, engagement and performance

It is important to track performance and hold businesses accountable for whether the commitments they make deliver any meaningful nutrition impact. Currently, only the performance of very large enterprises are tracked, leaving out others that may be relevant in low-income countries.

The 2016 *Global Nutrition Report* attempted to track business commitments that had been made at the N4G summit in 2013, but it received few inputs. SBN suggested that “reporting fatigue” and irregular N4G reporting cycles could explain a 65 percent drop in response (INTERVIEW: SUN BUSINESS NETWORK). The majority of the N4G commitments were not SMART (specific, measurable, achievable, relevant and time-bound) and thus were difficult to monitor (International Food Policy Research Institute, 2016).

The Access to Nutrition Foundation takes a comprehensive approach, assessing the nutrition performance of the 22 largest food and beverage manufacturers through analysis of their policies, practices and disclosures. The Access to Nutrition Foundation launched the first Access to Nutrition Index (ATNI) in 2013. The second (Access to Nutrition Foundation, 2016) concluded that all companies needed to improve on nutrition across all areas (the highest score was a 6 out of 10). The assessed companies that did the best were in high-income countries, but they had to improve on addressing undernutrition and not violate the *International Code of Marketing of Breast-milk Substitutes* (WHO, UNICEF and IBAN, 2016). Overall, undernutrition continues to be largely neglected despite efforts to influence companies’ nutrition policies and practices. In 2016, ATNI also published its first country index: the India Spotlight Index, which assessed the nutritional quality of the product portfolios of MNCs and Indian food and beverage companies (Text Box 3.1).

Text Box 3.1. The 2016 Access to Nutrition Foundation India Spotlight Index assessed 14 of the largest multinational corporations (MNCs) and Indian food and beverage manufacturers for their nutrition policies, practices and disclosure (‘corporate profile’), as well as the nutritional quality of their product portfolios. All of the MNCs scored higher on the corporate profile than did the Indian companies, whereas the four top scorers on the product profiles were Indian companies. The MNCs published more and had better disclosure policies, but they fell short on concrete product-oriented contributions to help fight the increasing double burden of undernutrition and overweight or chronic disease. The Index also showed that all companies could do more to ensure that their nutrition products are more affordable and accessible, as the average score for this category was only 1.9 out of 9. Only five of the companies assessed had disclosed a commitment to addressing undernutrition by fortifying appropriate products (and/or using fortified ingredients). As well, only Nestlé India and Britannia Industries had a structured approach to product fortification with specifically defined commitments and programmes. The companies’ marketing of breast-milk substitutes in Mumbai were broadly compliant with the requirements of the national regulations and the International Code of Marketing of Breastmilk Substitutes, with few concerning exceptions.

(Access to Nutrition Index, 2016b)

This kind of performance tracking may influence private sector investments and behaviour towards nutrition objectives. Business indices, such as ATNI and FTSE4GOOD,^{viii} can influence company policies and investments and offer valued insights to investors, consumers and governments that consider MNCs’ ability to operate.

There is no such mechanism to monitor performance of national companies or SMEs that produce the mainstay of foods available in local markets. National advocacy platforms, such as SBN, have raised awareness and brought companies to the table to learn more about opportunities in nutrition, but they are not set up for performance tracking.

^{viii} FTSE Russell is an ethical investment stock market index (<http://www.ftserussell.com/>) that assesses corporate practices and performance, including adherence to the Code, subsequent resolutions and national legislation/regulations.

Chapter 4: The Role of Business in Nutrition-Specific and Nutrition-Sensitive Interventions

This chapter gives an overview of potential private sector roles in nutrition. It categorises investments according to whether a business is offering products or services and whether these are offered through the public sector or through market channels. Simultaneously, it provides examples that categorise these products and services according to nutrition's technical areas. This will allow sectoral specialists to consider ways in which to engage the private sector (**Figure 4.1**).

An example of the categorisation is that businesses can sell their goods or services to an institutional buyer (UN, NGOs, government entities) or directly to a consumer. In the first case, products are distributed for free or at a subsidised cost to target populations using public sector channels (e.g. iron-folate supplements through health centres). In the second case, the company directly provides its goods or services to consumers using traditional market channels (e.g. oral rehydration solutions through pharmacies). A company may be driven purely by commercial objectives; but increasingly, companies have internalised nutrition objectives and want to make products more nutritionally suitable and at lower cost, making the buyer's budget go further.

Ajinomoto Co., Inc. partnered with VALID Nutrition in Malawi, which has worked over the past ten years to innovate milk-free and peanut-free recipes of ready-to-use therapeutic foods (RUTFs) to treat acutely malnourished children. Ajinomoto brought its amino-acid expertise to the table. The collaboration produced a new RUTF formulation with soy, maize and sorghum, which was enhanced with amino acids. The new formulation was effective in the treatment of severe acute malnutrition in children, performed better in reducing anaemia than a peanut-based and milk-based RUTF and was expected to reduce the costs of acute malnutrition treatment (Bahwere *et al.*, 2017).

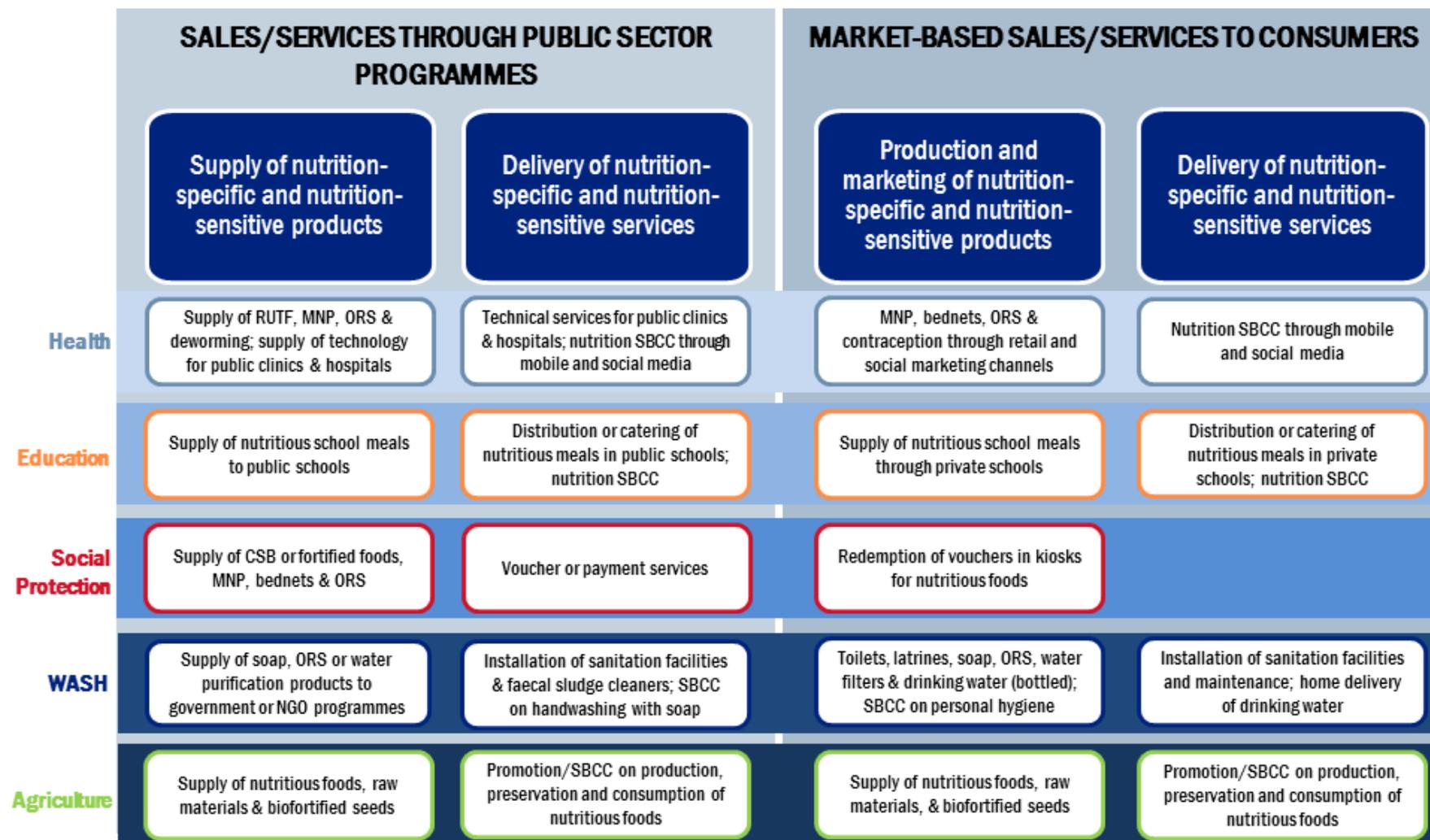
Examples of private sector engagement

Health sector

In the health sector, companies supply public and/or private health service providers with products—for example, oral rehydration solutions, MNPs, iron-folic acid supplements or bednets. They also provide services in private or government clinics or mobile services (e.g. nutrition education, breastfeeding and complementary feeding support or nutrition-sensitive care, such as treatment of infections). Private sector investment in research, development and production facilities have been important even for making MNPs and RUTF available. Competition and PPPs can help lower prices for lifesaving products, as has happened with antiretrovirals over the past 15 years. As mentioned above, Ajinomoto and VALID International collaborated on an improved RUTF (Bahwere *et al.*, 2017).

Public health systems have also relied on companies to distribute medical supplies, leveraging a company's supply chain, marketing and distribution expertise and logistics without requiring changes in the companies' core business model. Project Last Mile, a partnership between the Global Fund to Fight AIDS, Tuberculosis and Malaria; The Coca Cola Company; and The Coca-Cola Foundation, transfers core expertise to Tanzania's Medical Stores Department, which distributes medical supplies across the country (Ahmed, Curry and Linnander, 2015).

Figure 4.1: High-level pathway of business role in nutrition-specific and nutrition-sensitive interventions.



Abbreviations: CSB, corn-soy blend; MNP, micronutrient powders; NGO, nongovernmental organisation; ORS, oral rehydration salts; RUTF, ready-to-use therapeutic foods; SBCC, social and behaviour change communication; WASH, water, sanitation and hygiene

Education sector

In the education sector, companies large and small supply goods for school-based health interventions, such as deworming, clean water and sanitation, and school feeding (World Food Programme, 2015). These are primarily publicly funded, but a World Bank study noted increasing financial and technical support from the private sector (Drake *et al.*, 2016).



PATH/Seema Kapoor

Tetra Pak, for example, has supplied school feeding programmes with school milk since 1962, reaching 67 million children in 57 countries in 2016. They have also given technical support to developing fortified and nutritious beverages, ensuring food safety and quality, and implementing and evaluating school feeding programmes (Tetra Pak, 2015). Amway Charity Foundation's Spring Sprouts Kitchens programme provided Chinese schools with kitchens for school meal preparation. It also supported the Chinese Government with funding and technical skills in logistics, procurement and administration (Amway

Charity Foundation, 2015). The primary driver was to leverage CSR for permission to conduct business, but this type of initiative can help identify future opportunities.

Schools often outsource to commercial service providers functions such as procuring, storing, cooking and delivering food to schools (De Carvalho *et al.*, 2011). This makes school feeding an important institutional market for local suppliers, such as smallholder farmers or farmer associations, aggregators, or domestic and multinational food processors (Bundy *et al.*, 2009). This is particularly true with the advent of policies that stipulate local supply. In the Home Grown School Feeding initiative, for example, school feeding programmes are supplied by local smallholders (WFP, 2017). Globally, one-third of food for school meals is procured from small farms (Drake *et al.*, 2016).

Social protection sector

Social protection programmes target economically vulnerable populations with food, products (e.g. corn-soy blend, bednets) or cash transfers. Whilst few such programmes have had explicit nutrition objectives, they can have positive impacts on the immediate and underlying drivers of malnutrition (Alderman and Mustafa, 2013; Food and Agriculture Organization, 2015). An increasing number of them have been considering and integrating nutrition objectives in recent years.

Well-known and well-researched examples of social protection programmes include Oportunidades (formerly Progresá) in Mexico (Neufeld *et al.*, 2011), Bolsa Familia in Brazil (Ozanira da Silva Silva, 2012) and Action Contre la Faim programmes in Pakistan (Fenn *et al.*, 2017). Private sector involvement is typically on the supply side: competitively contracted development and production of nutritious food supplements, which are distributed to target populations, or production and sales of foods that people buy with their cash or vouchers. In the latter, private sector distribution channels sometimes replace public ones, potentially improving efficiency and supporting private sector employment. The private sector can also provide financial services, as in the MasterCard/WFP "digital food" partnership to deliver vouchers through mobile phones or bank cards (Williams, 2014).

Water, sanitation and hygiene sector

Access to WASH products and services has an important positive impact on nutrition, reducing diarrhoea, helminthic infestations and environmental enteropathy (WHO, UNICEF and USAID, 2015). A broad spectrum of businesses involved in nutrition range from small entrepreneurs to MNCs, from masons to toilet manufacturers, and from soap producers to sanitation service providers.

It is interesting to note, however, several challenges to business involvement: commercial and technological constraints, weak demand, lack of firm viability, inappropriate business models, attitudes towards investment and serving the poor, and an unsupportive investment climate (Sy, Warner and Jamieson, 2014; Mason, Matoso and Smith, 2015). Unilever has addressed the “demand” challenge by promoting social and behaviour change communication for handwashing with its Lifebuoy soap brand across Africa and Asia, improving hygiene behaviour and increasing soap sales (Pralhad, 2010).

A high concentration of small-scale informal businesses in the distribution and delivery of water supply (e.g. drinking water vendors) may indicate that it is challenging for more structured, formalised and regulated business models to distribute to the base of the pyramid (BOP) market (Mason, Matoso and Smith, 2015). One example of such a business, designed with nutrition impact in mind is the SmartLife kiosks in Kenya. This is a social enterprise developed by IDEO, in partnership with Unilever, Water & Sanitation for the Urban Poor and GAIN. It brings purified drinking water and a curated basket of nutritious foods together in a home delivery service (www.ideo.org/).

Demand creation and scaled business models are supported by multisectoral platforms such as WASH4Work (www.wash4work.org), which aims to mobilise business to address WASH challenges in the workplace, in communities where workers live and across supply chains, and the Global Handwashing Partnership (Global Hand Washing, 2016), which brings together industry, UN agency, donor, civil society and academic stakeholders.

Agriculture sector

The private and public sectors’ focus on agriculture and the food system has been primarily on increasing production and productivity of staple foods. However, since the 2013 *The Lancet* maternal and child nutrition series and the introduction of agriculture as a catalyst of nutrition-sensitive action, the attention has been directed progressively towards increasing production and productivity of nutrient-dense foods (Ruel, Alderman and Maternal and Child Nutrition Study Group, 2013). In addition to the direct nutrition impact, agriculture may indirectly improve nutrition through: 1) income from agriculture being spent on nutrient-dense foods or nonfood nutrition-sensitive items, and 2) participation in agriculture empowering women to make decisions on food expenditures, health and other aspects of care, and to right-size their own physical energy expenditure (Herforth and Harris, 2014). Below are examples of innovative agriculture-related private sector initiatives that have potential for having a positive nutrition impact on producer and consumer populations include:

- **Marketplace for Nutritious Foods:** This initiative is funded by the US Agency for International Development (USAID) and others. It seeks to increase the availability and improve the affordability of nutritious foods for low-income consumers through the provision of technical (e.g. business planning, marketing, food safety, product development) and financial support to SMEs.
- **GSMA mNutrition (mobile nutrition) Initiative:** This is funded by DFID. It offers farmers timely and relevant SMS or voice-message information to improve productivity and profitability, and potentially health and nutrition outcomes (INTERVIEW: GSMA).
- **Commercialisation of low-cost hermetically sealed bags that are suitable for small-scale, on-farm use:** These bags reduce post-harvest loss and improve food safety of grains and dried foods; for example, the GrainPro SuperGrainbag (Fintrac, 2016).

Chapter 5: Private Sector Engagement on Naturally Nutrient-Rich Foods

This chapter discusses the challenges and opportunities for businesses looking to support access to naturally nutrient-rich foods^{ix}—such as vegetables, fruits and animal-based products—through production and affordability, as well as to increase demand for the same. The latter is particularly difficult as it goes beyond productivity and profitability to consumers’ cultural norms and economic decisions (Moser, Raffaelli and Thilmany-Mcfadden, 2011). Due to seasonal production and perishability, these foods tend to be more costly than staple grains and many processed foods; thus, low-income buyers do not consume them as much.

In low- and middle-income countries (LMICs), smallholder farmers are key food producers, yet members of their households are often malnourished. This is due in part to the difficulty of access to markets to sell their produce; the income from this could help them better access health and sanitation services and the other inputs for a healthy and productive lifestyle, including nutritious foods they do not themselves produce. At the same time, the urban poor also have difficulty accessing naturally nutrient-dense foods. They have limited possibility of maintaining homestead gardens, procure much of their food from expensive markets with limited diversity of fresh foods and live in constrained food environments that lack cold chain and modern storage and packaging.

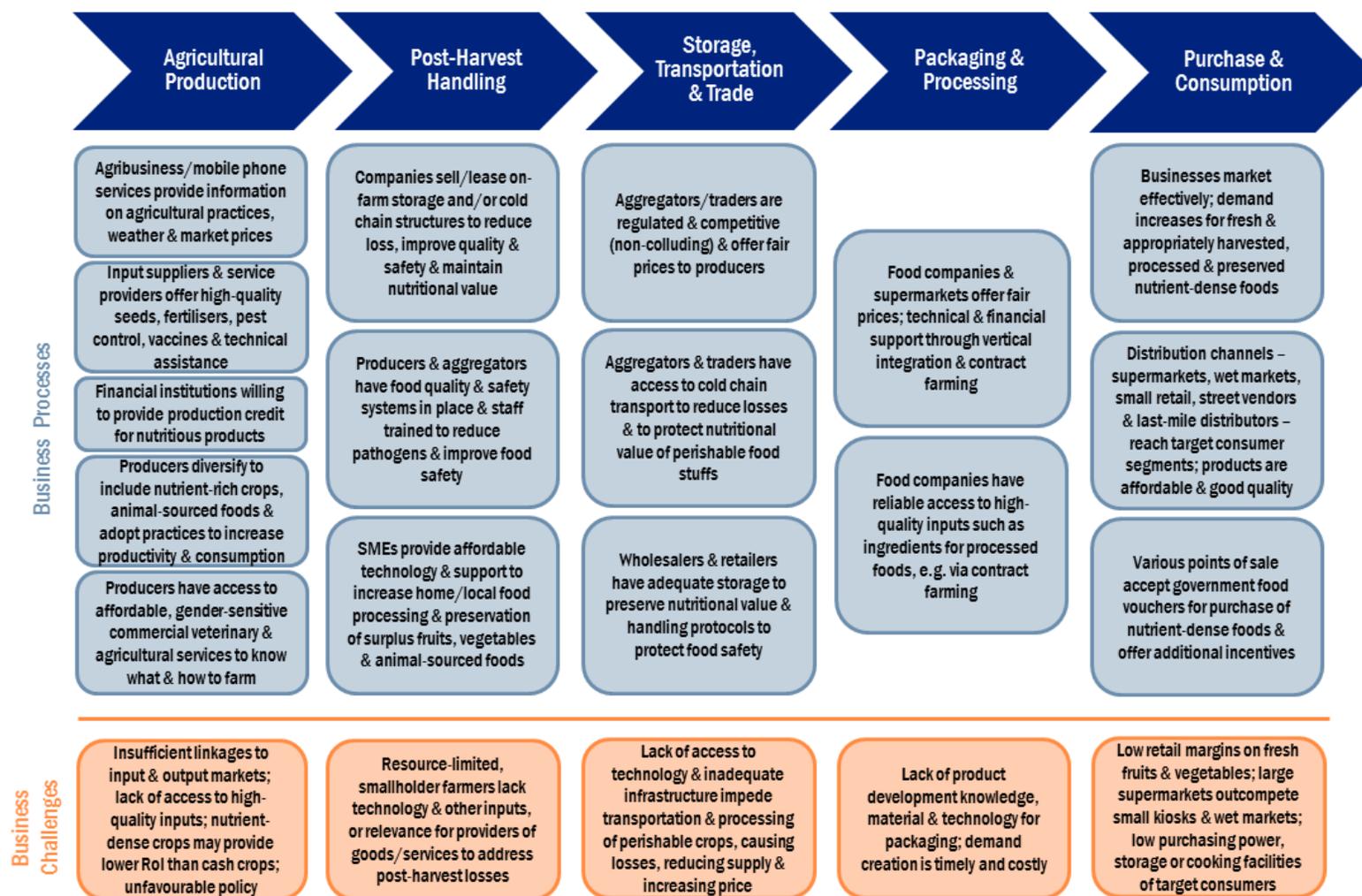
Addressing these challenges could be a win-win for consumers and businesses alike. In addition to solving the challenges for consumers, businesses can provide the necessary processing, storage, trade and distribution services for fresh foods, products, services or infrastructure to improve producer and consumer access to markets, services and inputs. Over the past five years, several donor-funded initiatives have emerged to encourage production, processing and distribution of naturally nutrient-dense foods, as well as to improve low-income populations’ access to and consumption—rather than preferring to sell most—of their most nutritious products. Examples include the Amsterdam Initiative against Malnutrition (AIM), SPRING Accelerator, Marketplace for Nutritious Foods (MNF), and Africa Enterprise Challenge Fund (AECF), which are mentioned in Chapter 3. Many of the examples presented here (summary in **Annex 4**) have received support from such mechanisms.

Pathway for the pillar on naturally nutrient-rich foods

Private sector actors in a variety of functions across the entire food system can maximise the market supply of safe, nutritious, affordable food. **Figure 5.1** lays out the major elements of the impact pathway for the pillar on private sector engagement to increase access to and demand for naturally nutrient-dense foods. It lays out some processes in which businesses may engage, as well as some challenges they face. The pathway starts with agricultural production, then moves through post-harvest handling, storage and trade, processing and packaging, and distribution and marketing. Those last steps are very important for demand.

^{ix} This report distinguishes ‘naturally nutrient-rich foods’ from biofortified foods, industrially fortified foods, specially fortified foods for women and children, and home fortification with micronutrient powders.

Figure 5.1: Impact pathway of private sector contribution to increase access to naturally nutrient-dense foods.^x



Abbreviations: RoI, return on investment; SME, small and medium-sized enterprise.

^x Although each row does not show a direct causal link, the boxes under each column constitute different elements of that part of the value chain.

The steps are not discrete, and some threads are important throughout—for example, the services around logistics, data and relationships to optimise efficiencies and coordinate actors and products along the supply chain. Some actors are active at more than one stage along the value chain; through this vertical integration, these actors provide an opportunity to improve quality, reduce food waste, reduce costs and improve consumer access and demand. There are many possible variations of vertical integration.

Aggregators—businesses or cooperatives that consolidate agricultural produce for markets—may provide on-farm processing to producers. Food processors, seed companies and retailers may engage in out-grower schemes or contract farming, in which they organise smallholder farmers and provide them with extension and other services. This provides producers with a guaranteed market and buyers with products of improved quality.

Some of the issues we address in this chapter are issues common to Chapter 6 (on fortification) as well, so they are best explained here in the first instance.



PATH/Monique Berlier

Supply-side considerations

This section considers the supply-side aspects of the pathway. These include agricultural and livestock production, post-harvest handling and on-farm processing, transportation and trade, and processing and packaging. We consider distribution and marketing under demand.

Agricultural and livestock production

Much of the food market in LMICs, particularly in rural areas, is served by smallholders who supply the low end of the domestic market through poorly integrated, informal supply chains. Slightly more integrated supply chains—including farmers' groups and domestic commercial growers—serve the higher end of domestic and regional markets. Large-scale commercial growers mainly produce for high-value export markets but will sell their low-grade products in local markets (Joosten, 2014).

Smallholder producers face numerous challenges, including lack of the following: crop choices, access to finance, appropriate technology, good-quality affordable inputs (seeds, fertilisers, pest control, etc.) and knowledge of good farming practices (Herrero *et al.*, 2017). Where agricultural extension services are weak or focused on staple or cash crops, smallholders have difficulty accessing agricultural inputs and information on naturally nutrient-dense food crops. There is an opportunity for agro-input suppliers to support smallholders to produce nutritious crops.

Improved access to agricultural inputs

These suppliers have a viable market for their products, selling improved seeds, fertiliser, and technology directly to smallholder farmers or through dealers and retailers in farming areas.

BASF's Samruddhi programme in India provides soybean farmers with extension services, covering topics such as seed selection and treatment, planting, fertiliser, protection from insects and disease, and harvesting. This is part of the company's marketing strategy. The costs are covered by increased sales of products such as fertiliser. Farmers benefit from increased yields, improved quality and higher prices for their crops (Hystra *et al.*, 2014; BASF, 2017).

Some agro-input suppliers focus on inputs for nutritious crops. They are, therefore, ideally positioned to promote the uptake, production and consumption of these crops by smallholder farmers. Strengthening the local horticulture seed system is an important investment.

Rijk Zwaan, a Dutch multinational vegetable breeder, makes long-term investments in the development and marketing of context-appropriate varieties. In Arusha, Tanzania, the company established a breeding station for local hybrid varieties, such as African eggplant, African kale, and Chinese pepper. The company believes that these varieties enable small-scale, local growers to play a key role in building sustainable food supplies in Africa. Its crop advisors and product development specialists provide tailored advice to farmers, building brand awareness and marketing. The company markets seeds through local subsidiaries and an extensive network of distributors (INTERVIEW: RIJK ZWAAN). Anticipating commercial viability in the future, the company is investing heavily and pricing their seeds at a premium—'what the market can bear.'

Kigali Farms is a social enterprise supported by AgDevCo. It sources from over 2,000 smallholder farmers and sells mushroom substrate to a further 1,700 farming families with the aim of establishing button mushrooms as a nutritious mainstream component of the Rwandan diet. According to its research, farming households consume 35 percent of the mushrooms that they produce and sell the remainder within their local community (AgDevCo, 2017).

Production technology such as irrigation, zinc-rich fertiliser or other practices that can increase yields and quality can support nutritious crops whilst developing capacity and empowering women.

KickStart International, a nonprofit social enterprise, sells small-scale irrigation technology (pumps and spare parts) to Africa's smallholders to increase crop yields and off-season production. Despite these technologies' low cost, they are still out of reach for poor farmers. KickStart, therefore, offers two financing options. One is mobile layaway, where farmers save up for a pump by making advance micropayments with their phone. The other is 'rent to own,' where farmers make a 30 percent down payment, make small payments over several months and pay off the pump once they have sold their harvest. They also encourage farmers to produce fruits and vegetables. According to the company's impact figures, 'On average, each business grows enough fruits and vegetables to feed their own family as well as 9 other families (about 50 people) all year round' (Galvin and Iannotti, 2014; Kickstart International, 2017).

Mobile technology facilitates farmers' access to information and other inputs

Amongst other benefits, mobile communications are giving farmers access to a wider range of input suppliers, and suppliers' access to the smallholder market. The following examples are not nutrition focused. However, they do support access to inputs and services for smallholder farmers, which are important to the entire value chain and necessary for production of high-quality nutritious crops.

Tulaa, a new venture spin-off from mobile solutions provider Esoko in Ghana, provides farmers with access to inputs and financial services through its mobile marketplace (Tulaa, 2017).

AgroStar provides a range of agricultural input products sourced from third-party providers to farmers in India over an mCommerce, or mobile commerce, platform (ImpactPreneurs, 2017).

Mobile technology can also be used to deliver information and education regarding agricultural and livestock practices; these are sometimes integrated with nutrition messaging. It can be used to encourage smallholders to grow nutrient-rich foods such as vegetables, fruits and animal products. It also has other advantages: some of the farmer's production will likely be consumed by her household, and the rest will likely be sold to other low-income, rural consumers (Jaeger, 2010).

The **VetAfrica** app is a decision support system for farmers, animal health workers and veterinarians, providing diagnostic information on animal disease and appropriate treatments. This gives farmers greater access to veterinary services and allows them to make more informed decisions and to keep herds and flocks healthier, which ultimately improve yields and make animal-sourced products more available on local markets. A study in Ethiopia showed that the app identified 80 percent of cattle diseases and provided advice that matched the professional assessment in 70 percent of cases (Revie, 2015; Microsoft, 2017).

The **GSMA mNutrition Initiative** has implemented value-added services to impact nutrition in 13 countries. It provides farmers who subscribe to their services a platform to access relevant production, marketing and nutrition information through mobile phone services (Palmer and Darabian, 2017).

In Bangladesh, **Win Miaki and Grameenphone** partnered with local NGOs to deploy information services that combine agricultural and nutrition content with the objective to empower women farmers, who were more likely to implement nutrition-related changes (INTERVIEW: GSMA).

Though some of these approaches may not have a direct impact on access to nutrient-rich foods, they address critical challenges by seeing smallholders as customers and by developing mobile platforms that link smallholders with inputs and services to encourage production and consumption.

Vertically integrated agribusiness buyers support smallholder production

Increasingly, private sector actors engage with smallholders as suppliers and buyers through integrated supply chains. For input suppliers, this helps to strengthen brand awareness and grow their markets. For buyers—including food processors and retailers—this helps to increase the reliable supply of high-quality products. Farmers may benefit from these arrangements through easier and cheaper access to inputs, financing, extension services, guaranteed markets and better prices for their commodities (Trienekens, 2011).

As mentioned, there are many variations of this model. Typically, an agribusiness contracts a group of smallholder farmers or 'out-growers' to grow agricultural products or raise livestock, often with prices guaranteed in advance and provision of inputs and technical assistance throughout the season. These schemes must be designed carefully, as they can lead to food insecurity if farmers neglect staple crops in favour of contracted cash crops (Jaeger, 2010). However, they can also support improved nutrition—when the contracted crop is nutrient-rich and some is consumed on the farm or sold in local markets, or when buyers provide inputs and technology to support crop diversification. Some examples of this, where global buyers aim to improve food and nutrition security of the local farmers, are discussed in Chapter 7. Success hinges on farmer adherence to extension advice so that the production can meet a buyer's requirements. Issues may arise if the

farmers ‘side-sell’ before the buyer collects the product, refuse to sell at the agreed price when market prices at harvest are higher or refuse to discount the buyer’s price to account for the cost of buyer-provided inputs. Companies try to address these challenges by using open purchase contracts, supervising over the course of the growing season and terminating working relationships with farmers who do not adhere to contracts.

Out-grower schemes that contract smallholders to grow nutrient-rich foods or raise livestock have the potential to improve dietary diversity if part of the produce is kept for personal consumption or sold in local markets (Sibhatu, Krishna and Qaim, 2015).

Pearl Dairy, the second-largest milk processor in Uganda, improved its cold storage infrastructure and expanded its network of milk collection centres and smallholder suppliers in remote areas with an investment from the International Finance Corporation (IFC). Productivity and quality improved with training and extension services for suppliers. Production increased in response to an increase in local consumption within remote rural communities (IFC, 2014).

Lecofruit, a Malagasy subsidiary of the French company Groupe Basan, contracts 11,000 smallholder farmers to produce high-quality French beans. Most of the produce are destined for European export markets, and a third are sold to local supermarkets. The company guarantees a price at the end of the season. In partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), they provide participating out-growers with seeds, fertiliser and extension services, as well as financing for micro-irrigation systems. These better equip them to grow other vegetables for personal consumption and local markets (GIZ, 2014).

Post-harvest handling, packaging and on-farm processing

Two key underlying causes of low availability and affordability of nutrient-rich food are food loss (spoilage) and waste (when food is not fully used). In sub-Saharan Africa, for example, approximately 50 percent of fruits and vegetables are lost or wasted (Affognon *et al.*, 2015). One study estimates that reducing loss/waste in developing countries by 10 percent could, by 2050, reduce fruit and vegetable prices by 14 percent, the population at risk of hunger by 11 percent and child undernutrition by 4 percent (IFPRI, 2013).

Post-harvest cold chain technology

As mentioned, fruits and vegetables are highly perishable and require cold storage if they cannot be delivered to market directly after harvest. Increasing access to affordable cold storage—either on the farm or near trading hubs—can increase the supply of perishable nutritious foods in the market and subsequently lead to lower prices. However, cold storage is often precluded by unreliable electric supply. It also is typically too expensive for smallholder producers and many SMEs.

ColdHubs in Nigeria is a ‘plug-and-play,’ modular, solar-powered, walk-in cold room for 24/7 off-grid storage and preservation of perishable foods. It is offered to farmers on a flexible, pay-as-you-store basis. It is installed in major food production and consumption centres (in markets and farms). Farmers place their produce in plastic crates stacked inside the cold room, which extends the freshness of fruits, vegetables and other perishable foods from 2 to about 21 days. They also work with pay-as-you-store pricing, but they have struggled to scale up because of limited access to finance. They also identified access to affordable financing and availability of less-expensive components as major constraints that so far have prohibited them from going to scale (INTERVIEW: COLDHUBS).

Baridi Stores in Uganda offers an inexpensive, solar-powered solution to farmers, bundled with innovative financing schemes. For example, Baridi Stores rents storage space on a pay-per-use basis. It also buys and sells produce from farmers who cannot afford to pay for cold storage in order to make its service more affordable (Baridi Stores, 2015).

Wakati, a Belgian start-up, has developed a small-scale, solar-powered, on-farm fruit and vegetable storage solution that does not cool but rather uses a small tent that leverages humidity and ozone sterilisation to provide a protective microclimate for 200 to 1000 kg of perishable product. The technology is not yet affordable for smallholders, but it is accessible for larger family farms or a group of small farmers (Wakati, 2016; Farley, Vuillaume and Keenan, 2017).

On-farm packaging technology

Packaging technology can also reduce post-harvest losses and protect produce for transport to markets. Options for smallholders are very limited due to costs (for machinery, packaging materials, spare parts and maintenance), electricity requirements and, in some cases, technical complexity. Low-technology solutions are a good opportunity.

Mazzi, a social enterprise established by Global Good, has developed a 10 L milk-collection container that reduces losses and improves storage and transport of smallholder-produced milk. The product is currently sold in Kenya and Ethiopia, with plans to expand to other markets in sub-Saharan Africa. It is affordable for smallholder producers and stackable for easy transport. Outside of Africa, Global Good is working with Nestlé to take the product to India, Peru, Pakistan and Sri Lanka under the Clinton Global Initiative's Commitments to Action. Global Good is also developing an affordable diagnostic for on-farm milk testing, which will help recognise disease, reduce spoilage and demonstrate quality to buyers (Global Good, 2017).

GrainPro, Inc. manufactures and distributes hermetic storage bags proven to reduce post-harvest loss due to pests. These are mainly used for staple grains, dried foods such as dry chili peppers and pulses, and seed. The company has built a market with smallholders over many years through education, marketing and partnering with NGOs. It keeps the bags affordable by cross-subsidising through high-margin sales of the bags to coffee associations and trading companies in the gourmet coffee sector. This type of strategy is important to commercial sustainability. GrainPro commits to food security and a long-term perspective on market development (INTERVIEW: GRAINPRO, INC.).

There is high need in the smallholder sector for these types of solutions for post-harvest handling, on-farm processing and packaging for transport. These solutions offer attractive new commercial opportunities due to the size of the market. To make solutions affordable, profitability may be low initially, requiring cross-subsidies from more profitable product lines, as in a hybrid business model (e.g. **GrainPro**) or a social business model (e.g. **Mazzi**).

Trade and transportation

Farmers often sell their crops to aggregators or wholesalers, who in turn sell them to local or regional formal or informal markets or retailers. Trade and transportation actors and processes determine the prices that farmers receive and, often separately, figure into the end-consumer's price. Business models that decrease transportation costs will make these foods more affordable. Efficient trade and transport may also increase the availability of nutrient-rich products beyond their regions of origin, thus increasing the diversity of products available on the wider market.

Good Nature Agro is a social enterprise that provides a guaranteed market to smallholder producers of certified legume seeds in Zambia. It is a successful example of vertical integration, efficiently linking the smallholder or agricultural cooperative to the market. It trains out-growers in sustainable production practices using private extension agents who promote improved practices and provide seeds and other inputs on credit. Its legume seed provides twice the income of traditional maize and cotton. Producers retain 10 to 20 percent of the seeds they produce for cultivation and on-farm consumption and local markets. It is a win-win, as buyers receive produce of agreed quality and quantity from farmers who stick with the agreed price and do not 'side-sell' to other buyers. Farmers also receive effective extension services and access to finance at reasonable rates. Moreover, nutrition education integrated into extension services and an emphasis on retaining seeds for production and own consumption (rather than merely for selling) have the potential to contribute to improved nutrition on the farm (INTERVIEW: GOOD NATURE AGRO).

Mobile platforms may provide price information and improve farmers' access to markets, which can result in increased availability of affordable nutrient-rich foods in markets. Nutrition messaging and promotion of nutrient-rich crops can be integrated into these platforms with little additional investment. This is an opportunity for partnerships with nutrition-focused NGOs, as the platforms themselves lack expertise in nutrition messaging for behaviour change. This also offers an opportunity for mobile platforms to build loyalty and deliver additional value to smallholders.

M-Farm in Kenya connects farmers with buyers through a mobile platform, where farmers can access price information and post images and crop description for sale (Farley, Vuillaume and Keenan, 2017).

Truce in India connects farmers, aggregators, wholesalers and processors with a mobile trading platform. It also offers logistical support for transportation and delivery of agricultural products (Farley, Vuillaume and Keenan, 2017).

Mobile-based logistics platforms can help overcome trade and transport challenges by coordinating food supply and even delivering foods directly to the consumer/retailer, by-passing the wholesaler.

Twiga Foods Ltd. in Nairobi, Kenya, operates a mobile-based business-to-business supply platform for retail outlets, kiosks and market stalls in Africa. The company enables vendors to order supplies of fresh fruits and vegetables using its platform. It supplies pineapples, tomatoes, bananas and more (GAIN 2018).

Another efficiency model in trade linkages is shorter supply chains, which reduce the physical distance between producer and consumer, and reduce transportation and trade costs. In turn, this can increase access and affordability of nutrient-rich foods for consumers.

Mozambique Fresh Eggs created a joint venture to replace imported eggs, which were costly due to high transportation costs, with locally produced eggs. The company provides chicks, feed and supervision to out-layers who produce high-quality eggs. It aims to scale up its model so that most of the eggs consumed within the region will be produced locally, increasing both availability and affordability of this highly nutritious food. There are expectations that this venture will be commercially viable (IB Trainer, 2017; Spore, 2017).

Cold chain solutions for trade and transportation

When local production of nutrient-rich foods is not possible, perishable products must be transported to markets further away. There are several multisectoral initiatives to improve access to cooled transportation, such as the Global Cold Chain Alliance and the Alliance for a Green Revolution in Africa (AGRA). Individual companies are also taking action. For example, in India, the lack of cold storage and infrastructure is reported to be a main reason for spiralling food prices, so several companies are trying to overcome the challenge (Mukherji, 2013).

Million Tons of Cold Storage in Africa Initiative, a public-private partnership launched by the Alliance for a Green Revolution in Africa and UPL Limited, aims to mobilise US\$2 billion in the next decade to set up cold storage facilities with a capacity of a million tons across sub-Saharan Africa (AGRA, 2016).

ColdHubs, mentioned above, also provides refrigerated transport solutions between production areas in the north of Nigeria and urban markets in the south (INTERVIEW: COLDHUBS).

Pick 'N Serve provides Indian banana farmers with a mobile aggregation, transport and marketing service. Instead of farmers delivering their crops to a warehouse, incurring cost and losses en route, a mobile unit collects their produce from the farm gate. They use a small cooling facility on-site, which prepares the bananas for transport to a nearby storage container and then on to local markets, retailers or ports for export (Farley, Vuillaume and Keenan, 2017).

The Shell Foundation, along with impact investor partners, is supporting commercial businesses, such as ColdHubs and InspiraFarms, in renewable energy to increase access to cold-chain solutions that integrate local solar energy or grid energy with efficient storage (INTERVIEW: SHELL FOUNDATION).

Processing and packaging

In addition to cooling, processing and packaging protect fresh, unprocessed, perishable foods from damage during transport. Processing and packaging facilitate transportation and storage, help maintain the quality and safety of processed nutrient-rich foods, and extend shelf life. They also offer a means to communicate with consumers about product brand, qualities and uses; help locally produced products compete with imports; and make nutritious foods more affordable to low-income consumers (through smaller package sizes, as in the example of Chicken Choice). Some companies have used solar drying to process foods where electricity is a challenge.

