



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Nutritious Food Financing Facility Program Review Report



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Acronyms

DHS	Demographic and Health Survey
FAO	Food and Agriculture Organization
GAIN	Global Alliance for Improved Nutrition
IFC	International Finance Corporation
LMICs	low- and middle-income countries
M&E	monitoring and evaluation
N3F	Nutritious Foods Financing Facility
NGO	nongovernmental organization
R&D	research and development
RFS	Resilience and Food Security [USAID Bureau for]
SDG	sustainable development goal
SMEs	small- and medium-sized enterprises
TA	technical assistance
TOC	theory of change
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
USAID	U.S. Agency for International Development
VA	vitamin A

Executive Summary

The program review is a qualitative assessment that examines the relevance, uniqueness, consistency, and feasibility of the Nutritious Food Financing Facility (N3F) theory of change (TOC) and plans to achieve it via the selected mechanism (N3F). The aim is to understand the extent to which N3F is likely to establish, improve, and sustain an effective approach for increasing investment in, and supply of, nutritious foods for low- and middle-income consumers, and with what consequences for the nutritional status of vulnerable populations. The review will also provide recommendations on how to improve the likelihood and scale of success.

We use a variety of methods as the basis of this review. Our intent is to identify specific components of the TOC—including both stated and unstated assumptions—that deserve careful consideration and may need to be revisited or revised. We bring a variety of perspectives to bear on the N3F and its TOC to point to specific priority areas for clarification and refinement. This report builds on the very substantial efforts by the Global Alliance for Improved Nutrition (GAIN)-led N3F team and their collaborators. With few exceptions, the issues we raise are familiar to the N3F team. Our added value is in “bundling” and prioritizing what they have considered, and reviewing these issues through three lenses: *experience* (as articulated to us by individuals active in domains relevant to the N3F program), *literature*, and *economic theory*.

By situating the N3F in a broader conceptual context, we elucidate dimensions of heterogeneity that will likely determine the success of the N3F in achieving its stated goals. These dimensions include (1) the structure of the supply-side firms and segments that shape the food environments in low- and middle-income countries (LMICs), (2) the food products that are specifically targeted by the N3F relative to a simple food product typology that emphasizes differential profitability, risks, and nutritional impacts at the product level, and (3) the sources of evidence or insight that provide a basis for evaluating the TOC.

The N3F fundamentally aims to help correct a market failure. Both private- and public-sector decision makers undervalue the benefits of more nutritious foods; willingness to pay is too low and hence demand and consumption are socially suboptimal. Decision-makers at all levels have to deal with these issues, practically; our task is to reflect on what role N3F might play and how to adjust the program’s TOC so that it can guide N3F investments to make them more appealing to potential N3F investors and more socially impactful.

There is a clear need for substantial additional credit and technical assistance among small- and medium-sized enterprises (SMEs) in the food sector in LMICs, particularly in sub-Saharan Africa. This need is not new; some needs are being filled by existing formal and informal lending institutions. However, large niches remain and novel funding and technical assistance mechanisms will be required to fill them; doing so has the potential to improve the food environment and thereby influence dietary diversity and diet quality in LMICs.

Based on our discussion of key issues that will affect the attractiveness and potential impacts of the N3F in Section 4, we derive the below suggested modifications to the TOC.

Recommended Modifications to the N3F Theory of Change	
4.1.1	Describe how the N3F will select SMEs and determine which specific firm activities it will target among the selected SMEs.
4.1.2	Link the ultimate outcomes in the TOC to a few specific SDGs that reasonably relate to the intended impacts of the N3F on local food environments.
4.1.3	Explain why promising SMEs producing nutritious foods have been overlooked by impact investors until now if they have such potential for generating profits and impact.
4.2.1	Clarify which of the N3F firm activities are expected to enhance profitability and how the specific set of activities and SMEs will shape the risk and return of the overall portfolio.
4.2.2	More clearly articulate the temporal links among the various inputs, outputs, etc., to quickly and convincingly convey the time frame for stages of N3F effects.
4.2.3	Discuss the market characteristics and conditions that are presumed to exist in the competitive food markets targeted by the N3F and are necessary for success.
4.3.1	Relabel and downplay the final two columns (impact level) of the TOC matrix. Remove citations in these columns, as they are either misleading or not especially relevant for LMICs.
4.3.2	Because diets matter and should help locate and shape N3F investments—explicitly mention this at the outset of the TOC.
4.4.1	Reductions in food losses and food waste, and improvement in food safety, should be treated as co-benefits rather than primary targets. Also, the TOC should note that these co-benefits may require additional natural resources and/or entail other complications.
4.4.2	Describe the factors the N3F will ensure that SMEs will comply with directed investments.

We conclude with several final reflections. First, there appears to be a fundamental tension between this rigorous and comprehensive review and the way impact investing typically functions. This call for rigor and detail is laudable, but may do little to improve the appeal of the N3F relative to competing impact-investing alternatives. Second, we have come to view a successful TOC as one that effectively bridges what comes before and after it—and one that creates room for better understanding how SMEs contribute to food environments, and how to manage those contributions. Third, impact investors vary widely in how they weigh expected impacts against expected returns, and in how seriously they think and wish to know about impacts. The N3F would benefit from a clearer articulation of what type of impact investor it is aiming to attract, and should ensure that the TOC speaks to this target. This could be elaborated in a guidelines document that could accompany the N3F mechanism and TOC.