SolarFlex Inc. is a social enterprise established by the Canadian nongovernmental organisation Malnutrition Matters. It develops and commercialises food-drying systems for small- and medium-scale applications. The company manufactures commercial dryers, as well as a 'small-farm' dryer with capacity for 10 to 20 kg of sliced, wet produce, which is suitable for small farming businesses in developing countries. At less than US\$2,000, the 'small-farm' dryer is more affordable than commercial dryers and easier to use. It is being piloted in India and Africa. Whilst this product is not affordable for most smallholder families, it could potentially be used by farmer cooperatives to preserve perishable fruits and vegetables for off-season sale and consumption (Malnutrition Matters, 2013).

Sahelia Solar is a solar company serving residential, commercial and industrial customers in Burkina Faso. It started working with rural agricultural cooperatives to provide solar power for off-grid food processing facilities. Its ‘pay-as-you-use’ model helps overcome the financial challenges of these small cooperatives. The access to reliable power enables the cooperatives’ members to produce higher added-value processed foods with longer shelf life and increases availability off-season (Sahelia Solar, 2014, 2017).

Though exact challenges may not be known, it can be difficult to transform a technical solution into a viable, costed commercial business with capability in distribution, marketing and sales. **Sahelia Solar**, on the other hand, was already an established company with a strong commercial model. This gave it some financial flexibility to invest in infrastructure and to make services accessible to smallholder farmers and cooperatives by using innovative pricing, such as a ‘pay-as-you-use’ model, to help them overcome financial challenges. The access to reliable power enables cooperative members to produce higher added-value processed foods with longer shelf life and increases availability off-season. Shared service solutions have also been introduced to counter the expense for single producers.

Cooperativa Central Gaúcha Ltda., a Brazilian dairy cooperative, offers a shared-resources solution to curb the expense of processing and packaging equipment for individual producers. They provide packaging services—sorting, cleaning, wrapping, packing and labelling—centralising and sharing the costs of equipment, labour and expertise (Farley, Vuillaume and Keenan, 2017).

Targeting urban consumers

Though many of the examples in this chapter have focused on supporting rural producers, increasing availability of nutrient-rich foods for the urban poor is equally important.

Happy Cow is a Kenya-based, family-owned dairy-processing company with a portfolio of dairy products: cheese, pasteurised milk, yoghurt, butter, fresh cream and ghee. It developed the new whey-based yoghurt product *Yogies* in 2014—a first of its kind in the local dairy processing industry, specifically targeting low-income consumers. The company’s aim is to diversify its nutritious product offerings whilst building a new market (GAIN, 2017).

Só Soja, a small processor, developed an affordable, nutritious soya-based yoghurt product targeting low-income urban consumers, especially women and adolescent girls, in central Mozambique. The company targeted institutional markets, such as hospitals and schools; distributed through small retailers; and used a mobile sales force with small, ice-box carts to sell directly to consumers. AgDevCo provided support to modernise and scale up its production facilities, and Marketplace for Nutritious Foods provided technical assistance on quality assurance. Despite this support and the product’s popularity, the company went out of business (GAIN, 2017) (CORRESPONDENCE: AgDevCo).

Although other factors may have been at play, two obvious differences between the surviving **Happy Cow** and the failed **Só Soja** are market size and product portfolio. **Happy Cow** serves national markets in Kenya and East Africa with a wide range of products of interest to a spectrum of consumers. It also was an already established company when it developed *Yogies*. On the other hand, **Só Soja** was a start-up with a single product, serving a single, small, urban market. It was supported by public-sector entities but lacked the capability of a commercial business.

Demand-side considerations

Whilst expanding availability and improving access to nutrient-rich foods are critical, they are by themselves insufficient for increasing consumption and nutrition impact amongst low-income consumers (Maestre, Poole and Henson, 2017). Consumers who are not aware of the existence and benefits of nutrient-rich foods also will not seek out or demand these foods in the market. They also must be able to find affordable and accessible products that respond to demand. However, those norms can constrain demand for certain products amongst specific demographics (e.g. in some cultures, women or children are discouraged from consuming eggs). For desirable and aspirational foods (e.g. meat and dairy), demand is mainly constrained by availability and affordability.

On the other hand, demand for fruits, vegetables and, in some cases, pulses is more variable, as some consumers in LMICs may have a minimal understanding of nutrition and the importance of dietary diversity. Furthermore, although *specific* foods, such as mangoes, may be abundant and available off the tree or in local markets at harvest time, poor consumers historically have not had access to a wide *variety* of affordable nutrient-rich foods, so they are not an integral part of traditional diets (Moser, Raffaelli and Thilmany-Mcfadden, 2011). For these types of foods, purchasing power and marketing will both be important.



PATH/Eric Becker

Distribution

Consumer segments are reached through different distribution channels: MNCs reach middle- and higher-income consumers through established, formal retail channels, but they also use traditional channels to reach low-income consumers who typically do not source their foods at supermarkets or other formal retail outlets. However, many low-income consumers, who often source their food from informal markets and kiosks, are primarily supplied by local businesses who do not have the expertise or the resources to promote their produce and create demand.

Proximity models of distribution deliver products to consumers where they are, such as poor urban neighbourhoods, making it more convenient to buy the product. Such models require additional retail outlets or community-level sales forces for the supply chain; the costs associated with these may be offset by the large market they provide, but this is not a given. With such community-level sales, transaction costs are high and such modes of delivery are a challenge to manage.

Groupe Bel launched the Sharing Cities programme in 2013, which uses existing street vendor networks in major cities in emerging countries to ensure availability of their products to hard-to-reach consumers. The street vendors sell a basket of products, including Laughing Cow®-branded products, and have access to a host of training, health insurance and financial services. By December 2016, the programme was active in three cities and a total of 5,300 street vendors had partnered with Groupe Bel. There are current plans for expansion (INTERVIEW: GROUPE BEL).

Tarakwo Dairies, based in Eldoret, Kenya, distributes pasteurised full-cream milk using coin-operated dispensing technology, with the milk costing as little as 5 Kenyan shillings (US\$0.05) per purchase. In September 2015, Tarakwo started selling pasteurised milk, with average daily sales of 200 L. By April 2017, sales had increased to a high of more than 4,000 L per day (GAIN 2018).

Maziwa King in Nairobi, Kenya sells pasteurised, full-cream milk using coin-operated milk dispensers. It also supplies other milk-dispensing companies in and around Nairobi. The company grew from a single outlet in 2014 to 11 in 2016. Currently, it sells over 200,000 L of milk because of strong demand for milk in small servings in the low-income markets they serve (GAIN, 2017).

Efficient distribution models can make nutrient-rich foods more affordable, particularly when they support local small farmers who are involved in producing these foods.

SPAR, a South African retailer, is increasing access to and affordability of nutrient-rich foods in several stores that mainly serve low-income consumers through its Rural Hubs initiative. The hub sorts and grades produce according to SPAR's quality standards, then distributes produce to about 30 retail shops in the vicinity; they sell their lower-grade product to local wet markets. The model is still in its pilot phase, with only two Rural Hubs established, serving less than 1 percent of SPAR retail outlets. However, the company aims to prove the initiative's viability and extend it to other regions in South Africa (see Annex 6, Case study 5).

R&D Green Mart, owned by **R&D Innovative Solution**, which is in turn supported by SPRING Accelerator, provides consulting services to farmers and agro-aspirants. It runs a vegetable retail business in Kathmandu. It has five outlets that sell 1,000 kg of green vegetables daily to middle class urban consumers. The company procures vegetables directly from farmers, which shortens the supply chain and reduces costs. R&D Innovative Solution ensures produce quality by running a demonstration farm and providing training on new technologies and inputs to farmers (mostly young women). Below-grade product (which may be safe but not attractive enough for retail markets) is kept on the farm for farmers' own consumption or sold locally (INTERVIEW: R&D INNOVATIVE SOLUTION).

Marketing

Whilst distribution models make nutrient-rich foods accessible to consumers, marketing distinguishes the products of one company from those of another. Farmers have little to no means to promote or market their crops. Aggregators and retailers that serve low-income consumers have little incentive to invest in branding or promotion of fresh produce and animal products, as their clients rely on price and visible quality when selecting produce. Affordability is an important driver of demand creation, especially if the product is offered in a form (e.g. a smaller package) that matches the disposable income of the poor (i.e. coins for small amounts of milk per day), as in the example of Maziwa King. Combining affordability with convenience and time-saving benefits is an even more powerful way to attract low-income consumers (see Chapter 6 for more on marketing to low-income consumers).

Chicken Choice in Nairobi, Kenya, packages and sells chicken through its own network of retail outlets, targeting lower- to middle-income consumers with individual pieces and small packages rather than whole chickens. Offal, which is under-valued by chicken processing companies, is particularly targeted to low-income consumers (GAIN, 2017).

Smart Logistics Solution Ltd. is a Kenyan aggregator and marketer of cereals and pulses (millet, soya beans, beans and green grams) that sources from 5,000 smallholder farmers. The company has developed a range of pre-cooked, dehydrated beans that are sold in small, affordable packages. The product can be cooked in only ten minutes. The product is highly nutritious and attractive to time-constrained, low-income consumers with limited access to cooking fuel (GAIN, 2017).

Promotion of product traits that distinguish the product from the competition (e.g. instant products, products that require short cooking time, small-sized packaging) helps to create demand for a product that is processed and packaged. Creating demand for fresh fruits, vegetables, dairy or other naturally nutrient-rich foods is a challenge, however. Local producers do not have the means, and the products cannot be easily distinguished from those of a competitor. This is where governments should support raising awareness on the benefits of healthy nutritious foods to drive consumer demand for them.

Key findings

Naturally nutrient-rich foods are not novel, but initiatives to increase access to and consumption by low-income consumers are relatively recent. Naturally nutrient-rich foods perhaps received additional attention, since the issue received some attention in *The Lancet* maternal and child nutrition series in 2013. The availability of naturally nutrient-rich foods is often limited due to perishability, weak market infrastructure, cost and cultural and dietary habits. Numerous examples of support along the value chain exist to help smallholder farmers increase productivity, enhance storage and processing, and improve distribution to increase the availability and consumption of these foods by low-income rural and urban consumers. Though encouraging, most of the interventions to date remain small in scale. Evidence of their impact on nutrition has not been measured or else has not been published.

What has worked for business?

- Partnerships between global inputs suppliers (e.g. **BASF, GrainPro and Rijk Zwaan**, who invest in future market development) and smallholder farmers help to increase access to inputs, such as fertilisers, high-quality seeds, storage solutions or other technology and expertise.
- **Vertical integration** of smallholder producers into a global or national supply chain unlocks the market, which generates income as well as products for own consumption. It also contributes to increased availability and improved quality of produce in that same market for other consumers (as in the case of **Pearl Dairy** and **Lecofruit**).
- Commercial solutions are developing based on supply-side, low-technology innovations—for example:
 - Low-technology solutions for processing or cooling available to smallholder farmers.
 - Mobile communication solutions to facilitate smallholder farmers' access to inputs, technology, extension services and information (**Tulaa, AgroStar, VetAfrica, M-Farm**).
- Commercial solutions are developing based on supply-side, business-model innovations—for example:
 - Proximity solutions to increase availability on or near farms (**Wakati, Sahelia Solar**).
 - Leasing, pay-as-you-use or shared-services opportunities to ensure that technology is being shared by multiple farmers, cooperatives or processors (**Sahelia Solar, ColdHubs, Cooperativa Central Gaúcha Ltda.**).
- Commercial solutions are developing based on demand-side, technical or business-model innovations—for example:
 - Proximity distribution models to improve access by bringing products closer to low-income consumers whilst shortening supply chains to reduce cost (**SPAR**).
 - Small package size to make nutrient-rich products more affordable and convenient (**Chicken Choice, Maziwa King**), though of course with the challenge of the smaller package meaning fewer nutrients.
- Established companies with established product portfolios and markets (**Sahelia Solar**) are better positioned than start-ups to introduce new products that target low-income consumers, as they can cross-subsidise with profitable product lines.

Innovations and partnerships that are supported by donor-funded mechanisms help de-risk innovative approaches in early stages. Investments made by publicly funded entities (**Global Agriculture and Food Security Program, Africa Enterprise Challenge Fund**) and business accelerators (**SPRING Accelerator, Marketplace for Nutritious Foods**) appear to be working, and companies value the support.

What has not worked for business?

Smallholders generally do not have the purchasing power to procure expensive or complex equipment (e.g. machinery, packaging materials, spare parts and maintenance), or equipment with specific requirements (e.g. electricity). Even technology designed to compete on price, such as the Wakati cooling tent, is out of reach for most smallholder farmers. Marketing these technologies to farmer groups or cooperatives that can share the costs is a feasible option, but market size and access in remote areas are still important challenges. Businesses are offering new types of services to address these affordability hurdles, but market development even for one product is a long-term activity. Furthermore, companies find that lack of access to affordable financing and unavailability of less-expensive components are major constraints to moving to full commercialisation (**ColdHubs**). Thus, much of the work in adding value and operating at scale with food safety and quality will continue to be managed by larger businesses, despite the inroads to including smaller actors.

Some of the factors that hold back market development are beyond the action of a single business or a few donors; they require multiple actors to address the barriers that occur at most stages of the value chain, to improve the entire market system. Many companies have mentioned the need for relevant policies and legislation that balance incentives for production of staple grains with incentives for production of diverse nutritious foods. The Global Panel on Agriculture and Food Systems for Nutrition Food environment brief and private Sector brief (Global Panel on Agriculture and Food Systems for Nutrition, 2017, 2018) recommend that governments strengthen the enabling environment for investment in nutrition.

Likewise, consumer market development for new products takes patience and financial backing through cross-subsidies or investors. Starting a company with a single, low-margin product aimed at lower-income consumers has not been successful, as a sustainable business cannot be built on the basis of one product (**Só Soja**).

Whilst some business initiatives operate in the early phases of the value chain—aiming to increase the availability of nutritious foods by focusing on production, processing, storage and post-harvest loss reduction—only a small number of business models focus on how to get the product closer to the consumer (**SPAR, Chicken Choice, Maziwa King**). However, this report does not identify specific investments in demand creation or promotion activities apart from SPAR, which intends to incorporate some nutrition education activities in retail stores, and Unilever, which is in early discussions with WFP about possible nutrition messaging through retail outlets.

Evidence for business impact

MNCs do not expect profitability in the short or medium term from their investments in base-of-the-pyramid nutrition, but they have a long-term interest in market development and brand loyalty. Examples of viable business models for SMEs in the areas of post-harvest handling, packaging for transport and on-farm processing are limited and are primarily commercialised through social enterprise approaches. However, there are examples of established local companies that have the financial flexibility to cross-subsidise products for low-income consumers with profits from other business lines. Evidence for sustained business viability of small-scale initiatives does not yet appear to have emerged.

Companies face many challenges to subsist in markets that may be attractive due to the potential volume given the base of the pyramid and the likely steady flow of cash, albeit in small amounts, but that may only offer low margins for a considerable period of time until markets have fully developed. These parts of the value chain may be more suitable for social enterprise approaches, which could potentially be scaled up with the support of specialised entities, such as impact investors or other investment support mechanisms set out in **Table 3.3**.

Evidence for nutrition impact

There appears to be little documented evidence that private sector engagement in supply chains for nutrient-rich foods improves consumption of these foods or the nutrition status of farmers and low-income consumers. We know that uptake of inputs and technologies to enhance production, reduce losses and improve processing and distribution should lead to greater availability of nutritious foods in farmers' households and lower prices in the market that can boost consumption. However, information is just starting to emerge that easy, affordable access to nutrient-rich inputs suited to the local climate and palate can lead to production that stays on the farm and in farming communities (**Kigali Farms**) or that there are spillover effects when farmers produce nutrient-rich foods for global supply chains, which lead to greater consumption of these products on the farm (**Lecofruit**). Research in this area is needed, particularly on how we should measure success along these long pathways, to see the benefits of such investments for consumers and business alike.

Whilst some approaches presented here may not directly improve access to and affordability of nutrient-rich foods, they address critical challenges that can deter farmers from producing such foods. Some of these approaches are designed explicitly for greater nutrition impact. For example, contract-farming schemes may include conditionality for smallholders to keep part of the nutrient-rich foods that they produce for their own household consumption. They may also reinforce healthy eating habits with education.



PATH/Amy Maclver

Knowledge gaps

Knowledge gaps in this new focus area are numerous. Data to substantiate nutrition or business impact are currently not being collected in any systematic or meaningful way. Studies on nutrition impact are expensive and complex. Additionally, the development sector could do better at considering how to support companies to identify the business case for focusing on nutrition impact. Also, donor-funded projects have not measured it. In view of the recent interest in making food systems more nutrition-sensitive, it is important to decide **how success will be evaluated**. Value chains and pathways are long, and it is extremely challenging to attribute any impact on nutrition indicators to individual interventions along them. Intermediate steps must be appreciated, rather than expecting that all investments will produce the result that will benefit consumers. The lack of a definition of metrics to be measured is a first challenge to overcome. Marketplace for Nutritious Foods has begun to address this; it reported the number of nutritious food portions that had been produced, which may provide adequate measures of consumers, consumption and time frame (GAIN, 2017). Information on business viability is considered competitive and therefore not shared by the companies.

Chapter 6: Private Sector Engagement in Scaling Up Fortification Solutions

This chapter analyses the role that businesses play in addressing micronutrient deficiencies in low-income countries by producing and distributing foods enriched with essential vitamins and minerals. We discuss three fortification pathways, which differ greatly in terms of maturity, depth of existing case studies and strength of evidence (Hoogendoorn *et al.*, 2016):

- Fortification of *staple foods*, such as maize, wheat flour or condiments (e.g. salt, bouillon cubes, vegetable oil, sauces): This can be through *mandatory fortification*, the addition of one or more micronutrients to foods commonly consumed by the general population, such as grains, salt, condiments or edible oil. This is usually mandated and regulated by the government in response to evidence of micronutrient deficiencies or beneficial effects. These efforts are typically made by large- and medium-sized food processing industries. It may also be through *voluntary (market-driven) fortification*—the addition of micronutrients to processed foods as part of a profit-driven initiative that is aligned with government regulations or standards but not necessarily mandated by the government. Mandatory fortification often begins this way to allow the industry to get ‘up to speed.’ A more recent case is *small-scale fortification*—the addition of micronutrients by informal or unregistered small-scale artisanal or cottage industries.
- Micronutrient-enhancement of foods for mothers, infants and young children, including both targeted fortification and home fortification: *Targeted fortification* is the fortification of foods aimed at population subgroups to increase their intake of a specific micronutrient, such as complementary foods for infants and children, food for emergency settings and school meals for children. *Home fortification* is also known as point-of-use addition of MNPs, such as “Sprinkles”, on (home-) prepared food, often for children from 6 months of age up to 24, 36, or 59 months, depending on the programme.
- *Biofortification*: This is the process whereby staple crops commonly consumed by the population are bred to increase their micronutrient content and thus nutritional value. There is also a process of *agronomic fortification*, which is similar, but the crops are treated to increase their micronutrient content and thus nutritional value.

Annex 4 lists the examples, which were identified through key informant interviews or desk review, included in this chapter and/or in case studies in **Annex 6**.

Pathway for staple food fortification

There is compelling evidence that staple food fortification is a cost-effective nutrition intervention (Horton, Mannar and Wesley, 2008). Though fortification of staple foods has a long history, rapid scale up occurred over the last 25 years. Over 140 countries now require universal salt iodisation; 85 countries mandate fortification of at least one staple cereal; and over 40 countries mandate fortification of edible oils, margarine or ghee (Hoogendoorn *et al.*, 2016). Fortification of condiments, such as fish sauce, soy sauce and bouillon cubes, is mandated in some countries as an extension of USI legislation; this is often part of companies’ core business. Other producers may fortify their products voluntarily, like adding iron, without a government mandate. Adding value to a product via fortification is strongly marketed and influences branding in the condiment business (Luthringer *et al.*, 2015; Hoogendoorn *et al.*, 2016).

Despite much of the milling of staples being conducted by smaller businesses, medium and large food processors produce much of the fortified staple foods sold in developing countries, with multinational ingredient suppliers and a few food companies also engaging. Fortification of staple foods is common in all regions; however, Asia has led on fortifying condiments. This practice now is expanding in Africa and the Caribbean, where the two main producers, Nestlé and Unilever, have started fortifying bouillon cubes (INTERVIEW: GAIN AND IDS) (Hoogendoorn *et al.*, 2016).

Figure 6.1 sets out the pathway through which companies can reach poor consumers with fortified staple foods and condiments.

Supply-side constraints and opportunities

On the supply side, companies undertaking fortification of staple foods and condiments face challenges in research and development, sourcing, production, and distribution and sales.

Research and product development

Multinational chemical companies (**AkzoNobel**, **BASF**, **DSM**) and a few Indian and Chinese firms are the main manufacturers and suppliers of fortificants. They have been involved in research and development around stability and bioavailability of micronutrient premixes for fortifying staples. Ingredient suppliers often offer their solid product knowledge to help national companies overcome product development challenges as part of their (future) market development strategy.

AkzoNobel invested in the development and safety and efficacy testing of Ferrazone®, a more stable and more bioavailable type of iron coated with sodium ethylenediaminetetraacetate (EDTA), in early 2000. This was because the reactivity of iron makes it challenging to add to food products, as it may affect colour and taste (Andang'o *et al.*, 2007; Akzo Nobel, 2017).

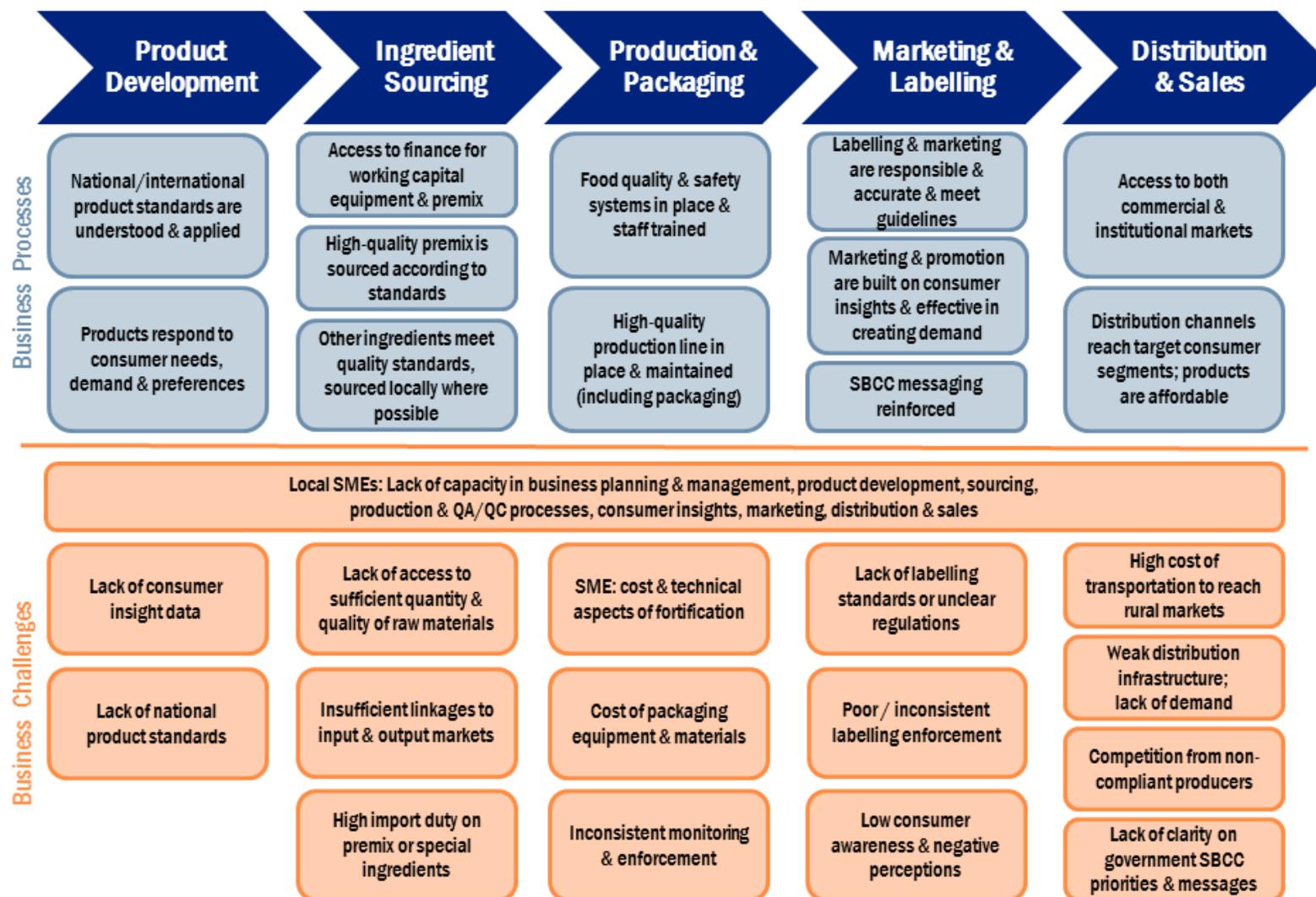
Nestlé researched how to add iron to bouillon cubes that already contained iodine and still maintain customer satisfaction and the colour of the cubes. Out of concern for too-high sodium intake, Nestlé started to lower salt in its Maggi products. In 2016, Maggi delivered over 100 million iron-fortified cubes daily to 78 million households in the Central and West African region (INTERVIEW: NESTLÉ).

Ingredient sourcing

A key challenge encountered by food producers in LMICs is the low quality and unreliable supply of locally sourced raw materials, such as maize. Other ingredients, such as micronutrient premixes or milk powder, are not always produced in-country and need to be imported against higher costs.

In Africa and Asia, mycotoxin contamination is an almost universal issue, which can be reduced by improved storage and processing technologies. These technologies are accessible to larger producers of fortified staple foods but not to most smallholder farmers, which generally must rely on 'cultural' post-harvest handling practices to minimise the problem. Chapter 5 gives examples of processes to reduce aflatoxin levels on the farm. The development and promotion of these approaches are mainly driven by public-sector players that are concerned about the public health effects of mycotoxins, such as the USAID-funded AflaSTOP project. Without stronger food safety standards and enforcement, however, there is no commercial interest for farmers and local producers to produce or use aflatoxin-free grain. This is because the cost implications of advanced technologies are high. Moreover, there is no consumer demand for aflatoxin-free products, as most consumers are not aware of the issue (Unnevehr and Grace, 2013).

Figure 6.1: Impact pathways for fortified staple foods and condiments.



Abbreviations: QA, quality assurance; QC, quality control; SBCC, social and behaviour change communication; SME, small and medium-sized enterprise.

Global companies, out of a commercial interest in a reliable supply of safe (e.g. mycotoxin-free) raw materials as well as a social motivation to strengthen local food systems, sometimes provide national fortified-food producers with technical support in these areas. Partners in Food Solutions, for example, links experts from General Mills, Cargill, Bühler, Royal DSM, The Hershey Company, and Ardent Mills with national food processors (INTERVIEW: PARTNERS IN FOOD SOLUTIONS).

The unreliable (seasonal) supply of raw materials and its corollary, widely variable prices, are also challenges for producers of fortified staple foods and their customers, as input costs are reflected in the price of the final product. Whilst larger staple food processors can take advantage of the lowest (local or global) market prices and store the bulk until processing, medium-sized and small millers rarely choose this option due to lack of access, low cash flow or transportation constraints.



PATH/Eric Becker

Access to finance and flexible storage facilities can help smoothen raw material supply, as exemplified by one Tanzanian maize miller who obtained a loan to expand his warehouse. This enabled him to buy maize in bulk when prices were low and store it for processing; thus, he avoided high prices later in the year when local supply was limited (INTERVIEW: PARTNERS IN FOOD SOLUTIONS).

The ‘negligible’ cost of fortificant is still an additional cost not easily absorbed by local millers nor incorporated into business models. With mandatory fortification, micronutrient premixes have often been subsidised or paid for by donors, but this is not sustainable. To lower the cost, the GAIN premix facility leverages economies of scale by aggregating the demand of multiple food processors. This facilitates producers’ access to high-quality premix from competitive suppliers whilst providing upfront financing (INTERVIEW: GAIN). In some countries, national governments partner with the United Nations Children’s Fund (UNICEF) to import and distribute potassium iodate to salt producers, but this is transitioning to the private sector. The case study on salt iodisation in Tanzania in **Text Box 6.1** illustrates the challenges of universal salt iodisation in countries with decentralised production. By and large, respondents agreed that whilst the cost of premix is not prohibitive, companies do not see the payback in turnover or profit (INTERVIEW: IFC, GAIN). The global community needs better data on what it takes to make fortification sustainable and fully integrated into companies’ business models.

High-quality fortificants are not typically available in-country and need to be sourced from abroad, in which case high import duties act as a disincentive. Local millers have successfully joined forces and advocated via their industry associations for duty-free importation of premix—a practice already adopted in countries like Tanzania and Uganda. India and Nigeria have domestic premix producers. However, in other countries, sourcing and importing premix pose a challenge, especially for smaller producers, because price and quality vary, quality verification requires special equipment and expertise, and procurement requires both capital and foreign currency (GAIN, 2017) (INTERVIEW: IFC).

Text Box 6.1: Case study of salt iodisation in Tanzania

Salt iodisation has been mandatory since 1995 in Tanzania. The government has partnered with the United Nations Children’s Fund (UNICEF) and other development agencies to train salt producers, promote consumer demand, establish testing laboratories and establish a revolving fund to facilitate producers’ access to KI03. However, enforcement remains weak and coverage is limited where small-scale salt production is practiced.

Challenges include:

- Use of unreliable, improvised equipment by small-scale producers.
- Cost of KI03 and manual sprayers.
- Inadequate monitoring and enforcement, especially of small and medium-sized enterprises.
- Low capacity of enforcement agencies.
- Limited budget for staff and site visits.
- Sustainability is dependent on donor funding.

(Robinson and Pittore, 2016) (INTERVIEW: IDS)

Production

During production of fortified staple foods, producers must ensure appropriate handling of ingredients to ensure food safety and quality, use of appropriate technology and consistent application of standards and quality control processes. Multinational alliances and NGOs can provide technical expertise on the selection, installation and use of equipment; establishment and oversight of QA/QC processes; and the use of appropriate testing technology, such as BioAnalyt test kits for in situ measurement of micronutrients in processed foods (INTERVIEWS: GAIN, PARTNERS IN FOOD SOLUTIONS, BIOANALYT). However, companies do not always follow technical advice. In Colombia, for example, a small number of large rice millers, which jointly supply more than one-third of the market, have been fortifying voluntarily since 2002. However, as it is costly to replace technology, the millers are using a less-effective technology of coating rice, which may not deliver the same benefits. These companies should move to a proven technology to ensure positive nutrition outcomes. However, as that would involve additional costs, there is little incentive for them to do so (Hoogendoorn *et al.*, 2016).

QA/QC are especially difficult for small millers, which often operate within substandard facilities, lack good hygiene or have limited knowledge of QA/QC practices. These small millers may rely on limited-term, donor-funded projects to supply equipment, fortificant and training, which can be ineffective because of high staff turnover (Robinson and Pittore, 2016). Many countries recognise these challenges and exclude smaller millers from mandatory fortification requirements, which of course reduces the availability of fortified products in rural areas that tend to be served by smaller millers. **Sanku**, a nonprofit social enterprise, is working to address this problem with an affordable, easy-to-use dosifier technology that is designed specifically for fortification by small millers. The technology has been rolled out across East and Southern Africa (Project Healthy Children, 2017).

Food safety

MNCs see improved food safety systems as critical to nutrition, quality and associated brand protection, and to viable international markets. Better and harmonised standards, when enforced, ensure equal opportunities amongst competing companies and eliminate the need to customise products for specific markets, which reduces costs. In the case of Cargill, this aligns well with the company’s core strategic objective: to nourish the world and its CSR approach.

Cargill works to harmonise and improve standards globally through multi-stakeholder initiatives, such as the Global Food Safety Initiative (<http://www.mygfsi.com/>) and Solutions for African Food Enterprises (SAFE) programme, which is funded by USAID. In support of a food safety campaign in India, Cargill assisted industry and government partners to design and implement risk-mitigation standards in food supply chains. This included partnering with Indian industry, as well as consumer and street vendor organisations to improve food safety standards for a stronger food system and create a more level playing field for all food companies in India. Together they developed a nationwide food safety awareness campaign (through radio, social media, community events and trainings) targeting vendors, consumers and small and medium-sized enterprises, which complemented the government's awareness programme. They also conducted a street vendor training to raise awareness of food labelling, safe food storage and handling practices (INTERVIEW: CARGILL) (Halbersmam, 2015).

Furthermore, the big ingredient suppliers (**BASF and DSM**) are investing in food safety training and capacity building, especially in larger countries where they see a potential market, though this is not yet part of their core business. Their resources do not allow them to positively reply to every request for technical support, leaving smaller countries to look elsewhere (INTERVIEWS: BASF) (see **Text Box 6.2**).

Text Box 6.2: To BASF, fortification is a long-term vision, not for short-term profit

BASF has supported the National Food Fortification Alliances through three stages of development:

1. Creating stakeholder awareness and political will.
2. Building technical capacity in fortification and establishing pilots with local producers.
3. Scaling up pilots, in some cases up to 80 percent of coverage.

Achieving the last mile of food fortification (i.e. achieving high quality and high coverage) requires a push to get up to scale and set up monitoring systems. BASF estimates that this requires strong partnerships rather than high investments.

Though a small part of its business, BASF investments in food fortification are made with a 20- to 30-year perspective of growing the current market and developing future market opportunities. In the short term, their nutrition engagement helps to strengthen their brand, which contributes to employee motivation.

(INTERVIEW: BASF)

Demand-side constraints and opportunities

Consumer demand

Business respondents mentioned that low consumer awareness of nutrition, generally, and of the benefits and value of fortified foods, more specifically, translate to lack of demand for fortified products. This is especially prevalent in rural markets where unfortified, locally produced alternatives are available. In such price-sensitive markets, consumers will not pay a higher price for a staple food to cover the additional costs of fortifying and advertising its nutrition benefits.

In general, companies invest in promotion of their product brand to distinguish it from the competitor's brand, whereas staple foods are low-value products and are often sold unbranded. In the case of branded staples, it often is assumed that it will not pay off to invest in promotion, as consumers do not easily distinguish between different brands of flour or oil that offer similar value. Yet even low-income consumers display brand loyalty where income allows. Cargill decided to invest in creating demand for fortified oil in India—a massive market.

Cargill India invested in mass-media marketing and community-based campaigns to create demand for fortified edible oil, whilst also training distributors and agents to stress the health benefits of fortification to retailers (INTERVIEW: GAIN) (SUN Business Network, 2017). The company cross-subsidised fortification costs with profits from other products to keep the fortified oil competitive and affordable. As low-income consumers had found the product unaffordable, these subsidies continued. Consumers accepted Cargill's health claims, which resulted in approximately 25 million consuming fortified cooking oil. Other cooking oil producers now fortify their products (INTERVIEW: SBN) (Hoogendoorn *et al.*, 2016). In this case, Cargill led the charge and other companies followed (INTERVIEW: CARGILL).

In some cases, MNCs engage in nutrition awareness-raising through CSR initiatives, often in partnership with an NGO.

The Cargill Foundation developed NutriQuiz in Brazil, a mobile app (available on the Google Play Store) that poses 600 questions on healthy eating, thus providing nutrition education to consumers through fun, accessible technology (INTERVIEW: CARGILL).

In Malawi, **Airtel 321** launched nutrition and maternal and child health content, which received good initial traction but a low number of repeat users. Based on user information and feedback, several changes were made—for example, to ensure more dynamic content, it added new recipes on a weekly basis. An 800-respondent survey noted an improvement in nutrition knowledge and reported nutritional practices (INTERVIEW: GSMA).

Companies see raising nutrition awareness by the public sector as a means to help create demand. Following strong government outreach in Indonesia, an established fast-moving consumer goods company leveraged consumer awareness on the benefits of fortified products to market an affordable fortified instant noodle product. Noodles had become the mainstay for many urban and rural poor due to its convenience and relatively low cost (Dewi, 2016), and because it was a higher-value product (packaging, taste) than fortified staples such as flour and cooking oil. Within three years, the company captured 45 percent of the instant noodles market; competitors responded by fortifying their own products. (INTERVIEW: IFC).

Despite consumer awareness on fortification, low-value products (grains, oil) mainly compete on price and not on nutrition benefits, with low-income consumers choosing the economical option (INTERVIEW: GAIN). In Brazil, Colombia and the Dominican Republic, for example, large rice millers have introduced fortified products that have strengthened their brands but have not achieved significant reach amongst consumers who prioritise affordability (Hoogendoorn *et al.*, 2016).

Packaging and labelling

Packaging has several functions: it allows food to be transported over long distances safely and to be stored for long periods of time, whilst maintaining nutritional quality. Small-sized or single-portion affordable packages bring products within the reach of low-income consumers. Packaging is also an important means of communication to consumers, providing information on product content and use. Labelling is usually regulated by government authorities to protect consumers from false claims, but such regulations, where they exist, are often poorly enforced. Companies note a lack of access to information on nutrition labelling requirements and how to make a health claim (INTERVIEW: SBN).

Government certification, such as with a fortification logo (**Figure 6.2**), is typically managed by a national food safety authority. Government certification can build consumer confidence and influence purchase of healthier alternatives (Solon, Sanchez-Fermin and Wambangco, 2000). The responsibility of regulating the use of fortification logos and nutrition claims on labels, as well as

setting and enforcing standards for fortified products, all fall to national governments. Such regulations can increase private companies' confidence that investment in fortification makes business sense. In Nigeria, for example, enforcement of mandatory fortification legislation reduced the price gap between companies that began fortification voluntarily and their competitors. However, these processes can also be difficult for businesses to navigate. Where product standards are inconsistently enforced, the use of a logo does not necessarily reflect the quality of the product (INTERVIEW: GAIN) (Robinson and Pittore, 2016).

Figure 6.2: Sample fortification logos from the Philippines, Kenya and India.



With or without a logo, 'copycat' products undermine consumer confidence, reduce nutrition impact and dilute companies' return on investment in fortified products. In West Africa, for example, Nestlé and Unilever introduced iron- and iodine-fortified bouillon cubes, which now reach many millions of consumers. Unfortified copies with identical packaging are now popping up in local markets (Interview: GAIN), and consumers may not be able to distinguish between them.

The risk of unfortified products claiming equal health benefits but competing on price is a disincentive for national companies to fortify voluntarily. It is not only MNCs but also national companies with strong brands—such as Lisabi Mills in Nigeria, a medium-sized Nigerian food processor—that face widespread counterfeiting of its branded products. Greater enforcement of mandatory fortification has meant that other manufacturers are being compelled to fortify, and this reduces the price gap (Nwuneli *et al.*, 2014).

Finally, but not least importantly, many companies are now developing small package sizes to make fortified products more affordable for low-income consumers. Mount Meru Group, for example, markets fortified edible oil.

Mount Meru Group introduced 50 mL packages of fortified oil in Uganda in response to consumer demand for more affordable products and other companies' use of smaller sizes for competing products. Although the product is fortified, the company sees the economic justification as far more compelling than the nutrition value, as awareness of the value of fortified products is low. The company uses its normal distribution channels to sell the product. It also works with PSI, which distributes the product in rural kiosks alongside other health and nutrition products (EMAIL: MOUNT MERU GROUP).

Distribution and sales

Reaching low-income consumers in rural markets with affordable products is challenging on many fronts. Many rural villages are cut off from markets completely for part of the year. Distance and poor road networks drive transportation costs up. These costs tend to make fortified products uncompetitive, as locally produced, unfortified products are more affordable. Moreover, the retail infrastructure that is accessible to the poor in both rural and urban areas is weak. Products compete for shelf space in small outlets and kiosks, which prioritise lower-cost products that sell quickly; for example, non-iodised salt in open bulk bags are prioritised over fortified alternatives.

To fill the gap of a weak retail infrastructure, 9 of the 30 interviewed businesses used proximity distribution networks to get closer to consumers. The businesses also engaged and trained independent sales agents. This approach permitted consumer interaction to build awareness, conveyed benefits and encouraged adoption (Massachusetts Institute of Technology Practical Impact Alliance, 2015).

Hindustan Unilever Limited recruited over 45,000 Shakti Ammas (women entrepreneurs) in India and trained them in managing distribution, selling iodised salt, amongst others. The Shakti programme has been extended to include Shaktimaans, who are typically the husbands or other male family members of the Shakti Ammas (INTERVIEW: UNILEVER) (Narsalay, Coffey and Sen, 2012).

Spring Impact in Senegal runs a project, funded USAID, that trains rural entrepreneurs and connects them with local suppliers of agricultural, health and nutrition products, such as fortified flour. The agents acquire products at wholesale prices because they order in bulk; thus, they can offer affordable but not subsidised foods to rural consumers (EMAIL: SPRING IMPACT).

Building effective proximity distribution networks is time and resource intensive. Scarce success stories are mainly from networks operating at scale with a varied product basket (Kayser, Klarsfeld and Brossard, 2014; Massachusetts Institute of Technology Practical Impact Alliance, 2015). Retail, wholesale and communications channels are all important.

Some companies sell large volumes of fortified staple foods to institutional buyers, such as state governments or NGOs that distribute the food generally for free to poorer target populations through public distribution systems, social protection programmes, school meals programmes and emergency food aid baskets (Hoogendoorn *et al.*, 2016). For example, **Lisabi Mills** supplies local NGOs with fortified wheat flour, bean flour, yam flour and custard (Nwuneli *et al.*, 2014). High-volume sales to institutional buyers improve a company's cash flow and may increase their willingness to invest in low-margin products for low-income consumers.

The evidence is strong that food fortification, as well as the increase of USI in LMICs, can be highly effective in addressing micronutrient deficiencies in developed countries. An upcoming meta-analysis by Professor Z. Bhutta confirms this, but it also indicates that there is still unequal access and coverage of these foods amongst the poorest population groups (Hoogendoorn *et al.*, 2016).

Pathway for micronutrient enhanced foods for mothers, infants and young children

This section provides examples of private sector companies that are working to promote access to and consumption of micronutrient-enhanced foods.

Compared with staple food fortification, this category of fortified foods has developed more recently. In 2007, the Bill & Melinda Gates Foundation provided a grant to GAIN to explore the potential role of the private sector in reaching low-income households with affordable fortified complementary foods and MNPs for children 6 to 24 months of age. The first products were launched into the market in 2010. Efforts to produce fortified foods for mothers or adolescent girls are even more recent and are not guided by international or national product standards (INTERVIEW: GIZ). Targeting children and women with micronutrient enhanced foods is a relatively recent business focus; hence, there is little evidence and few successful case studies.

Over the past ten years, MNCs and large regional companies have produced and introduced high-quality, affordable fortified foods into the market; most use a social or hybrid business model. However, there are only a few case studies for which a process or impact evaluation has been carried out (van Liere *et al.*, 2017).

The main types of products that are being fortified and targeted to infants, children and women are:

- Fortified (instant) porridges.
- Fortified dairy products.
- Fortified snacks/biscuits.
- Multiple MNPs.
- Ready-to-use supplementary or therapeutic foods.

MNPs that are used for home fortification of complementary foods are mainly distributed for free through the health sector (Reerink *et al.*, 2017). However, a few examples where MNPs are sold, usually at a cost subsidised by a donor, are discussed here. Ready-to-use supplementary or therapeutic foods, such as lipid-based nutrient supplements, are mainly procured by institutional buyers such as UNICEF and WFP and are distributed for free. Therefore, they are not discussed in this chapter.

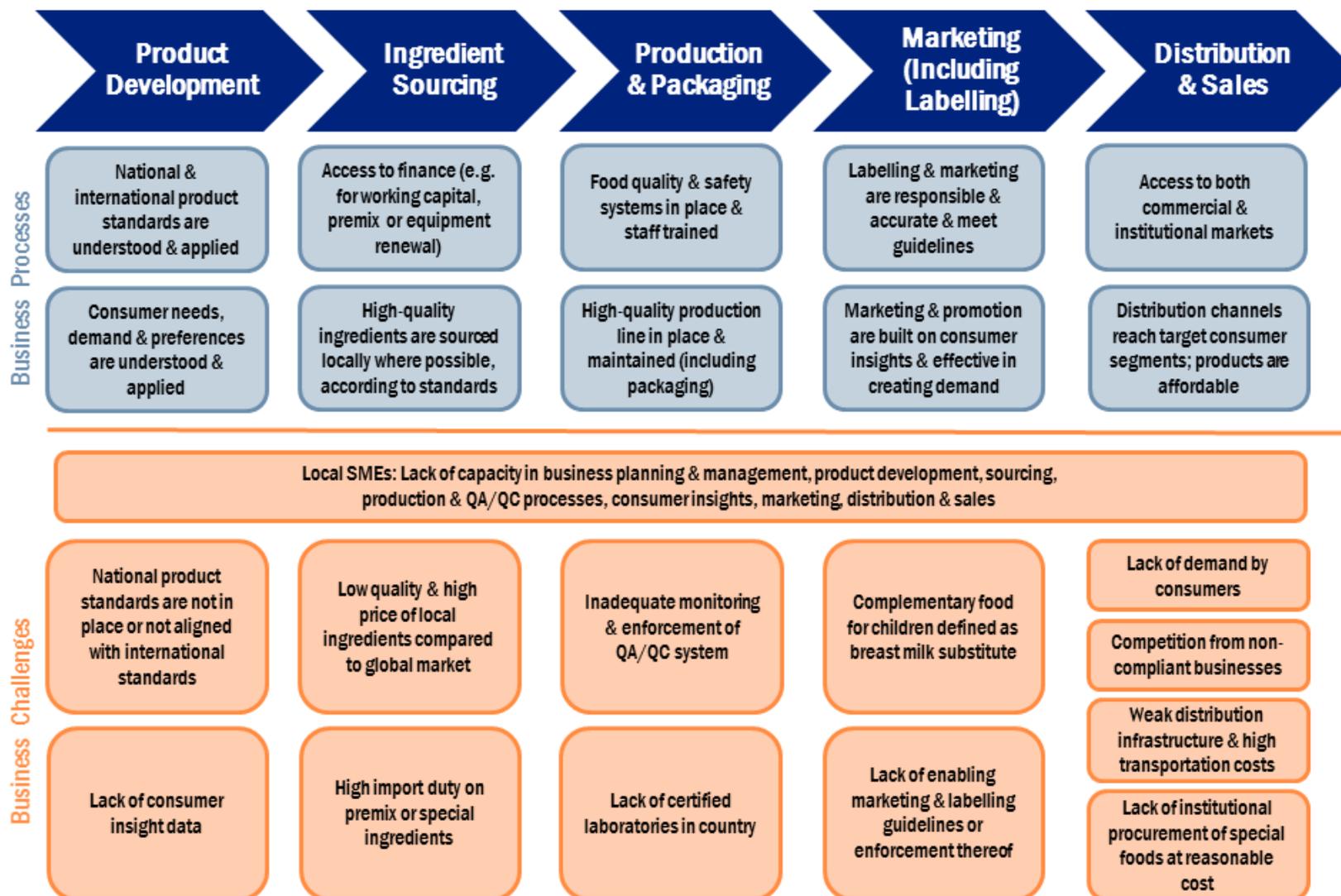
Figure 6.3 illustrates different pathways along the value chain through which business interventions can contribute to improving diets of poor women, infants and children with special fortified foods. Most interventions aim to improve affordability, availability (supply) and/or acceptability (demand) of nutritious foods for these target groups. In this sense, they are quite like the pathway for fortified staple foods and condiments, which was discussed in the previous section. However, there are a few distinct and important differences, which lie mainly in the ecosystem of enablers and barriers.

Unlike fortified staple foods, targeted fortified foods are for subgroups of the population. This creates a need to invest in building awareness and demand, as the target population does not yet have a habit of consuming such products. Also, by the time they learn to appreciate those products, they may no longer be part of the target audience. This is a possible hindrance to marketing strategies. Additionally, there is opposition to processed complementary foods, as they may potentially displace breast milk amongst very small children and culturally acceptable local foods amongst older children. The Codex Alimentarius^{xi} evidence-based composition guidelines recognise complementary feeding as a *complement* to breast milk. They also recognise that products that meet these guidelines do not displace breastfeeding or local foods; rather, they strengthen complementary feeding amongst small children and micronutrient intake amongst older children.

Other international and national guidelines, such as *the International Code of Marketing of Breast-milk Substitutes* (World Health Organization, 1981), aim to protect displacement of breast milk particularly by formula milks. However, it is conceivable that the concern about these issues may also give pause to the private sector as they aim to promote fortified complementary foods or even foods for older children. More recent guidelines take up the issue of inappropriate marketing of those foods as well (World Health Organization, 2017a). Businesses report that they are confused by the divide regarding the benefit or detriment of the promotion of fortified complementary foods; hence, companies are cautious about stepping into the market of child nutrition, as they are wary of the reputational risks.

^{xi} The Codex Alimentarius Commission is a joint intergovernmental body of the Food and Agriculture Organization of the United Nations and the World Health Organization.

Figure 6.3: Impact pathway of private sector actors on access to and use of fortified special foods for mothers, infants and children.



Note: QA, quality assurance; QC, quality control; SME, small and medium-sized enterprise.

Supply-side constraints and opportunities

Deep understanding of local food habits and consumer preferences are needed to guide decisions on product format, flavour and other characteristics, even for experts in their field. **Danone** (Case study 10) learned that it did not work to simply transfer their knowledge on yoghurt consumption to Bangladesh, where yoghurt was considered a treat for special events such as weddings. Many local SMEs have no knowledge about the end consumer of their product, because their focus is to push their products into the market through distributors, which leaves the responsibility of demand creation to the distributors. The **BoP Innovation Center** works with African SMEs to develop their capability in consumer insights (BoP Innovation Center *et al.*, 2012). Gathering consumer-centred insights is a crucial first step but is beyond the technical and financial reach of most national companies.



PATH/Doune Porter

Marketers have long identified price, taste and convenience as the three key benefits for consumers.

Yedent Ltd, a local Ghanaian food producer, decided that their fortified porridge for children needed to be instant (Van Liere *et al.*, 2015) in response to a study that found convenience to be an important deciding factor for urban Ghanaian women (Pelto and Armar-Klemesu, 2011).

Taste is a determining factor for a mother before giving a food to her child. However, a mother's or caretaker's taste buds may already be used to high sugar or salt levels, so they may dislike complementary foods with a sugar content below 15 percent, as per Codex Alimentarius guidelines (Codex Alimentarius, 1991). MNCs, such as Nestlé and Danone, have learned that consumers like variation; therefore, they have begun to offer cereal porridges in multiple sweet and savoury flavours. Local companies, such as **Protein Kissè-La** in Côte d'Ivoire, have copied this approach (Kayser, Klarsfeld and Brossard, 2014; Van Liere *et al.*, 2015).

Research and product development

Large and multinational companies have very good product development capacity compared to that of local SMEs. International ingredient suppliers often provide product development support to their customers, especially to enhance nutrition composition or to reduce costs.

Arla Foods Ingredients is using its expertise in dairy by-products, such as whey permeates, to support local small and medium-sized enterprises in Ethiopia, Malawi and Senegal with the development of nutritious foods. The business sees this as a long-term investment in developing business, getting to understand a new market and creating a network of local partners (INTERVIEW: ARLA FOODS).

Firmenich, the Swiss flavour company, works with food processors from Nigeria to Indonesia to incorporate insights on flavour and palatability of food during the product development phase. 'We need to treat low-income consumers the same way we treat other consumers, understanding their preferences, not just what is good for them. Food has to be delicious—according to their tastes—and aspirational' (INTERVIEW: FIRMENICH).

Local SMEs are also innovating in product development, primarily through in-depth knowledge of local consumer taste rather than through scientific research. They would benefit from technical support to develop higher-quality and more desirable foods whilst keeping costs affordable.

Ingredient sourcing

In the interviews, large and small companies alike mentioned the challenge of producing high-quality nutritious foods for an affordable price. Nutritional quality comes at a cost: high-quality ingredients (e.g. milk powder) are often expensive or need to be imported because the quality and/or reliable supply of local ingredients is insufficient, which adds costs for transportation and import taxes. This is the case of maize and peanuts in poor countries, where aflatoxin contamination remains an issue. Large regional and multinational companies, such as **Africa Improved Foods and Danone**, try to overcome this challenge by 'smart' sourcing (i.e. being flexible in sourcing ingredients, depending on price and quality, by substituting one ingredient with another) (INTERVIEWS: AFRICA IMPROVED FOODS AND DANONE; Case studies 7 and 10).

Local SMEs have limited capacity to solve sourcing challenges and still produce high-quality products; therefore, they are more vulnerable to seasonal changes affecting price and quality. This directly impacts their business viability, either by a lower/negative profit margin or a higher consumer price, which in turn reduces affordability for low-income or institutional buyers.

Other companies have established direct links with their suppliers to ensure the quality and reliability of supply and to lock in prices through vertical value chain integration.

AACE Foods is a medium-sized national food producer in Nigeria that produces fortified foods, such as a fortified soya-maize complementary food for children, which is sold in bulk to aid agencies and in small packaging to consumers. The company aims to improve the quality of maize supply and provide smallholders producers with better income, food and nutrition security. It has established contract agreements with over 2,000 mainly female smallholder farmers. These farmers receive technical assistance through the Dutch-funded Toward Sustainable Clusters in Agribusiness through Learning in Entrepreneurship (**2SCALE**) project to increase yields, improve quality and strengthen their business operations. Smallholders' access to finance is overcome with microfinance loans at planting time, which are underwritten and repaid directly by the company using a portion of payments to the farmers at harvest. The company also provides farmer clusters with storage technology at communal processing centres, which ensures product traceability back to individual producers (INTERVIEW: AACE FOODS).

Production

Amongst smaller producers and even larger national producers, food safety and quality processes in the production line remain relatively weak. Companies such as **Africa Improved Foods** (Rwanda) and **Protein Kissée-La** (Côte d'Ivoire) have managed to obtain QA/QC and management certifications (such as ISO 9001 Quality Management and the Food Safety System Certification 22000), which enable them to sell to larger institutional buyers such as WFP (INTERVIEWS: AFRICA IMPROVED FOODS AND PROTEIN KISSÉE-LA). SMEs and some larger companies in LMICs often are unable to meet standards and require technical support to select, install and operate appropriate production technologies to gain access to institutional markets. **GAIN**, **TechnoServe** and **Partners in Food Solutions** provide such technical assistance, which companies see as instrumental in strengthening production processes.

Monitoring product quality and creating food transparency are essential to ensuring that foods are truly nutritious and comply with mandatory fortification or product standards.

BioAnalyt has developed iCheck™, a low-cost device that allows rapid, on-the-spot monitoring of fortification levels for use by companies, such as **Nestlé**, and technical agencies, such as **GAIN**. The analyses are 10 to 20 times cheaper than in a laboratory. However, they are meant as a rapid production check rather than as replacement for independent laboratory verification. BioAnalyt has changed its business model over the past six years from selling the devices to offering a set of technical support services to companies, which pay for the services and must develop the processes and systems for food quality and safety monitoring (INTERVIEW: BIOANALYT).

Demand-side constraints and opportunities

Even if the lack of supply of affordable micronutrient-enhanced foods were solved, the lack of demand remains a crucial point, similar to the challenge with naturally nutrient-dense foods and fortified staple foods. Numerous determinants influence consumer demand, including certain factors discussed earlier in the supply constraints (affordability, product attributes), as well as awareness of the product and its benefits, desirability, positive first experience and product proximity. The subsequent section discusses these points following the impact pathway.

Packaging and labelling

The previous section on staple food fortification explained the functions of packaging and labelling: to facilitate safe transportation of products whilst maintaining their nutritional qualities and communicating with consumers about product content and use. Innovations in packaging can make nutritious food products more affordable and more desirable to target consumers.

Tetra Pak works with customers, in low-, middle- and high-income countries to find creative, aseptic, low-cost packaging innovations to address the specific challenges faced by low-income households in securing safe, healthy and nutritious food products. Cost can be reduced, for instance, by smaller packaging, such as a wedge or thin pillow or pouch design. These represent a future market opportunity, which would justify the investment (Tetra Pak, 2017).

For example, **Reybanpac**, a Tetra Pak customer in Ecuador, launched a product called Lenutrit as a nutritious product to help reduce malnutrition amongst low-income families, especially infants aged 6 to 24 months. This low-sugar, ultra-high-temperature yoghurt is made with milk and whey, and fortified with vitamins and minerals. It is packed in aseptic 110 mL packages. The safe, affordable carton packages match the product and the target group's needs, as research showed that mothers prefer single-serving packages (Tetra Pak, 2015).

NINFood in Vietnam developed bright-coloured packaging for MNPs in three different sizes to suit consumers who have varying purchasing power (a single-dose sachet, a monthly dose in a pouch with ten sachets and a six-monthly dose in a box with six pouches) (GAIN, 2015b). The number of sachets bought by caregivers was positively correlated with their wealth index, demonstrating that variation in packaging size helps to increase affordability for the lower-income consumers, an important factor in driving first trial of the (Nguyen *et al.*, 2016).

Culturally appropriate labelling is important for nutritious foods. Labelling should address consumers' needs, wants and aspirations, whilst providing effective guidance on product use.

Marketing

The first objective of marketers is to promote their brand and to distinguish their product from other competing products within the same category. In the case of complementary foods for children, however, it is especially important to ensure consistency with appropriate child feeding practices, including continued breastfeeding and dietary diversity.

Marketing messages and the choice of communication channels must account for customer differences. Branding pricing and packaging may differ to meet specific needs and create more demand. For higher-value products, strong brand awareness and credibility are important contributing factors to creating consumer demand. Only one bad product experience is sufficient to shake consumers' confidence. Established brands of international companies such as **Nestlé** and **Unilever** have built high credibility amongst consumers, compared to local producers, by consistently delivering high-quality products. On the other hand, local food producers are more vulnerable to customers' prejudices, even when following strict fortification guidelines and quality standards (INTERVIEWS: IDS AND AFRICA IMPROVED FOODS).



PATH/Mike Wang

Communication channels include mass media (TV and radio advertisements, social media, billboards), as well as more direct and targeted communication—for instance, by community agents and mobile telephone services. A combination of these channels in marketing drives brand and product awareness, as well as utilisation and sales, most effectively; however, it is also very costly.

In the market of micronutrient-enhanced products, there is constant influx of new potential customers as children enter the 6- to 24-month age range, during which they

require complementary food with high nutrient density. This results in a need for continuous marketing investments to make the new customers aware of the product and its benefits.

All companies interviewed mentioned how challenging it was to promote the nutrition message and the product simultaneously. Clear guidance by national authorities was appreciated; however, unclear guidance or varying interpretation may cause confusion. This seemed to be especially the case for enhanced foods for infants and children. Though the *International Code of Marketing of Breast-milk Substitutes* (World Health Organization, 1981) was meant to provide clear guidance, interpretation of the Code and subsequent resolutions differed vastly by country. In some countries, there was a blanket ban on promotion of any foods for children under 2 years of age. In other countries, it was unclear what was allowed and what was not. All respondents who produced micronutrient-enhanced foods for infants and children reported that this lack of clarity hampered their efforts to build awareness and demand. For example, **Africa Improved Foods** decided not to engage in any mass media marketing, which damaged its potential for commercial viability (Case study 7).

Many respondents mentioned that marketing nutritious foods was not only about promoting nutrition value but also about communicating desirability (Kayser, Klarsfeld and Brossard, 2014).

Nutri'zaza, a social enterprise in Madagascar, has invested in communicating the 'bliss factor,' which can mean the immediate satisfaction (taste) provided to the child, the time-saving aspect of instant porridges to the mother or the convenience of home delivery of ready-to-eat porridges in the early morning (INTERVIEW: NUTRI'ZAZA; Case study 11).

Low-income consumers perceive well-known international brands as aspirational and providing value for money; therefore, often they are prepared to pay more for these products than for local competitors, which may be perceived of being of lower quality.

Danone's Milkkuat in Indonesia has adopted as its mascot a tiger, a familiar symbol for bravery. The mascot, which has a strong red colour, is prominently present in ads, games and street events. It has become one of the best-known children's brands in the country (INTERVIEW: DANONE). Danone, like any marketing company, knows that every consumer, including those at the base of the pyramid, is looking for excitement in taste, convenience, brand aspiration or attractive packaging (Danone launched the Milkkuat Tiger Bottle, shaped to resemble the brand's mascot).

Local SMEs are mostly not in the position to develop an effective marketing strategy, because they are constrained in their access to data on consumer habits and preferences, lack the in-house expertise to do this analysis themselves and do not have sufficient cash flow to invest in mass-media communication. Some SMEs mentioned that they advertised on television only a few times per year to satisfy their distributors, but they mainly invested in point-of-sales marketing.

Distribution and sales

Product distribution to get the nutritious food into the consumer's hands, especially in areas with poor infrastructure, is a complex and costly challenge. Companies need to investigate where the target consumer procures their foods and what distribution networks they might interact with, in order to segment the target group and to select the appropriate distribution channel.

Ajinomoto found that they could reach many more consumers in Ghana with **KOKO Plus**, a flavoured soy/amino acid–micronutrient supplement, by selling through traditional retail channels as opposed to using a proximity distribution model. On the other hand, raising awareness of nutrition benefits was less effective than using the community sales force, which has a limited reach and is more expensive (INTERVIEW: AJINOMOTO CO., INC; Case study 8).

Challenges around distribution and proximity sales forces were mentioned in the previous section on staple food fortification. These challenges were also highlighted through the example of **AACE Foods** in Nigeria. They found that a community distribution model paid off in more densely populated urban areas but not in rural areas.

AACE Foods faced the initial challenges of getting supermarkets to carry new products and getting customers who were wary of trying something unknown to try their products. To overcome these, AACE Foods developed the Our Mama sales force. AACE Foods trained approximately 120 women to become part of the sales force to educate mothers and sell the new products in their own communities. To make the product affordable, they supplied the saleswomen with deeply discounted wholesale rates. They also maintained low transportation costs by only working in neighbourhoods within easy access of the warehouse. Transportation to more distant rural areas is a major barrier for scaling up this effort (INTERVIEW: AACE FOODS).

Defining the right price point of a product is crucial to create demand, especially for low-income consumers. It is not only about being cheap but also about defining the magical price point, which coincides with the one coin or note that the consumer carries in her or his pocket, and how much that consumer is willing and able to spend that day (**Text Box 6.3**).

To encourage regular purchase of MNPs, financial incentives for the community sales force as well as promotional items for the parents have been successful in Vietnam. This led to compliant use of MNPs, as per recommended frequency and quantity (GAIN, 2015b; Nguyen et al., 2016). However, this is hardly financially viable.

Text Box 6.3: Getting to the magical price point

In almost every country, there is a small coin or a note that practically everybody carries in their pockets. It is the amount of cash that is easily spent on a drink or snack. For companies, aiming for that one-coin price point is essential to create and maintain demand for a food product. If the cost of the package plus the content, along with a necessary product margin, exceeds this one-coin price point, the product will either become too expensive or unprofitable.

Danone experienced a collapse in sales when they increased the price of products following a spike in milk prices both in Bangladesh (Shokti Doi Yoghurt) and Indonesia (Milkuat milk drink). In response, in Bangladesh, Grameen Danone Foods decided to rework the product mix without compromising on the 30 percent recommended dietary allowance (RDA) of micronutrients per cup. This was done to get closer to the old price point, which consumers were willing to pay, given the extreme price sensitivity of low-income consumers. Danone then introduced a cheaper version, called Shokti Pocket, which offered a smaller portion size and did not need to be refrigerated. Now, Danone builds in a buffer during product development to absorb variations in costs and allow flexibility in sourcing raw ingredients to meet the nutritional profile required (Interview: Danone). (Agnew and Henson, 2018)

Tetra Pak offers a range of tested techniques to keep products at that magical price point, including finding the optimal size ('optisizing'), recipe tweaking and reducing customer system costs. 'Optisizing' refers to inexpensive, relatively simple machine kits that reduce packaging size, which have been successful in Vietnam, Indonesia and India (Tetra Pak, 2015).

Most companies interviewed indicated that it was not easy to attain commercial or financial viability for their nutritious-foods business. Breakeven points lie as far as eight to ten years after product launch, not only for a small company such as the Ivorian SME **Protein Kissèe-La**, which cross-subsidises its porridge business by its business as a supplier of maize grit to breweries, but also for the social business set up by **Danone** (INTERVIEWS: DANONE AND PROTEIN KISSÈE-LA; Case study 10).

Africa Improved Foods was initially aiming for a three-year break-even period. However, with sales to institutional buyers generating less profit than expected, this ambitious target may only be achieved through accelerated growth in the commercial market (INTERVIEW: AFRICA IMPROVED FOODS; Case study 7). This in turn would be a huge challenge requiring additional investment.

Pathway for biofortification

This section aims to analyse how the private sector can improve access to and consumption of biofortified crops by poor consumers. Biofortification^{xii} is the process by which the micronutrient content of a food crop is improved through agronomic practices, conventional plant breeding or modern biotechnology. This increases nutrient levels in crops during plant growth rather than through the addition of micronutrients during processing. Though the concept of biofortification was

^{xii} Biofortification involves breeding of crops, aiming not only to increase the acquisition of mineral elements and their accumulation in edible portions but also to improve their bioavailability by altering concentrations affecting uptake by the gut. There is a similar 'agronomic' strategy, which includes effective soil management and fertiliser applications, aiming to increase the phytoavailability of mineral elements. Using these strategies, staple crops can be significantly biofortified with minerals that are lacking in consumers' diets.

born in the 1990s, donor investments in research and development took off once the CGIAR fast-tracked the Biofortification Challenge Program in 2002 and HarvestPlus launched in 2003.

Biofortified crops are staple foods (examples in **Text Box 6.4**) that are consumed by the majority of the population, so they do not require any major changes in dietary habits (Hoogendoorn *et al.*, 2016). Biofortification may therefore reach populations where supplementation and conventional fortification activities may not; this would be

the case where access to processed food and purchasing power are limited (Ruel, 2003). Expected impact pathways for biofortified staple crops are through home consumption by the farmer and her family, increased access to biofortified staples through local markets and retailers, and incorporation of biofortified food ingredients in processed foods (Bouis and Saltzman, 2017). The impact pathway is graphically represented in **Figure 6.4**.



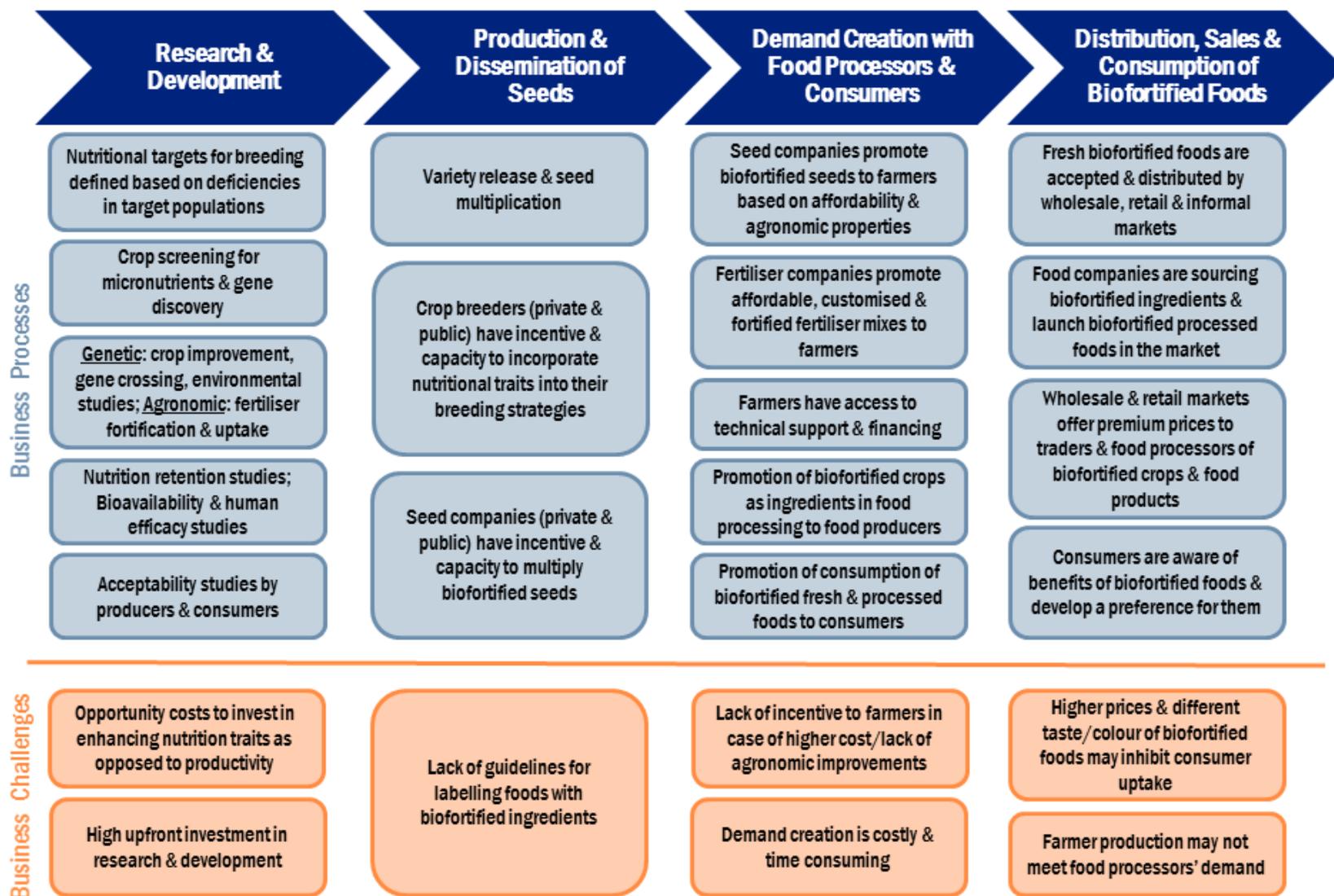
PATH/Satvir Malhotra

Text Box 6.4 Examples of biofortified crops

- Iron-rich beans, cowpeas, Irish potato, lentils, millet and sorghum.
- Zinc-rich wheat, cowpeas rice, sorghum, lentils and maize.
- Provitamin A carotenoid-rich sweet potato, maize, cassava and plantain.
- Amino acid- and protein-rich sorghum and cassava.

HarvestPlus, a CGIAR research programme that is coordinated by the International Center for Tropical Agriculture (CIAT) and International Food Policy Research Institute (IFPRI), has been the driving force behind key research and development of biofortification. Now, **HarvestZinc**, a sister effort, is championing the cause of agronomic fortification, which refers to the application of mineral micronutrient fertilisers to soils or plant leaves to increase micronutrient contents in edible parts of crops (INTERVIEW: IFDC). Much of the effort to date focused on research and development of successful hybrid varieties, field testing, and micronutrient bioavailability and consumer acceptability studies. More recently, the private sector has gotten engaged in seed multiplication and seed dissemination to farmers (INTERVIEW: HARVESTPLUS). As of the end of 2016, approximately 20 million people in 4 million farming households were estimated to grow and consume biofortified crops (Bouis and Saltzman, 2017). The biggest upcoming challenges lie in developing a supply at scale and creating consumer demand.

Figure 6.4: Impact pathway for biofortified foods.



Supply-side constraints and opportunities

Increasing the availability of seeds and planting materials in local input markets is essential to encouraging farmer adoption. It is also essential to ensuring that biofortified seeds and planting materials are competitive with traditional crop varieties in terms of price, yield and other characteristics, as well as ensuring that farmers are aware of the benefits (Bouis and Saltzman, 2017). The pathway to commercialisation, however, also needs attention in terms of not only getting the crops into farms and markets but also into processed food value chains.



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Research and development

Since its launch, **HarvestPlus** has developed an extensive and systematic research and learning agenda executed by an alliance of agricultural research institutions and implementing agencies. The numerous research steps range from conventional breeding of biofortified germplasm and regional trials prior to release of the new varieties, to bioavailability studies as well as randomised controlled efficacy studies to demonstrate nutritional impact. So far, the entire research agenda has been financed by public-sector organisations and foundations without private sector involvement.

Major international agribusinesses invest in crop breeding with a productivity, rather than nutritional improvement, lens. Also, for the biofortified varieties developed by **HarvestPlus**, they will not be able to rely on intellectual property rights to recover invested funds and make profits. However, with increasing demand for biofortified crops, the private sector may be interested in innovation and new variety development, especially for hybrid varieties for which seeds need to be procured annually.

Agronomic biofortification, especially in the case of foliar application, is highly effective for zinc and selenium, whilst also effective for iodine and cobalt. Zinc improves crop productivity, and it engenders better seedling vigour, denser stands and higher stress tolerance in potentially zinc-deficient soils. These factors can help create demand for zinc fertilisers (Cakmak, 2014).

The **HarvestZinc Fertilizer Project**, developed under HarvestPlus, started exploring the potential of various zinc-containing fertilisers for increasing zinc concentration in cereal grains and improving yield in 2008. The results of the project show the feasibility and effectiveness of foliar or combined soil plus foliar application of zinc fertilisers in increasing zinc levels in grain, especially in wheat. Currently, the project is doing foliar tests with iodine to get a better understanding of how fertiliser strategies can improve grain iodine concentration in cereal crops such as rice and wheat (INTERVIEWS: HARVESTPLUS & IFDC).

Though agronomic biofortification is still very much in the research phase (and therefore will not be discussed further in the following paragraphs), large fertiliser companies, such as **Bayer's Crop Science division** and other European and North American companies, are partnering with HarvestZinc—seeing a future market development opportunity.

Production and dissemination of seeds

A sufficient supply of biofortified seeds and plantings is key before farmers start growing crops; the supply depends largely on existing seed systems. Asian seed systems are relatively well-developed;

however, most African countries have weak extension systems, and these are mostly based on local exchange of seeds amongst farmers (Horton, Alderman and Rivera, 2008).

HarvestPlus has partnered with local seed companies, such as **Zambia Seed Company Limited (Zamseed)**, providing marketing materials to help distributors promote the biofortified seeds. Seed companies appreciate the innovation that biofortification brings to the seed market and see their commercial share in the seed product. Other seed companies have social objectives and attempt to support low-income farmers. There is solid evidence to show that seed farmers reserve a minimum quantity for their own use and then grow and consume the high-iron and high-zinc biofortified beans. In fact, the biofortified bean (NUA45) is now bigger in the Zimbabwean seed market than the nonbiofortified equivalent.

Zambia Seed Company Limited (Zamseed) was founded as a joint venture between the Government of Zambia and several private entities, including farmers' associations. It was the first company to sell biofortified seed in Zambia. It sells field crop and vegetable seeds, and it currently markets 18 varieties of maize. They have seen the value that orange maize adds to their portfolio. HarvestPlus provides marketing materials and sales expertise to Zamseed. As a result, orange maize has now significantly increased the market share of the maize seed market (<https://www.accesstoseeds.org/index/eastern-africa/zamseed/>).

Zimbabwe Super Seeds was founded to work with and provide commercial opportunities to rural/subsistence farmers. It has a unique business model in seeds production, whereby these farmers are the actual seed growers and producers. They provide incentives to grow seeds along with parent and training materials. They then aggregate the bean seeds and retail the seed in commercial settings (<http://www.zimsuperseeds.co.zw>).

In Rwanda, the private sector's interest has spurred efforts to meet the growing demand for iron bean seed. HarvestPlus worked closely with the Rwanda Agriculture Board to facilitate bean seed production through contracted farmers, cooperatives and small seed companies (Bouis and Saltzman, 2017; DFID, 2017b). Only five years after the first release, iron beans make up more than 10 percent of national bean production in Rwanda (Asare-Marfo *et al.*, 2016). The government has taken a role in supporting this, by setting policy that prefers biofortified crops. Multiplication of sufficient planting material is a crucial first step and requires partnerships with and incentives for private sector seed companies.

Demand-side constraints and opportunities

Increased demand for and consumption of biofortified crops require close cooperation with food processors and retailers. Throughout HarvestPlus' country programmes, examples of partnerships with local food processors are increasing. These are often informal partnerships with SMEs, but they contribute to increased demand for biofortified crops across the food chain. Demand creation for biofortified crops needs to be done at three distinct levels: (1) demand from farmers for biofortified seeds and plantings, (2) demand from food processors for biofortified crops as ingredients, and (3) consumer demand for biofortified crops or foods.

Demand creation with farmers/producers

Smallholder farmers tend to be risk averse due to limited access to capital and tenuous market linkages. Therefore, if there is not a guaranteed or vibrant market that offers a premium price for biofortified crops over conventional crops, uptake may be limited. Biofortified crops may not be adopted by farmers if yields are less than that of nonbiofortified crops, so all biofortified crops have been bred to have the same or better yield as existing crops (INTERVIEW: HARVESTPLUS). In general,

farmers are willing to grow any crop if the returns are superior to their current crop mix, which is the case for the iron-rich beans in Rwanda.

Farmers can be incentivised to take up biofortified crops by field demonstrations, promotional planting material and market demand from retail or food processors. Moreover, when women farmers were involved, the demand for biofortified crops increased.

HarvestPlus, to promote provitamin A yellow cassava in Nigeria, adopted a successful ‘free sampling’ and ‘snowballing’ approach by providing free bundles of cassava stems to farmers in combination with agronomic training and nutrition information. In the following season, these farmers were then required to distribute an equal number of free stems to two additional farmers, which helped to dramatically lower the delivery costs of the planting material. This also reached the poorest farmers, who otherwise would not have been able to afford improved varieties for planting (Bouis and Saltzman, 2017).

Centro Internacional de la Papa (CIP) and Tusky introduced orange-fleshed sweet potato (OFSP) in Kenya, where farmers share planting materials or cuttings through informal networks and availability is sufficient to meet a growing consumer demand (INTERVIEW: CIP; Case study 14).

The end goal is to ultimately integrate biofortified crops fully into the commercial market and to ensure that biofortified crops/seeds become the market leader. Farmers will be more motivated if there is scope for a commercial market for the biofortified produce in addition to the encouraged nutritional value. Therefore, much of HarvestPlus’ work centres around working with retailers, food processors and manufacturers to incorporate biofortified ingredients into their product lines; biofortified ingredients are sourced from producers, usually for a premium price over conventional crops (INTERVIEW: HARVESTPLUS).

Demand from food processors

Food processing companies may play an important role in developing the food product value chain for biofortified crops and creating a market for biofortified produce. This is especially true for local SMEs that deliver the mainstay of processed foods in LMICs and may easily adopt biofortified grain and other crops even before supplies reach scale.

FarmFresh, a local food manufacturer in Rwanda, sources high-iron beans from farmers, transforming it into a high-quality, ready-to-eat product for urban, middle-income consumers who are willing to pay a premium for convenience and improved nutrition and are open to new products. Once production of biofortified crops becomes mainstream, it will be easier to reach the urban poor as well (INTERVIEW: HARVESTPLUS).

Sylva Foods in Zambia produces and markets Maize Meal Nutri Cereal using orange maize. In their first year of manufacture, orange maize supply was insufficient for the company’s production, so the proprietor of Sylva Foods started growing orange maize on his own land to demonstrate to rural farmers that there was a market for the biofortified crop. Currently, the company is sourcing all of its biofortified produce from local farmers. It is planning a large-scale supply to a leading supermarket in 2018 (INTERVIEW: HARVESTPLUS).

The interest of multinational companies is slower to develop, which can be explained by their need for large volumes, which currently cannot yet be satisfied through biofortified crops alone.

Nestlé has started to use biofortified maize as an ingredient for their cereal porridge production in Nigeria. The first results are encouraging, with an increase in orange maize farming observed, though the total supply of biofortified maize is still insufficient to fulfil Nestlé's manufacturing needs and the level of vitamin A in the orange maize is below the required fortification levels of the porridge. Farmers are highly incentivised to be associated with global brands, as they perceive the prospects of demand to be greater than what would come from supplying smaller local companies (INTERVIEWS: NESTLÉ & HARVESTPLUS).

Demand creation with consumers

The staple crops that are eligible for biofortification have been selected because they are consumed by the entire population. As such, there is not a need to create a new eating habit. The biofortified crops look like conventional crops, except for the provitamin A-rich crops.