What role should USAID play in promoting and supporting the N3F? We offer three answers to this question. USAID could play an important role in a few ways:

- By ensuring that GAIN has the support it needs to make the needed modifications to the TOC—but more importantly, to develop and outfit the N3F teams required to do the upfront “spadework” that precedes the elements of the TOC, and the work that follows the TOC, especially the sales, fund management, and monitoring and evaluation (M&E). Seed money for these formative investments will not come from institutional investors, but investors can be tapped to sustain them.

- By reducing the risk that is inherent in the N3F, including the specific features that make it risky, even relative to other impact-investing options (e.g., local currency loans).
- By helping to continually articulate and promote the economic wisdom and social imperative of investing in improved human nutrition and the linkages to the SDGs, and helping to highlight the novel space that N3F occupies at the confluence of food systems and private-sector engagement.

I. Introduction

Food systems are currently drawing peak interest on the global stage, with particular attention to patterns of availability and affordability of nutritious diets within and across countries (Bai et al. 2021) and policy options for addressing inequities. The 2021 United Nations (UN) Food Systems Summit epitomizes this showcasing of food systems as central to the development and growth of people, communities, and economies. And in this spotlight moment, the private sector has never played a more central role in the functioning of food systems and their impact on human lives. The Global Alliance for Improved Nutrition (GAIN) conceptualized the Nutritious Food Financing Facility (N3F) as an impact-investment vehicle for supporting small- and medium-sized enterprises (SMEs) engaged in nutritious food supply chains, including procurement, processing, and distribution.

The N3F offers a novel approach to directing and catalyzing private-sector engagement in food systems in ways that have the potential to enhance food environments and health and nutrition outcomes. The N3F aims to have a direct impact on these firms and the food products they offer to local consumers, and thereby enhance the evolution of food systems in low- and middle-income countries (LMICs) to improve nutrition. These broader intended effects are envisioned as occurring through a host of hypothesized multipliers in local markets and food environments (so-called “pathways to scale”). At a higher level, part of this impact may consist of demonstration effects that the N3F, as a proof of concept, could have on similar purposeful impact-investing vehicles that target SMEs with the goal of enhancing the availability, affordability, and convenience of nutritious foods in urban and periurban markets. Several stakeholders and interested observers seem to be watching closely to see what lessons can be learned from the design and operation—the successes and failures—of the N3F.

In this report, we offer a systematic and critical review of the theory of change that underlies the N3F. As stated in the scope of work that initiated this review:

“The program review is a qualitative assessment to examine the relevance, uniqueness, consistency, and feasibility of the N3F theory of change and plans to achieve it via the selected mechanism (N3F). The aim is to understand the extent to which N3F is likely to establish, improve, and sustain an effective approach for increasing investment in, and supply of, nutritious foods for low- and middle-income consumers, and with what consequences for nutritional status of vulnerable populations. Specifically, it will query the existence and importance of the problems the N3F seeks to address, how well the N3F model aligns to the problems it has identified, and how well its mechanisms are likely to work to implement that model in practice. It will also provide recommendations on how to improve the likelihood and scale of success.”

In our review of the N3F, we harness a combination of methods, including review of published peer-reviewed and gray literature, relevant conceptual and theoretical frameworks, and interviews with key stakeholders. Since this work is proceeding concurrently with preparations to formally launch the N3F, the program review is not intended to determine whether the N3F proceeds as planned, but rather to provide a critical and constructive assessment of the constituent elements of the N3F TOC—that is, to examine the elements themselves for clarity and relevance, and to assess the validity of the assumptions embedded in these elements and relationships—in order to formulate realistic expectations for its intended impact on diets, and to offer insights that might help frame its future progression. In GAIN terminology, this review is meant to be “formative, not summative.”

We first provide a more detailed description of the mixed methods we deploy to conduct this review. We then provide a broader conceptual and theoretical framing of the TOC, which will help, in part, shed light on how we tap different sources of insight to evaluate key elements of the TOC. Against this backdrop, we then discuss a series of critical considerations related to the N3F and linkages in the TOC. In discussing these considerations, we rely on a mix of empirical evidence from peer-reviewed literature,

expert perspective and experiences, and basic economic theory. Our discussion of these considerations provides the basis for recommendations aimed at refining the N3F TOC and implementation going forward.

2. Methodology

Our review of the N3F takes a complementary, mixed-methods approach and aims for breadth more than depth. Our intent in this review is to identify specific components of the TOC—including both stated and unstated assumptions—that deserve careful consideration. We bring a variety of perspectives to bear on the N3F and its TOC in order to shed light from different angles and point to specific priority areas for clarification and refinement.

The point of departure for this review is the TOC as embedded in the N3F. To ground our subsequent review, we begin by providing a broader conceptual context for the N3F that incorporates the N3F TOC as explicitly articulated by GAIN. Seeing the N3F in this broader context enables us to frame and discuss key features of the TOC.