In the rural areas where OFSP or orange maize is cultivated, there is an initial need to promote acceptance and consumption through campaigns delivered by governments and NGOs. The initial concerns that the change in colour of staple foods may inhibit consumption were not realised. Furthermore, several empirical studies led by HarvestPlus and partners have consistently shown that biofortified foods (irrespective of the colour change) are liked as much as the popular local varieties (Birol *et al.*, 2015).

In addition, there is a growing urban market for 'healthy, nutritious foods,' which could become a strong driver for demand for biofortified foods. This will occur if they can be distinguished from nonbiofortified crops; this is not the case for grains and beans, but it is for the orange maize and OFSP. Targeting a middle-income consumer segment, which is an early adopter of new habits, may be a wise business strategy prior to targeting price-sensitive, low-income consumers.

Tuskys has used the orange trait to introduce a new healthy potato bread into its portfolio. Although sweet potatoes are widely grown as a secondary staple throughout sub-Saharan Africa and are seen as a food security crop grown for home consumption, their image has been improved through upscale marketing, new processing and consumption techniques. Tuskys Supermarkets in Kenya started producing orange sweet potato bread. They use both the colour and sweet taste to promote the bread, which fits within the bread-eating culture and responds to a growing desire of middle-income urban population to eat healthier food (Case study 14) (INTERVIEW: TUSKYS).

Distribution, sales and consumption of biofortified foods

Distribution of biofortified crops to retail channels is accelerated through partnerships with food producers and retailers. In Zambia, through collaboration with small- and large-scale millers, orange maize has been used to make mealie meal, which is a staple food consumed throughout the day and used in a variety of dishes in the country. Mealie meal is now available in all but one of Zambia's major retailers, and its market share is growing on a weekly basis (INTERVIEW: HARVESTPLUS).

These types of partnerships need to be accelerated to stimulate farmers' production of biofortified crops and availability of biofortified foods in the market. Whilst retailers and supermarkets are more likely to serve the urban middle-class consumer, increased production is expected to lead to home consumption of the excess produce by farmers as well as increased availability in local markets.

Though biofortified seeds are governed by the same considerations as any other seeds, biofortified ingredients or foods still need to be integrated in global standards and guidelines that govern food

processing, such as the Codex Alimentarius. This will support food processors with labelling and health claims and will reduce the incidence of false claims (Bouis and Saltzman, 2017).

Role of other actors

Many of the examples above have referenced the support provided by development agencies, UN agencies, NGOs and MNCs that support SMEs. These entities apply either their own or public funding to reduce the risk of private sector investment in fortification, encourage and support such investment and support national governments to deliver effectively. Overall, multi-stakeholder partnerships are key to scaling up biofortification, as collaboration between researchers, the government, seed companies, food processors, NGOs and retailers is needed at different stages of the supply chain.

National governments

Governments should implement policies and actions that help to fix the broken food system, clearly articulate the role of the private sector in national policy frameworks and strategies, and provide concrete direction to the private sector on government priorities and areas where commercial models can contribute. The Global Panel on Agriculture and Food Systems for Nutrition (Global Panel on Agriculture and Food Systems for Nutrition, 2017, 2018) suggests that governments should regulate product labelling and marketing, especially to children; provide food product reformulation guidelines and food safety standards; and tax unhealthy foods and subsidise healthy nutrient-rich foods. Moreover, the government should run public campaigns to promote better food choices. The SBN strategies at the country level support governments by identifying and prioritising opportunities for private sector engagement within national nutrition strategies.

Companies expressed the importance of a clear and evidence-based regulatory framework, including product standards and marketing guidelines. Though understanding the needs, local companies such as **Indofood** did not feel an incentive to improve their fortified porridges for children to the fortification levels of the Codex Alimentarius (1991) before the national product standard was revised (van Liere *et al.*, 2017). Furthermore, regulatory frameworks can incentivise private sector investment in nutrition or at least remove barriers by eliminating import duties on fortificants and other key imports like milk powder—if these are used as ingredients for nutritious products targeting vulnerable populations. Reduced import taxes on fortificants improve the production and quality of fortified foods (Hoogendoorn *et al.*, 2016). **Cargill** hosts study tours for legislators from low-income countries to visit Cargill factories in Europe and the United States to see food safety and QA/QC processes, to understand the legislative framework in developed-country contexts and to build a culture of exchange between legislators and the private sector (INTERVIEW: CARGILL).

Effective and consistent monitoring and enforcement of standards must accompany regulations to ensure a level playing field among competitors and between domestic producers and importers (Hoogendoorn *et al.*, 2016). These processes require prioritisation of staffing, training and operating budgets for standards and food control agencies; however, clearly, developing-country governments face many competing priorities for allocation of scarce resources.

If mandatory fortification is not in place, national governments may still encourage private sector nutrition engagement by investing in nutrition education, awareness raising and demand creation for nutritious product categories. Government endorsements and fortification logos have been mentioned by numerous companies as useful tools for broader awareness raising.

Fortification alliances

National governments lead coordination efforts, often through food fortification alliances, multisectoral bodies that bring all actors together to coordinate and track progress on fortification. It is thanks to these alliances, which bring partners from the public and private sectors together, that large-scale food fortification has been adopted and scaled in so many countries over the last 20 years. All partners bring their expertise to the table:

- National governments define standards, and develop and enforce legislation.
- Companies provide technical, production and marketing expertise.
- International NGOs support implementation, technical assistance to national governments and companies and global coordination.
- UN agencies contribute through advocacy, standards development and communications. They also serve as major buyers of fortified foods for emergency relief and nutrition treatment programmes.
- Academic institutions monitor fortification programmes and conduct research to inform policy and programming.
- Financial donors fund the activities of these other actors; collectively, they have moved the agenda forward. (INTERVIEWS: GAIN, BASF)

Technical agencies

Large international companies and associations (such as **DSM, BASF, Stern, Unilever, Bühler, Cargill, Bunge, and the International Association of Operative Millers**) contribute to the fortification agenda in developing countries. Donors use public funding to support international NGOs—such as **GAIN, Nutrition International, Clinton Health Access Initiative, Helen Keller International, TechnoServe** and others—to perform advocacy and deliver technical support to national fortification programmes and local SMEs. This support may include advocacy for mandatory or voluntary legislation, as well as technical support to companies related to equipment and QA/QC or to governments on issues around standards, taxation, monitoring and enforcement. It is also improving access to finance for SMEs.

Research institutions

Independent research institutions, which are typically publicly funded, perform both basic and applied research to develop and test biofortified crop varieties and agronomic methods, and to determine the most effective and appropriate compositions of fortified processed foods. They also perform efficacy and effectiveness trials of products, and overall coverage and effective coverage surveys (e.g. [GAIN's fortification assessment coverage tool \(FACT\) surveys](#)) to better understand the reach and impact of fortified foods. Independent researchers performing such analyses enhances the credibility of the results and builds knowledge across the field that informs development-sector, government and private sector actions. The CGIAR Research Centers and their support to developing the technology, through HarvestPlus, for example, have been very important to move the science forward and attract the investment of donors, where the private sector would not have invested. The Bill & Melinda Gates Foundation, DFID, USAID and others have supported the research and development work that has moved biofortification forward and catalysed scale-up efforts.

Key findings

This chapter brings together three very different pathways to increase access to fortified foods: staple foods consumed by the entire population, micronutrient-enhanced foods for children and women and biofortified foods.

Fortification of staple foods and condiments was the most successful pathway. It has created access to fortified foods at scale, thanks to the over 25 years of experience, advocacy, mandatory legislation, technical assistance and capacity building. Even still, a final push is needed towards reaching higher percentages of the poor populations and improving fortification quality through concerted efforts by the public sector to enforce compliance.

Efforts to develop market-based solutions to increase access to micronutrient-enhanced foods for women and children started around 2006 to 2007. These efforts have encountered not only supply- and demand-side barriers, they have also met resistance from within the formal nutrition sector due to perceived negative impact on breastfeeding practices. This divide within the sector between opponents and proponents of industrially processed complementary foods for children has dramatically slowed down progress in creating access to high-quality, nutritious, fortified foods that are specially formulated for this target group by private sector companies.



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Biofortification has received significant investments for basic research and development of new varieties over the past 15 years. The next phase to roll out and scale up the use of these novel foods has just begun. This phase is focused on demand creation: convincing farmers to sow the crops, processors to use the ingredients and consumers to buy and consume them. Currently, various market pull mechanisms are being used, such as paying premiums to farmers to grow and incentivising the food industry to use biofortified crops in their final products.

What works for business?

Over 90 percent of all business respondents (MNCs and SMEs alike) indicated that they worked in partnerships with nutrition partners, which provided legitimacy, insights and direction to the companies. Private sector engagement in nutrition without a public sector partner was rare amongst the respondents, though this might offer a biased view due to the selection of respondents.

For both food fortification and biofortification, pre-competitive investments in research and development innovation were made by the public sector because investment in nutrition research rarely gives an immediate return on investment. Opportunity costs are too high for businesses.

Larger companies can apply efficient and smart-sourcing strategies by combining inputs from local, regional, and global supply chains, but this remains challenging for smaller companies. MNCs invest in inclusive and sustainable supply chains out of commercial interest. They also build their suppliers' capacity to increase produce quality, as well as farmers' productivity and loyalty.

Access to imported inputs, such as premix or powdered milk, are sometimes constrained by high import duties and value-added taxes, which could increase prices by as much as 70 percent. However, in several countries, tax waivers or exemptions helped to moderate fortificant costs.

Setting up proximity community distribution models seems to work best in more densely populated urban areas. Digital media or mobile phone technology could be used to reduce costs and increase efficiency of these expensive networks. Loyalty programmes for community sales agents but also for retailers can incentivise them to sell nutritious foods. Using local small retailers for the redemption of food vouchers, which are distributed by a public-sector programme, may drive sales and utilisation of nutritious foods up even further, but this requires subsidisation by the public sector. Using consumer insights beyond the nutrition benefits of a product to focus also on the perceived value of convenience, taste, satiation and other aspirations pays off in terms of demand creation, as well as government endorsement through a logo or seal.

What did not work for business?

Domestic supply chains are weak. The supply and quality of ingredients are inconsistent and require major sustained investments to be strengthened. Companies and organisations therefore often resort to importation of higher-quality ingredients. Food quality and safety remain important challenges, especially for SMEs, but quality can become world-class with the support of technical agencies. Investments are needed in capacity building and setting up of quality control structures at the national level, as well as innovations in low-cost quick measurement devices.

Once the product development and supply-side challenges have been overcome, the largest barrier lies in the limited consumer awareness, which translates into lack of demand or unwillingness to pay for fortified products. Consumer insights research as well as consumer and market segmentation have proven crucial for each step of the pathway. SMEs often do not have this research capacity in-house, nor do they have the financial resources and expertise to develop large marketing campaigns. Some local companies have received support from technical agencies.

Because retail and wholesale channels are often underdeveloped, many actors rely on proximity or last-mile distribution channels to reach the target low-income consumers. These sales networks are very costly to set up and maintain; therefore, it is especially useful and efficient if the company can piggyback on an existing network or when the consumer is relatively close by (urban-poor). It remains a huge challenge to reach the rural poor effectively.

The challenge of access to finance and sometimes hard currency was expressed, especially by small local companies. Donor funding helps to de-risk early-stage investments or pilot business models, but companies are often in need of additional funds. Eligibility criteria of development finance institutions are often beyond the reach of local SMEs. There is perhaps a role here for governments to partner with development agencies and development finance institutions to address these challenges with blended finance models that include technical assistance to ensure requirements for financing are met and to help national companies move towards commercial investment.

Evidence for business viability

The key evidence for business viability of marketing of fortified foods lies in the fact that staple and condiment fortification has been rolled out at scale. Despite their initial protest, millers have either absorbed the cost of mandatory fortification or let the consumer pay. However, when fortification is voluntary, the price competition with non-fortified foods is high, especially for generic, non-branded products that cannot distinguish themselves. Respondents stated that the marketing and selling of fortified foods to consumers at the BOP is currently not a very profitable business due to lack of demand for fortified foods and relatively high costs to produce nutritional value and distribute to poorer, hard-to-reach consumers (especially for fortified foods for women and children). With respect to biofortification, these crops still need to be rolled out and adopted by private sector seed companies and food processors. There are opportunities to market these foods based on their agronomic or nutritional traits (Bouis and Saltzman, 2017).

MNCs often reported that they have a longer-term business interest to learn from innovation and engage with partners where there is a perceived future market development opportunity. It offers them the opportunity to obtain insights in a new market and new consumer segments, to develop a network of partners, and to improve the quality and reliability of their supply chain. There is a growing sense of responsibility amongst companies, especially MNCs, to do no harm, contribute to better nutrition, and to ensure their products fit an overall healthy eating pattern.

Evidence for nutrition impact

There is strong evidence in developed countries and increasing evidence in developing countries that the fortification of staple foods can be highly effective to address micronutrient deficiencies. Efforts to develop market-based solutions to improve child feeding have been few, small, and scattered over the past five to ten years. Though efficacy studies show potential impact, only a handful of experiences have been documented. There also is no solid evidence base for effectiveness with regard to the contribution of the private sector (van Liere *et al.*, 2017). The impact of biofortification on health and nutrition outcomes has been established through various efficacy studies (De Moura *et al.*, 2014; Gannon *et al.*, 2014; Finkelstein *et al.*, 2015; Haas *et al.*, 2016; Palmer *et al.*, 2016; Talsma *et al.*, 2016).

Opportunities for donors

For staple food fortification, the time is ripe to invest in the last mile, addressing issues around fortification by small millers, ensuring that monitoring and enforcement are effective and consistent, or improving situations of voluntary fortification. For all other pathways, it may make more sense to explore approaches at scale that can reach larger populations with the same amount of effort (i.e. that are more cost-effective), such as working with cooperatives and larger companies. This can be compared to the costs and effectiveness of working exclusively with small companies.

Donors can also play a role by overcoming the two key hurdles to increasing access to micronutrient-enhanced foods for children and mothers: regulatory environment and demand creation. Both challenges cannot be overcome by private sector investments alone; they require strong global and country-level collaboration between private- and public-sector entities.

National media and consumer associations have a potentially important role to play in raising awareness about food quality and safety issues, holding the private sector to account for consumer safety, and holding government to account for enforcement. Donors should consider supporting capacity-building in these areas.

Chapter 7: Private Sector Engagement in Scaling Up Nutrition in the Workforce

Chapter 7 summarises lessons learned on improving nutrition in the workforce. Since the start of this millennium, global businesses have increasingly embraced the need for acceptable employment conditions—including occupational safety and health—in their global value chains, out of concern for responsible and sustainable development (Hadwiger, 2015).

Reduction of over-nutrition and the risk for diet-related NCDs has been an integral element of employee health programmes of MNCs and other large companies in developed countries for the past 10 to 15 years. For example, Unilever’s Lamplighter programme and Marks and Spencer’s Plan A both increase awareness about diet-related NCDs and encourage healthy lifestyles.

However, occupational health interventions in developing countries mostly address sexual and reproductive health, HIV/AIDS, hygiene and sanitation. They rarely address nutrition (INTERVIEW: BSR AND ILO) despite the evidence that improved diets could lead to higher productivity (Haas and Brownlie, 2001). The first commitments to improve workforce nutrition in developing countries were made in 2013 at the N4G summit, which launched actions to improve workforce nutritional status and regularly report progress; however, programmes are still in the early stages of development.

Cargill Global pledged in 2013 to recognise the importance of employee nutrition for a productive and healthy workforce in its global policies. Activities included increased support for breastfeeding mothers in its workforce in Central America, such as establishing lactation rooms at plants and offices; provision of health clinics on palm plantations and as part of school meals programmes in Indonesia; support of healthier life choices with fruit provision during meetings, a global walk challenge and on-site nutrition and health services in the United Kingdom; training of local communities on good nutrition and healthy lifestyles, using workshops on a well-balanced diet, planting vegetables at home and cooking simply; and healthy meals in Brazil (Cargill, 2016a, 2016b).

According to SBN estimates, as per January 2017, 30 companies have made a workforce commitment, collectively reaching 1.2 million workers (INTERVIEW: SBN). Most of these commitments are in an early stage. Analysis and documentation of lessons learned over the past four years are still very limited. **Annex 4** lists examples researched by desk review or interview.

Pathways for workforce nutrition

This report distinguishes between workforce in a factory setting and workforce in an agricultural supply chain, which may overlap within an urban-rural divide.

Figures 7.1 and 7.2 provide visualisations of the pathways through which companies support better nutrition of their employees in an industry setting (**Figure 7.1**) or in a cash or food crop value chain setting (**Figure 7.2**). The first step in the pathway is the assessment (through data collection or desk review) of the current situation with regards to nutritional status, food consumption pattern and nutrition-related workplace health and labour policies. Making the nutrition situation visible opens the dialogue with employers and management on the feasibility in terms of costs, time and organisation.

Commercial benefits for companies

Workforce health and nutrition programmes have the potential to impact a business's bottom line (net profits) in the medium term by reducing costs from sick leave, training or health care. It is important to build a business case to encourage managers to invest in workforce health and nutrition programmes. Though company-level data may not exist, there is some evidence that investing in workforce nutrition makes good business sense.

Large western companies like **Unilever** invest in workforce health and wellness programmes, including nutrition issues, because they expect impact on the company's bottom line: their net profits. The programmes lead to a healthier, more motivated and therefore more efficient and productive workforce with reduced levels of sick leave—contributing overall to reduce costs on recruitment, training or health care for the business.

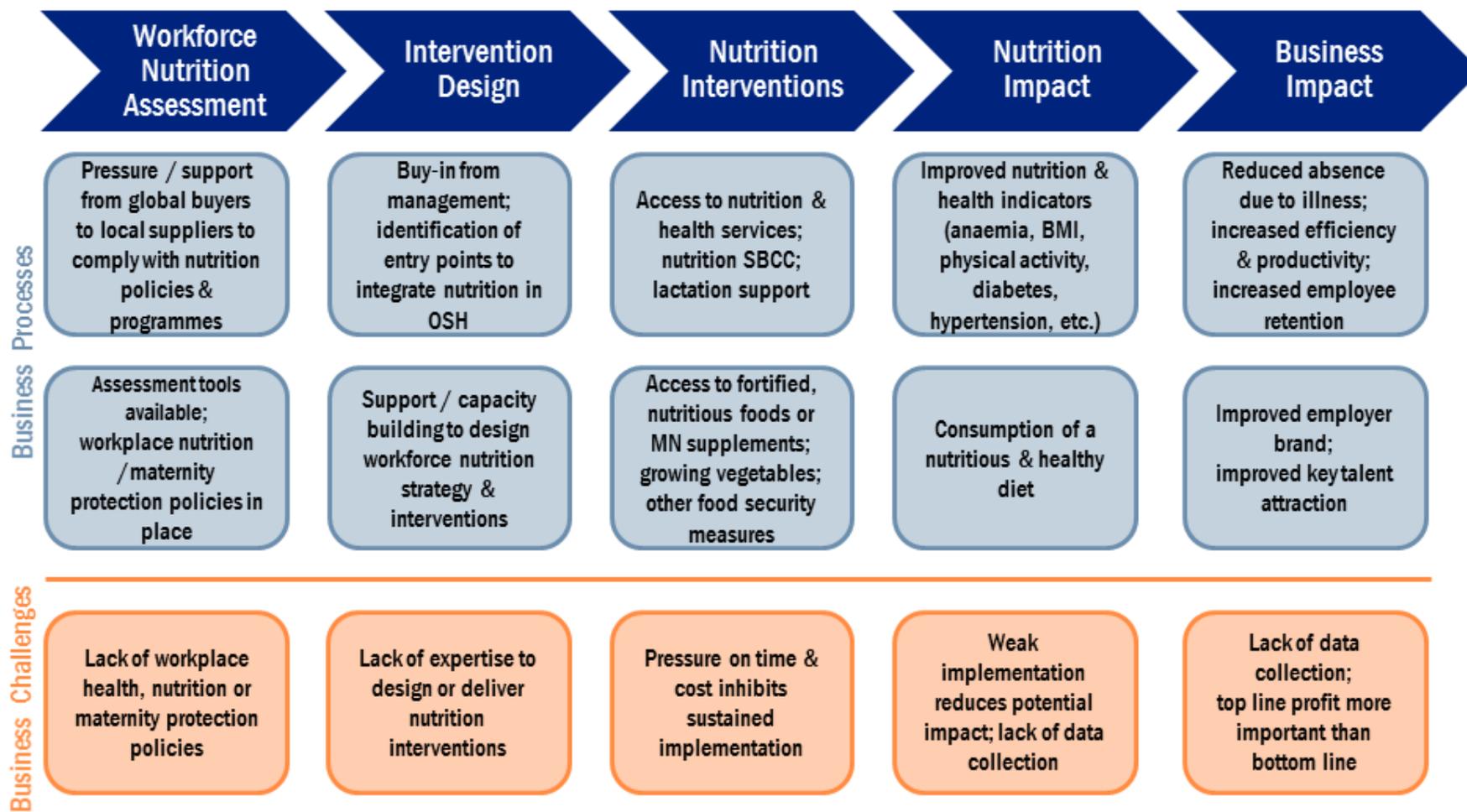
Unilever's Lamplighter programme, introduced in 2001, is the company's worldwide programme for improving employee health and well-being. It provides structure and guidance on how to develop initiatives around physical and mental health so that each country business can develop locally appropriate activities to address four modifiable risk factors—physical health, exercise, nutrition and mental resilience. Lamplighter offers individual employees a health risk assessment, measuring risk factors for noncommunicable diseases, such as smoking, blood pressure, blood cholesterol and sugar levels; body mass index; waist/hip circumference; and fitness. This is followed by counselling on physical exercise, nutrition and mental resilience. In 2016, Lamplighter covered 70 countries, reaching approximately 83,000 employees. It has proven to reduce health care costs, reduce absenteeism, increase productivity, reduce premiums on health insurance, improve morale and well-being, reduce accidents at work and improve engagement and performance. The aggregated results show that for every €1.00 spent on Lamplighter, Unilever saw a return of €2.57, thanks to reduced health care costs and absenteeism and increased engagement and well-being (GBC Health, 2017).

Employee attraction and retention are also important arguments for companies who want to recruit the best talents in a tight labour market and ensure that investment in training and development of these talents pay off. For example, **Safaricom** in Kenya invests in a mother-friendly workplace with child care benefits, lactation opportunities and maternity insurance to attract key female talent (Safaricom Telecommunications Kenya and International Finance Corporation, 2017).

In supply chains where prices and demand for a crop are high, farmers shift easily from one buyer to another. As well, international companies are motivated to build a strong relationship and create supplier loyalty with programmes such as workforce nutrition (INTERVIEWS: SYMRISE, MARCATUS QED; Case studies 18 and 19). At the same time, where farmer communities are poor, it is important for the supplier to increase food security by diversifying the income base and making farm communities more resilient (INTERVIEWS: SYMRISE, UNILEVER, SUSTAINABLE TRADE INITIATIVE; Case studies 17, 18 and 19).

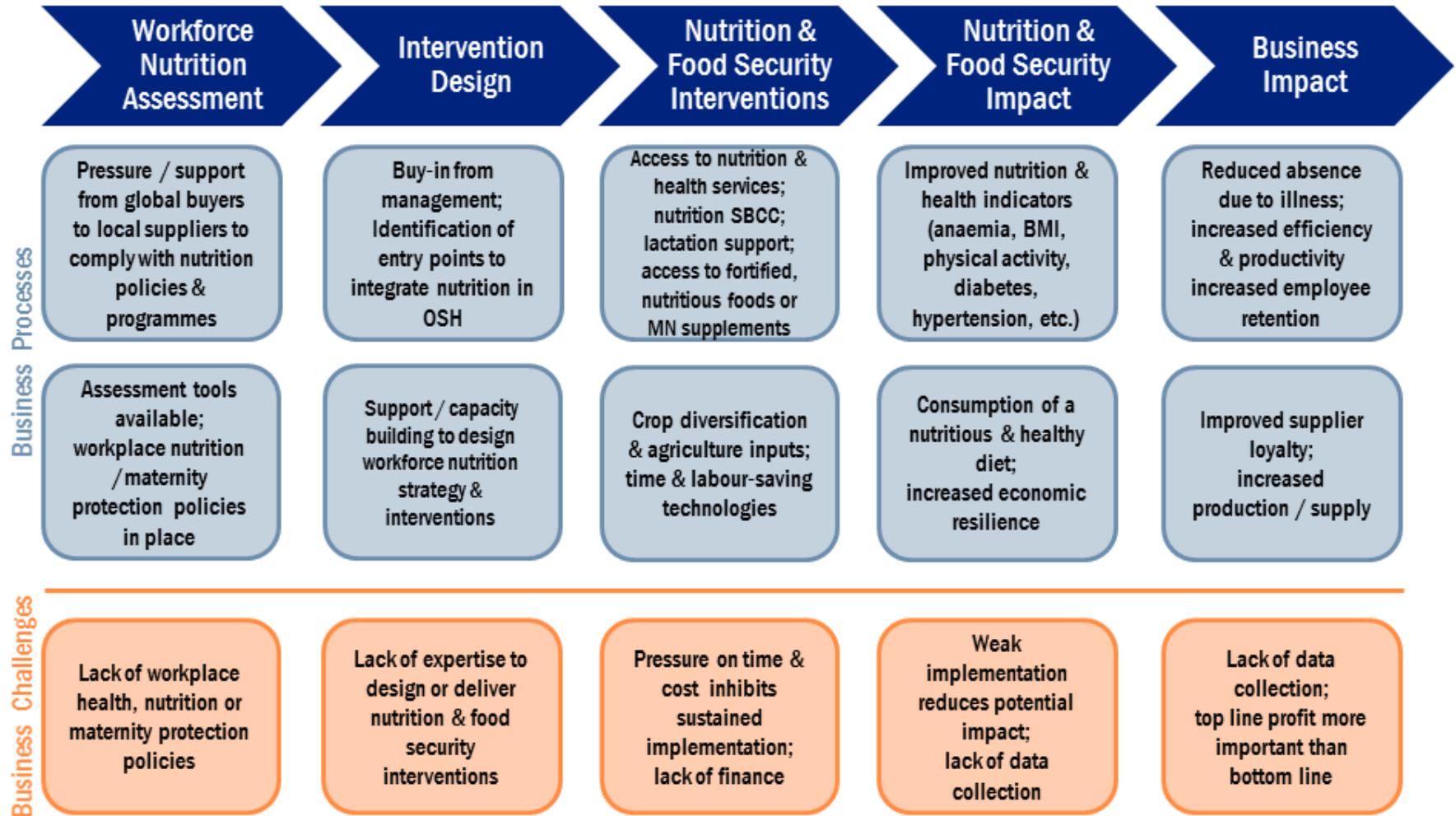
However, many of the smaller and local companies in developing countries face cash-flow problems; they therefore look to maximise their profit by keeping their workforce costs as low as possible. For instance, members of the Nigeria SBN, who were committed to improving nutrition of their workforce, chose to implement targeted one-off activities that were within their budget (INTERVIEW: SBN NIGERIA). Pressure from global buyers on local suppliers, as is happening for instance in the garment industry, may help to create buy-in from local companies to invest in workforce interventions—especially if these workforce practices help to attract new clients (INTERVIEW: BUSINESS FOR SOCIAL RESPONSIBILITY).

Figure 7.1: Impact pathway of workforce nutrition interventions by private sector industry actors impacting nutrition outcomes.



Abbreviations: BMI, body mass index; MN, micronutrient; OSH, occupational safety and health; SBCC, social and behaviour change communication.

Figure 7.2: Impact pathway of workforce nutrition in food or cash crop value chains.



Abbreviations: BMI, body mass index; MN, micronutrient; OSH, occupational safety and health; SBCC, social and behaviour change communication.

Assessment of nutrition indicators and related labour policies

A baseline assessment of nutrition indicators, current practices and alignment with national policies and guidelines is an important first step in identifying priorities and taking action.

Years ago, companies such as **Unilever** and **Marks and Spencer** started offering health and nutrition check-ups to their employees, followed by behavioural counselling. Availability of these data raises awareness of the individual employees and provides valuable insights to the company for designing appropriate interventions and measuring progress over time.

Marks and Spencer (M&S) started Plan A, its social and environmental sustainability programme in 2007, recognising that it had not only a role in supporting its customers to make healthier choices but also in supporting its employees to live healthier lives. A comprehensive programme was set up, including promotion of health and well-being information on its intranet, access to personal health coaches and promotion of physical activity. In 2015, 2,800 employees participated in the M&S Wellbeing Weight Loss Challenge. Healthy food options were signposted with an 'Eat Well' logo in canteen facilities; caloric values were provided for core menu items; and free fruit, water and breakfast items were made available. Office staff had access to free health checks to measure key health markers with trained independent dietitians. In 2017, M&S updated its Plan A; it added concrete targets, such as all M&S staff worldwide would complete a health risk assessment by 2019. An individual health risk assessment would help to tailor interventions to the needs of the employees. These data will be used to tailor interventions and advice, and report annually on progress. By 2022, health and well-being learning and support will be covered in employee programmes worldwide. M&S aims to expand its nutrition and well-being objectives and initiatives to their franchise partners and direct suppliers (Marks and Spencer, 2017a, 2017b).

Several multinational cocoa processors and producers (**Nestlé, Mondelēz, Barry Callebaut, Olam, Hershey's, Cargill, Lindt, ECOM and Touton**) joined forces with the Sustainable Trade Initiative (IDH) and GAIN in 2017 to better understand the nutrition situation of smallholder farmers in their own supply chains in Ghana and the Cote d'Ivoire. The companies wanted to understand why their support to income-generating interventions had not resulted in expected improvements in the nutrition situation of cocoa farmers' families. They also wanted to identify and test appropriate interventions to impact nutrition (INTERVIEWS: SUSTAINABLE TRADE INITIATIVE AND GAIN). Overall, the generation of data on nutritional issues like anaemia and the general lack of dietary diversity is ongoing.

Assessment of compliance with health and labour regulations is also crucial. The International Labour Organization has developed a tool to assess compliance with labour health policies. Except for maternity and breastfeeding protection measures, however, such legislation rarely addresses nutrition topics. A rare example is Indonesia where the calorific level of canteen meals has been defined in the national labour law (INTERVIEW: INTERNATIONAL LABOUR ORGANIZATION).

Design of nutrition workforce interventions

Providing a global framework and guidance, allowing for context-specific localisation of interventions and being cognisant of employee needs and practical limitations are key. Interviewed companies mentioned that creating ownership and building management capacity are crucial for the sustainability of such programmes. A high-level internal champion helps to create management buy-in to identify the budget that is needed for implementation. Several global companies that rolled out

their workforce programmes highlighted the importance of providing sufficient flexible global framework and guidance to allow each country business to develop locally appropriate activities that are adapted to the context and can resonate with local employees (**Cargill, Unilever, Groupe Bel**).

Groupe Bel, a French cheese producer, initiated a pilot in Egypt, France and Morocco to improve the nutrition of 3,000 employees. To accommodate the different country contexts and priorities, a toolkit was developed that proposed a menu of activities in four different intervention areas (nutrition education, physical activity, infrastructure and breastfeeding support). The company's country offices were asked to select at least one activity per area to tailor the workforce nutrition programme to the context. In practice, it appeared that interventions that were considered optimal from a nutrition point of view may not be easy to implement due to cultural or context-specific preferences. For instance, the French team considered breastfeeding to be a personal choice in the private space of employees; they opted to support breastfeeding women but not to promote breastfeeding in the workplace, for example, by using promotional posters that could offend women who had made a different choice. The Morocco team chose to enhance the quality of canteen meals. The Egypt team preferred private nutrition consultation sessions (INTERVIEW: GROUPE BEL) (Case study 16).

Employees and managers jointly designing programmes helps incorporate practical limitations in terms of cost and time allocation of the workforce and enhances the feasibility of implementation.

Marcatus QED, a global supply chain company, integrated inputs from their field officers early in the design process to ensure that the Unilever and GAIN behaviour change modules were designed to fit the very short and intense gherkin cultivation period in India (INTERVIEW: MARCATUS QED; Case study 19).

Types of workforce nutrition interventions

Amongst other ideas that are emerging, the types of nutrition interventions that companies propose to their employees or others who they may work with can be categorised as follows:

- Nutrition education/social and behaviour change communication.
- Breastfeeding promotion and protection.
- Crop diversification measures, including vegetable gardens.
- Provision of nutritious foods or micronutrient supplements.

Raising nutrition awareness was the most commonly mentioned intervention for this review, though frequency and quality of such vary hugely.



PATH/Satvir Malhotra

Nutrition education and behaviour change communication

All companies interviewed reported that they had implemented activities to improve employee awareness around nutrition. However, there was variation in the interventions' quality, frequency and depth.

The **Nigeria SBN** reported that some local Nigerian companies included nutrition messages in the annual health and wellness fair or organised one-off cooking demonstrations (INTERVIEW: SUN BUSINESS NETWORK NIGERIA). **Unilever**, with its partners **Marcatus QED** and **GAIN**, developed the Seeds of Prosperity programme, which uses a behaviour change approach. The programme consists of a five-week nutrition module, followed by a four-week hygiene module (INTERVIEWS: GAIN, UNILEVER, MARCATUS QED; Case study 19). The training is based on Unilever's behaviour change approach (called Five Levers of Change), which has been very successful in promoting handwashing-with-soap behaviour (Unilever, 2011).

A common challenge was mentioned by a number of the respondents: Time is money; taking 30 minutes out of the working day impacts the productivity targets of workers and requires additional time investment of field agents.

Sustained impact of behaviour-change activities depends on the quality and implementation frequency of the interventions. Although a one-off event may increase awareness, it may be unlikely to catalyse sustainable behaviour change.

Breastfeeding promotion and protection

Most companies offer maternity protection measures that are required according to the country's labour laws, such as maternity leave and a place and time for lactation breaks. In general, these measures are mostly insufficient to support exclusive breastfeeding for a child's full first 6 months and continued breastfeeding from 6 months through 2 years, as per WHO and UNICEF recommendations.

Several organisations, such as **UNICEF** and **Alive & Thrive**, have been working with companies to improve the implementation of their breastfeeding policies. UNICEF found that just following national legislation did not always lead to the expected result. Making the bottlenecks visible allowed the company's management to take additional measures and enabled working mothers to continue breastfeeding (**Text Box 7.1**).

Text Box 7.1. Improving continued breastfeeding, UNICEF-Kenya

United Nations Children's Fund (UNICEF)-Kenya partnered with a multinational company that was strictly following national maternity protection regulations. An independent assessment revealed that most female employees stopped breastfeeding after returning to work after 14 weeks of maternity leave. As per legal requirement, the company offered optional flexible work to allow women to breastfeed their babies, but the company kept the women's productivity targets identical to those of other workers. In practice, women could not afford to choose the flexible work option as it came with a lower salary. Furthermore, distance to the child care centre made it hard for mothers to breastfeed during working hours. The company's management agreed that having the policies in place was not enough and that more should be done.

To solve the challenges to improving continued breastfeeding, the company's management proposed to bring the child closer to the mother. It introduced two child care centres and ensured that lactating women out in the field were close to these. UNICEF started to show social and behaviour change communication (SBCC) videos during lactating breaks. In addition, UNICEF is implementing SBCC activities in the community and currently identifying additional child care possibilities through informal women's groups. The company is carrying out a cost-benefit analysis to estimate the impact of breastfeeding on reduction of absence due to sick leave (INTERVIEW: UNICEF; Case study 15).

Alive & Thrive worked in Vietnam with the Department of Women's Welfare and the Vietnam General Confederation of Labour to implement a workplace lactation support programme in 70 workplaces. The programme and the government collaboratively developed a toolkit that provided practical advice to companies on costs and characteristics to set up a lactation room (Alive & Thrive, 2014).

Crop diversification measures

A few companies reported that they had stimulated their employees or the employees of their suppliers to grow vegetable for their own consumption—with an aim to improve dietary diversity as well as economic resilience.

In Madagascar, **Symrise** collaborates with **Save the Children** to provide mother and child nutrition training and initiate vegetable gardens (INTERVIEW: SYMRISE). In Malawi, access to a diversified diet is obtained, amongst other measures, by providing additional vegetable portions to tea workers at the estate and by establishing vegetable gardens to increase consumption by the farmer families (Malawi Tea 2020, 2016).

The Malawi Tea 2020 programme is led by a multi-sectoral coalition of producers, trade unions, large international buyers, certification agencies, NGOs and donors. It has committed to providing better nutrition for farmers and families as one of the 40 intervention areas of this living wage programme. Starting in 2017, the tea workers (approximately 50,000) were provided with more nutritious midday meals, which consisted of maize flour that had been fortified with iron. The workers also received weekly vegetable portions. In several estates, kitchen gardens or women's clubs have been initiated to grow vegetables and encourage their consumption at the household level (Malawi Tea 2020, 2016).

One of the key challenges is that dietary diversity is not easy to measure. Furthermore, the impact of kitchen gardens on access to nutritious foods and dietary diversity remains to be demonstrated.

Other measures that have been mentioned are the provision of seeds and other agricultural inputs to stimulate crop diversification; these improve food security and economic resilience of farmers working in global supply chains.

Symrise, in Madagascar, offers interest-free rice loans to its vanilla farmers, which help to reduce the 'lean' season. This period of three to four months prior to the rice and vanilla harvests is characterised by food insecurity and low dietary diversity. These result in increased vulnerability to malnutrition. By ensuring access to the staple food of the vanilla farming communities, Symrise helps to address both food security and financial security, as the farmers are not forced to sell their vanilla harvest early at a lower price. Distribution of the rice and pay-back can be time-consuming; hence, Symrise has partnered with a farmer's cooperative that takes on these tasks (INTERVIEW: SYMRISE; Case study 18).

Provision of nutritious foods or micronutrient supplements

Companies with canteens where employees can get a meal either for free or for discount offer an opportunity to make the recipes and menus more nutritious or offer a healthy choice. Most of the MNCs apply such an approach in developed countries or offer free healthy snacks such as fruits during meetings (**Cargill, Unilever, Marks and Spencer**). In developing countries, there are some examples of provision of more nutritious foods, notably by using fortified foods (**Malawi Tea 2020, Business for Social Responsibility [BSR] and GAIN**). However, it remains challenging due to

prohibitive costs, food safety and lack of canteens or kitchens—all of which were mentioned by companies.

There is evidence that better nutrition, notably improved iron status, could lead to higher productivity (Haas and Brownlie, 2001). However, only **the BSR-GAIN** project in Bangladesh mentioned the weekly provision of iron supplements to female workers of reproductive age.

Business for Social Responsibility (BSR) and GAIN, in a pilot project, worked with factories in the Bangladesh garment industry to ensure hot lunches were nutritionally enhanced with fortified foods such as iodised salt, iron-fortified rice and vitamin A-fortified oil. This was done along with training of peer educators and social and behaviour change communication related to anaemia, hygiene and infant and young child feeding practices. Female workers were given once weekly iron-folate supplement in hot meal factories and twice weekly in non-hot meal factories. Though there has been significant reduction in anaemia in the two intervention factories, the provision of nutritious hot meals was found to be complex in the two pilot factories. Moreover, most garment factories in Bangladesh do not have a canteen. However, the knowledge on healthy diets, nutrition, hygiene and child feeding is scalable and replicable at the community level. In terms of cost, time and feasibility of improving iron status, supplementation represents a cost-effective intervention (INTERVIEWS: BSR AND GAIN).

In urban Kenya, UNICEF observed a few very progressive examples of workplace breastfeeding and maternity protection programmes offered by businesses that compete for higher-educated personnel (INTERVIEW: UNICEF).

Safaricom provides an extensive package to recruit working mothers by offering child care run by child care professionals at no charge, on-site medical care if children fall sick, a mother's room for expressing milk and breastfeeding, medical insurance for antenatal care and delivery, free immunisation of children up to 9 months of age and healthy choices in the cafeteria where her child can join her for any meal (Safaricom Telecommunications Kenya and International Finance Corporation, 2017).

Evidence for nutrition impact on employees

In developing countries, evidence of nutrition impact of interventions in the workplace is scarce, with the exception of evidence for iron supplementation resulting in higher productivity (Haas and Brownlie, 2001). Workplace nutrition interventions in developing countries have only developed over the past four years and have not yet resulted in documented impact. There are few companies that would invest in a survey to measure nutrition benefits of their workforce programmes. Also, most workforce programmes consist of other elements besides nutrition—making it difficult to attribute impact to the nutrition intervention specifically.