We then leveraged this conceptual framing of the N3F as a structure for organizing our review of the TOC. Specifically, we tap three primary sources as the basis for our assessment. First, we conduct a broad survey of the extant literature related to key features and assumptions of the N3F, with a special focus on empirical evidence from reliable peer-reviewed publications. This corpus of evidence includes over 130 published articles. Instead of presenting in detail here this broad survey of the literature, we incorporate what we consider the most relevant and insightful evidence directly into our Critical Considerations in Section 4.

Second, we rely on basic economic theory as the basis for evaluating key features and assumptions for which empirical evidence is lacking. By using theory in this way and for this purpose, we aim simply to generate insights that can fill critical gaps in the evidence base. In this sense, economic theory related to profit maximization in firms, income and price effects among consumers, and interconnections through markets provides a structured, consistent, and rigorous way of thinking about these gaps. Note that theory offers a structured way of thinking, but need not be represented in mathematical or graphical form; indeed, given the purpose of this review, we will invoke economic theory primarily in words, with a primary focus on the underlying intuition and logic. For example, by structuring our thinking about the food systems in which food SMEs compete, we are able to represent the TOC and its intended effects in a systematic manner that opens these key assumptions to interrogation. Particularly important in this regard are the various multipliers that ostensibly will enable the N3F to have an outsized impact on food environments. Our conceptualization of the supply side of the food sector helps ground our discussion of these direct and indirect effects. We invoke basic producer theory to highlight the important role that fungibilities within a firm may play in mediating the impact of N3F support in practice. Similarly, we use consumer demand theory to frame an assessment of the final pathways in the TOC that link a nutritionally enhanced food environment to changes in dietary intake and ultimately to improved health outcomes for target populations.

Third, we relied on the insights and perspectives of those most directly familiar with the SME landscape, and with financing and food environment spaces so central to the N3F. We did this in several ways. We engaged Tom Reardon (Professor, Michigan State University) and Alice Chapple (Director, Impact Value) as expert consultants on this project and regularly sought their input and direction as we structured our review methods and sought to interpret our findings. They have both provided constructive and critical feedback to earlier versions of this report. In addition, we identified dozens of potential key informants and conducted interviews with a subset that we determined to be especially high-priority (see annex 1). We used an interview guide that covers a range of issues relevant for the N3F TOC (see annex 2).

In addition to these three primary sources, we relied on two secondary sources of insight and information related to the N3F. We explored some survey data and descriptive statistics to form an empirical characterization of food habits in specific food environments, habits that are ultimately the

“site” of the intended N3F effects. We believe this data work, while clearly secondary in the context of this review, is nonetheless insightful and raises a number of questions about specific “baseline” details that define the food markets and dietary patterns that typify the kind of settings the N3F is targeting. We also surveyed the many related initiatives and policies that attempt to leverage specific investments, incentives, or technical assistance to encourage private sector activity. To the extent the experience and impact of these efforts are documented, they also provide an additional source of evidence for evaluating the assumptions embedded in the TOC.

With the various elements of this mixed methodology in mind, the relationship between our research approach and the structure of this report is worth noting. Instead of describing the results of each methodological element in sequence, we have opted for a more synthetic and, we believe, more useful structure for this report. The substantive core of our review as captured in this report is contained in the Critical Considerations of Section 4, which organizes and discusses in detail the most important considerations that have emerged in this research. While we try to distinguish in that section between evidence provided by the literature, insights from theoretical perspectives, and experiences and views of key informants, we also strive for synthesis across these primary sources.

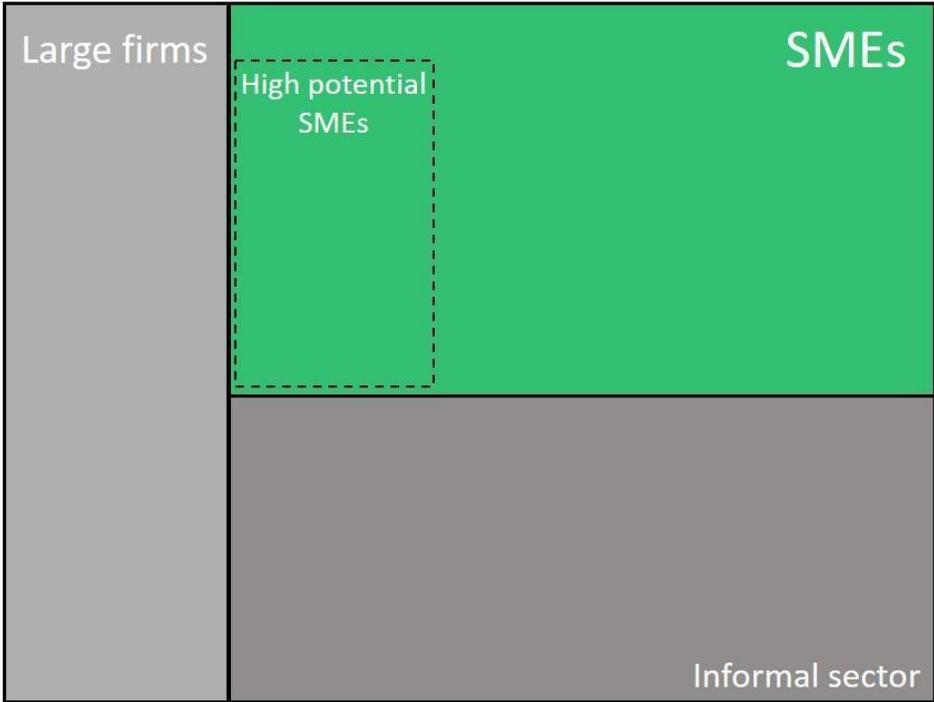
3. Conceptual Underpinnings of the N3F

In this section, we explore several key conceptual underpinnings of the N3F in order to shed light on the broader landscape in which the N3F aims to achieve its intended impact on food environments and on health and nutrition outcomes of vulnerable populations. We begin with a stylized supply-side representation of the producers and retailers that constitute the food environment in the urban and periurban settings typical of the five priority countries for the N3F (Kenya, Mozambique, Nigeria, Rwanda, and Tanzania). We then impose a product typology on the specific nutritional food targets of the N3F. Finally, using the N3F's social impact grid as the most detailed articulation of the TOC, we identify key linkages that deserve attention and describe how our methodology differentiates among various types of linkages.

3.1 Stylized Supply-Side Representation of the Food Environment in LMICs

Consider three types of enterprises producing and distributing food in urban and periurban markets in priority countries: (1) large food firms that include multinational firms, their subsidiaries, and national or regional firms, (2) SMEs, and (3) informal-sector enterprises. Figure 1 depicts these three segments of the food environment in LMICs. This stylized depiction is *roughly* (but by no means precisely) scaled according to the relative importance of these segments to the production, distribution, and retailing of food to end consumers in urban and periurban markets in LMICs, with the majority of food supplied by SMEs and the informal sector. This figure designates *high-potential SMEs* as a subset of the complete food SME segment. Firms in the dashed box have the kind of management, governance, and growth potential that the N3F would consider as prerequisites for supporting as part of the facility.

Figure 1. Stylized Representation of the Three Main Supply-Side Segments of the Food Environment in Urban and Peri-Urban Food Environments in LMICs



Note: Proportions of boxes are roughly scaled according to relative importance of each segment.

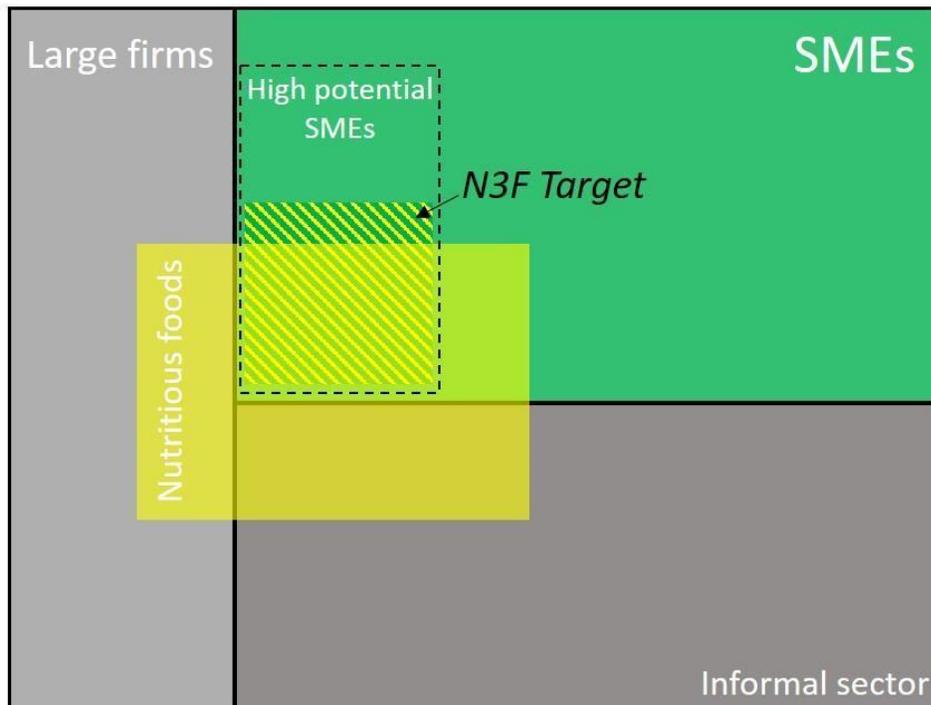
While this simple depiction of the supply side of the food environment abstracts from reality in many ways, two such abstractions are worth noting. First, SMEs in LMICs are extremely heterogeneous and span a remarkable range of organizational structures and managerial competency, and many fail just a few short months after starting up (IFC 2012). Moreover, the line between the informal sector and SMEs is in reality much less distinct than suggested by this stylized figure, as many SMEs (particularly small firms) operate squarely in the informal sector. Thus we can observe that some SMEs are too informal and too small to be licensed as a business, while others are well-managed, formally organized firms with salaried workers and skilled managers. In figure 1, we differentiate only high-potential SMEs from the rest and ignore these other important dimensions of heterogeneity within the SME box. We assume the high-potential SMEs designated as a subset in this figure will predominantly consist of medium-sized enterprises that are at least to some degree “investor-ready” and meet minimum governance and accountability standards. Second, this simple depiction abstracts from the complex interactions among these three segments. In practice, supply chains for a given food often include links in each of the three segments, with the informal sector typically entering toward the retail end of the chain. To simplify, we consider the area of these three boxes as representing the total contribution of firms in these respective segments to the food environment, but will keep these important interconnections in mind.