Unilever's Lamplighter programme has shown measurable positive impacts on numerous indicators and estimated a positive return on investment, but there has been no information that is related to nutrition indicators. Positive impact of a behaviour change intervention was measured in a pilot carried out by **Unilever** and **Marcatus QED**. It showed an increased dietary diversity score of Indian gherkin farmers (INTERVIEWS: UNILEVER, MARCATUS QED; Case study 19).

Though this review has not found any direct records of employee perceptions, workforce nutrition interventions may offer important labour benefits. Some respondents mentioned the importance that workers attached to the quality and attractiveness of food in the canteen; however, there was a risk that lack of hygiene could lead to food contamination and result in serious health complaints.

Role of other actors

All workforce nutrition case studies in developing countries presented in this report were initiated because of a public-sector organisation. This is not only the case for local SMEs but also for MNCs. Companies indicated that they lacked the internal capacity and required external technical nutrition support to assess needs, develop interventions or build the capacity of their staff in this area.



PATH/Nguyen Ba Quang

Since 2013, N4G and SBN have successfully advocated with businesses to improve the nutrition of their workforce in developing countries—though more needs to be done. At the same time, GAIN started working with organisations that focus on improvement of livelihoods and working conditions (e.g. IDH or BSR) and providing technical support in the development of relevant nutrition interventions.

The Government of the Netherlands, through its Social and Economic Council, develops sectoral agreements on international responsible business conduct. These address risks related to health, food safety and food

security of the labour force for Dutch companies working, for instance, in the garment and textile or food sector (Social and Economic Council, 2017).

Large global actors act as role models and catalysts for an entire supply chain. Unilever plays this role in the tea sector, since 12 percent of all tea produced in the world is procured by them (INTERVIEW: UNILEVER).

Technical nutrition agencies (such as NGOs, GAIN and UNICEF) should advocate for integrating nutrition in workforce programmes in developing countries and create stakeholder alliances per industry sector or supply chain to obtain impact at scale.

Key findings

Workforce nutrition has been a new focus area since 2013 in both industry and agribusiness sectors in developing countries, for which there are few good examples and limited evidence.

What works for business?

Advocacy and technical support by public sector nutrition organisations have led to integration of both under- and over-nutrition interventions into existing occupational safety, health or livelihood programmes of international companies in LMICs. A voluntary, minimally intrusive situational assessment of workers' nutritional status (e.g. body mass index) and workplace policies makes the issue visible to management and helps to develop a context-specific programme. To roll out a programme to multiple countries, companies require support from an internal champion and a

flexible global framework that allows for implementation of small, doable and locally relevant actions. Nutrition behaviour change interventions are implemented by all companies (MNC or SME), though quality, frequency and duration of the interventions vary widely. Many companies also support working mothers who want to continue breastfeeding by providing lactation rooms and breaks, most often in compliance with maternity protection legislation. Only one organisation provided weekly iron supplementation despite the cost-effectiveness of this intervention and the supporting scientific evidence of impact on workers' productivity.

What does not work for business?

Nutrition as a standalone issue has little relevance for companies, as they are rather concerned with the conglomerate package of issues to address, of which nutrition is only a part. Cost, time and complexity of implementation were mentioned as the main challenges by local companies that had limited cash flow and operated in highly competitive environments. These challenges pertained especially to interventions that aimed to increase access to nutritious foods (e.g. enhanced canteen menus with fortified foods, and crop diversification by vegetable gardens on-site or at home). Most local or even larger international companies did not have the expertise to develop or implement workforce nutrition interventions and needed to rely on external technical support.

Evidence for business viability

MNCs invest in workforce health and nutrition because of the positive impact on their bottom line, in terms of reduced employee absence, increased employee retention and increased workers' motivation and performance. Global supply companies aim to strengthen economic resilience of local farmers to create farmers' loyalty to them. Many of the smaller and local companies in developing countries, however, face cash flow problems; therefore, they look to maximise their profit by keeping their workforce costs as low as possible. Nutrition benefits would therefore need to be factored into productivity metrics in order to justify their costs.

Evidence for nutrition impact

Except for scientific evidence related to the impact of iron supplementation on productivity, there is no published evidence for any nutrition workplace intervention. Several organisations aim to address this gap and provide such impact data.

Gaps in knowledge

With such a thin evidence base, many key questions around nutrition in the workforce are yet to be answered. A few of them are below:

- What is the target population? Also, what is the objective of tailoring interventions?
- Which metric should be used to measure dietary diversity?
- Can one influence child nutrition with intervention in the workplace?
- How does one integrate nutrition in occupational health?
- Which interventions are most effective, and what will be the return on investment?
- Is the objective to impact productivity or to increase employee satisfaction to retain workers and reduce turnover, thereby reducing recruitment and training costs?

For governments and industry associations, the questions are how to translate this development into supportive policies and strategies. A structured and systemic learning agenda is needed to progress this new area of work and successfully and sustainably engage the private sector.

Chapter 8: Lessons Learned and Recommendations

Where do business and nutrition meet?

Failing food systems and markets that lead to massive under- and over-nutrition point to the urgency of finding better ways for both the public and private sectors to increase access to nutritious foods and establish collective norms and preferences for healthy eating habits. Historically, the private sector has played a marginal role in addressing under- and over-nutrition at scale because of market failures and challenges along the value chain, which limit profitable markets for products that contribute to better nutrition, especially markets that reach the poor and most vulnerable. There are some examples, however, of companies attempting to do so. This review has analysed ongoing and potential engagement of businesses along seven different pathways to learn lessons on what worked, what did not work, what the evidence is, where the knowledge gaps are and what opportunities exist for business, but also for other actors, to accelerate better access to nutritious foods and healthy diets for vulnerable populations.

For this report, MQSUN+ interviewed 85 people who represented 65 organisations, of which 33 were for-profit businesses, 22 development organisations, 6 donor agencies and 4 research organisations. Of the 33 businesses, 17 were MNCs, 7 regional companies and 9 SMEs. Overall, MQSUN+ contacted 126 organisations, of which 50 percent did not respond or could not be reached due to lack of contact details.

Public sector engagement with business is the new normal. Over the past five years, donors and NGOs frequently have solicited businesses for commitment and engagement in improving nutrition through the EAT Forum, *Every Woman Every Child*, the New York City Food Tank Summit, Zero Hunger, N4G, SUN Global Gathering, World Economic Forum, Global Agri-business Alliance and New Alliance for Food Security and Nutrition.

Multinational food and ingredient companies especially, but also increasingly agribusiness, are genuinely committed to addressing complex nutrition issues not only out of social motives but also because they see future market opportunities. At the country level, the larger food processing companies—especially those fortifying staple foods—and some inspired SMEs are stepping up. However, most SMEs are less clear about where opportunities lie for them and about the expectations of national government or other nutrition partners.

The seven pathways for business engagement in nutrition that have been developed for this report differ in level of maturity, level of financial investment, level of engagement and support from public sector partners, and coordination and agenda setting for learning; therefore, the strength of evidence about each of the pathways also differ. Key findings and opportunities for each pathway have been discussed at the end of Chapters 5, 6 and 7. This chapter aims to discuss higher-level lessons learned, opportunities and recommendations for businesses and other actors.



PATH/Evelyn Hockstein

What works well in business engagement?

Joining forces

Where markets do not already offer access to affordable, nutritious foods to the poor, PPPs can help to engage businesses in nutrition solutions. Partnerships work to engage businesses in nutrition issues in LMICs, which they would not address on their own account; this was the conclusion in the ATNI 2016 report.

It may be due to the nature of the sample for this review, which attracted respondents who were likely already sensitised, that over 90 percent of all 33 businesses interviewed, MNCs and SME alike, were engaged in a nutrition partnership with an NGO, with the UN or with another type of nutrition organisation: Most MNCs partnered with international nutrition organisations (e.g. **DSM-WFP**). MNCs also partnered with or supported individual SMEs with technical assistance (**Ajinomoto-VALID Nutrition**) or bundled their expertise in alliances to support local SMEs (**Postharvest Loss Alliance for Nutrition, Partners in Food Solutions, Global Cold Chain Alliance**). It must, however, be noted that there may have been a selection bias in this review because MQSUN+ predominantly identified companies that worked in partnership with other agencies.

De-risking private sector investment

Donor-driven investments (e.g. by the **Global Agriculture and Food Security Program's Private Sector Window, Africa Enterprise Challenge Fund, AgDevCo, Gates Foundation**), business support mechanisms (e.g. **SPRING Accelerator, Marketplace for Nutritious Foods**) and multi-stakeholder platforms, (e.g. **Amsterdam Initiative against Malnutrition**) addressed lack of access to finance for risky investments in new untested business models or for strengthening market systems. As such, they have supported local SMEs to stimulate nutrition-focused businesses and to reach rural smallholder farmers with appropriate services and low-income consumers with affordable nutritious products. Though these mechanisms seemed to have been effective in supporting private sector investment in nutrition, to the knowledge of the researchers, there has not been any assessment of the nutrition impact of these mechanisms, nor has there been a measure of the aggregate commercial viability and sustainability over time of the businesses they supported.

National business and nutrition platforms

So far, 15 countries have set up their own private sector networks under the SUN Movement, and 7 more countries are developing theirs. These platforms advocate for private sector engagement in nutrition, bringing local companies to the table that may not have considered nutrition as a viable opportunity and facilitating a constructive dialogue between government, the private sector and NGOs. Though the impact of these platforms is yet to be evaluated, they offer opportunities for more investments in nutrition-oriented business, to establish partnerships and to create a conducive enabling environment.

Vertical integration

The pathway analysis showed that many companies were strengthening their supply chains through deeper engagement with agricultural suppliers. For instance, agricultural input suppliers provided extension services to farmers to create loyalty and build markets (**BASF, Rijk Zwaan**). Additionally, supermarkets and food processors provided inputs and technical advice to smallholders and farmer groups to ensure quality and reliable supply of produce and reduce costs by eliminating steps in the supply chain (**Pearl Dairy, SPAR**). Vertical integration in the supply chain has the potential to increase

supply and decrease costs of nutrient-rich foods, which would contribute to improved access and affordability; however, this often requires specific investment with support of public sector actors in awareness raising and promotion of consumption of these foods.

Shared resources

Local SMEs or smallholder farmers often cannot access technology because it is too costly for them individually or not efficient if a technology is used infrequently. Joint investments, leasing agreements and 'pay-as-you-use' business models offer opportunities to share and bring costly technologies within reach, for instance in packaging (**Cooperative Central Gaúcha Ltda, Brazil**) and in cold chain storage facilities (**Cold Hubs, Nigeria**). As above, a specific nutrition lens is required to ensure that improved productivity and loss reduction indeed leads to increased access to and consumption of perishable, nutrient-rich foods by low-income rural and urban consumers. Where companies lack this nutrition perspective, collaboration with technical nutrition agencies is required.

Proximity solutions

Due to poor infrastructure and geographical challenges, many SMEs, smallholder farmers and urban and rural poor consumers are hard to reach with services or products. Proximity sales and distribution networks increase access to healthy foods and other products to these vulnerable communities and provide income to the sales force (**BRAC, Shakti Ladies, Sharing Cities, Living Goods**). Proximity service solutions, such as for near-farm mobile processing or mobile cold chain units (**Alyx Limited in Nigeria**), also greatly increase access to services that otherwise are out of reach for smallholder farmers. Mobile phone-based trading platforms link suppliers of agricultural inputs, technology and information with smallholder and rural SME buyers (**GSMA, M-Farm**).

Innovative use of existing technology

Simple innovations and applied use of innovations help to create access to information, to a market or to technology that greatly improves the quality and yield of production of nutrient-dense foods by smallholder farmers and processors; they potentially can lead to improved access to these foods for consumers (**mNutrition-GSMA, icheck-BioAnalyt, Kenya M-Farm online marketplace, solar drying technology-Shell and Wakati**). Donor-driven business incubators or multi-stakeholder platforms, (**SPRING Accelerator [United Kingdom], Africa Enterprise Challenge Fund [United Kingdom], Amsterdam Initiative against Malnutrition [the Netherlands], Marketplace for Nutritious Foods [United States]**) have been successful in supporting small-scale businesses that are innovative and aim to reach low-income consumers. Whilst individual companies may be successful, the collective nutrition impact and commercial sustainability of these innovation hubs remain to be determined.

What has not worked well (yet)?

Creating demand for nutritious foods

All food companies (MNCs and SMEs) mentioned that the biggest barrier to their success was the lack of demand for nutritious foods. They felt that the task at hand was beyond their means, as it required three main actions simultaneously: awareness raising about nutrition problems and the benefits of nutritious foods amongst consumers, which the companies considered to be a task for public sector actors; establishment of population-wide norms and preferences for healthy eating and nutritious foods (seen as another task for the public sector); and commercial marketing and promotion of nutritious foods to provide consumers with healthy choices, which the companies were doing themselves. Though some large MNCs chose to invest in generic nutrition promotion where

public action was missing, this was beyond the financial means of most of them and it was not their mandate. Amongst the case studies, this review has not identified successful examples where governments, civil society and companies worked closely together to deliver a comprehensive, consumer-centred and sustained behaviour change strategy around healthy eating and nutritious foods. Historical examples of public sector-led campaigns include the five-a-day campaigns in the United Kingdom and the promotion of fruit consumption in other developed countries, as well as the Indonesian Five-is-Perfect campaign promoting milk consumption. South Korea provides an example of a country with a healthy traditional diet that was preserved through the joint efforts of dietitians and the government (Lee, Popkin and Kim, 2006).

Accessing the poor

Most companies have stated that nutritional quality comes at a cost and that nutritious food products cannot always be produced at prices that are affordable for the poorest of the poor and still are commercially viable. Distributing these products at subsidised cost or for free remains the remit of the public sector, which should leverage private sector expertise in product development and efficiency in distribution.



PATH/Ian Stanley

A market growth strategy that has been used by some companies is to target the income quintiles above the poorest of the poor to establish a market and build brand awareness. The expectation is that, in the long-term, economies of scale will reduce costs and bring the product into the reach of the poorer consumers or allow for a cross-subsidy approach. Some companies such as Happy Cow have taken this approach, but it is not yet clear whether the trickling down effect of this longer-term strategy will necessarily take place and increase purchase of nutritious foods by poorer consumers.

Though proximity distribution networks are being set up to access the hard-to-reach consumers, their commercial viability is not guaranteed. Building effective proximity distribution networks has proven to be time- and resource-intensive, sometimes putting them out of reach of local SMEs. The few success stories are mainly linked to networks that operate at scale and have a varied product basket.

Enabling regulatory environment

There is an opportunity for donors and NGOs to help governments assess and strengthen regulatory frameworks for nutrition impact. In many countries, agricultural policy has focused historically on promoting, incentivising and protecting the production of staple grains to ensure food security, whereas policy elements to incentivise nutrition security—such as subsidies for improved and biofortified seeds, extension services for nutritious crops and the use of government purchasing power to create a market for these crops—are very new and largely unexplored.

Though there is a successful example in mandatory food fortification, there are huge gaps remaining in the regulatory environment that directly impact private sector investment in nutrition. Monitoring and enforcement of compliance with mandatory fortification or food regulation have been called for to create a level-playing field for the private sector or, more importantly, to achieve high coverage and substantial nutrition impact. The situation for micronutrient-enhanced foods for children and women is more delicate. Despite heroic efforts of WHO and Codex Alimentarius Commission to clarify product standards and guidance on marketing, interpretation varies widely from country to country

and from nutrition expert to nutrition expert. This creates uncertainty amongst MNCs and SMEs alike, and adds to the risk of investing in children's and women's nutrition.

The Global Panel on Agriculture and Food Systems for Nutrition highlights the role of governments in ensuring a high-level dialogue with the private sector to align national food systems with the public health goal of healthy diets for its population (Global Panel on Agriculture and Food Systems for Nutrition, 2017, 2018). Moreover, it recommends that governments establish clear product standards and marketing guidelines; invest in monitoring of compliance; invest in agricultural policies and research for nutritious foods; use taxes to discourage the marketing and purchase of unhealthy foods; and provide subsidies to promote the marketing and purchase of nutrient-rich foods.

Evidence for business viability

The business respondents who were interviewed did not like to share information on the viability or profitability of their business models, or even the constraints they face, as they are confidential and of a competitive nature. The arguments presented here have been deducted from the interviews and remain mainly qualitative and anecdotal.

Direct profitability, which is the primary driver for any business investment, seems mainly successful for input suppliers, be it in the agricultural input side (storage bags, cold chain, mobile information services) or in food processing (premix or ingredient suppliers). There is anecdotal evidence from some of the case studies in Chapter 5, that their business models that address supply chain weaknesses are profitable. These successes are not driven by the demand for nutritious foods but by demand for higher profitability for smallholder farmers and processors thanks to agricultural inputs as well as non-nutritious foods. Evidence around effective ways for business to engage in biofortification is still to be generated, as barriers to scaling up biofortified crops through a commercial market still must be addressed.

Food processors stated that the marketing and selling of (affordable) nutritious foods to consumers at the BOP is currently not very profitable due to a lack of demand for nutritious foods and relatively high costs to produce foods with nutritional value and to distribute to poorer, hard-to-reach consumers. Business motivations to engage in improving nutrition or nutritious foods for consumers and its workforce lie more in the long-term contributions to the company's bottom line.

MNCs and large regional companies indicated that they are interested to learn from innovation and engage with partners where there is a perceived future market development opportunity. It offers them the opportunity to obtain insights in a new market and new consumer segments, to develop a network of partners and to improve the quality and reliability of their supply chain. There is a growing sense of responsibility amongst companies, especially MNCs, to do no harm, contribute positively to better nutrition and ensure their products fit in an overall healthy eating pattern. Doing good is not only the right thing to do; it also offers MNCs the opportunity to gain operating legitimacy with host governments, to win the goodwill of consumers and to motivate and retain their own staff.

For large regional and national companies, many of which are family owned, there is perhaps an even stronger sense of social responsibility to help strengthen the society in which they operate and live. Unfortunately, MQSUN+ did not manage to interview this category of companies to verify their perspective.

Small local players (SMEs) are interested in any opportunity to slightly expand their market, build their product portfolio and increase cash flow. They seek to access financial and technical support of public sector partners (for example, through business incubators, such as Marketplace for Nutritious

Foods, which provide SMEs with an opportunity to strengthen and grow their business and get an early competitive advantage in new markets).

The commercial marketing of nutritious foods to low-income consumers often does not lead to profits in the short term. Several MNCs and SMEs have developed hybrid and social enterprise business models (Danone, Africa Improved Foods, Protein Kissée-La) to develop future market opportunities and sustainable supply chains; unlike purely commercial models, these do not have the same negative impact on their profit and loss balance sheet. Hybrid models are either cross-subsidised by another production line within the business, or by serving both the commercial market and the institutional market (e.g., selling in bulk to public sector organisations that distribute the product for free or at subsidised prices to target populations). Social enterprise models, which are driven by a double or triple bottom line (e.g. making profit and having a social impact and/or environmental impact), use commercial approaches to subsidise or cover costs but expect lower-than-market returns.

Respondents agreed that making a profitable business out of selling nutritious foods takes time and patience. Social enterprises indicated that it would take eight to ten years before they would be able to reach the break-even point (point at which revenues cover incurred costs).

The same is true for workforce nutrition programmes in value chains or factories: these need to realise both benefits, in terms of a sustained impact on dietary diversity, as well as a business return on investment in order to justify long-term investments into these programmes.

Evidence for nutrition impact

Strong to medium-strong evidence

The evidence is strong that food fortification can be highly effective in addressing micronutrient deficiencies in developed countries; it also is strong in the case of universal salt iodisation in LMICs. An upcoming meta-analysis confirms this for developing countries; however, it also indicates that there is still unequal access and coverage of these foods amongst the poorest population groups (Hoogendoorn *et al.*, 2016).

Evidence for biofortification (medium strength) is building up, as the entire approach was developed as a structured and centralised learning agenda, driven by the HarvestPlus initiative. Evidence on efficacy and effectiveness trials is available for most biofortified crops (Bouis and Saltzman, 2017).

Weak to no evidence

The development of market-based solutions to improve child feeding in LMICs has started, but these have been relatively few and small efforts. Though efficacy studies show potential impact of the products, only a handful of experiences have been documented. There is an urgent need to build a more solid evidence base for private sector impact on access and consumption of nutritious foods for children and women (van Liere *et al.*, 2017).

Investments in engaging the private sector in the pathways to increase access to naturally nutrient-dense foods and nutrition in the workforce have been too recent to be able to yield any meaningful evidence. Though some of the respondents on workforce nutrition indicated that they were collecting data to generate evidence for its impact, there are many questions open as to the most appropriate indicators and metrics.

Structured learning agenda

Out of the seven pathways discussed in this review, only two (the food fortification and the biofortification pathways) had a structured learning agenda—mainly because these two initiatives have achieved a certain maturity. Moreover, they were driven by the public sector, and the private sector became one of the key partners. The other pathways would benefit from the development and central coordination of a more structured and systematic learning agenda that would allow for more rapid progress and generation of evidence.

Across the seven pathways, the key challenges for which evidence needs to be strengthened are about demand creation, distribution and affordability, as well as creation of a sustainable business model. The questions that need to be answered include, amongst others:

- How could demand be created for uptake and consumption of nutritious foods in a cost-effective way amongst low-income consumers?
- How could supply-chain efficiencies be increased to make these foods affordable for the poor and encourage more companies to apply efficiencies to end-user pricing rather than profits?
- Which distribution approaches are most effective and efficient in reaching the poor in rural, peri-urban and urban areas?
- How could governments, civil society and donors support business to create demand for nutritious food categories, whilst avoiding conflicts of interest around branded promotion and competitive advantage for companies? What is the most cost-effective way to create nutrition awareness at large scale amongst populations?
- Which policies and legislation need to be in place to create an enabling environment for a market for nutritious foods or to stimulate companies to set up workforce nutrition programmes?
- Which interventions are most cost-effective to improve nutrition of employees in the workplace and across agricultural supply chains?
- Which metrics are most appropriate to measure nutrition impact of business engagement in this area?
- Which metrics are most appropriate to establish whether solutions are commercially viable and sustainable, and over which period?



PATH/Evelyn Hockstein

Opportunities and recommendations

Multinational and larger regional/national companies

Nutrition-sensitive and inclusive supply chains

Companies could invest in their global supply chains: making them more inclusive, building capacity of smallholder farmers and local SMEs, offering contracting agreements, applying a nutrition lens and promoting production and consumption of nutritious foods. They could include nutrition considerations for low-income consumers in their product development processes and promote the use of biofortified seeds, crops and foods, as well as invest in improved nutrition for their own workforce throughout the supply chain.

Innovative business models

Companies could set up hybrid business models that allow for cross-subsidisation by more profitable product lines, or that serve both the commercial as well as the institutional public market. Companies could also develop or invest in new social enterprise models, which are better adapted to the low profitability of the nutritious foods business in low-income markets, which would allow for tighter margins and a longer break-even period.

Joining forces

More companies could bundle their expertise in global alliances (such as the Postharvest Loss Alliance for Nutrition, Partners in Food Solutions or the Global Cold Chain Alliance) to share this expertise with local SMEs as part of their CSR strategy or future market development initiatives. Joining efforts and sharing lessons learned at the global level, through the SUN Movement or in national or regional business platforms, and creating regional expertise and training hubs would expand access and enable many more SMEs to build their capacity and strengthen their businesses in terms of business planning, product development, food safety and quality, marketing and distribution strategies.

Demand creation

Food companies could join forces with each other, with national governments as well as with NGOs to invest in innovative, consumer-centred, large-scale, sustained behaviour change campaigns. Such collaborations could use consumer insights and lessons from commercial marketing campaigns to change social norms and practices regarding eating healthy diets and dietary diversity—creating demand for naturally nutrient-rich, as well as fortified foods. These efforts are needed in addition to branded promotion campaigns, which is the usual remit of food companies. Promoting products that are convenient and tasty (according to cultural preferences), as well as nutritious, will perform better in the market over products that are branded solely as ‘nutritious.’

Learning agenda

Companies, together with donors and research institutes, must invest in a more structured learning agenda to generate evidence of the nutrition impact, as well as business viability, of their efforts. Anecdotal evidence is not sufficient to progress this important area if meaningful contributions to the Sustainable Development Goals are to be achieved.

Government engagement

Companies need to engage with government authorities from the early stages onward to ensure alignment of their efforts with national nutrition strategies, policies and guidelines. Companies may jointly advocate with nutrition agencies for a nutrition-enabling regulatory environment, such as duty-free importation of premix, establishment of product standards and marketing guidelines that are aligned with international guidelines and strengthened monitoring and enforcement of these.

Small and medium-sized local companies*Partnerships and networks*

Local companies (SMEs or cooperatives) that wish to strengthen their business operations and increase their access to technical and financial support whilst contributing to improve nutrition in their country could join the SBN, if existent in country, or join forces with global partners, either MNCs or NGOs. Companies that respect labour laws and government regulations, keep audited accounts and pay their taxes will find that they have easier access to partners who are willing to invest money, time and effort.

Innovative business models

Businesses could take the reality of smallholder farmers and SMEs into account and innovate by developing shared-resource business models (lease or pay-as-you-use), employing proximity solutions (on-farm processing or near-farm storage) that use low-tech approaches (hermetic storage bags, milk collection cans) and existing resources (refurbish vans into cooling trucks), and adapting high-tech solutions to local needs (solar energy or mobile phone solutions).

Market segmentation

Companies could use insights in consumer and market segments and differentiate their business approach. Targeting better-off, elite, young populations or other early adopters may be a smart marketing strategy to penetrate quickly, whilst more sustained efforts are needed to convince lower-income consumers and to develop affordable products. Starting with middle-income consumers to build business viability and working down to lower-income consumers over time is an advisable strategy.

Recommendations for donors*Convenor and stimulator*

Donor governments have been successful, and could continue, in their role as convenor and stimulator of private sector solutions by financing innovation engines such as the Africa Enterprise Challenge Fund, Amsterdam Initiative against Malnutrition, Marketplace for Nutritious Foods and SPRING Accelerator, with SBN as broker. These initiatives require a nutrition lens to be applied to each investment and the inclusion of a structured learning agenda to generate evidence on the nutrition and business impact of all investments collectively. These mechanisms could also be used to drive technology innovations. Moreover, a much greater effort could be put into dissemination and replication of viable models. Whereas much effort goes into demonstration pilots, their scale up and replication generally do not happen automatically, as these bring new challenges that require additional support. These challenge can be overcome through partnerships with national ministries of agriculture and science and technology. Donors could be patient and allow these investments ample time and an iterative development, as well as testing to happen at the right scale.

Leadership towards systemic and at-scale change

Whilst stimulating individual business engagement, it is only by overcoming the systemic obstacles of lack of demand, lack of trust and lack of good governance that these innovations will start bringing impact at scale. Robust leadership within the nutrition sector is required: the United Kingdom and other donor governments, through the SUN donor group, need to convene and motivate innovation and collaboration between private and public sector actors as equal partners. They need to take a market systems approach and provide national governments that grapple with these issues with support in creating an enabling environment and investment climate for nutrition-focused businesses. It is particularly important to ensure a fact- and evidence-based, transparent dialogue between opposing and unusual partners—even if this creates uncomfortable discussions. Progress can only be achieved when differences are accepted, a common objective is agreed upon, compromises are made and concrete iterative steps are taken.

Innovating investment

At-scale systemic changes require at-scale investments. Though access to finance was outside the scope of this report, it has become clear from interviews with companies that de-risking private sector investments is a necessity for them. The public sector has made pre-competitive investments in research and product development in biofortification and large-scale fortification. To accelerate the deployment of commercial solutions to increase access to and consumption of nutritious foods,

innovative finance could be used to encourage private sector co-investment in research and product development, in volume guarantee schemes for local producers, in innovative solutions to supply chain weaknesses and in creating population-wide norms around healthy eating and stimulating demand for nutritious foods.

Recommendations for governments

Enabling environment

Governments' key mandate is to ensure appropriate policies, strategies and guidelines that provide a favourable and fair environment for all private sector companies, especially SMEs that want to invest in nutritious foods; these include clear product standards, marketing guidelines, legislation (including for workforce nutrition), monitoring and enforcement of regulation or preferential taxation schemes for fortificants. Governments are also responsible for creating a favourable investment climate for businesses, through their agriculture, trade and industrial policies—for instance, differentiating between commercial and social enterprises, especially regarding taxation.

Convenor

Governments can support the establishment of business nutrition platforms, such as the SBN, in countries where these do not yet exist. Governments can take a sector-wide approach to establish agreements or covenants with the food sector, or any other sector, to address health and nutrition risks of their consumers through their products, as well as health and nutrition risks of their workforce through specific workplace policies.

Local procurement

Governments could set nutritional guidelines for the procurement of foods for institutional demand (i.e. school feeding, social safety nets) to stimulate the local commercial market by sourcing locally—both inputs and final product. Governments can also work with NGOs to set up voucher systems and strengthen existing commercial retail channels to distribute these foods.

Shifting social norms

Governments, in partnership with NGOs and the private sector, could invest in innovative, consumer-centred, large-scale, sustained behaviour change campaigns. They can use consumer insights and lessons from commercial marketing campaigns to change social norms and practices regarding eating healthy diets and dietary diversity. Thus, they can create demand for naturally nutrient-rich as well as fortified foods.



PATH/Evelyn Hockstein

Recommendations for nongovernmental organisations

Bridging the gap

NGOs or technical agencies must take an active role to broker between government and the private sector. They could continue to support SMEs in developing nutrition-oriented business plans, linking them to local markets as well as global partners to strengthen their capacity or integrate them in global supply chains.

Replication

NGOs, managing grant mechanisms, innovation platforms or accelerators, and those providing technical assistance to businesses that engage in nutrition must ensure widespread sharing of lessons, broad uptake, scale up and replication of successful case studies.

Shifting social norms and demand creation

The primary role of NGOs and Civil Society Organisations (especially consumer organisations) is to hold governments and businesses to account—to demand transparency and equitable investment of resources. But they can also collaborate with governments and companies to develop and implement innovative, consumer-centred, and sustained behaviour change campaigns. For these, they can use consumer insights and lessons from commercial marketing campaigns to change social norms and practices regarding eating healthy diets and dietary diversity. Thus, they can create demand for naturally nutrient-rich as well as fortified foods. Sustainability of the implementation of nutrition interventions for workers in global or local supply chains will probably depend on the inclusion of nutrition indicators in a certification scheme, which should be managed by an international NGO.

Recommendations for research*Learning agenda*

The research community must work closely with the private sector to generate evidence and ensure more rapid progress in private sector engagement for better nutrition. They need to coordinate the development and implementation of a rigorous and structured learning agenda for each of the seven private sector pathways described in this report.

Metrics

The research community needs to develop the appropriate metrics and methodologies to measure business benefits as well as nutrition impacts beyond dietary diversity scores in order to capture healthy eating behaviours and adequate uptake and intake of nutritious foods. In workplace nutrition, there is a need to define what the appropriate and measurable nutrition and business impact indicators could be, and which interventions are (cost-) effective. Similarly, whilst many companies have incorporated smallholder farmers into their supply chains, it remains difficult to access data to evaluate how this type of trade is impacting these farmers' livelihoods and nutritional status. The measurement of business and nutrition impacts along the value chain would be an important investment going forward.

Though business engagement in nutrition is a new normal, this is, at large, still a new area of work, with evidence that is only emerging. It has become clear throughout this report that there are no 'quick fixes' to be expected from private sector contributions to improve nutrition of low-income populations. At the same time, the abundance of examples shows the commitment of businesses to play their part and has identified a multitude of opportunities. A systemic and whole-of-market approach is needed to make food systems more nutrition-friendly. All actors are required to work together. Finally, more large-scale, collective efforts, will be needed beyond collaborations between single business and public sector actors.

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Annex 1: List of Interviews

	Company/organisation
1	AACE Foods (Nigeria)
2	Access to Nutrition Foundation
3	Africa Enterprise Challenge Fund
4	Africa Improved Foods Rwanda Limited
5	AgriNepal
6	Ajinomoto Co., Inc.
7	Amway
8	Arla Foods Ingredients
9	BASF
10	Groupe Bel
11	Bill & Melinda Gates Foundation
12	BioAnalyt
13	BoP Innovation Center, The Netherlands
14	Business for Social Responsibility (BSR)
15	Cargill
16	Centro Internacional de la Papa (CIP)
17	Cold Hubs
18	Dangote Foundation, Nigeria
19	Danone
20	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Affordable Nutritious Foods for Women (ANF4W)
21	UK Department for International Development Agriculture Research
22	DSM Nutrition Improvement Program, Nutrition Emerging Markets
23	EarthEnable
24	Emerging Ag
25	Firmenich
26	Forum for the Future
27	GAIN: Amsterdam Initiative against Malnutrition Large-Scale Food Fortification Marketplace for Nutritious Food Workforce Nutrition
28	Global Cold Chain Alliance
29	Global Panel on Agriculture and Food Systems for Nutrition (GLOPAN)
30	Good Nature Agro
31	GrainPro Inc.
32	GSMA
33	HarvestPlus
34	IDH, Sustainable Trade Initiative
35	International Finance Corporation Global Agriculture and Food Security Program's Private Sector Window, Global Agribusiness
36	Inspira Farms
37	Institute of Development Studies (IDS)
38	International Cooperation, Ministry of Foreign Affairs, Netherlands, Food and Nutrition Security
39	International Fertilizer Development Center (IFDC)
40	International Labour Organization
41	Marcatus QED Inc.

	Company/organisation
42	Mount Meru Group
43	Nestlé
44	Nutri'zaza
45	Partners in Food Solutions
46	Power of Nutrition
47	Protein Kissèe-La, Cote d'Ivoire
48	Renata Ltd. and BRAC - GAIN
49	Rijk Zwaan
50	R&D Innovative Solution/AgriNepal
51	Scaling Up Nutrition Business Network
52	Shell Foundation
53	Shreenagar Agro Group, Nepal
54	SPAR
55	SPRING Accelerator
56	USAID's Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING)
57	Supporting Nutrition in Pakistan
58	Scaling Up Sweetpotato through Agriculture and Nutrition (SUSTAIN)
59	Sustainable Food Lab
60	Symrise
61	TechnoServe
62	Tuskys Supermarket
63	United Nations Children's Fund (UNICEF)
64	Unilever
65	World Food Programme (WFP)

Annex 2: Definitions Used

Term	Definition
Healthy diet, nutritious foods	A safe and diverse diet made up of plenty of fruits and vegetables, whole grains, fibre, nuts and seeds, whilst limiting free sugars, sugary snacks and beverages, processed meats and salt, and replacing saturated and industrial trans fats with unsaturated fats (Global Panel on Agriculture and Food Systems for Nutrition, 2016; World Health Organization, 2017b).
Dietary diversity	Different foods or food groups consumed over a period (Ruel, 2003); a qualitative measure of food consumption that reflects household access to a variety of foods and, in some cases, indicates potential nutrient adequacy of the diet of individuals. Dietary diversity questionnaires can be a rapid, user-friendly, easily administered and low-cost assessment tool (Kennedy, Ballard and Dop, 2010). A Minimum Dietary Diversity indicator of four or more food groups out of seven has been internationally recommended since 2008 for infants and young children (World Health Organization, 2008). A MDD for Women, with a threshold of at least five food groups out of ten, is now available (Food and Agriculture Organization & FHI 360, 2016).
Nutrition-specific interventions or programmes	Interventions or programmes that address the immediate determinants of foetal and child nutrition and development—adequate food and nutrient intake, feeding, caregiving and parenting practices, and low burden of infectious diseases. Evidence-based, nutrition-specific interventions for women, such as folic acid supplementation, iron supplementation, calcium supplementation, multiple micronutrient supplementation, salt iodisation and balanced energy-protein supplementation; evidence-based nutrition-specific interventions for infants and children, such as breastfeeding promotion, complementary feeding promotion, preventive vitamin A supplementation, iron supplementation, zinc supplementation and multiple micronutrient supplementation ('Executive Summary of the Lancet Maternal and Child Nutrition Series', 2013).
Nutrition-sensitive interventions or programmes	Interventions or programmes that address the underlying determinants of foetal and child nutrition and development and incorporate specific nutrition goals and actions—for example, food security; adequate caregiving resources at the maternal, household and community levels; and access to health services and a safe and hygienic environment. These can serve as delivery platforms for nutrition-specific interventions, potentially increasing their scale, coverage and effectiveness. Examples: agriculture and food security; social safety nets; early child development; maternal mental health; women's empowerment; child protection; schooling; water, sanitation and hygiene; health and family planning services (Maternal and Child Nutrition Study Group, 2013).
Fortification	Fortification is the practice of deliberately increasing the content of an essential micronutrient (i.e. vitamins and minerals, including trace elements) in a food at processing stage (usually staple foods and condiments; e.g. vitamin A fortified wheat flour, iodised salt, vitamin D enriched edible oils, etc.) to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health.
Biofortification	Biofortification is the process by which the micronutrient content of a food crop is improved through agronomic practices, conventional plant breeding or modern biotechnology. Biofortification differs from conventional fortification in that biofortification aims to increase nutrient levels in crops during plant growth rather than through manual means during processing of the crops. Biofortification may therefore present a way to reach populations where supplementation and conventional fortification activities may be difficult to implement and/or limited (Ruel, 2003). Examples of biofortification projects include: <ul style="list-style-type: none"> • Iron-biofortification of beans, cowpeas, Irish potato, lentils, millet and sorghum. • Zinc-biofortification of wheat, cowpeas, rice, sorghum, lentils and maize. • Provitamin A carotenoid-biofortification of sweet potato, maize, cassava and plantain. • Amino acid- and protein-biofortification of sorghum and cassava.
Agronomic fortification	Agronomic fortification is the application of mineral micronutrient fertilisers to soils or plant leaves to increase micronutrient contents in edible parts of crops. This is a strategy similar to breeding for increased micronutrient content, which can be done prior to harvest. Soil and foliar application of micronutrient fertiliser can be used for several different mineral micronutrients to varying effectiveness.

Term	Definition
	Agronomic biofortification, especially in the case of foliar application, is highly effective for zinc and selenium, whilst also effective for iodine and cobalt. As an effective strategy for reducing micronutrient deficiency, zinc provides one of the best and quickest avenues for agronomic biofortification, particularly within cereal crops (Cakmak, 2014).
Business categories	<ul style="list-style-type: none"> • Self-employed (e.g. farmers) micro-entrepreneurs. • SME (different countries use different definitions mainly based on number of employees). • Regional enterprises that operate across various countries in a region. • MNC: a company that operates internationally, usually with subsidiaries, offices or production facilities in more than one country.
Nutrition-specific business models*	Business models for products or services aimed directly and explicitly at improving the nutrition of target populations (for example, foods, fortified blended cereals, micronutrient powders and biofortified foods).
Nutrition-sensitive business models*	Business models for products or services that can positively impact the nutrition of target populations either directly or indirectly (for example, poultry and dairy production, safe water device suppliers, sanitation supplies, etc.).
Nutrition-sensitive agriculture	Nutrition-sensitive agriculture is a food-based approach to agricultural development that puts nutritionally rich foods, dietary diversity and food fortification at the heart of overcoming malnutrition and micronutrient deficiencies. This approach stresses the multiple benefits derived from enjoying a variety of foods; it also recognises the nutritional value of food for good nutrition and the importance and social significance of the food and agricultural sector for supporting rural livelihoods. The overall objective of nutrition-sensitive agriculture is to make the global food system better equipped to produce good nutritional outcomes (Food and Agriculture Organization, 2014).
Nutrition-supportive business models and processes	Business models and processes within business models that overcome a barrier to nutrition impact, but which are not necessarily aimed at improving nutrition (for example, improving storage and transportation processes can decrease cost and make nutritious foods more accessible to the poor).
Pro-nutrition agricultural policy	Agricultural policies that incorporate nutrition objectives and indicators to measure progress, target vulnerable groups and women and focus on a diversified food production that includes the production of nutrient-dense crops. They include policies interventions to improve processing, storage, marketing and use of nutritious foods.
Workforce nutrition interventions	<p>Any intervention aimed at improving the nutrition of workers and/or their families, conducted by an employer. Categories include:</p> <ul style="list-style-type: none"> • Workplace health and safety (food safety, sanitary conditions). • Health and wellness (provision of nutritious meals, social and behavioural change communication, provision or subsidised sale of micronutrient supplements). • Maternity protection and breastfeeding support (maternity leave and breastfeeding policies, place and time during working hours to breastfeed or express milk and milk storage facilities). (GAIN & SUN Business Network, 2014) <p>Possible workforce nutrition interventions:</p> <ul style="list-style-type: none"> • Nutrition education customised to the target population, including advice on dietary diversity, SBCC on water and sanitation and disease prevention. • Subsidised or free seeds, equipment, fertiliser, etc. for homestead, community or on-farm production of a diversity of nutrient-dense foods. • Provision of nutritious meals. • Access to free or subsidised micronutrient supplements
Corporate social responsibility for nutrition	Any initiative undertaken by a business organisation that explicitly aims to improve the nutrition of a target population outside of the organisations' own staff and suppliers and not as part of a profitable business model.