Next, in figure 2, we superimpose a yellow box representing nutritious foods as a subset of the food environment. The N3F draws on the GAIN definition of a nutritious food, so you can think of this nutritious food space as containing food that “in the context where it is consumed and by the individual that consumes it, provides beneficial nutrients (e.g., vitamins, major and trace minerals, essential amino acids, essential fatty acids, dietary fiber) and minimizes potentially harmful elements (e.g. anti-nutrients, quantities of trans or saturated fats and sugars)” (N3F Eligible Foods, p1, 2020); we will return to the

eligible foods as initially defined by N3F in the next subsection). Nutritious foods so defined are provided by all three segments of the food environment.

Also depicted in figure 2 is the N3F target, which by design is composed primarily of high-potential SMEs that are already engaged in producing and selling nutritious foods. As shown, the N3F target also extends beyond this precise union to include other promising food SMEs that could—as a result of N3F support and encouragement—be enticed to modify or extend their product offerings to include more nutritious foods. Food SMEs on this periphery might undergo additional review and, like all candidate SMEs, would only qualify for N3F support if they did not produce disqualifying foods. Nudging such firms on the periphery to enhance their nutritious food offerings seems to be one of the important margins that the N3F aims to directly impact.

Figure 2. Stylized Food Environment Segments with (Baseline) Nutritious Food and N3F Target Overlay



Note: The N3F primarily targets high-potential SMEs that are currently producing and distributing nutritious foods, but also includes SMEs that could—with the right resources and support—make their products more nutritious; for this reason the N3F target extends beyond the baseline nutritious food domain.

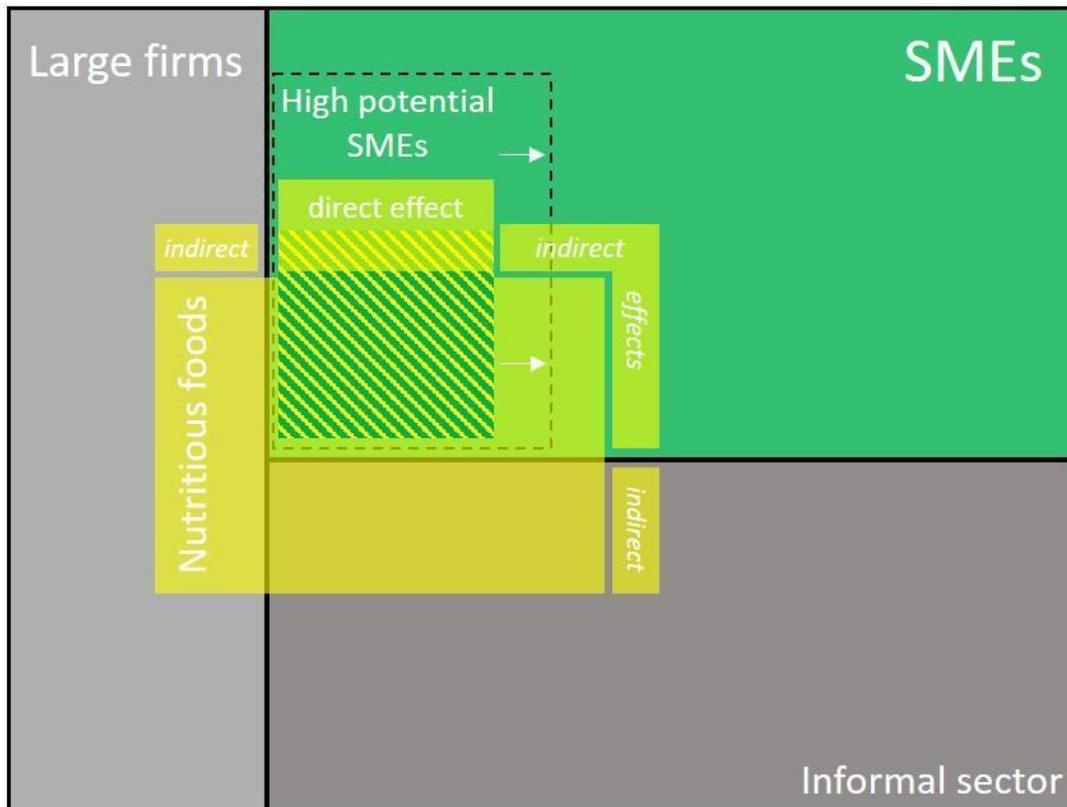
Although not depicted in the diagram, central to the N3F model is the assumption that financial constraints limit the ability of these high-potential enterprises from tapping new opportunities, growing their operations, and enhancing profitability. Before relying on the diagram to capture the intended impacts of the N3F on food markets, it is important to note that there appear to be conflicting views on two different dimensions of SMEs. First, the relative share of total SMEs that are high-potential and financially viable likely varies dramatically from one setting to another based on local market conditions and competitive pressures. Careful vetting of SMEs for inclusion in the N3F target is obviously critical and must be alert to strategic deception by firms with spotty financial records looking for concessionary financing. Second, and potentially more important, the prevalence of genuine and binding financial constraints among this subset of viable firms is similarly open to debate (Ciampi et al. 2020). While it may indeed be the case that promising SMEs struggle to grow because they lack access to debt or equity investments in the range of 100,000 to 2.5 million U.S. dollars (USD) (i.e., the so-called “missing middle”

of financial services), this does not directly imply that relaxing this financing constraint will trigger growth. Often, myriad other constraints faced by these firms are as, or perhaps more, binding than this one.