*These have been created for the purposes of this review.

Annex 3: Summary of What Works

	What worked	What did not work	Strength of evidence	Knowledge gaps
All pathways	<p><u>Multiple partners joining forces increases access to technical support for local SMEs and helps to strengthen an enabling environment:</u></p> <ul style="list-style-type: none"> • Bundling of expertise of global business to support SMEs. • Forging partnerships between business and NGOs. • Creating national business and nutrition platforms. <p><u>De-risking private sector investment by increasing access to financial and technical support increases access to markets and improves the quality and availability of nutritious food products through:</u></p> <ul style="list-style-type: none"> • Donor-funded business incubators or challenge funds. • Innovative finance mechanisms. • Vertical integration into supply chain. <p><u>Smarter use of existing resources and technology for local farmers/SMEs helps to increase the quality and availability of nutritious food products.</u> For instance, through:</p> <ul style="list-style-type: none"> • Pay-as you-use business models (packaging, cold chain). • Innovative use of existing technology to improve quality and increase access to relevant information. <p><u>Proximity solutions help to bring technologies to farmers and nutritious foods to poor people's homes:</u></p> <ul style="list-style-type: none"> • Proximity distribution networks offer access to market products where there is no market and provide adequate information to consumers. • Mobile service solutions can be installed temporarily on the farm to allow processing or storage, reducing food waste prior to bringing it to market. <p><u>Donor and MNC support to create an enabling environment towards strengthened legislation and compliance.</u></p>	<p><u>Creating demand for nutritious foods is a challenging task for businesses, as it involves not only promoting their branded product but also conveying basic nutrition and health messages:</u></p> <ul style="list-style-type: none"> • The latter is not the task of the private but that of the public sector. • Too many messages are confusing for the consumers. • A business may be less trustworthy regarding nutrition advice than the government. <p><u>Reaching the poor with affordable products is another key challenge:</u></p> <ul style="list-style-type: none"> • High-quality, nutritious foods are more expensive than low-quality, low-nutrient-dense foods everywhere in the world. Access to the poorest of the poor requires: <ul style="list-style-type: none"> • Subsidisation of nutritious foods for the poorest of the poor may be necessary to ensure access for them. • Government procurement of nutritious foods to distribute to the poor, against a commercially viable price for the producer. 	<p><u>Strong evidence for efficacy of:</u> all fortified products (staples, condiments, MNPs, biofortified foods and special foods for mothers and children).</p> <p><u>Strong evidence on effectiveness for commercial delivery of:</u> fortified staple foods and condiments.</p> <p><u>Weak evidence for effectiveness of commercial delivery of:</u></p> <ul style="list-style-type: none"> • Naturally nutrient-dense foods. • Fortified foods for children and mothers. • Biofortified foods. • Workforce nutrition in low-income countries. 	<p>Many knowledge gaps remain, both with respect to creating commercially viable and sustainable business approaches to improve nutrition, as well as to the nutrition impact of such approaches. Yet a viable business model is a prerequisite to seeing nutrition impact; it should therefore be the joint priority of public and private sector partners.</p> <p><u>Key knowledge gaps to be filled include:</u></p> <ul style="list-style-type: none"> • What are appropriate metrics and methodologies to measure business benefits and nutrition impact along a complex pathway? • What are the most cost-effective ways to create demand for and distribute nutritious foods amongst the poor at scale? • What is needed to create a favourable enabling environment for business solutions to access nutritious foods?

	What worked	What did not work	Strength of evidence	Knowledge gaps
PILLAR 1: Naturally nutrient-dense foods	<p><u>Vertical integration of smallholders into global supply chains gives farmers access to agricultural inputs and technical advice to improve the quality of produce, increase crop diversity and increase farmers' income, amongst others, by:</u></p> <ul style="list-style-type: none"> • Agriculture input companies that build a market for their seeds, fertilisers, etc. • Retailers who aim to improve consistent supply of high-quality produce. • MNCs or global buyers who aim to procure high-quality raw material for food processing. <p><u>Business models that offer paid services to smallholder farmers that meet their exact needs and resources help to improve the quality of produce, including:</u></p> <ul style="list-style-type: none"> • Temporary mobile on-farm services for cold storage/processing. • Lease or pay-as-you-use services for packaging/ storage. • Mobile information services regarding market prices, best agricultural practices and nutrition. <p><u>Though the primary objective is on production and income, increasingly, a nutrition lens is added to improve food and nutrition security of farmers, including:</u></p> <ul style="list-style-type: none"> • Encouraging the production of nutritious foods for the market, own consumption and sale in local communities. • Conditional clause in contract farming to encourage retention of a portion of nutritious crop production for own consumption. • Adding social and behaviour change communication to technical support. 	<p><u>Most of the initiatives in this pillar remain small in scale; therefore, they reach only small population groups.</u></p> <p><u>Key challenges in this pillar remain:</u></p> <ul style="list-style-type: none"> • Low awareness of nutrition and corollary lack of demand for nutritious foods within low-income populations and lack of incentives for producers to replace staple crops with nutritious fruits and vegetables. • Lack of efficient distribution channels that ensure access to nutritious foods by poor consumers. 	<p>Though there are a good number of success stories on the effectiveness of strengthening the value chain for naturally nutrient-dense foods, <u>there are no data collected to measure impact on nutrition indicators of poor populations.</u></p>	<p>Define appropriate metrics of success regarding business and nutrition.</p> <p>Evaluate aggregate impact of business development and innovation funds or mechanisms on business viability, sustainability and nutrition.</p>
PILLAR 2: Fortified foods and condiments	<p><u>Bundling of expertise of multi-stakeholder partners:</u></p> <ul style="list-style-type: none"> • Creating national food fortification alliances that include government, NGO and business partners. • Bundling global companies' expertise to provide technical assistance to SMEs. • Providing strong donor support for fortification agenda. <p><u>Creating a favourable enabling environment for fortification of staple foods and condiments:</u></p> <ul style="list-style-type: none"> • Many countries adopted mandatory legislation for some foods. 	<p><u>Cost of fortification:</u></p> <ul style="list-style-type: none"> • Companies are not always willing to absorb cost of fortification under voluntary regimes. • Donor subsidisation of fortificants/premixes is happening but requires phasing out. <p><u>Quality and safety compliance remain challenging:</u> Many countries lack an adequate monitoring and enforcement system of the fortification legislation, which induces</p>	<p><u>There is strong evidence for efficacy, effectiveness and reach of fortified staple foods and condiments,</u> though not in all countries and for all staples alike.</p>	<p>What are cost-effective ways of monitoring compliance with fortification legislation?</p> <p>What are cost-effective ways to ensure last-mile fortification by small-scale millers?</p>

	What worked	What did not work	Strength of evidence	Knowledge gaps
	<ul style="list-style-type: none"> Several countries offer a tax waiver/exemption on value-added tax and importation taxes for fortificants and premixes. <p><u>Fortified staple foods (and, to a lesser extent, condiments) are mostly affordable, also for low-income populations:</u></p> <ul style="list-style-type: none"> Fortification cost may be subsidised in the beginning (by the government or a donor). When fortification is mandatory, additional cost may be charged to the consumer but remains limited. For voluntary fortification, the producer absorbs the cost to avoid being at competitive disadvantage. 	<p>food fraud and undermines mandatory fortification legislation.</p> <p><u>Small-scale fortification:</u> Where staples are produced by many small millers, achieving full fortification requires more technical and financial support, and low-tech innovations.</p>		
PILLAR 2: Fortified foods for children and mothers	<p><u>The adoption of social or hybrid business models seems more appropriate than a commercial model for these types of food:</u></p> <ul style="list-style-type: none"> One needs to expect a long-time horizon to achieve commercial viability. Cross-subsidisation of the product may be needed, either by a more profitable product line or a more profitable market. <p><u>The use of proximity distribution models where they already exist helps to reach the poor and provide them with adequate information on the product and other nutrition practices:</u></p> <ul style="list-style-type: none"> Setting up new community networks is very time- and resource-intensive; therefore, it is better to use existing networks. Offering a convenient nutrition solution is attractive to poor consumers who are willing to pay for them. 	<p><u>Producing companies face challenges in immature markets for these foods:</u></p> <ul style="list-style-type: none"> Local supply chains offer low-quality food and sometimes come at higher cost than global supply. Access to finance is difficult. Access to the institutional market is challenging due to competition with global market prices. <p><u>The enabling environment is not always favourable to these types of products:</u></p> <ul style="list-style-type: none"> In many countries, marketing guidelines and product quality and safety standards are not aligned to international standards. Companies are reluctant to enter the space of child nutrition, as they are cautious about reputational risk due to continued discussion on displacement of breastfeeding by these foods. <p><u>There is a lack of demand for special nutritious foods for children and mothers:</u></p> <ul style="list-style-type: none"> Creating demand for these foods is quickly seen as interfering with breastfeeding practices. 	<p>Strong evidence for efficacy and effectiveness of MNPs.</p> <p>Strong evidence for efficacy of nutritious foods for children.</p> <p>The efficacy of affordable products of high nutritional quality is proven; however, this is not the case for effectiveness of distribution via the commercial market.</p>	<p>What are the most cost-effective ways to create demand for and distribute nutritious foods amongst the poor at scale?</p> <p>What is needed to create a favourable enabling environment for business solutions to access nutritious foods?</p>

	What worked	What did not work	Strength of evidence	Knowledge gaps
		<ul style="list-style-type: none"> The dietary diversity message prevails in the public sector; support either is limited or does not exist to create demand for fortified nutritious foods for these groups. 		
PILLAR 2: Biofortified foods	<p><u>The carefully structured learning agenda around biofortification has delivered successes in the development of nutrient-high varieties of several staple crops, has proven the bioavailability of the nutrients in foods and has demonstrated efficacy in improving nutrient levels when consuming biofortified crops.</u></p> <p><u>Regarding business impact, biofortification is still in its infancy:</u></p> <ul style="list-style-type: none"> OFSP is being accepted by consumers in some countries, and used in premium bakery products. Iron-rich beans in Rwanda are accepted by farmers due to higher yields. 	<p>Biofortified seeds need to be produced at scale by seed companies and then taken up at large scale by farmers.</p> <p>There is a need to create demand for biofortified seeds/foods with farmers, food producers and consumers.</p>	<p>Evidence for bioavailability and efficacy of consumption of biofortified foods.</p> <p>Development of staple crops high in bioavailable micronutrients.</p> <p>Efficacy trials have shown good bioavailability of micronutrients and improved nutrient levels.</p>	<p>What are the most cost-effective ways to create demand for and distribute (seeds of) biofortified crops and foods amongst farmers/food producers/consumers at scale?</p>
PILLAR 3: Workforce nutrition	<p><u>MNCs have numerous business drivers to invest in workforce nutrition as part of overall employee well-being:</u></p> <ul style="list-style-type: none"> They aim to create loyalty among suppliers in global supply chains. It increases employee satisfaction and motivation—leading to retention of employees. Strong employee health programmes attract new key talent. It improves nutrition and well-being of employees, reduces absence due to illness and hence increases effectiveness at work. <p><u>Social and behaviour change interventions seem to be the most feasible nutrition intervention for MNCs and SMEs alike, yet impact depends on the design and quality of implementation.</u></p> <p><u>Global guidance allowing context-specific adaptation offers flexibility, which is needed in a business setting, yet may reduce or slow down potential impact on nutrition.</u></p>	<p>Local SMEs in low-income countries face many obstacles, such as relatively high implementation costs and unclear or slow return on investment.</p> <p>The impact on productivity is not measured/not easily measurable.</p>	<p>Global MNCs have evidence of improved health, nutrition and business indicators due to employee health programme.</p> <p>Strong evidence on efficacy of iron supplementation on work productivity in developing countries.</p> <p>There is very limited evidence of nutrition social and behaviour change communication leading to higher dietary diversity score in developing countries.</p>	<p>Define appropriate metrics of success regarding business and nutrition.</p>

Abbreviations: MNC, multinational corporation; MNP, micronutrient powder; NGO, nongovernmental organisation; SME, small and medium-sized enterprise.

Annex 4: Primary Source of Examples by Chapter

Chapter 5 on naturally nutrient-dense foods

<p>Interviews with key informants</p>	<p>AgriNepal – Nepal BASF – global Good Nature Agro – Zambia GrainPro, Inc. – multiple Green Mart/R&D Innovative Solution – Nepal GSMA mNutrition – global Partners in Food Solutions – global Shell Foundation – India SPAR – South Africa Rijk Zwaan – Africa Sunaulo Anda – Nepal</p>
<p>Desk reviews</p>	<p>Agrostar – India Baridi Stores – Uganda Chicken Choice – Kenya (Global Alliance for Improved Nutrition’s Marketplace for Nutritious Foods) ColdHubs – Nigeria Cooperative Central Gaúcha Ltda. – Brazil Happy Cow – Kenya (GAIN for Nutritious Foods) Grameenphone – Bangladesh KickStart International – multiple Kigali Farms – Rwanda Lecofruit – Madagascar M-Farm – Kenya Maziwa King – Kenya Mazzi – East Africa Million Tons of Cold Storage in Africa Initiative – multiple Mozambique Fresh Eggs – Mozambique New Horizons – Mozambique Partners in Food Solutions – global Pearl Dairy – Uganda Pick ‘N Serve – India Tomato Jos – Nigeria Sahelia Solar – Burkina Faso Smart Logistics Solution Limited – Kenya SolarFlex Inc. – Canada Só Soja – Mozambique Truce – India Tulaa – East Africa WFP–ENVIU school feeding partnership – Kenya VetAfrica – East Africa Wakati – Belgium</p>

Chapter 6 on fortified foods

Interviews with key informants	<p>Africa Improved Foods Rwanda Limited – Rwanda Ajinomoto – Ghana and Malawi Arla Foods Ingredients BASF BioAnalyt BRAC-GAIN-Renata Ltd. – Bangladesh Centro Internacional de la Papa Danone – Bangladesh and Indonesia DSM and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Affordable Nutritious Foods for Women (ANF4W) – Ghana HarvestPlus Nestlé Nutri'zaza – Madagascar Tusksys Supermarkets – Kenya</p>
Desk reviews	<p>BOP Innovation Center (BoP Innovation Center <i>et al.</i>, 2012) Danone – Indonesia (Kayser, Klarsfeld and Brossard, 2014) Indofood – Indonesia (van Liere <i>et al.</i>, 2017) NINFood – Vietnam (GAIN, 2015b; Van Liere <i>et al.</i>, 2015; Nguyen <i>et al.</i>, 2016) Protein Kissèe-La – Côte d'Ivoire (GAIN, 2015a) PSI^{xiii} – Madagascar (Reerink <i>et al.</i>, 2017) Tetra Pak and the Favorita Group – Ecuador (Tetra Pak, 2015) Yedent Ltd – Ghana (Van Liere <i>et al.</i>, 2015)</p>

Chapter 7 on workforce nutrition

Interviews with key informants	<p>Breastfeeding at work – Kenya Business for Social Responsibility (BSR) and Global Alliance for Improved Nutrition (GAIN), garment industry – Bangladesh Groupe Bel – global SUN Business Network – Nigeria Sustainable Trade Initiative, cocoa – Côte d'Ivoire and Ghana Symrise, vanilla – Madagascar Unilever and Marcatus QED, tea and gherkin – India</p>
Desk review	<p>Cargill – global (Cargill, 2016c, 2016b) Cargill Cocoa Promise (Cargill Cocoa & Chocolate, 2017) Marks and Spencer, Plan A (Marks and Spencer, 2017a, 2017b) Malawi Tea 2020 (Malawi Tea 2020, 2016) Safaricom – Kenya (Safaricom Telecommunications Kenya and International Finance Corporation, 2017) Unilever, Lamplighter (GBC Health, 2017)</p>

^{xiii} Formerly called Population Services International, the organisation has expanded beyond family planning.

Annex 5: Catalogue of Examples

Naturally nutrient-rich foods

Pillar 1: Private Sector Engagement on Naturally Nutrient-Rich Foods						
Supply/Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Supply-side considerations	Improved access to agricultural inputs	Agricultural and livestock production				
		<p>BASF's Samruddhi programme in India provides extension services to soybean farmers on topics such as seed selection and treatment, planting, fertilisation, protection from insects and disease and harvesting. This is part of the company's marketing strategy. The costs are covered by increased sales of products such as fertiliser. At the same time, farmers benefit from increased yields, improved quality and higher prices for their crops (Hystra <i>et al.</i>, 2014; BASF, 2017). BASF is the largest chemical company in the world.</p>	Multinational	Business development	Sourcing/input	Capacity development
		<p>Rijk Zwaan is a Dutch vegetable-breeding company. It makes long-term investments in developing and marketing context-appropriate vegetable varieties. In Arusha, Tanzania, the company established a breeding station for local hybrid vegetable varieties, such as African eggplant, African kale and Chinese pepper. The company believes that these varieties enable small-scale growers to play a key role in building sustainable food supplies. Crop advisors and product development specialists provide tailored advice to farmers and build brand awareness. The company markets seeds through local subsidiaries and an extensive distributor network. Though the approach may or may not bring a profit at present, the company is investing and pricing their seeds at a premium ('what the market can bear'), expecting future commercial viability. (Case study 4)</p>	Multinational	Business development	Sourcing/input	Affordability and access
		<p>A social enterprise supported by AgDevCo, Kigali Farms markets mushroom substrate to farmers (1,700 to date) and aims to establish button mushrooms as a mainstream component of the Rwandan diet. Farming households consume 35% of the production and sell the remainder in the local community (AgDevCo, 2017). Kigali Farms sources from over 2,000 smallholders. For more information, see http://www.kigalifarms.com.</p>	SME, informal or micro-entrepreneur	Social	Production, distribution	Affordability and access

Pillar 1: Private Sector Engagement on Naturally Nutrient-Rich Foods							
Supply/Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach	
Supply-side considerations		KickStart International sells small-scale irrigation technology to smallholders to increase crop yields and off-season production. Despite its low cost, the technology is still out of reach for many, so two financing options are available: mobile layaway, where farmers make advance micropayments by phone, and 'rent-to-own,' where farmers make a 30% down payment, make small payments over several months and pay it off once they have sold their harvest. They also encourage production of fruits and vegetables. 'On average, each business grows enough fruits and vegetables to feed their own family as well as 9 other families (about 50 people) all year round' (Galvin and Iannotti, 2014; Kickstart International, 2017). This nonprofit social enterprise, supported by the USAID, the Bill & Melinda Gates Foundation and the Skoll Foundation, partners with CARE and Save the Children, amongst others.	SME, informal or micro-entrepreneur	Social	Sourcing/input	Low-tech innovation, affordability	
		Tulaa , a new venture spin-off from the mobile solutions provider Esoko in Ghana, provides farmers with access to inputs and financial services through its mobile marketplace (Tulaa, 2017). Mobile communication solutions facilitate smallholder farmers' access to inputs, technology, extension services and information.	SME, informal or micro-entrepreneur	Social	Sourcing/input	Mobile services	
		AgroStar provides a range of agricultural input products from third-party providers to farmers in India via an mCommerce platform (ImpactPreneurs, 2017). Mobile communication solutions facilitate smallholder access to inputs, technology and information.	Large regional or national company	Commercial	Sourcing/input	Access and mobile services	
	Mobile technology facilitates farmers' access to information and other inputs	The VetAfrica app is a decision support system for farmers, animal health workers and veterinarians. It provides diagnostic information on animal disease and appropriate treatments, allowing farmers greater access to veterinary services to make more informed decisions and keep herds and flocks healthier—ultimately improving yields and making animal-sourced products more available on local markets. In Ethiopia, the app identified 80% of cattle diseases and provided advice that matched the professional assessment in 70% of cases (Revie, 2015; Microsoft, 2017). Scottish software company and Microsoft Innovation Grant winner Cojengo developed the tool.	SME, informal or micro-entrepreneur				
		The GSMA mNutrition Initiative has implemented value-added services through its mAgri platforms, aiming to impact nutrition in 13 countries by providing a platform for subscribing farmers to access relevant production, marketing and nutrition information through mobile phone text messaging (Palmer and Darabian, 2017).	Multinational	Commercial	Demand creation	Mobile services	
		In Bangladesh, Win Miaki and Grameenphone partnered with local NGOs to deploy agricultural and nutrition information services with the objective to empower women farmers. Female service users were more likely to implement nutrition-related changes than men.	Large regional or national company	Commercial	Demand creation and sourcing/input	Mobile services	

Pillar 1: Private Sector Engagement on Naturally Nutrient-Rich Foods						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Supply-side considerations	Vertically integrated agribusiness buyers support smallholder production	Pearl Dairy improved its cold storage infrastructure and expanded its network of milk collection centres and smallholder suppliers in remote areas with an investment by IFC. Productivity and milk quality improved with training and extension services for suppliers, and production increased in response to an increase in local milk consumption within remote rural communities (ICF, 2014). Uganda's second-largest milk processing plant had a US\$8 IFC investment.	SME, informal or micro-entrepreneur	Commercial	Sourcing/processing, storage	Vertical Integration
		Lecofruit contracts 11,000 Malagasy smallholder farmers to produce high-quality French beans, most of which are destined for European export markets whilst a third are sold to local supermarkets. The company guarantees a price at the end of the season. In partnership with GIZ, they provide participating out-growers with seeds, fertiliser and extension services, as well as financing for micro-irrigation systems—better equipping them to grow other vegetables for personal consumption and local markets (GIZ, 2014).	Large regional or national company	Commercial	Sourcing/input	Vertical integration
	Post-harvest handling, packaging and on-farm processing					
	Post-harvest cold chain technology	ColdHubs in Nigeria is a 'plug-and-play,' modular, solar-powered, walk-in cold room for 24/7 off-grid storage and preservation of perishable foods. It is offered to farmers on a flexible, pay-as-you-store basis. It is installed in major food production and consumption centres (in markets and farms) where farmers place their produce in plastic crates stacked inside the cold room, extending the freshness of fruits, vegetables and other perishable foods from 2 to about 21 days. They work with 'pay-as-you-store' pricing, but have struggled to scale up because of limited access to finance. They also identified access to affordable financing and availability of less-expensive components as constraints prohibiting them from going to scale. The company was brought together with solar and refrigeration design-build experts from Conestoga Cold Storage in the United States, who helped to reduce the manufacturing costs of the cold boxes, maximise revenue and provide staff training on standard operating procedures and overall management. For more information, see http://www.coldhubs.com/ .	SME, informal or micro-entrepreneur	Social	Storage	Low-tech innovation
Baridi Stores in Uganda offer an inexpensive, solar-powered solution now available to farmers. This is being bundled with innovative financing schemes—like renting storage space on a pay-per-use basis and buying and selling of produce from farmers who cannot afford to pay for cold storage—to make it affordable (Baridi Stores, 2015).		SME, informal or micro-entrepreneur	Social	Storage	Low-tech innovation	

Pillar 1: Private Sector Engagement on Naturally Nutrient-Rich Foods						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Supply-side considerations		Wakati , a Belgian start-up, developed a small-scale, solar powered on-farm fruit and vegetable storage solution that does not use cooling. Instead, a small tent uses humidity and ozone sterilisation to provide a protective microclimate for storage of 200 kg to 1,000 kg of perishable product. The technology is not yet affordable for smallholders but is accessible for larger family farms or a group of small farmers (Wakati, 2016; Farley, Vuillaume and Keenan, 2017).	Other	Social	Storage	Low-tech innovation
	On-farm packaging technology	Mazzi , a social enterprise established by Global Good, developed an affordable, stackable collection container to reduce losses and improve storage and transport of smallholder-produced milk. The product is sold in Kenya and Ethiopia, with plans to expand in sub-Saharan Africa. Mazzi is working with Nestlé and the Clinton Global Initiative to take the product to India, Peru, Pakistan and Sri Lanka. They are also developing an affordable on-farm testing diagnostic, to help recognise disease, reduce spoilage and demons Supply Side Considerations trate quality (Global Good, 2017).	Other	Social	Storage	Low-tech innovation
		GrainPro, Inc. manufactures and distributes hermetic storage bags proven to reduce post-harvest loss due to pests. These are mainly used for staple grains, dried foods and seed. The company has built a market with smallholders over many years through education, marketing and partnering with NGOs. It keeps the bags affordable by cross-subsidising through high-margin sales of the bags to coffee associations and trading companies in the gourmet coffee sector. This strategy is important to the product's commercial sustainability. GrainPro maintains a commitment to improving food security, whilst maintaining a long-term perspective for market development.	Multinational	Social	Storage	Low-tech innovation
	Trade and transportation	Good Nature Agro in Zambia efficiently links smallholders and cooperatives to market, providing a guaranteed market to smallholder producers of certified legume seeds. This seed provides twice the income of traditional maize and cotton, and producers retain 10% to 20% of the seeds they produce for cultivation, on-farm consumption and local sale. Buyers receive produce of agreed quality and quantity from farmers who learn from extension services, stick with the agreed price and do not 'side-sell' product to other buyers. Nutrition education integrated into extension services and a contractual clause to retain seeds for production and own consumption may contribute to improved nutrition on the farm. They train out-growers in sustainable practices using private extension agents who promote improved practices and provide inputs on credit.	SME, informal or micro-entrepreneur	Social	Sourcing/input	Vertical integration
M-Farm in Kenya connects farmers with buyers through a mobile platform, allowing access to price data and posting of information about crops for sale (Farley, Vuillaume and Keenan, 2017).		SME, informal or micro-entrepreneur	Social	Market access	Mobile services	

Pillar 1: Private Sector Engagement on Naturally Nutrient-Rich Foods						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Supply-side considerations		Mozambique Fresh Eggs created a joint venture to replace imported eggs, costly due to high transportation costs, with locally produced eggs. The company provides chicks, feed and supervision to out-layers. It aims to scale up its model so that most of the eggs consumed within the region will be produced locally—increasing both availability and affordability of this highly nutritious food. There are expectations that this venture will be commercially viable (IB Trainer, 2017; Spore, 2017).	SME, informal or micro-entrepreneur	Social	Production	Affordability and access
	Cold solutions for trade and transportation	Million Tons of Cold Storage in Africa Initiative , a PPP launched by the Alliance for a Green Revolution in Africa and UPL Limited, aims to mobilise US\$2 billion in a decade to set up cold storage facilities with a capacity of a million tons across sub-Saharan Africa (AGRA, 2016)	Large regional or national company	Social	Market access	Vertical integration
		ColdHubs provides refrigerated transport solutions between northern production areas and southern urban markets in Nigeria.	SME, informal or micro-entrepreneur	Social	Transportation, market access	Convenience
		Pick 'N Serve provides Indian banana farmers with a mobile aggregation, transport and marketing service. Instead of farmers delivering crops to a warehouse, incurring cost and losses en route, a mobile unit collects produce from the farm gate. They use a small cooling facility on-site, which prepares the bananas for transportation to a nearby storage container and then on to local markets, retailers or ports for export (Farley, Vuillaume and Keenan, 2017).	Large regional or national company	Commercial	Transportation, market access	Vertical integration, convenience
		Shell Foundation , along with impact investor partners, is supporting commercial businesses, such as ColdHubs and InspiraFarms , to increase access to cold chain solutions that integrate local solar energy with efficient storage or grid energy, with improved storage. India struggles with a 'bad-grid' electrical system with frequent brownouts, causing high rates of food spoilage.	Multinational	CSR	Storage	Low-tech innovation
	Processing and packaging	SolarFlex Inc. , a social enterprise established by the Canadian NGO Malnutrition Matters, develops and commercialises food drying systems for small and medium-scale applications. It manufactures commercial dryers and a 'small-farm' dryer suitable for businesses with a 10 kg to 20 kg capacity of sliced, wet produce. At less than US\$2,000, the technology is more affordable and easier to use than commercial dryers. It is being piloted in India and Africa. Whilst this is not affordable for most smallholder families, farmer cooperatives could use it to preserve perishable fruits and vegetables for off-season sale and consumption (Malnutrition Matters, 2013). For more information, see http://www.solarflex.ca/index.html .	Other	Social	Processing	Low-tech innovation

Pillar 1: Private Sector Engagement on Naturally Nutrient-Rich Foods						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Supply-side considerations		Sahelia Solar started working with rural agricultural cooperatives to provide solar power for off-grid food processing facilities. They offered a 'pay-as-you-use' model to overcome the financial challenges of these small cooperatives. The access to reliable power enables the cooperatives members to produce higher-added value processed foods with longer shelf life, and it increases availability off-season (Sahelia Solar, 2014, 2017). Sahelia Solar is a solar company serving residential, commercial and industrial customers in Burkina Faso. For more information, see http://saheliasolar.com/ .	SME, informal, or micro-entrepreneur	Commercial	Processing	Low-tech innovation
		Cooperative Central Gaúcha Ltda , a Brazilian dairy cooperative, offers a shared-resources solution to curb the expense of processing and packaging equipment for individual producer members. They provide packaging services—sorting, cleaning, wrapping, packing and labelling—centralising and sharing the costs of equipment, labour and technical expertise (Farley, Vuillaume and Keenan, 2017).	Large regional or national company	Commercial	Processing and packaging	Shared resources
	Targeting urban consumers	Happy Cow developed Yogies, a whey-based yoghurt product in 2014—a first of its kind in the local dairy processing industry—specifically targeting low-income consumers. The company's aim is to diversify its nutritious product offerings whilst building a new market (GAIN, 2017). Happy Cow Limited, established in 1996, is a Kenya-based, family-owned dairy processing company with a portfolio of dairy products: cheese, pasteurised milk, yoghurt, butter, fresh cream and ghee.	Large regional or national company	Commercial	Production, distribution and marketing	Affordability and convenience
		Só Soja , a small food processor, developed an affordable, nutritious soya-based yoghurt product targeting low-income urban consumers, especially women and adolescent girls, in central Mozambique. The company targeted institutional markets, such hospitals and schools, distributed through small retailers and used a mobile sales force with small ice-box carts. The product was popular and the company received technical assistance on quality assurance and quality control to modernise and scale up its ; production facilities. However, it went out of business despite this support (GAIN, 2017).	SME, informal or micro-entrepreneur	Social	Production, distribution and marketing	Affordability and convenience
Demand-side considerations	Distribution	Maziwa King in Nairobi, Kenya, sells pasteurised, full-cream milk using coin-operated milk dispensers, and supplies milk to other milk-dispensing companies in and around Nairobi. The company grew from a single outlet in mid-2014 to eleven outlets in 2016. It currently sells over 200,000 L of milk because of strong demand for small-serving milk in the low-income markets they serve (GAIN, 2017).	SME, informal or micro-entrepreneur	Social	Distribution	Affordability and convenience

Pillar 1: Private Sector Engagement on Naturally Nutrient-Rich Foods						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Demand-side considerations	Distribution	SPAR is increasing access to and affordability of nutrient-rich foods in several stores that mainly serve low-income consumers through its Rural Hubs initiative. The Hub sorts and grades produce according to quality standards, then distributes produce to about 30 retail shops in the vicinity; the lower-grade product is sold on local wet markets. The model is in its pilot phase, with only two Rural Hubs established, serving less than 1% of SPAR retail outlets, but the company aims to prove viability and extend it elsewhere in South Africa. SPAR Group Ltd. is a South Africa retailer. (Case study 5)	Multinational	Business development	Distribution	Vertical integration
		Green Mart , owned by R&D Innovative Solution in Nepal, runs a vegetable retail business in Kathmandu with 5 outlets selling 1,000 kg of green vegetables daily to middle-class urban consumers. The company procures vegetables directly from farmers, which shortens the supply chain and reduces costs. R&D Innovative Solution ensures quality by running a demonstration farm and providing training to farmers (mostly young women) on new technologies and inputs. Below-grade product (which may be safe, but not attractive enough for retail markets) is kept on-farm for own consumption or sold locally. The company is supported by SPRING Accelerator and provides consulting services to farmers and agro-aspirants. (Case study 6)	SME, informal or micro-entrepreneur	Commercial	Distribution	Access, capacity building
	Marketing	Chicken Choice in Nairobi, Kenya, packages and sells chicken through its own network of retail outlets, targeting lower- to middle-income consumers with individual pieces and small packages rather than whole chickens. Offal, which is under-valued by chicken processing companies, is targeted to low-income consumers (GAIN, 2017).	SME, informal or micro-entrepreneur	Social	Distribution	Affordability and convenience
		Smart Logistics Solution Limited is a Kenyan aggregator and marketer of cereals and pulses (millet, soya beans, beans and green grams) sourcing from 5,000 smallholder farmers. The company has developed a range of 'easy to cook' beans that have been pre-cooked and dehydrated. Sold in small, affordable packages and cooked in only ten minutes, the product is highly nutritious and attractive to time-constrained, low-income consumers with limited access to cooking fuel (GAIN, 2017).	SME, informal or micro-entrepreneur	Commercial	Production, distribution and marketing	Affordability and convenience

Abbreviations: CSR, corporate social responsibility; GIZ, Deutsche Gesellschaft für Internationale Zusammenarbeit; IFC, International Finance Corporation; NGO, nongovernmental organisation; SME, small and medium-sized enterprise; USAID, US Agency for International Development.

Fortified foods

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions Pathway for staple food fortification						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Supply-side constraints and opportunities	Research and product development	AkzoNobel invested in the development, safety and efficacy testing of Ferrazone, a more stable and more bioavailable type of iron, coated with sodium EDTA in early 2000. This was because iron's reactivity makes it challenging to add to food products, as it may affect colour and taste (Andang'o <i>et al.</i> , 2007). AkzoNobel is a multinational chemical company.	Multinational	Commercial	Research & development	Evidence generation
		BASF builds the capacity of national fortification alliances for fortification, quality assurance and monitoring.	Multinational	Business development & commercial	All areas	Capacity building
		Nestlé researched how to add iron to bouillon cubes already containing iodine, whilst maintaining customer satisfaction and product colours. Out of concern for too-high sodium intakes, Nestlé started to lower salt in its Maggi products. In 2016, Maggi delivered over 100 million iron-fortified cubes daily to 78 million households in the Central and West African region.	Multinational	Commercial	Research & development	Strong brand/marketing
	Sourcing and production	DSM is advocating for and supporting promotion of MNPs and premixes, providing support to World Food Programme and Sight & Life in order to encourage food fortification and building the capacity of small entrepreneurs.	Multinational	Business development & commercial	Sourcing	Capacity building, evidence generation
	Food safety	Cargill works to harmonise and improve standards globally through multi-stakeholder initiatives, such as the Global Food Safety Initiative and the USAID-funded SAFE programme. In support of a food safety campaign in India, Cargill assisted industry and government partners to design and implement risk mitigation standards in food supply chains. This included partnering with industry and consumer and street vendor organisations to improve standards for a stronger food system and create a more level playing field for food companies. Together, they developed a nationwide food safety campaign (delivered through radio, social media and community events across the country, including street vendor training) targeting street food vendors, consumers and SMEs, complementing the government's awareness programme, to raise awareness of food labelling, safe food storage and handling practices (Interview: Cargill, Halbersma 2015).	Multinational	Business development & commercial	Production, marketing, distribution & sales	Quality assurance

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions
Pathway for staple food fortification

Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Demand-side constraints and opportunities	Consumer demand	Cargill India invested in mass media marketing and community-based campaigns to create demand for fortified edible oil, whilst training distributors and agents to emphasise fortification's health benefits (Interviews: GAIN and SBN 2017). The company cross-subsidised fortification costs with profits from other products to keep the fortified oil competitive. As low-income consumers had found the product unaffordable, these subsidies continued. Consumers accepted Cargill's health claims, resulting in approximately 25 million consuming fortified cooking oil. Other cooking oil producers now fortify their products (Interview: SBN).(Hoogendoorn <i>et al.</i> , 2016) In this case, Cargill led the charge and other companies followed.	Multinational	Business development & commercial	Production, marketing, distribution & sales	Demand creation, Cross subsidy
		The Cargill Foundation developed NutriQuiz in Brazil, a mobile app that poses 600 questions on healthy eating, providing nutrition education through fun, accessible technology.	Multinational	CSR	Marketing	Demand creation
		Airtel 321 in Malawi launched nutrition, maternal and child health content, which received good initial traction but a low number of repeat users. Based on user information and feedback, several changes were made, such as ensuring more dynamic content by adding new recipes weekly. An 800-respondent survey noted an improvement in nutrition knowledge and reported practices (Interview: GSMA).	Large regional or national company	Commercial	Marketing	Demand creation
	Packaging and labelling	Mount Meru Group introduced 50 mL packages of fortified oil in Uganda in response to consumer demand for more affordable products and to competing products also using smaller sizes. Although the product is fortified, the company sees the economic justification as far more compelling to consumers than the nutrition value, as awareness of the value of fortified products is low. The company uses its normal distribution channels to sell the product. It works with PSI, which distributes the product in rural kiosks alongside other health and nutrition products (Email: Mount Meru Group).	Large regional or national company	Commercial	Production, marketing & distribution	Affordable packaging
	Distribution and sales	Groupe Bel launched the Sharing Cities programme in 2013, using existing street vendor distribution networks in major cities to ensure availability of their products to hard-to-reach consumers. The street vendors sell a basket of products, including Laughing Cow®-branded products. They have access to training, health insurance and financial services. By 2016, the programme was active in three cities with a total of 5,300 street vendors who partnered with the Groupe Bel. There are current plans for expansion (Interview: Groupe Bel).	Multinational	Commercial	Distribution & sales	Proximity distribution

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions Pathway for staple food fortification						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Demand-side constraints and opportunities		Hindustan Unilever Limited recruited and trained over 30,000 Shakti Ammas (women entrepreneurs) in India in distribution management and selling of iodised salt, amongst others. The Shakti programme has been extended to include Shaktimaans, who are typically the husbands or other male family members of the Shakti Ammas.	Multinational	Commercial	Distribution & sales	Proximity distribution
		Spring Impact in Senegal runs a USAID-funded project, which has trained rural entrepreneurs and connected them with local suppliers of agricultural, health and nutrition products such as fortified flour. The agents acquire products at wholesale prices because they order in bulk. Thus, they are able to offer affordable but not subsidised foods to rural consumers (Email: Spring Impact).	SME, informal, or micro-entrepreneur	Hybrid	Distribution & sales	

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions
Pathway for micronutrient-enhanced foods for mothers, infants and young children

Supply/ Demand	Element	Example	Business type	Business Model	Value Chain Element	Approach
Supply-side constraints and opportunities	Research and product development	Yedent Ltd , a local Ghanaian food producer, decided that their fortified porridge for children needed to be instant (GAIN, 2015a), in response to a study that found convenience to be an important deciding factor for urban Ghanaian women (Pelto and Armar-Klemesu, 2011).	SME, informal or micro-entrepreneur	Hybrid	Production, distribution & marketing	Affordability and convenience
		Arla Foods Ingredients is using its expertise in dairy by-products, such as whey permeates, to support local SMEs in Ethiopia, Malawi and Senegal with the development of nutritious foods. The business sees this as a long-term investment in business development; it is getting to understand a new market and creating a network of local partners.	Multinational	Business development	R&D, product development	Capacity development
		Bangladesh Grameen Danone Foods is marketing Shokti +, a yoghurt enriched in micronutrients (30 percent of Recommended Dietary Allowance (RDA) in iron, zinc, vitamins, iodine).	Multinational	Social	R&D, product development, distribution & marketing	Affordability, convenience, proximity distribution
		Protein Kissée-La , a local Food producer in Cote d'Ivoire, decided to ensure that their FARINOR product would be compliant with nutritional guidelines for complementary foods and with marketing guidelines, which resulted in the new product portfolio of NUTRIBON in small-sized packages at an affordable price.	SME, informal or micro-entrepreneur	Hybrid	Production, distribution & marketing	Affordability and convenience
		Firmenich , the Swiss flavour company, works with food processors from Nigeria to Indonesia to incorporate insights on flavour and palatability of food during the product development phase. 'We need to treat low-income consumers the same way we treat other consumers, understanding their preferences, not just what is good for them. Food has to be delicious—according to their tastes—and aspirational' (Interview: Firmenich).	Multinational	Commercial	R&D, product development	Capacity development
	Sourcing	AACE Foods produces fortified foods. It has established contract agreements with over 2,000 mainly female smallholder farmers. These farmers receive technical assistance through the Dutch-funded 2SCALE programme to increase yields, improve quality and strengthen their business operations. Smallholders' access to finance is overcome with microfinance loans at planting time, underwritten and repaid directly by the company using a portion of payments to the farmers at harvest. The company also provides farmer clusters with storage technology at communal processing centres, which ensures product traceability back to individual producers (Interview: AACE Foods). AACE Foods is a medium-sized Nigerian food company that produces fortified foods. It aims to improve the quality of their maize supply and to provide smallholder producers with better income, food and nutrition security.	Large regional or national company	Commercial	Production, distribution & marketing	Vertical integration