Finally, we use our stylized representation of the food environment to depict the intended effects of N3F support of target SMEs in figure 3. The N3F aims to expand the availability, affordability, and convenience of nutritious foods. In this figure, this expansion is represented by an increase in the size of the yellow box (i.e., without differentiating between availability, affordability, and convenience per se). We attribute this expansion of nutritious foods in the food environment to direct N3F effects and to indirect effects that are triggered by N3F support but work through local markets, competitive interlinkages, and strategic responses. The first, direct effect of N3F support is to expand the nutritious foods produced by high potential SMEs. This direct effect potentially includes expansion along several margins simultaneously. For now, note that the expansion in the availability of nutritious foods comes both from direct support of firms already producing promising nutritious foods and from support of promising SMEs on the nutritious foods periphery that had not, prior to N3F support, produced nutritious foods to any meaningful extent.

As for indirect effects, there may be spillovers into all three segments of the food market. Within other SMEs, these spillover effects could come through various interlinkages, including competitive effects on inputs and suppliers as well as the kind of copycat effects articulated in the N3F theory of change. These indirect effects could be both positive and negative in terms of their impact on food environments. On the positive side, direct copycatting of highly nutritious foods produced by target SMEs could obviously enhance the nutritional offerings in the local food environment. This could happen through downstream or upstream linkages. These indirect effects could, however, also be negative as competitive pressures among firms push them to make food offerings tastier or more appealing by adding unhealthy ingredients or processing to an initially healthy product. As depicted in figure 3, these indirect effects could easily extend to informal actors as well, perhaps primarily through retail distribution linkages.

Figure 3. Intended Direct and Indirect Effects of N3F Support of Target SMEs Where Direct Effects Emerge from N3F-supported Activities, Outputs, and Outcomes



Note: Within supported, high-potential SMEs, successful promotion of these target foods could expand the nutritious food offerings of these firms beyond the original N3F target via complementarities and within-firm spillovers. Indirect effects could emerge through local multipliers and spillovers to other SMEs and firms in other segments. Demonstration effects and other spillovers of generalizable business practices could expand the set of high-potential SMEs independently of the nutritious food domain, as a further indirect effect.

Indirect effects could also extend the nutritious-foods reach of large-scale and multinational space as well. The most likely mechanism for such an indirect effect would seem to be strategic or opportunistic responses from these large firms to the direct effects of the N3F on food environments through SMEs. If the N3F were wildly successful at stimulating growth and dynamism among nutritious food SMEs, this indirect effect could also emerge as firms previously classified among SMEs are able to grow to the point of becoming a large-scale firm or a target for acquisition by a multinational or other large-scale regional firm. In such a best-case scenario—unlikely, it seems, but possible—the N3F would potentially function as an incubator for new divisions or subsidiaries of large enterprises, which could enhance the food environment in significant ways.

As a final indirect effect, consider how N3F support of target firms could expand the subset of SMEs that are financially viable—depicted in figure 3 as an expanded subset of high-potential SMEs. This expansion of high-potential firms could come through spillovers to other SMEs that learn how to become “investor-ready,” or as N3F support catalyzes the local financial-services sector to cater more effectively to SMEs. For example, local banks could be encouraged by the demonstration effects provided by successful N3F investments. As the local financial ecosystem is enhanced, a broader set of SMEs could gain access to valuable financing. Although not depicted in the figure explicitly, this expanded access could reduce the number of high-potential SMEs that are credit-constrained and help to unlock their potential in food markets and other sectors of the economy entirely.

In summary, these indirect effects reflect local multipliers that leverage the N3F support to potentially amplify the ultimate impact on the food environment. What matters in the end is the net effect of all these multipliers, both positive and negative, functioning at different scales, through different segments of the food market and financial ecosystem. Understanding these various pathways and interlinkages, including both positive and negative spillover effects, is central to assessing the theory of change as proposed by the N3F. Identifying the pathways and interlinkages that N3F *will ultimately rely upon* for profitability and impact is fundamental to upgrading the TOC.

3.2 Eligible N3F Foods and Product Typology

In this subsection, we delve more directly and deeply into the “nutritious foods” space of the food environment as depicted above in figures 1–3. To be more concrete about what specific products and foods constitute this space as defined by the N3F, we reproduce GAIN’s N3F Eligible Food Matrix in table 1. In the green rows, the matrix includes four categories of eligible foods for direct N3F support listed in order of priority: (1) high inherent nutritional value, (2) enhanced nutritional value, (3) supplements, and (4) some inherent nutritional value. In the yellow row, the matrix specifies only one other food category eligible for direct N3F support, albeit after additional review: (5) source of added nutrients with some risks. The bottom three rows of the matrix indicate foods that are not eligible for direct support and, in the case of the bottom row, are grounds for excluding an SME from consideration of N3F support even if it includes an eligible food product among its offerings.