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions
Pathway for micronutrient-enhanced foods for mothers, infants and young children

Supply/ Demand	Element	Example	Business type	Business Model	Value Chain Element	Approach
	Production	BioAnalyt developed a low-cost device (iCheck) that allows companies such as Nestlé and technical agencies such as GAIN to conduct rapid, on-the-spot monitoring of fortification levels, 10 to 20 times cheaper than in a laboratory. They are meant as a rapid production check rather than as replacement for independent laboratory verification. BioAnalyt has changed its business model over the past 6 years from selling the devices to offering a set of technical support services to companies that pay for the services and must develop the processes and systems for food quality and safety monitoring (Interview: BioAnalyt).	Large regional or national company	Commercial	Quality monitoring	Capacity development and technical innovation
Demand-side constraints and opportunities	Packaging and labelling	Tetra Pak is an international packaging company well known for its CSR support to school milk programmes and to efforts to improve access to nutritious foods. It works with customers in low-, middle- and high-income countries to find creative responses for aseptic low-cost packaging innovations for the specific challenges faced by low-income households in securing safe, healthy and nutritious food products. Costs can be reduced, for instance, by smaller packaging size, such as a wedge-shaped or thinner pillow or pouch design. The future market opportunity justifies the investment (Tetra Pak, 2017).	Multinational	Commercial	Packaging	Affordability and convenience
		Reybanpac , a Tetra Pak customer in Ecuador, launched a product called Lenutrit as a nutritious product to help reduce malnutrition amongst low-income infants aged 6 to 24 months. This low-sugar, ultra-high-temperature yoghurt is made with milk, whey, vitamins and minerals. It is packed in aseptic 110 mL packages, a safe affordable carton package that matches the product and the target group's needs, as research showed that mothers preferred single serving packages (Tetra Pak, 2015). Reybanpac is part of the Favorita Group in Ecuador.	Large regional or national company	Commercial	Production, distribution & marketing	Affordability and convenience
		NINFood in Vietnam developed bright-coloured packaging for MNPs in three different sizes to suit consumers who have varying purchasing power (a single-dose sachet, a monthly dose in a pouch with 10 sachets and 6-monthly dose in a box with 6 pouches) (GAIN, 2015b). The number of sachets bought by caregivers was positively correlated with wealth, demonstrating that variation in packaging size helps to increase affordability for the lower-income consumers. It was considered an important factor in driving the first trial of the MNP (Nguyen <i>et al.</i> , 2016).	Large regional or national company	Social	Distribution/ packaging	Affordability and convenience
	Marketing	Nutri'zaza , a social enterprise in Madagascar, has invested in communicating the 'bliss factor,' which can be the immediate satisfaction (taste) provided to the child, the time-saving aspect of instant porridges to the mother or the convenience of home-delivery of ready-to-eat porridges in the early morning (Interview: Nutri'zaza; Case study 11).	SME, informal or micro-entrepreneur	Social	Distribution	Proximity distribution/ convenience

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions Pathway for micronutrient-enhanced foods for mothers, infants and young children						
Supply/ Demand	Element	Example	Business type	Business Model	Value Chain Element	Approach
Demand-side constraints and opportunities		MNPs are distributed in Bangladesh and Madagascar: through a community network that serves as a sales force for healthy products.	Other	Social	Distribution	Proximity distribution/ convenience
		Danone's Milkuat in Indonesia has adopted a tiger as its mascot—a local and familiar symbol for bravery. The mascot, a strong red colour, is prominently present in ads, games and street events. It has become one of the country's best-known children's brands (Interview: Danone). Danone knows that every consumer, also those at the base of the pyramid, is looking for excitement, either in taste (choice of flavours), convenience, brand aspiration or attractive packaging. (Danone launched the Tiger Bottle, shaped to resemble the brand's mascot.)	Multinational	Commercial	Production, distribution & marketing	Strong brand/ marketing
	Distribution and sales	Ajinomoto found they could reach many more consumers in Ghana with KOKO Plus, a flavoured soy/amino acid-micronutrient supplement, through traditional retail channels as opposed to a proximity distribution model. On the other hand, raising awareness of nutrition benefits was less effective than using the expensive, limited-reach community sales force (Interview: Ajinomoto Co., Inc.; Case study 8).	Multinational	Business development	R&D, product development	Capacity development; Evidence generation
		Africa Improved Foods Rwanda Limited is addressing the issue of aflatoxin contamination in maize and peanuts, trying to overcome this challenge by 'smart' sourcing (i.e. being flexible in sourcing ingredients, depending on price and quality, by substituting one ingredient with another) (Interviews: AIF and Danone; Case studies 7 and 10).	Large regional or national company	Hybrid	Production, distribution & marketing	Cross-subsidy
		AACE Foods faced the initial challenges of getting supermarkets to carry new products and attracting hesitant customers. To overcome these, AACE Foods developed the Our Mama sales force, training approximately 120 women to educate mothers and sell the new products in their own communities. To make the product affordable, AACE Foods supplies the Our Mama sales women with deeply discounted wholesale rates, whilst maintaining low transportation costs by only working within easy access of the warehouse. The cost of transportation to more distant rural areas is a major barrier for scaling up (Interview: AACE Foods). AACE Foods is a medium-sized national food producer in Nigeria that produces a fortified soya-maize complementary food for children, sold in bulk to aid agencies and in small packaging to consumers.	Large regional or national company	Commercial	Distribution	Proximity marketing/ convenience

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions Pathway for biofortification						
Supply/ Demand	Element	Example	Business Type	Business Model	Value Chain Element	Approach
Supply-side constraints and opportunities	Production and dissemination of seeds	<p>Zambia Seed Company Limited (Zamseed) was the first company to sell biofortified seed in Zambia. They market 18 varieties of maize, and see the value that orange maize adds to their portfolio. Orange maize now has an important share of the maize seed market. It has operations in field crop and vegetable seeds, with a focus on maize breeding. It was founded as a joint venture between the government and several private entities, including producers' associations, with support from the Swedish International Development Cooperation Agency. HarvestPlus provides them with support in marketing and sales of these products. For more information, see https://www.accesstoseeds.org/index/eastern-africa/zamseed/.</p>	Large regional or national company	Commercial	R&D, product development	Capacity development
		<p>Zimbabwe Super Seeds has a unique business model whereby rural/subsistence farmers are the actual seed growers and producers. They provide incentives to grow seeds along with parent and training materials, and then they aggregate the bean seeds and retail the seed in commercial settings. Zimbabwe Super Seeds was founded with the specific intention to work with, support and provide commercial opportunities for rural and subsistence farmers. For more information, see http://www.zimsuperseeds.co.zw.</p>	Large regional or national company	Commercial	R&D, product development	Capacity development
Demand-side constraints and opportunities	Demand creation with farmers/ producers and distribution, sales and consumption of biofortified foods.	<p>Tuskys collaborated with Centro Internacional de la Papa (CIP) to introduce OFSP and partner with other value chain actors to engage in innovative uses for OFSP. This collaboration is in Kenya, where farmers share planting materials through informal networks, making those materials sufficiently available to meet a growing demand. Additionally, they started producing OFSP bread, promoting it through both the colour and sweet taste fitting in within the bread-eating culture and responding to a growing desire of middle-income urban population to eat healthier food. Although sweet potatoes are widely grown as a secondary staple throughout the country and are a food security crop grown by women for home consumption, its image has been improved through this effort (Interview: CIP; Case study 14).</p>	Other	Social/ commercial	R&D, production, marketing	Input supply & product innovation
	Demand from food processors	<p>FarmFresh, a local food manufacturer in Rwanda, sources high-iron beans from farmers, transforming it into a high-quality, ready-to-eat product for urban middle-income consumers who are willing to pay a premium for convenience and improved nutrition and are open to new products. Once production of biofortified crops becomes mainstream, it will be easier to reach the urban poor as well (Interview: HarvestPlus).</p>	SME, informal or micro-entrepreneur	Hybrid	Production and distribution	Vertical integration

Pillar 2: Private Sector Engagement in Scaling Up Fortification Solutions Pathway for biofortification						
		<p>Sylva Foods in Zambia produces and markets Maize Meal Nutri Cereal using orange maize. In their first year of manufacture, orange maize supply was insufficient for the company's production, so the proprietor of Sylva Foods started growing orange maize on his own land to demonstrate to rural farmers that there is a market for the biofortified crop. Currently, the company is sourcing all its biofortified produce from local farmers. It is planning large-scale supply to a leading supermarket in 2018.</p>	SME, informal or micro-entrepreneur	Hybrid	Processing, distribution	Vertical integration
		<p>Nestlé has started to use biofortified maize as an ingredient for their cereal porridge production in Nigeria. The first results are encouraging, even though the total quantity supply of biofortified maize is insufficient to fulfil manufacturing needs and the level of vitamin A in the orange maize is below the required fortification levels of the porridge (Interview: Nestlé). Farmers are incentivised to be associated with global brands and can see the demand. Orange maize farming has increased (Interview: HarvestPlus).</p>	Multinational	Commercial	R&D, production, distribution & marketing	Strong brand/marketing

Abbreviations: 2SCALE, *Toward Sustainable Clusters in Agribusiness through Learning in Entrepreneurship*; EDTA, ethylenediaminetetraacetate; GAIN, *Global Alliance for Improved Nutrition*; MNP, *micronutrient powder*; R&D, *research and development*; Recommended Dietary Allowance, RDA, ; SAFE, *Solutions for African Food Enterprises*; SME, *small and medium-sized enterprise*; USAID, *US Agency for International Development*.

Workforce nutrition

Pillar 3: Private Sector Engagement in Scaling Up Nutrition in the Workforce					
	Element	Example	Business Type	Business Model	Approach
Types of workforce nutrition interventions	Commercial benefits for companies	<p>Unilever's Lamplighter programme, introduced in 2001, is its worldwide programme for improving employee health and well-being. The programme provides structure and guidance on how to develop strategic initiatives around physical and mental health so that each country business can develop locally appropriate activities to address four modifiable risk factors—physical health, exercise, nutrition and mental resilience. Lamplighter offers individual employees a health risk assessment, measuring risk factors such as smoking, blood pressure, blood cholesterol and sugar levels, body mass index, waist/hip circumference and fitness. This is followed by counselling on physical exercise, nutrition and mental resilience. In 2016, Lamplighter covered 70 countries, reaching approximately 83,000 employees. It has reduced health care costs including premiums on insurance, absenteeism and accidents at work and has improved morale and well-being, productivity, engagement and performance. The aggregated results show that for every €1.00 spent on Lamplighter, Unilever saw a return of €2.57, thanks to reduced health care costs and absenteeism and increased engagement and well-being.</p>	Multinational	Commercial	Health risk assessment, counselling, physical activity, nutritious food options
		<p>Safaricom in Kenya invests in a mother-friendly workplace with child care benefits, lactation opportunities and maternity insurance to attract key female talent.</p>	Large regional or national company	Commercial	Child care, lactation support
	Assessment of nutrition indicators and related labour policies	<p>Marks and Spencer (M&S) started Plan A, its social and environmental sustainability programme in 2007, recognising that it had not only a role in supporting its customers but also its employees to live healthier lives. A comprehensive programme was set up, including promotion of health and well-being information on its intranet, access to personal health coaches and promotion of physical activity. In 2015, 2,800 employees participated in the M&S Wellbeing Weight Loss Challenge. Healthy food options are signposted with an 'Eat Well' logo in canteen facilities; caloric values are provided for core menu items; and free fruit, water and breakfast items are made available. Staff have access to free health checks to measure key health markers with trained independent dietitians. In 2017, M&S added concrete targets, such as all M&S staff worldwide would complete a health risk assessment by 2019. These assessments help tailor interventions to the needs of the employees. By 2022, health and well-being learning and support will cover employee programmes worldwide. M&S aims to expand its nutrition and well-being objectives and initiatives to their franchise partners and direct suppliers.</p>	Multinational	Commercial	Health risk assessment, counselling, physical activity, nutritious food options
	Design of nutrition workforce interventions	<p>Groupe Bel, a French cheese producer, initiated a pilot in Egypt, France and Morocco to improve the nutrition of 3,000 employees. To accommodate different contexts and priorities, they developed a toolkit proposing a menu of activities in different intervention areas (nutrition education, physical activity, infrastructure and breastfeeding support). Country offices were asked to select at least one activity per area to tailor the workforce nutrition programme to the context. For instance, the Morocco team chose to enhance the quality of canteen meals (Interview: Groupe Bel).</p>	Multinational	Commercial	Varying from counselling, lactation rooms, nutritious food options, etc.

Pillar 3: Private Sector Engagement in Scaling Up Nutrition in the Workforce

	Element	Example	Business Type	Business Model	Approach
Types of workforce nutrition interventions		Marcatus QED , a global supply chain company, integrated inputs from their field officers early in the design process to ensure that the Unilever and GAIN behaviour change modules were designed to fit the short and intense gherkin cultivation period in India (Interview: Marcatus QED; Case study 19).	Multinational	Commercial	Behaviour change intervention
	Nutrition education, behaviour change communication	Unilever , with its partners Marcatus QED and GAIN , developed the Seeds of Prosperity programme , which uses a behaviour change approach. The programme consists of a 5-week nutrition module, followed by a 4-week hygiene module (Interviews: GAIN, Unilever, Marcatus QED; Case study 19). The training is based on Unilever’s behaviour change approach (called Five Levers of Change), which has been very successful in promoting handwashing-with-soap behaviour (Unilever, 2011).	Multinational	CSR	Behaviour change intervention
	Breastfeeding promotion and protection	Alive & Thrive worked in Vietnam with the Department of Women’s Welfare and the Vietnam General Confederation of Labour to implement a lactation support programme in 70 workplaces. They developed a toolkit providing practical advice to companies on costs and characteristics to set up a lactation room, and have been working with companies to improve the implementation of their breastfeeding policies (Alive & Thrive, 2014).	Other	Social	Lactation support
	Crop diversification measures	The Malawi Tea 2020 programme has committed to improving the nutrition for farmers and families as one of the 40 intervention areas of this living wage programme. Starting in 2017, the tea workers (approximately 50,000) have been provided with more nutritious midday meals, which consist of maize flour that has been fortified with iron. The workers also have received weekly vegetable portions; in several estates, kitchen gardens or women’s clubs have been initiated to grow vegetables and encourage household consumption (Malawi Tea 2020, 2016). The programme started in in 2015 and is led by an action-oriented multi-sectoral coalition of producers, trade unions, large international buyers, relevant certification standards, NGOs and donors.	Multinationals & others	CSR	Nutritious meals, vegetable garden/ take-home ration
		Symrise , in Madagascar, offers interest-free rice loans to its vanilla farmers, which help to reduce the ‘lean’ season’s impact. This period of 3-4 months prior to the rice and vanilla harvests is characterised by food insecurity, low dietary diversity, and increased vulnerability to malnutrition. By ensuring access to rice, the staple food of the vanilla-farming communities, Symrise helps to address both food and financial security, as the farmers are not forced to sell their vanilla harvest early at a lower price. Distribution of the rice and pay-back can be time-consuming, so Symrise partners with a farmer’s cooperative that manages these tasks (Interview: Symrise; Case study 18). Symrise also collaborates with Save the Children to provide nutrition training and initiate gardens.	Multinational	Commercial	Behaviour change intervention, vegetable garden and rice subsidy
	Provision of nutritious foods or micronutrient supplements	BSR and GAIN , in a pilot project, worked with factories in the Bangladesh garment industry to ensure hot lunches were nutritionally enhanced with fortified foods such as iodised salt, iron-fortified rice and vitamin A-fortified oil. They also conducted training of peer educators and SBCC related to anaemia, hygiene and infant and young child feeding practices. Female workers were given once weekly iron-folate supplement in hot meal factories and twice weekly in non-hot meal factories. Though there has been significant reduction in anaemia in the 2 intervention factories, the provision of nutritious hot meals was found to be complex in the 2 pilot factories. Additionally, most garment factories in Bangladesh do not have a canteen. However, the knowledge on healthy diets and	SME, informal or micro-entrepreneur	CSR	Behaviour change interventions, fortified foods in hot meals, weekly iron-folate supplementation

Pillar 3: Private Sector Engagement in Scaling Up Nutrition in the Workforce					
	Element	Example	Business Type	Business Model	Approach
		nutrition, along with hygiene and child feeding, is scalable and replicable at the community level. In terms of cost, time and feasibility, iron supplementation represents a cost-effective intervention (Interviews: BSR and GAIN).			
		Safaricom provides an extensive package to recruit working mothers by offering child care run by child care professionals at no charge, on-site medical care if children fall sick, a mother's room for expressing milk and breastfeeding, medical insurance for antenatal care and delivery, free immunisation of children up to 9 months of age and healthy choices in the cafeteria where a child can join its mother for any meal (Safaricom Telecommunications Kenya and International Finance Corporation, 2017).	Large regional or national company	Commercial	Lactation support, child care
	Nutrition impact on employees	Unilever's Lamplighter programme has shown measurable positive impacts on numerous indicators and estimated a positive return on investment, but there is no information related to nutrition indicators. Positive impact of a behaviour change intervention was measured in a pilot carried out by Unilever and Marcatus QED, which showed an increased dietary diversity score of Indian gherkin farmers (Interview: Unilever, Marcatus QED; Case study 19).	Multinational	Commercial	See above

Abbreviations: BSR, Business for Social Responsibility; CSR, corporate social responsibility; GAIN, Global Alliance for Improved Nutrition; M&S, Marks and Spencer; NCD, noncommunicable disease; NGO, nongovernmental organisation; SBCC, social and behaviour change communication; SME, small and medium-sized enterprise.

Annex 6: Case Studies

Pillar 1: Case studies on improving access to naturally nutrient-dense foods

Case study 1: Commercial cold chain solutions

(INTERVIEWS: SHELL FOUNDATION & COLDHUBS; desk review <http://www.inspirafarms.com/case-studies/>, <http://www.alyx-limited.com/>)

Fresh fruits and vegetables start to deteriorate as soon as they are harvested, and fresh milk spoils within hours. Cooling significantly slows this process down, increasing the storage life of the produce, improving market supply of these nutrient rich foods and increasing the income of the farmers. The challenge lies in making low-cost, efficient cooling options available to farmers and small traders. This case study presents three examples of social enterprises that make cooling services and products available to producers and aggregators. Their success lies in factors such as offering flexibility in leasing space in a cold hub, mobile cooling solutions and off-grid solar-powered solutions, as well as providing technical support to go beyond the cold chain towards overall food safety.

InspiraFarms, London, United Kingdom

InspiraFarms is a social enterprise based in the United Kingdom. It receives support from the Department for International Development and the Shell Foundation, amongst others. It provides turnkey refrigerated storage solutions and affordable leases that enable small and growing agribusinesses to access emerging technology, reduce produce losses, cut energy costs, access new markets and grow sustainably—on or off grid. In Kenya, for example, InspiraFarms partnered with the Nyamarura Dairy Farmers Cooperative to test a new off-grid dairy chiller with a 2,000 L capacity and real-time data monitoring capacity. The dairy cooperative received funding from Root Capital to acquire the chiller. After only eight months using the unit, the group could chill over 1,500 L of milk at 4C° daily, which it supplied to the New Kenya Co-operative Creameries. The income from the chilled milk has enabled the Nyamarura Dairy Farmers Cooperative to cover their operational and management costs, repay their loan to Root Capital and maintain a fair standard price to farmers. The cooling solution itself is often not enough to solve local farmers' market access challenges; the InspiraFarms team, therefore, offers pre- and post-sales technical support, such as preparing clients for international food safety certifications (e.g. HACCP).

ColdHubs, Lagos, Nigeria

ColdHubs, is a 'plug and play' modular, solar-powered walk-in cold room, for 24/7 off-grid storage and preservation of perishable foods. ColdHubs is installed in major food production and consumption centres (in markets and farms). Farmers place their produce in clean plastic crates, and these plastic crates are stacked inside the cold room. This extends the freshness of fruits, vegetables and other perishable food from 2 days to about 21 days. ColdHubs offers farmers with a flexible pay-as-you-store subscription model. In preparation for storage, farmers transfer their perishable foods into ColdHubs' reusable plastic crates, which fit neatly onto the shelves. Farmers pay a daily flat fee for each crate of food they store. Farmers benefit by increasing the percentage of

their product that reaches the market in good shape and can command a top price. Consumers benefit from better-quality produce that is available in the market.

ColdHubs is a Nigerian company. Its chief executive officer is a farmer, an innovator and a social entrepreneur who has found strong partners with which develop innovative solutions in GIZ, Factor[e] (a venture development firm) and the Postharvest Loss Alliance for Nutrition (PLAN), which is funded by USAID.

Alyx Limited, Lagos, Nigeria

Alyx Limited is Nigerian company that has developed a cold chain logistics method in which small cold room trailers are rented to farmers during harvest for transporting their produce from the farms to aggregation centres or markets. Alyx Limited has devised a cheaper method to keep farm produce fresh at a fraction of the cost of conventional cold rooms, which are expensive to acquire by poor farmers. They fabricate cold room semitrailers and trucks from 3 tons to 7.5 tons locally that can be hooked on to any truck head or tractor for immediate post-harvest cooling of fruits and vegetables. The company also provides retrofitting services to existing transporters converting their old trucks into cooling vans for inter-city haulage of fruits and vegetables and any other cold chain logistics haulage order.

The company offers services that ensure fresher, nutritious and quality-assured produce to be sold in the markets. Alyx Limited has received support from the USAID-funded PLAN.

Case study 2: Vertical integration—Good Nature Agro, Zambia

(INTERVIEW: GOOD NATURE AGRO; desk review www.goodnatureagro.com)

Good Nature Agro (GNA), a Zambian company, runs an out-grower programme for legume seed that gives farmers three services that are currently limited: access to inputs, access to information and access to a ready market. For two years, GNA has piloted their model and delivered results, raising smallholder incomes by an average of US\$220 (194 percent) per hectare. Aggressively scaling from the pilot phase, GNA is now working with 2,000 farmers, each farming about 0.5 to 1.0 hectare. They are aiming to work with 50,000 farmers by 2020.

GNA selects nominated leaders within a community who are strong farmers and willing to try something new. GNA interviews them to assess their initiative, problem solving and agronomic skills. GNA then hires them as Private Extension Agents (PEAs). PEAs are paid on commission, so their incentives align with those of GNA and their growers—to produce more high-quality seed. Through this model, GNA ensured a ratio of 1 GNA extension agent for every 40 farmers, instead of 1 government extension agent per 5,000 farmers.

Farmer clients of GNA are provided with the most essential input—high-quality seed—on loan. For every kilogram of seed borrowed, growers return 2.5 kilograms of their crop to GNA at the end of the season. This simple approach—repaying seed with seed—reduces friction around financing and ensures a high rate of repayment.

Growers can also opt in to add additional inputs such as fertiliser, manure or herbicide to their loan during the growing season. All loans are tracked and updated with a smartphone and tailored mobile application used by each PEA, keeping them in touch with the health and performance of every field and grower.

PEAs provide farmer trainings through the growing season in fair finances, group management and agriculture. In groups of 40 and in growers' individual fields, trainings and recommendations are highly personalised—starting with an initial analysis of the health of every farmer's soil and land. This results in a more appealing value proposition to the farmer and creates farmer loyalty to GNA.

GNA purchases 100 percent of the legume seed that growers produce; this way, GNA operates as the market and can offer growers complete security, which is very different from the informal markets the growers previously had to navigate to sell their crop. If the crop is of sufficient quality, the growers' efforts are rewarded by GNA paying a premium price. This method can result in a grower receiving double the value compared to selling that same crop into a standard commodity market.

GNA markets the seeds they purchase from farmers under the brand Good Nature Seeds—reflecting its commitment to growing the land as a path to growing farmer incomes. GNA secures wholesale contracts and supplies retail outlets throughout Zambia, with the aim of equipping even more small-scale farmers with high-quality legume seed. The seed is sold on local markets to a range of farmers. As farmers diversify from maize, production and therefore availability of legumes increase.

Case study 3: Postharvest Loss Alliance for Improved Nutrition (PLAN)

(INTERVIEW: GAIN)

GAIN has created the Postharvest Loss Alliance for Nutrition (PLAN) to bundle the expertise of the multiple public and private actors to collectively reduce loss and waste of nutritious food. PLAN aims to act as a global nucleus for coordination, programming, research, knowledge exchange and investment on postharvest food loss, as well as a national hub in emerging markets for business-to-business (B2B) engagement. At the centre of the Alliance is the B2B Engine, where the needs of local businesses—in terms of access to knowledge, technologies and financial services—are matched with the expertise of international industry leaders and technical experts.

In Nigeria, for instance, PLAN matched the need of the Nigerian company Alyx Limited to design a hub-and-spoke model for storage of fresh fruits and vegetables with the expertise of a refrigeration design engineer from CT Technologies International in Denmark. Together, they developed a small cold room trailer and cold box from scratch using only local parts, except for the refrigeration unit, which was imported (Case study 1: Commercial cold chain solutions).

Similarly, through the B2B Engine, PLAN brought together the Nigerian company ColdHubswith solar and refrigeration design-build experts from Conestoga Cold Storage in the United States, who helped to reduce the manufacturing costs of the cold boxes, maximise revenue and conduct staff training on standard operating procedures and overall management (Case study 1).

Case study 4: Rijk Zwaan

(INTERVIEW: RIJK ZWAAN; desk review <https://www.rijkwaaanafrica.com/>, <https://www.icco-cooperation.org/en/projects/vegetables-for-all-project-in-tanzania-project>)

Most seed companies perceive high-quality seed production and distribution for low-income countries to have high risk and low return on investment. Rijk Zwaan, an international vegetable breeding company based in the Netherlands, decided to invest in this opportunity, aided by the support of the Amsterdam Initiative against Malnutrition and financial support of the Government of the Netherlands.

Rijk Zwaan is one of the global top five companies in the vegetable seed market, with 2,800 employees in 30 different countries. Three families own approximately 90 percent of Rijk Zwaan, whilst the remaining 10 percent is owned by its employees through an employee share scheme. To develop new varieties and supply top-quality seeds, continuous innovation is essential. Close to 40 percent of its staff are actively involved in research and development. Moreover, the company invests 30 percent of its turnover in research and development each year. Rijk Zwaan invests specifically in developing hybrid varieties of African vegetables, such as eggplants, kale, peppers and

tomatoes; these are being evaluated in terms of their suitability for cultivation in East and West Africa.

To sell their vegetable varieties to local farmers, Rijk Zwaan takes a local approach. Rijk Zwaan seeds are sold through 30 local subsidiaries. In countries where Rijk Zwaan does not have its own subsidiary, it works with distributors. In many areas, farmers are still in the process of getting to grips with the basics of vegetable production. That is why Rijk Zwaan has a team of experienced crop advisors and product development specialists who give expert advice to farmers, tailored to local circumstances. By being close to the grower, Rijk Zwaan can share its research findings and connect growers to banks, suppliers and market organisations so that they can professionalise their businesses.

Because scale and local expertise are needed to increase the impact, Rijk Zwaan actively seeks collaboration with government bodies, local growers' associations and knowledge institutes all over Africa. This partnerships approach was also at the basis of the Amsterdam Initiative against Malnutrition's Vegetables for All project in Tanzania, in which RZ worked with six public sector partners. The partners took a value chain approach; they developed activities along the journey from seed to stomach, improving the supply and demand steps to increase quantity, quality and diversity of vegetables by high-quality seed supply; improving drying technologies; implementing behaviour change interventions; and conducting financial training. Some 4,000 small-scale farmers received training to improve production, post-harvest handling, marketing and consumption of nutritious vegetables.

Though Rijk Zwaan seeds are premium-priced, they are also more productive and responsive to the demands of the market. The price includes a message to producers of demonstrated superior performance in field trials and hands-on demonstrations. Rijk Zwaan believes that the adoption of their high-quality vegetable varieties will lead to increased productivity and competitiveness of smallholder farmers in the market, which subsequently will increase their profitability.

RijkZwaan is quite clear that its profit centres are North America and Europe, not Africa. Yet, they invest in African vegetable varieties with a 10- to 20-year time horizon, building brand awareness and loyalty in the anticipation that the horticultural sector throughout Africa will grow.

Case study 5: SPAR Rural Hubs, South Africa

(INTERVIEWS: GAIN & SPAR CONSULTANT; desk review <https://www.spar.co.za/About-SPAR/Company>, <http://www.inclusivebusinesshub.org/gain-spar-south-africa-develop-sustainable-model-work-smallholder-farmers-spar-rural-hubs/>)

SPAR Group Ltd. is one of the largest retail chains in Africa, focusing mainly on groceries, with six distribution centres and over 1,000 stores across Southern Africa. SPAR worked with GAIN and the Dutch Government, through the Amsterdam Initiative against Malnutrition, to design and establish the SPAR Rural Hubs initiative. The initiative aims to increase the diversity of fresh vegetables sold through SPAR retail outlets in rural communities and to reduce cost in the supply chain and pass savings on to consumers to make healthy food more affordable.

SPAR used to source fruits and vegetables from large agricultural producers, who delivered products in bulk directly to the company's centralised warehouses in Johannesburg, where they were sorted and shipped out to SPAR retail outlets across South Africa. This model was time-consuming. It extended the time between harvest and consumption. Hence, it decreased the nutritional value of produce, excluded smaller producers, reduced margins of all actors along the supply chain and limited the diversity of produce available in local SPAR retail outlets. The Rural Hubs initiative aims to shift sales of fresh produce in all stores from 2 to 4 percent of total sales to 8 to 10 percent.

Each Rural Hub is supplied by about 30 local farmers. This integrates smallholder producers in a formal supply chain that previously was out of reach for them, and it includes them in a shared ownership structure with the retailer. The hub sorts and grades produce according to SPAR's quality standards, then distributes produce to about 30 retail shops in the vicinity. The lower-grade product is sold on to local wet markets. The model is in its pilot phase. Only two Rural Hubs have been established, which serve less than 1 percent of SPAR retail outlets. However, the company hopes to prove the initiative's viability and extend it to other regions in South Africa. To do so, it will have to address many challenges; the main challenge is identifying local smallholders who can guarantee supply of produce at SPAR standards and deliver the product reliably to the Rural Hubs. SPAR developed a selection process to identify the most suitable local suppliers. SPAR is providing these farmers with agricultural extension services and support with linking to the Rural Hub. Another challenge is that participating farmers had difficulty accessing the financing they needed for agricultural inputs and operating expenses. The consortium partners are working to establish a blended financing mechanism that smallholder suppliers to the hubs can access. Finally, maintaining quality standards and control is challenging for smallholders, who receive technical assistance from local NGO's) through the Rural Hubs initiative.

The Rural Hubs programme also takes a consumer-centred approach. It studied the nutritional status of SPAR clients, and their understanding of dietary diversity and nutrition. Consumers will benefit from access to a wider variety of fresh, affordable produce at their local retail outlet and at informal markets.

SPAR wanted to shorten supply chains by integrating smallholder producers and making the shops more relevant to local consumers. The support of the Dutch government, which financed about 15 percent of the project costs, and the collaboration with NGO partners provided a big incentive to do it at larger scale and to add a nutrition lens to the initiative.

Case study 6: SPRING Accelerator investments in eggs and vegetables in Nepal

(INTERVIEWS: SPRING ACCELERATOR, SHREENAGAR AGRO GROUP, R&D INNOVATIVE SOLUTION; desk review <http://www.springaccelerator.org/>, <http://www.safnepal.com/>, www.agrinepal.com/)

The SPRING Accelerator, which is funded by DFID, aims to encourage business innovations that can transform the lives of adolescent girls, aged 10 to 19 years, in East Africa and South Asia. The idea is to create sustainable markets for life-enhancing products and services, which help girls keep safe, learn, earn and save without harm. SPRING Accelerator identifies companies and provides expertise in business development, investment readiness, human-centred design, innovation and marketing

Two examples of SPRING Accelerator businesses in Nepal have a nutrition angle to them, aiming to increase egg and vegetable production and consumption.

The Sunaulo Egg by Shreenagar Agro Farm

Despite a modest beginning in 2002, Shreenagar Agro Farm has grown into Nepal's leading agribusiness, providing integrated services to farmers, including day-old chicks and fingerlings, nutritious feed for chicks and fish as well as training and technical services, such as after-sales service and progress monitoring. One of Shreenagar Agro Farm's main products are eggs, which are distributed throughout the main market of Kathmandu. The innovation is that they have branded the eggs with an aspirational name: Golden Eggs. Currently, adolescent girls in Nepal do not consume eggs due to economic constraints in rural areas and negative cultural perceptions in the urban centres. The branding and marketing is all about overcoming those barriers; messages are communicated through multiple channels—social media, school lunch programmes, poster, flyers and direct trainings. They are working with shop owners to stock eggs along with nutritional education and promotion materials, and instructing them on appropriate motivational messaging.

R & D Innovative Solution

This company provides consulting services to farmers and agro-aspirants on developing business plans, accessing bank and insurance services, setting up new and upgrading existing farm houses and linking to local and international markets. Most of the smallholder farmers are young women due to the high level of outmigration of men.

R&D Innovative Solution, with support from the SPRING Accelerator, is helping some 250 farmers to diversify their crop mix into horticulture to serve a growing segment of urban middle-class consumers who are looking for organic and nutritious food. The secondary objective is for smallholder farmers to increase their consumption of vegetables that do not meet the grade for the higher-end urban market.

R&D Innovative Solution provides technical support, agricultural inputs and field-based training for farmers. It also has five retail outlets in Kathmandu, which procure directly from farmers and sell around 1,000 kg of green vegetables daily. This shortens the supply chain by at least three middle men, which offers the farmers a competitive advantage in the market. Green Mart purposefully brands the vegetables as grown by local producers, which appeals to urban consumers.

Pillar 2: Case studies on improving access to fortified foods

Case study 7: Africa Improved Foods Rwanda Limited

(PERSONAL COMMUNICATION: AFRICA IMPROVED FOODS; desk review <http://www.africaimprovedfoods.com/>) (DSM, 2015; FMO, 2015)

The joint venture **Africa Improved Foods Rwanda Limited** (AIF) was established with the objective to manufacture affordable, nutritious and high-quality foods to improve the nutritional status of children and women in Rwanda and the region. Seven private and public sector partners were involved.^{xiv}

Successes

The massive investment of US\$60 million enabled the building of a plant of world-class quality in Kigali on land provided by the Government of Rwanda. Production of fortified cereal-based porridges started in December 2016 for two institutional buyers who distribute the foods for free to their target populations: Super Cereal Plus for the UN's World Food Programme and Shisha Kibondo for the Government of Rwanda.

Two commercial products were launched in Rwanda (March 2017) and Uganda (June 2017): **NootriToto™** for children between 6 months and 2 years of age, and **NootriMama™** for pregnant and breastfeeding mothers. Over 100 tons of commercial product was sold cumulatively in the first four months, distributed through conventional distribution channels (wholesalers and retailers). The products are well positioned and are about 30 percent more expensive than other incumbents in the market (which are generally not fortified and of lower quality). Their prices are between one-third to one-half the price of international premium products.

^{xiv} Royal DSM and the Government of Rwanda took part in the joint venture and collaborated with the World Bank (International Finance Corporation), CDC (the Development Finance Institution of the UK Government's Department for International Development) and FMO (the Dutch development bank). The United Nations World Food Programme was engaged from the beginning as the main institutional buyer. The Clinton Health Access Initiative played an important role in facilitating the dialogue between the different actors and as research partner.

Six months after launch, the plant is producing at 90 percent of its total production capacity of 45,000 tons; of the currently produced volume, the main part is sold to the World Food Programme, about 15 percent to the Government of Rwanda and less than 5 percent through the commercial market. The company has made important efforts to implement the highest standards of nutrition and food quality and safety. Whereas the products ordered by the institutional buyers are produced according to their respective specifications, the products for the commercial market are in line with the Codex Alimentarius guidelines for Formulated Complementary Foods (CAG/GL 8-1991). To date, the factory has received the FS22000 certification for food safety, and all products have received the Standardisation Mark (S-Mark) from the Rwanda Standards Board for trading within the East African Community.

Key obstacles

Despite the successes and achievements over the past two years, AIF has encountered many obstacles:

1. Reliance on institutional market does not lead to a viable business model. The AIF business model was built on the assumption that the majority of volume production would be sold to the WFP for a relatively profitable price in the first five years, allowing the commercial market to grow slowly. Yet, WFP procurement policies do not allow preferential procurement AIF is therefore competing head-to-head with European producers. Currently, raw material prices in the East African region are much higher than those in Europe due to bad weather conditions, which have led to a bad harvest and unfavourable exchange rates. To secure the contract with WFP, AIF had to align its prices with the lower European prices; as a consequence, AIF is losing money on its business with WFP.
2. Conveying the message on value and quality of the product to the consumers is challenging in the current public sector environment. AIF has chosen to fully comply with the international guidelines and national regulations on claims and labelling, but they have found the guidance on this topic (in the *International Code of Marketing of Breast-milk Substitutes* and subsequent World Health Assembly resolutions) ambiguous and hard to implement. Also, AIF received pushback from nutrition actors who feared that marketing of a complementary food might have negative impact on breastfeeding rates. Therefore, AIF decided not to engage in above-the-line marketing (i.e. media advertisement) for NootriToto (the children's product), which means it cannot communicate the high quality of its products to consumers who often perceive products produced in Europe as being of better quality than products produced in Rwanda. Currently, AIF only engages in below-the-line promotion, such as organising meetings for nutritionists and distributing leaflets; however, these are not sufficient to raise brand awareness, build confidence and create demand with potential consumers.
3. Local sourcing of raw material of high enough quality is challenging. The initial philosophy of 100 percent local sourcing of raw ingredients had to be adapted to ensure high quality and cost. Due to bad weather conditions and a subsequent poor harvest, maize prices in Rwanda were much higher than those on the international and regional market. At the same time, it proved to be difficult to source sufficient raw produce locally that was free of aflatoxin contamination. AIF has therefore turned to a more diversified sourcing model, both sourcing from local farmers and at the regional market.

Impact on commercial viability and nutrition

AIF needs to accelerate its commercial business model to create financial sustainability. This means launching and scaling up commercial products in the markets of Rwanda, Uganda and other East African countries, such as the Democratic Republic of the Congo, Kenya and Tanzania. AIF is also

looking at developing alternative distribution channels, such as the direct distribution sales force of the Living Goods network in Uganda.

The main challenges lie in demand creation: AIF will have to persuade the consumer to pay extra for proper quality. Whilst playing by the rules, AIF finds itself in a disadvantaged position, as the rules do not allow communication of the products' quality and value to consumers. Other companies, on the other hand, perhaps with lesser-quality products, are making incorrect claims. This severely hampers the penetration of products into the market and ultimately may endanger the commercial viability of AIF's business.

It is too early to discuss the potential nutrition impact of AIF's business, as production and distribution only started in December 2016. A research programme, run by the Clinton Health Access Initiative, for which baseline measurements have been taken prior to the launch, has been set up to define its nutrition impact. First results are expected in 2018.