Table 1. N3F Eligible Food Matrix

Characteristic	Description	Examples of Food Categories	N3F Fit	
1	High inherent nutritional value	Naturally contains micronutrients, dietary fiber, high quality protein, essential fats and/or beneficial bio-actives in significant quantities. No major harmful qualities when consumed in recommended quantities.	Unprocessed and minimally processed: fruits and vegetables; legumes; nuts and seeds; unsweetened dairy products; eggs; fish and seafood (including canned or dried); organ meats	Eligible for N3F with little or no additional review, if meeting criteria established by GAIN
2	Enhanced nutritional value	Foods with some inherent nutritional value that become more nutritious through the addition of nutrients (i.e., fortification) or changes to the processing procedures. No major harmful qualities when consumed in recommended quantities.	Fortified grains/flours and related products (e.g., complementary foods, low sugar biscuits and cereals); biofortified crops; grain products that mitigate loss of germ and dietary fiber; sprouted grains	

3	Supplements for special populations	A science-based nutritional supplement intended to be consumed by populations at high risk of malnutrition (e.g., pregnant women, young children).	Micronutrient powders (MNPs); lipid-based nutrient supplements (LNS)	
4	Some inherent nutritional value	Foods with some inherent nutritional value for which potentially harmful elements have been minimized.	Minimally sweetened dairy products; low-sodium and minimally processed poultry and fish; nutrient-dense whole grains (e.g., teff, millet, sorghum, fonio)	
5	Source of added nutrients but some risks	A condiment that enhances the nutritional value of foods or diets to which it is added; healthy in appropriate quantities but can be overconsumed.	Iodized salt; fortified cooking oil	Potentially eligible for N3F funding but require additional product review
6	“Neutral foods”	Foods that have limited nutritional value but no harmful ingredients or processing modes.	Unfortified cereals, roots, and tubers and products made from them (e.g., pasta); spices and herbs (intended to be consumed in small quantities); minimally processed red meat ² ; low-salt condiments; unsweetened tea and coffee	Not eligible for <i>direct</i> N3F funding, but may be part of the product portfolio of an N3F-supported firm without additional product review
7	Foods of little or no nutritional value and potential harm	Limited nutritional value and potentially harmful ingredients or processing.	Highly processed meat/fish/poultry; processed foods with little fiber and considerable salt, sugar, or fat; sugar-sweetened beverages with some nutritional value (i.e., juice, dairy); sweeteners; highly processed cheese	Not eligible for <i>direct</i> N3F funding, but may be part of the product portfolio of an N3F-supported firm subject to additional product review
8	Disqualifying foods	Considered harmful to public health and, as such, may make a firm ineligible for consideration for N3F funding.	Breast-milk substitutes; alcohol; hydrogenated oils; tobacco; highly sweetened sugar beverages of no nutritional value (i.e., soda)	Firm ineligible for N3F funding

Source: GAIN

To evaluate this eligible-food matrix, consider a simple food product typology that reflects key differences in consumer demand for these products and associated implications for product promotion

and marketing among SMEs in particular.¹ In table 2, we depict this typology along with examples that map loosely to the eligible-food matrix in Table 1. Obviously, what are shown as discrete categories in table 2 are in fact parts of a continuum, so in practice there are fuzzy boundaries between these stylized categories.

Table 2. Food Product Typology with Implications for SMEs

Product Type	Description	Example from Eligible N3F Foods	Demand Implications for SMEs
A. Familiar (but unchanged) product	Known food with enhanced affordability, availability, or convenience (AAC) resulting from packaging, distribution, etc.	1. Expanded distribution of unprocessed or minimally processed familiar whole foods	Meaningful enhancements in AAC naturally attract consumers. Such products can sell themselves, but AAC investments may or may not be profitable, depending on the costs of improvements.
B. Nutritionally enhanced familiar product	Known food with enhanced nutritional properties resulting from new milling, processing, fortification, etc.	1. Fortified flours 2. Iodized salt	Enhancements can be invisible or quite visible and salient to the consumer. Marketing may draw attention to new traits without making the product seem foreign. Profitability hinges on whether consumers are willing to pay a premium for the trait.
C. Totally new product	New product or formulation that is sufficiently different as to be considered “all-new” by consumers	1. Unfamiliar whole foods 2. Biofortified crops if they look like a different food (e.g., orange-fleshed sweet potatoes) 3. Supplements for special populations	Pitching an “all-new” product to consumers is very difficult for any firm, but especially so for SMEs with limited marketing budgets and capacity. Aside from a few outliers, this is mostly unprofitable; too risky and too long-term for SMEs.