Case study 8: The Ajinomoto Group

(PERSONAL COMMUNICATION: AJINOMOTO FOUNDATION AND THE AJINOMOTO NUTRITION IMPROVEMENT DEPARTMENT) ('Ajinomoto Co.: Better Nutrition, Brighter Future in Ghana', 2013; Ghosh *et al.*, 2014, no date; Aaron *et al.*, 2016)

The Ajinomoto Group is a Japanese food and chemical corporation that produces seasonings, cooking oils, TV dinners, sweeteners, amino acids and pharmaceuticals. A business interest to better understand African markets has led the company to start up two nutrition projects. The first is a social business undertaking in Ghana to introduce a flavoured soy-/amino acid-micronutrient supplement (KOKO Plus) in the market and the second is a product development partnership with VALID Nutrition to reduce costs of the treatment of acute malnutrition in children with ready-to-use therapeutic food.

KOKO Plus

The KOKO Plus supplement, for children 6 to 24 months of age, consists of a local protein source (soy flour), a micronutrient premix, amino acid (lysine), palm oil and sugar. The supplement is packaged in a 15 g sachet and must be sprinkled on a child's home-made meal. An efficacy study found that KOKO Plus increased haemoglobin blood levels better than a micronutrient supplement without soy or amino acids, and modelled 100 percent delivery of the supplements (actual delivery rate was 60 percent). KOKO Plus also showed a significantly better impact on growth than the micronutrient-only group.

A study compared two distribution models in Ghana for their respective effectiveness in reaching the children of low-income households. The first model used a community network of female sales ladies and health extension workers who told mothers about the importance of nutrition. This approach was highly effective in creating demand, influencing nutrition behaviour and getting mothers to give KOKO Plus regularly to their children. However, from the business perspective, this model turned out to be too expensive to maintain and scale up the level of activities to become a sustainable business. The second model used retail channels combined with social marketing activities. This model was effective in spreading the message, but the product was only used every now and then. Business-wise, this model seemed to have a better chance of being scaleable and sustainable. Going forward, the challenge is to combine the benefits of both distribution models into one, which is both cost-effective and effective in behaviour change.

Based on a market study carried out with the University of Ghana, the optimal price estimate for KOKO Plus was 20 to 30 pesewas (approximately US\$0.10 at the time of the pilot studies) per sachet. Due to inflation and devaluation of the local currency, the price of KOKO Plus increased to

50 pesewas per sachet, which seems a considerable cost for a household that has US\$2.00 to spend per day.

The pilot phase was not conclusive on the business opportunity for Ajinomoto, which decided to safeguard the activity from business pressure and allow more time to fine-tune the business model. To do so, Ajinomoto transferred the KOKO Plus project to a newly established nonprofit, public interest foundation, which will continue to develop the retail product. Without the for-profit motive, it becomes acceptable for public sector actors (e.g. Ghana Health Service) to collaborate in the promotional activities (behaviour change communication to mothers).

Success factors

- Ajinomoto has taken a partnership approach in every step of its project. It brought on board academic partners in product development and evidence generation, as well as NGOs and government services for the implementation. This approach has allowed corrective measures along the way and ensured strong and active support of partners who have become actors.
- The company focuses on evidence generation prior to developing a product. It establishes efficacy of the product and effectiveness of the distribution models. Study design and implementation by external experts ensure independence and therefore greater credibility of the study results.
- The company shows patience and persistence. The KOKO Plus project was initiated in 2009; though it has not yet turned into a viable business seven years later, the company continues to invest in tweaking and learning how to best improve the business model.

Case study 9: DSM and GIZ, Access to Nutritious Foods for Women, Ghana

(INTERVIEW: GIZ) (Namdiero and Martin, 2015)

The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) partnered with three Ghanaian companies and three global partners (DSM, Ajinomoto and Sight & Life) to test market-based approaches for affordable nutritious foods for women of childbearing age (15 to 49 years).

After almost four years of research to better understand the market, the consumers and the value chains, as well as to develop and register the products, three products were launched into the market. These products were nutritionally enhanced extensions of the existing product portfolios:

- 1) Instant porridge (produced by Yedent Agrofoods Ltd.).
- 2) Hot pepper (*shito*) sauce (produced by Samba Foods Ltd.).
- 3) High-protein, condensed-milk biscuits (produced by Mass Industries Ltd.)

The porridge is fortified with 100 percent of RDA of water-soluble vitamins, the biscuit at 50 percent and the *shito* at 30 percent. All are packaged in a single-serving size. Their nutritional value is similar, though slightly lower for the *shito* due to technical limitations.

To make the products available as widely as possible, the products were distributed via an established distributor with access to 500 stores, instead of via a door-to-door direct sales force. However, this distributor was not motivated to actively push the products; hence, retailers were hesitant to take up the new products, not knowing how these would sell. To overcome this barrier, sales agents were recruited to promote the products with the retailers. Sales agents offered retailers a display rack, which included a selection of products for a token price of 10.0 Ghanaian cedi. A willingness-to-pay study revealed that the magical price point for a treat is 1.0 Ghanaian cedi (about 0.20 euro), corresponding to one coin of out-of-pocket cash. This price point offered an acceptable profit margin for the porridge company but not for the *shito* company. The *shito* company had to reformulate its product; it sourced cheaper raw ingredients to reduce costs. The price points for

biscuits needed to be halved to 0.5 Ghanaian cedi to align with the fierce competition; this was achieved by reducing the fortification levels.

Getting the marketing approach right for these products that target adult women was almost as challenging as for foods for children. Public sector actors expressed concerns that the promotion of processed fortified foods would negatively impact dietary diversity. In response to these concerns, marketing messages were developed to promote at the same time dietary diversity and the branded fortified food. This complexity may result in less-effective promotion of the products, as too many messages presented simultaneously have proven to be confusing for the consumer and less impactful.

Challenges

External support to the local companies stopped four to six months after the fortified foods for women were launched into the market. This poses a risk for their commercial viability. Product awareness among consumers is still very low and the local small and medium-sized enterprises do not have the cash flow for the level of investments needed to create sufficient demand. This may negatively impact market growth and sales. All three companies have expressed a concern that the product is only targeted to women, which reduces the number of potential consumers.

Case study 10: Danone social businesses

(Renouard, 2012; Faivre-Tavignot, 2016; Agnew and Henson, 2018) (INTERVIEW: DANONE; Desk review www.danonecommunities.com)

Ten years ago, Danone consciously decided to launch a new business incubator, outside of its core business, with the goal of improving access to good nutrition and safe drinking water for base-of-the-pyramid consumers. This investment fund, called Danone Communities, was launched at the initiative of Danone and from start with a consortium of partners. It is funded by banks and other institutions, Danone employees and Danone. The fund functions independently from Danone's business operations and is not coupled to the business' bottom line.

This case study presents lessons learned from one social business and one commercial business.

Shokti +

In Bangladesh, Grameen Danone Foods Ltd. (GDFL) is marketing Shokti +, a yoghurt enriched in micronutrients (30 percent of RDA in iron, zinc, vitamins and iodine). In eastern China, NutriGo sells the casein-based nutrient supplement Ying Yang Bao, based on a national product standard, to combat anaemia. Ying Yang Bao can be sprinkled on rice, noodles or beverages. In Indonesia, Danone brings Milkkuat, a lactic-acid beverage enriched with vitamins and calcium, to the market as a healthy snack alternative for school-aged children.

Consumer-centred product development: In Bangladesh, Danone learned that consumer research is critical to develop a food product that resonates socially and culturally within the broader food culture. Ten years ago, GDFL plunged ahead with its yoghurt business, aiming to build on Danone's experience. GDFL designed single-portion cups to target specifically the nutritional needs of Bangladeshi children. However, the market plan ignored the fact that yoghurt is not commonly given to children in Bangladesh; rather, it is considered a special treat for occasional events, such as weddings. To make eating yoghurt a more frequent habit, GDFL made huge investments to create awareness and behaviour change—for instance, through the distribution network of Shokti Ladies and retail shop owners. This resulted in very high brand awareness (98 percent) and benefit awareness (82 percent). Based on this lesson, Danone now prioritises understanding consumer insights through so-called 'food style' research prior to investing in new product development. It also builds on existing product categories and eating habits for new product development.

Proximity distribution: To reach rural consumers with its yoghurt, GDFL set up a proximity distribution network of rickshaw-van sellers (with small cooling boxes fixed on their bikes) to supply female micro-entrepreneurs who then sell door to door. These sales ladies keep the yoghurt fresh in isotherm bags. For these sales ladies, though income is relatively small, it provides them with a social status. There is however a significant turnover rate within the sales force; this leads to disruption in the supply and availability of the yoghurt, which have been cited as reasons for less-frequent consumption. In urban areas, the yoghurt is sold through small street shops and modern stores. These sellers use incentive schemes—offering stickers and other rewards for repeat purchase.

Magic price point: Shokti + was marketed at a lower price than other yoghurts. However, a spike in milk prices, which was triggered by the global food crisis of 2008, pushed the per cup price of Shokti yoghurt in Bangladesh too high above consumers' willingness to pay. Consequently, sales collapsed. In response, GDFL decided to rework the product mix, without compromising on the 30 percent RDA of micronutrients per cup, to get closer to the old price point that consumers were willing to pay. This had been a major constraint for low-income consumers who were extremely price-sensitive. Danone then introduced a cheaper version called Shokti Pocket, which offered a smaller portion size and did not need to be refrigerated. Moving forward, Danone builds in a buffer during product development to absorb variations in costs and allow flexibility in sourcing the raw ingredients it needs to meet the nutritional profile required. Danone calls this smart sourcing.

Milkuat Biscuits

In Indonesia, something similar happened. When raw material prices for Danone's milk drink Milkkuat were passed on to the consumer, sales also dropped massively. The new price was above the spending power of Indonesian school children with limited pocket money. Danone realised that there was a magical price point that must match available cash, even if it were only one coin or a small paper note that the target consumer carried.

Creating demand: Convincing consumers to purchase the product remains the largest challenge in Bangladesh. GDFL trains distributors, sales ladies, nurses and midwives to raise nutritional awareness among villagers. GDFL also organises mini street events using the yoghurt's mascot to increase brand awareness. TV advertisement, featuring Muhammad Yunus, the founder of Grameen, has successfully reached the urban population. GDFL realises that investments in demand creation are substantial and need to be made on a continuous basis.

The selling point of Milkkuat is not that it is nutritious or the cheapest product in the market: it is the brand's image that has been created by Milkkuat's tiger mascot, which embodies a 'fun, courageous and optimistic attitude.' Danone, like any marketing company, knows that every consumer, including those at the base of the pyramid, is looking for excitement, either in taste (choice of flavours), convenience, brand aspiration or attractive packaging. Danone, therefore, launched the Tiger Bottle, shaped to resemble the brand's mascot.

Health authority endorsement tends to make the promotion of nutritious and safe food products more credible and acceptable. In China, the nutrient supplement Ying Yang Bao has been distributed through public nutrition programmes since 2008. Health authorities have been communicating the nutrition benefits of the product. For NutriGo, which sells Ying Yang Bao directly to the consumer, this provides strong credibility for the product. It is important to note that the products that are manufactured and marketed by the social businesses do not use established Danone brands.

Business benefits and viability: Danone's experience shows that it takes, on average, at least seven to eight years before a social business breaks even. GDFL in Bangladesh has not broken even after ten years, whereas the Chinese NutriGo business, which started in 2013, is expected to break even in 2019. Even then, social businesses are fragile. Like any other young businesses, they face the

classic challenges of emerging countries, such as price volatility or climate events that can damage business viability. These businesses would not have been able to survive within the framework of Danone's commercial business, where shareholder value maximisation would not allow the patience and persistence needed to ensure access to nutritious and safe food products for low-income consumers.

The social business experience also brings valuable benefits to the commercial business in terms of innovation, insights into new markets and consumer segments, and employee development and attraction. The commercial business has adopted numerous lessons learned and innovations that were developed over the past decade through the social businesses. At the same time, Danone employees can benefit from secondment opportunities in the social businesses, which could be transformative for them personally, for the social business they contribute to, as well as for the Danone core business.

Case study 11: Social enterprise Nutri'zaza, Madagascar

(INTERVIEW: NUTRI'ZAZA)

The French development organisation GRET has been working in Madagascar to improve complementary feeding practices since the mid-1990s. It developed a complementary food (Koba Aina) and ensured distribution, sales and promotion of the product (Bruyeron *et al.*, 2010). Concerned with the sustainability of the approach, the partners decided in 2013 to turn the development project into a social business called Nutri'zaza. The enterprise purchases Koba Aina from local producer and distributes it in urban areas using several distribution channels:

- 44 percent of 2017 sales was made in the 'commercial' market: About 5,000 outlets such as pharmacies, modern retail and supermarkets sell single-portion packages of 35 g.
- 33 percent of sales come from the 'social' channel: Nutri'zaza employs around 100 community sales agents who are ambulant vendors. They sell warm, ready-to-eat porridges door to door or in so-called 'baby restaurants' in low-income neighbourhoods.
- In 2017, 23 percent was sold to NGOs, the so-called 'institutional' buyers: The size of this market fluctuates from year to year, depending on calamities and project financing.

Successes

Koba Aina is an affordable complementary food, which costs US\$0.10 per ready-to-eat portion and US\$0.14 for a single-sized pack. This is about two to five times less expensive than the premium products in the market of equivalent nutritional value.

With one daily advertisement broadcasting on TV and radio during the most popular times in the day, Nutri'zaza reaches most of its potential clients, whilst also promoting the product with wholesalers. Nutrition education sessions run at the baby restaurants and offers monitoring of babies' growth; both services attract mothers and promote child nutrition.

In the early project days, Koba Aina was marketed as the cheapest solution for the poor. However, no one likes to be called poor, and the poor prefer aspirational solutions. Therefore, the social enterprise changed the marketing message. It began to emphasise the convenience and nutritional quality of the product: "*Available near your place; good for your child.*" To make Koba Aina more attractive and aspirational, Nutri'zaza renewed its packaging and introduced new flavours.

Challenges

As a social business with some commercial success, Nutri'zaza has started to face stronger competition. To stay ahead of competitors, Nutri'zaza has realised that it needs to invest to diversify its market. The transformation of the project into a social enterprise also has slightly changed its

relationship with the government, which does not distinguish between a commercial and a social enterprise, and which expects fiscal revenue from the company.

Though promotion of complementary foods was allowed in the past, the Malagasy Ministry of Public Health has communicated that this is no longer allowed on the basis of a 2011 ministerial decree that prohibits commercial promotion of breast-milk substitutes. Enforcement of this decree will impact Koba Aina's demand-creation efforts, which may directly impact sales and the overall viability of the social enterprise.

Lack of national product standards for fortified complementary foods makes it even more challenging for Nutri'zaza to distinguish its high-quality product from others that make false claims.

Case study 12: Marketing MNP's by BRAC and Renata, Bangladesh

(INTERVIEW: GAIN) (Afsana, K., Haque, M.R., Sobhan, S. & Shahin, 2014; Kayser, Klarsfeld and Brossard, 2014; Khondker, 2016)

Renata Limited is a pharmaceutical company in Bangladesh that manufactures and supplies MNPs to BRAC, the Social Marketing Company, UNICEF and others. This case study pertains to the distribution of MNPs by BRAC. BRAC is the world's largest NGO. Amongst others, BRAC developed a network of around 90,000 community workers, which constitute a formidable sales force. Through this network, BRAC is able to deliver basic health care services as well as sell products, including MNPs, to hard-to-reach rural and under-serviced urban populations.

Renata Limited produces different affordable MNP brands, including MoniMix, Pushtikona 5 (with five micronutrients), Pushtikona 15 and Sprinkles. The 5-micronutrient composition that BRAC distributes differs from the WHO recommendation of 15 micronutrients, which is based on a Bangladesh Government decision.

Pushtikona 5 is being sold through BRAC's community-based microfranchising system. Over 40,000 female community workers have been trained to promote and sell MNPs in otherwise hard-to-reach rural areas, where cultural habits restrict women's public movement. These women are trusted members of the communities. Initial sales were low in part due to stockouts or gaps in the distribution system. Better stock-in and stockout tools, improved refresher training with a focus on sales techniques and supportive supervision have helped to increase availability. Sales data are being analysed monthly; they distinguish high- and low-sales performers and enable timely course correction.

The MNP cost to the consumer equals 2.50 taka (US\$0.030) per sachet. The MNPs are sold either as individual sachets or in boxes of 30 sachets, which is a three-month supply. The profit margin for the community health worker is 0.65 taka (US\$0.006) per sachet.

The use of MNP to fortify complementary foods at the point of use is embedded in a comprehensive child nutrition promotion strategy. To ensure compliance and effective use, an incentive system was put in place, which offered community workers 60 taka for each child who consumed a full course of MNP (i.e. 60 sachets over a six-month period).

Business benefits and viability: A steady and tenfold increase in sales of the product took place between July 2014 and August 2016. By August 2016, sales had reached 3.9 million sachets per month, with total contact coverage (i.e. children consumed MNP at least once) of close to 1.3 million children. It is estimated that, since September 2014, over 250,000 children have consumed the effective course of 60 sachets over six months. Implementation of behaviour change interventions, including the airing of a TV commercial, started in July 2016. Impact and process evaluations are being carried out for this project, the results of which will be available in 2018. The commercial viability is yet to be determined.

Case study 13: Biofortified seeds dissemination in Zambia

(INTERVIEW: HARVESTPLUS) (Mabaya, 2010; AGRA, 2013; Simpungwe, 2014; Bouis and Saltzman, 2017)

To address vitamin A deficiency in its population, the Government of Zambia is supporting a campaign to replace the consumption of traditional white maize with orange maize, which is rich in beta-carotene and pro-vitamin A; the orange maize was developed by HarvestPlus. One of the first target audiences to be engaged are private sector seed companies, which are needed to multiply and disseminate biofortified orange maize seeds to farmers.

Because private seed companies dominate the hybrid maize seed market in Zambia, upon release of the variety, the Zambia Agriculture Research Institute signed a licensing memorandum of understanding with three seed companies—Zambia Seed Company Limited (Zamseed), Seed Co and Kamano- in which each one of them was allocated one the released hybrids under an exclusive commercialization modality.

To scale up biofortified maize to reach more households in more provinces, the main challenge is to ensure extensive distribution of seeds through private networks to outlying areas. To this end, Zambia Agriculture Research Institute and HarvestPlus incentivised the three seed companies and facilitated the initial production and marketing of the biofortified maize during field days and agriculture shows. Initial seed production was below target, as it had to be grown during the winter off season, when farmers faced irrigation management issues. In 2014, however, one of the companies managed to produce about 200 tons of seed, whereas the two others focused on 2015 seed production.

Because many rural households that purchase from agrodealers cannot afford to buy large quantities of seed, HarvestPlus worked with the private seed companies to ensure that large quantities of smaller, affordable pack sizes would be available. After commercial introduction, seed companies monitor the market demand for hybrids and collect information from their retail outlets and field representatives to forecast and implement the subsequent seed production.

The current seed market for maize hybrids in Zambia is estimated at 15,000 tons per year. This is projected to increase to 18,000 tons by 2018. In 2013, 11,000 households were reached with orange maize. In 2015, this already increased to 126,000 households. HarvestPlus expects that at least 500,000 farming households in the country will be growing orange maize by 2020. To ensure long-term sustainability and competitiveness, seed companies have plans to engage in vitamin A maize breeding, thereby establishing their own vitamin A maize product lines.

Case study 14: Orange-fleshed sweet potato baked goods by Tuskys Supermarkets, Nairobi, Kenya

(INTERVIEW: TUSKYS; Desk review: http://tuskys.com/index.php?route=product/category&path=59_68) (Bocher *et al.*, 2017)

Tuskys is a leading regional retailer with 55 branches in Kenya and 7 branches in Uganda. Since its establishment, the retail chain has seen itself at the forefront in promoting healthy living.

Euro Ingredients Limited and Centro Internacional de la Papa introduced orange-fleshed sweet potato (OFSP) to Tuskys when Tuskys was developing a line of healthy bakery products. Tuskys seized this new business opportunity to create a competitive advantage through its healthy product range. In addition, the OFSP puree could serve as a partial substitute for the costly imported wheat flour. Thus, Tuskys could procure from local farmers and generate additional revenue for the company.

Centro Internacional de la Papa trained Tuskys personnel on the use of OFSP puree in their baking applications to make sweet potato bread and other baked goods. Sweet potato bread has now become commercially viable, and it is rated number one in the specialty bread category in terms of sales performance.

It is Tuskys intention to roll out OFSP products in all its 40 plus branches to increase the uptake. The customer response has been great, and it is expected to increase through a customer awareness campaign. Demand is high, and stores run out very quickly after stocking. The inconsistent supply of the OFSP puree is the major constraint, as the producing area is 500 km from Nairobi, the main market. Tuskys is not interested in producing the puree from raw sweet potatoes. It needs a reliable business partner that can supply high-quality OFSP puree on a consistent basis. This has led to the development of a vibrant secondary market in the OFSP growing region, where producers are selling approximately 75 percent of their crop to aggregators who supply the puree to the manufacturer (Organi Limited [K]). The other 25 percent that does not meet the buying specifications of the aggregators goes into the local market; it is purchased by the regional population or consumed at home by OFSP producers.

Substituting 50 percent of wheat flour with OFSP puree is estimated to reduce the cost of producing bread and buns by 13 percent. Thus, incorporation of OFSP puree in a baked product provides a cost-cutting avenue whilst providing consumers with organoleptically acceptable and vitamin A-rich product (Amagloh, Mzamwita and Bukania, 2015). Tuskys baked products target mainly middle-class, urban consumers who procure their food from supermarkets. The first OFSP bread was marketed in six Tuskys stores in June 2015 at a premium price (5 Kenyan shillings more than its regular bread); OFSP bread reached 20 stores by August 2016.

Consumer preference ratings for the four OFSP products are higher than the corresponding control products. However, consumer ratings for the products' physical characteristics (colour, smell, taste and texture) are not significantly different between OFSP and control products.

“The bread and buns come in different flavours to give customers variety. We for instance have our popular sweet potato bread/buns that are healthy and low in calories.”

Pillar 3: Case studies on improving nutrition in the workforce

Case study 15: Breastfeeding in the workplace, Kenya

(INTERVIEW: UNICEF) (Safaricom, 2017)

Kenya has very progressive maternity protection policies and laws in place, including a 90-day paid maternity leave (which was mandated in the Kenya Employment Act, 2007) plus the right to optional flexible work when a woman returns to work after a 14-week maternity leave. The Kenya Employment Act also recommends one or two breaks daily or reduced working hours for women so that they may breastfeed their children up to 9 months of age.

UNICEF Kenya, in collaboration with the Kenya Private Sector Alliance (KEPSA) set out to engage with companies along many agriculture value chains, such as flowers and tea, with the purpose of documenting current practices and best practices and advocating for improvements in workplace breastfeeding policies. They experienced that companies were not lining up for this collaboration: after one full year of dialogue, a consortium of smaller local companies stepped out, and only one large international company (anonymous) expressed interest in further steps.

The objective of UNICEF's workforce nutrition programme is to increase exclusive breastfeeding rates, which drop sharply at the average age of 15 weeks. This drop coincides with the mother's return to work after a legalised 14-week maternity leave.

Assessment

The international company was following all of the national regulations and expected to tick all the boxes. However, a baseline assessment of current practices showed that female employees returning to work after the 14-week legal maternity leave had to achieve identical productivity targets as any other worker. As per legal requirement, the company also offered optional flexible work to allow women to breastfeed their babies. However, in practice, none of the women chose this option as they could not afford to make that choice, which implied a lower salary. The assessment also revealed that the workplace was too far from the day care to enable the mother to go there to breastfeed her child. Most young mothers therefore stopped breastfeeding after returning to work. When the senior management looked at these results, they decided to do more (INTERVIEW: UNICEF).

Intervention

Reducing the productivity targets for lactating women was not an option for the business, but they were open to try and bring the child closer to the mother. As a result, the company opened two child care centres and placed the lactating mothers who worked out in the field close to the day-care centre. The centre offered rooms for mothers to breastfeed and express breast milk, as well as facilities to store breast milk. Whilst breastfeeding, mothers can watch short behaviour change videos on nutrition and hygiene topics. Though mothers needed to contribute financially to the child's day care, this was affordable to them.

UNICEF is implementing social and behaviour change activities in the community surrounding the company's workplace. It also is working with women's groups to develop additional child care facilities. The company aims to do a cost-benefit analysis to estimate the impact of offering opportunities to continue breastfeeding on variables such as sick leave (INTERVIEW: UNICEF).

Lessons learned

It proved challenging for UNICEF to engage companies that work in agricultural value chains in activities to improve their workplace support for breastfeeding. The global company that partnered with UNICEF can serve as a role model for smaller companies.

In contrast with the agricultural value chains, UNICEF observed many very progressive examples of breastfeeding and maternity protection policies in urban Kenyan businesses that compete for higher-educated personnel, as was the case in the financial and mobile telephone sectors. For example, Safaricom provides an extensive package of benefits with a child day-care facility run by childcare professionals at no charge, on-site medical care if children fall sick, a mothers' room for expressing milk and breastfeeding, medical insurance for antenatal care and delivery, free immunisation of children up to 9 months of age and healthy choices in the cafeteria, where children can join their mothers for any meal (Safaricom, 2017).

Case study 16: Introducing workplace nutrition by Groupe Bel, global

(INTERVIEW: GROUPE BEL)

Groupe Bel is a 150-year old family company in France, which produces cheeses that are packaged in single-serving portions. The company is present in 33 countries and has 30 production sites on five continents; it sells its products in around 130 countries.

In 2015, following a public commitment to the Scaling Up Nutrition Business Network (SBN), Groupe Bel initiated a pilot in three countries to improve the nutrition of 3,000 employees. The first step was

to create internal buy-in, especially from the human resource and workplace safety teams. This required several sessions to explain the importance of nutrition and to discuss potential interventions. A toolkit was developed with four intervention areas:

- Nutrition education.
- Physical activity.
- Infrastructure (access to water, a canteen or other places to buy healthy food).
- Breastfeeding support.

For each intervention area, a menu of activities is proposed, from which the country teams are supposed to select at least one per area. In countries where the ministry of health issued national guidelines or policies (e.g. maternity protection or breastfeeding policies), a country team could also decide to follow one of those recommendations. Each country programme would therefore be different. In Morocco, for instance, the country team decided to enhance the nutritional quality of the canteen meals based on the company nutritionist's review of menus and recipes. In Egypt, the country team organised private consultation sessions between a nutritionist and the interested employees in the head office.

Successes

Following the three-year pilot, Group Bel launched the global rollout of its workforce nutrition programme in late 2017. The programme will reach at least 11,000 office and factory staff. It also will be made available to its distributors. Internal buy-in and support of the global and country human resource teams, as well as flexibility in the approach, are key factors for success.

Obstacles

Actions that are considered optimal from a nutrition point of view may not be easy to implement due to cultural perspectives. For instance, the French human resource team considered breastfeeding to be a personal choice, part of the privacy of employees. They therefore opted to offer support to those women who choose to breastfeed but not to promote breastfeeding in the workplace, as this choice lies outside the work environment. In the French workplace, therefore, doctors and nurses will give leaflets with breastfeeding advice to support working mothers who choose to breastfeed, but there will be no posters to promote breastfeeding directly to workers.

Intended impact

Taking an iterative step-by-step approach, Groupe Bel realises that there may not be any measurable behaviour change in the short term in the food and nutrition practices of participating employees. When additional actions are added to the programme over time, it is expected that the programme will have more impact. Countries will be asked to report annually on their actions.

Lessons learned

- Implementing a programme across so many different geographies requires flexibility and room for different cultural perspectives in the approach.
- An iterative approach helps to create buy-in, as the implementation of a comprehensive programme would require too many resources at once.

Case study 17: Improving nutrition for workers in the cocoa value chain

(INTERVIEW: SUSTAINABLE TRADE INITIATIVE) (Cargill, 2017)

Sustainable Trade Initiative

Many large international cocoa processors and buyers (Nestlé, Mondelēz, Barry Callebaut, Olam, Hershey's, Cargill, ECOM and Touton) have joined the Sustainable Trade Initiative (IDH) and GAIN to better understand the nutrition situation of smallholder cocoa farmers and their families in Ghana and Cote d'Ivoire and to identify possible interventions to improve the current situation.

The motivation for the companies lies in the fact that cocoa, which has a low productivity, does not earn a cocoa farmer sufficient money to feed his or her family. Studies have shown that malnutrition in the poor cocoa-producing regions is high. The international processors and buyers have tried to increase the income of the cocoa farmers by initiating other income-generating activities. For instance, ECOM in Ghana has developed snail- or fish-growing activities for women. However, they found that more income did not mean that more money was spent on health and nutrition.

Investing in the sustainable livelihood of cocoa farmers contributes to the sustainability of the cocoa supply; without such investments, farmers might abandon the industry in search of a better income. In studying this, the first step has been to generate baseline figures on nutritional issues, such as anaemia and the lack of dietary diversity in cocoa-producing regions. After desk research has been concluded, the study will be complemented with field-level data on dietary diversity of smallholders in cocoa-producing regions. Touton and ECOM are collecting data in two areas of Ghana, whilst Olam, Cargill and Barry Callebaut are focusing on data collection in three zones of Côte d'Ivoire. The initial results will offer a clearer picture of the current state of nutrition in the cocoa sector.

The second step is for the partners to discuss the outcome of the studies. The partners also need to understand possible approaches to improve the nutrition status and increase access to diverse diets. Though no decision on the menu of interventions has been made, the third step of the assessment is to look at implementation. The intent is not to create new programmes but to piggyback on existing income-generating activities to make them more nutrition-sensitive. Currently, different international companies implement different income-generating programmes, including stimulating aquaculture, providing school meals and establishing kitchen gardens.

Cargill: The Cocoa Promise

Cargill is one step ahead in that it has announced many specific commitments to improve the livelihoods of farmers and their communities and to support good nutritional practices for cocoa-producing communities in many countries by 2020. In Cote d'Ivoire for instance, Cargill is working to ensure community-based awareness of education, health and nutrition through the implementation of community action plans. The company aims to reach approximately 21,000 individuals in 30 villages to train community nutrition advisers and community food-crop promotion advisers to support income-generating opportunities. The objectives are to increase economic access to better nutrition, to specifically promote exclusive breastfeeding to all communities and to construct or renovate 30 school canteens or water pumps.

Cargill works with a Swiss contact to improve health outcomes in cocoa-farming communities in Sulawesi, Indonesia, by providing nutrition and health training. Over 16,000 community members have learned how to grow vegetable gardens and maintain fishponds to ensure access to diverse sources of nutrients. In addition to improving community health, the training helps women to develop new means of generating income. Also, farmers are encouraged to diversify their crops to improve their economic resilience. For most programmes, Cargill reports on reach and the number of people trained. In a similar programme in Ghana, the dietary diversity score was measured, which showed that it had improved from 4 to 6 food groups. This was based on a scoring system developed by CARE, which includes 12 food groups in total; a score of 7 or higher indicates good nutrition.

Lesson

International companies invest in their cocoa suppliers not only to increase productivity but to enhance resilience of their cocoa farmers and to ensure a sustainable supply of good-quality cocoa.

It is too early to know the successes and challenges of the work done by IDH and its partners, but one lesson has been learned already: to develop locally relevant interventions based on (1) evidence of community needs and priorities, and (2) existing platforms.

Case study 18: Symrise—nutrition and food security of vanilla producers in Madagascar

(INTERVIEW: SYMRISE; Desk review: <https://vanilla.symrise.com/>) (Symrise, 2016)

Symrise is a global supplier of fragrances, flavourings, speciality cosmetic ingredients as well as natural ingredients for food and pet food. Their flavour products are heavily dependent on natural raw materials such as fruits, vegetables and vanilla. Symrise buys its vanilla in the Sava region in Madagascar, where farmers are usually confronted with a lean season that lasts up to three to four months. This period—prior to the rice and vanilla harvests—is characterised by food insecurity and low dietary diversity, which result in a high potential for malnutrition. To buy food or meet other urgent household needs, farmers are tempted to sell their vanilla in advance or borrow money from the so-called ‘vanilla flower contractors’ against a poor 10 to 40 percent of the market value of the vanilla. This leads to lower income for the farmer family.

Dependency on vanilla is high in the Sava region, driven in part by the very high vanilla prices on the global market. Farmers therefore do not see the immediate benefit to diversifying their income by planting other crops or developing other income-generating activities. As a result, vanilla-farming communities are extremely vulnerable to risks of crop theft, vanilla harvest failure or price drops.

It is in Symrise’s commercial business interest to make the vanilla sector more sustainable and to build the resilience of the vanilla farmers. Creating robust and self-sustaining communities will secure a stable high-quality vanilla supply. For this purpose, Symrise has implemented many initiatives in the past that use effective partnerships with their global customers, local and international NGOs and technical agencies. These initiatives include:

1. Provision of interest-free rice loans helps to reduce the impact of the ‘lean’ season and prevents farmers from being forced to sell their vanilla harvest early at low prices. Ensuring access to rice, the staple food of the vanilla-farming communities, provides both food security and financial security.
2. Provision of health care insurance offers families more resilience in case of a health crisis and prevents them from going into negative debt spirals.
3. Provision of mother and child nutrition training and the initiation of vegetable gardens, in collaboration with Save the Children, improve dietary diversity of the farmers, with a specific focus on infants and children.

Successes

Symrise has fully integrated along the value chain with farmers and partners, implementing interventions that have high local relevance because they address local problems. Symrise started these interventions in partnership with GIZ eight years ago. Unilever joined the partnership five years ago. More recently, Save the Children came on board.

Relevant interventions that resonate with the farmers (and ultimately consumers) help to create a powerful emotional connection between supplier and farmer. In return, Symrise obtains supplier

loyalty, as vanilla farmers see Symrise as their preferred buyer. As a farmer said: ‘Many come and say good things, but we do not see them again; but Symrise always comes back!’

Challenges

In a poor country such as Madagascar, there is a general under-investment in public health, infrastructure and education. The population is poor, and incomes are vulnerable, which lead to market issues such as the risk of theft. To avoid their harvest being stolen, many farmers harvest their vanilla early. This leads to lower quality of the crop and consequently a lower income.

Symrise is implementing its initiatives with many partners, including its global customers such as Unilever, and actively seeking to expand these initiatives, bringing other co-investors to scale the impact of their proven practice of change. Recently, Symrise—together with its partners Unilever, GIZ and Save the Children—started to expand its initiatives to the most vulnerable families in the communities, who may not be vanilla farmers. They aim to make the entire community more resilient and robust. This can create some understandable tension with the vanilla farmers, who see the advantages that previously were linked to vanilla production suddenly becoming available to others who do not need to make the same effort to grow vanilla to high-quality standards.

Way forward

Symrise is in this for the long haul, because vanilla is their business, and it is in their interest to uplift the vanilla-farming communities, so this is not a project from which they will ‘phase out.. Additional partners will be brought in, especially private sector companies with different competencies and expertise—for instance, to bring solar energy to Sava or to enhance rice yields.

Case study 19: Unilever and Marcatus QED—Seeds of Prosperity

(INTERVIEWS: UNILEVER, MARCATUS QED, GLOBAL ALLIANCE FOR IMPROVED NUTRITION, AND THE SUSTAINABLE TRADE INITIATIVE)

Motivation

As part of Unilever’s Sustainable Living Plan, the company reviewed many supply chains to identify whether there were any specific issues concerning people’s livelihoods. Whilst focusing on their smallholder tea, gherkin and vanilla supply chains, malnutrition and dietary diversity came up as key concerns. The company decided to aim for improving the dietary diversity of farmers’ households within these supply chains. This focus also fits with the strategy of Unilever’s Global Food Category, where (fortified) food products are being positioned as part of healthy eating, which starts with dietary diversity as the basis.

Apart from the tea that it produces, Unilever is mainly a buyer, so it needs to work through suppliers to implement nutrition-improving interventions. In the case of gherkins, Marcatus QED, the global agri-food solutions supply chain company, welcomed Unilever’s project to help enhance their livelihood and productivity improvement efforts and to strengthen relationships along the supply chain. Farmer loyalty is especially important when working with a short-term crop, such as gherkins, in a highly competitive environment. Additionally, new farmers require investments into training and equipment. As part of their Responsible Farming Program, Marcatus QED integrated a hygiene and nutrition programme with efforts to improve yields through sustainable agricultural practices and to uplift farming family livelihoods.

Interventions

The objective of the Seeds of Prosperity programme was to improve the dietary diversity score, and thus the nutrition, of farmer families. To this end, Unilever, with support from GAIN, developed a behaviour change module and stimulated the growth of vegetable gardens. This was based on

Unilever's behaviour change approach, called Five Levers of Change, which was successful in promoting handwashing-with-soap behaviour (Unilever, 2011). A pilot was set up in India to test the approach in partnership with Marcatus QED, with gherkin farmers and in Unilever's own tea plantations.

To fit within the very short, intensive gherkin cultivation period, a nine-week context-specific behavioural change intervention was designed, which spoke to diet diversification and hygiene topics. Printed behavioural tracking sheets, specialised local nutritional food guides, healthy shopping lists and kitchen garden seeds were distributed to participating farming families. At the end of the intervention, participants were rewarded with a reinforcement Snakes and Ladders game that included nutrition and hygiene messaging.

At baseline, only 2 percent of the farming families were consuming adequate diet diversity to satisfy their nutritional needs. Results from the endline survey showed that 67 percent of the farmer families reported an increase in the number of food groups consumed. After the interventions, 30 percent of the farmers were also found to be washing hands with soap more frequently. In addition, this programme was found to contribute to farmer loyalty: 82 percent of the farmers indicated that they would want to work with the same supplier again in the next season.

Successes

In the business context, it is a prerequisite to identify an internal champion who believes in and is willing to invest in a new approach. This was not the case at the start of the Seeds of Prosperity programme, which was funded with Unilever corporate social responsibility funds. This was because, at the time, none of the Unilever business categories was interested. However, with a shift in leadership and strategy in the Global Food Category, the business now considers the focus on dietary diversity as providing a home for its branded products.

The Seeds of Prosperity programme was launched side by side with the Marcatus Mobile Education Platform, which is a video-based education platform that empowers field officers with improved knowledge and tools to better educate farmers. The specific gender-awareness component of the Marcatus Mobile Education Platform helped the predominantly male field extension staff to engage with women during the nutrition trainings.

The Indian pilot generated positive results. Unilever therefore decided to further roll out this approach in its own tea plantations in India and Kenya. In the tea supply chain, Unilever is the largest global buyer. Hence, it has a lot of leverage to catalyse change with suppliers in the rest of the sector, in collaboration with the Sustainable Trade Initiative. In other supply chains, such as gherkins, Unilever is only a small player; it therefore plays more of a facilitator role, depending on suppliers to progress investments.

Challenges

Creating internal business buy-in for the lifetime of the project can be as challenging as creating buy-in from the suppliers. Not all suppliers are queueing up to be part of a voluntary programme (as opposed to obligatory activities—for instance, obtaining Rainforest Alliance certification). It took Unilever time and engagement to explain the benefits of nutrition interventions to get proper buy-in of suppliers.

Marcatus QED also encountered challenges during implementation. As the programme was launched, the industry was hit with several years of drought. The pressure put on field officers to secure sowings and support farmers during their production took priority. The distances between farmers also grew larger. Even though the sessions were designed to be quick and rewards were given for outreach, the additional workload that field officers acquired from adopting both the

nutrition and hygiene education and the mobile education platform came second to their main job of giving direct agricultural support to farmers to ensure a productive crop.

Though the nutrition programme may contribute to increased loyalty among supplying farmers, it is not the only factor to drive a farmer's decision to repeat working with a supplier. Additionally, running the programme with individual farming families can also be a relatively expensive investment for some suppliers to carry themselves, especially for short-term crops. Benefits, with regards to a sustained impact on dietary diversity as well as a business return on investment, need to be realised to justify long-term investments into these programmes.

Way forward

Marcatus QED sees great value in this programme. It is exploring how to use the materials and methodology developed, and how it can be integrated more effectively into their other programmes to support its continued expansion.

Unilever has decided to continue investing in improving nutrition of the workers in their own tea plantations in India and Kenya. Impact will be measured three, six and nine months after the implementation of the behaviour change modules.

The sustainability of the implementation of nutrition interventions by local suppliers will probably depend on the inclusion of nutrition indicators in a certification scheme. Questions remain open as to which indicators would need to be included, what interventions would be needed to comply and how compliance can be monitored.