Considering tables 1 and 2 together, two insights emerge that are especially noteworthy. First, for most SMEs the product types in table 2 are listed in order of feasibility. It is conceivable that some food SMEs could succeed with type A product innovations and investments, but few if any SMEs could successfully introduce new products (type C), which require a long-term commitment to building consumer demand and associated resources that are likely beyond most SMEs. Indeed, some informants we consulted

¹ Another important product dimension to consider is the temporal product cycle. Firms in competitive markets are constantly under pressure to differentiate their products from those of their competitors. These competitive pressures lead to a well-known product cycle that includes four distinct stages: introduction, growth, maturity, and decline. It is useful to consider where the N3F target firms are likely to be in their product offerings at the time they decide to pursue N3F support. Naturally, SMEs will be keen to receive this kind of external support in the mature or decline stage, when they begin to feel some urgency to differentiate or further upgrade their product offerings as they see their market share begin to wane or recent growth starting to fade.

suggested that SMEs that pin their profitability on totally new products are doomed to failure. The successful production, distribution, and marketing of some type B products could fit the capacities of food SMEs, but the newer the product from the perspective of the final consumer the more challenging this undertaking becomes for any firm—and especially for SMEs with limited capacity.

Second, an especially well-managed and high-potential SME *could* introduce an eligible food product of type A or B, but this does not mean that it *should* do so because profitability is by no means guaranteed. Type C products are likely to be out of reach for most SMEs, and the profitability of such products is so unclear and the risk of failure so high that most SME should not stake their futures on totally new products. In all cases, profitability ultimately hinges on end consumers valuing the improvement on offer enough to pay a premium for the product. This value proposition for the consumer is obviously key, but it is also unclear for many of the eligible foods in table 1. Consumers in LMICs, who are the ultimate target of the N3F, are generally willing to pay a premium for improved taste and convenience, but are often willing to pay surprisingly little for improved nutritional quality, food safety, or long-term health benefits. For good reason, the N3F aims to support SMEs with a record of promising performance and financial viability in the provision of these eligible foods. In these cases, the relevant question is whether scaling up or tweaking this promising business model with N3F support could generate additional profits for the SME and the N3F while also enhancing the local food environment. It is, however, important to appreciate the substantive differences between the eligible food categories (table 1) in terms of viability and profitability from the SME perspective.

As the N3F launches and begins to work with SMEs, something like the sample matrix in table 3 could be a useful decision tool to help guide the selection of firms and products. While the matrix, which reflects tables 1 and 2 as different dimensions of a food product space, would apply differently to different products and firms, it may help SME managers and N3F formulate realistic perceptions of the likelihood of success and ultimate profitability. Rather than raising this as a specific recommendation, we offer the matrix as a perspective on how the eligible food list and SME capacity to profitably sell food products may interact in ways that could shape the ultimate success of the initiative.

Table 3. Sample Matrix of N3F Eligible Foods List and Simple Food Product Typology. (Prototype of a decision tool that explicitly reflects the likely risks and profitability of product innovations among SMEs.)

N3F Eligible Foods		A. Familiar Product: Less risky Potentially profitable	B. Modified Product: Risky Unlikely profitable	C. Totally New Product: Extremely risky Beyond most SMEs
1	High inherent nutritional value			
2	Enhanced nutritional value			
3	Supplements for special populations			
4	Some inherent nutritional value			
5	Source of added nutrients but some risks			
6	“Neutral foods”			

7	Foods of little or no nutritional value and potential harm			
8	Disqualifying foods			

Note: Cells are shaded according to likely success of corresponding products (Green=most likely, Orange=less likely, Red=least likely).

3.3 Deconstructing the N3F Theory of Change

In this subsection, we deconstruct the N3F TOC by classifying key linkages in GAIN’s “social-impact grid” according to the likely relevance of the different sources of insight, perspective, or evidence as described in our methodology section above. We also evaluate key linkages in this social-impact grid based on how well firm activities and outputs seem to align with increased expected profitability of the target SMEs.

Table 4 shows the core of the TOC as depicted by GAIN’s social-impact grid. The colors in this table indicate the sources best suited to evaluating the linkages in this TOC. **Yellow** cells depict linkages in the TOC that are primarily determined or shaped by the N3F engagement with and influence over target SMEs. These direct-control yellow cells reflect the mechanical relationship between firms’ activities, outputs and immediate outcomes, and, critically, the enforceability of conditionalities in N3F contracts with these SMEs.

From a profitability perspective, it is not exactly clear which of the SME outputs or subsequent outcomes in table 4 are inherently aligned with increased expected profitability, but this is such a crucial consideration that we flag 5 outputs (using an asterisk [*]) that seem to be potentially aligned with SME profitability. For the other 16 outputs, it is easier for us to imagine these decreasing profits for an SME competing for consumer attention and purchases with formal and informal food firms of all sizes (figure 1). Making nutritional food products more affordable to consumers entails lowering prices, which for any SME that is a “price taker” (i.e., must accept the market’s prevailing prices) is not typically a viable path to profitability. Cutting food waste can provide efficiency gains, but it can also increase production costs (it is simply too costly to eliminate certain food waste). Increasing food quality and safety is only profitable if consumers are willing to pay a premium for these attributes, which may or may not be the case. Assessing alignment of N3F activities, outputs, and outcomes with expected firm profitability is as challenging as it is important. This profitability perspective is particularly unique for SMEs, which tend to respond more to short-run imperative than to long-run strategic planning, and lack the marketing capacity and resources to shift consumer preferences in order to sustain price premiums for their food products.

On the other side of the TOC in table 4 are the **blue** cells. These cells lend themselves to assessment and evaluation based on empirical evidence from the nutrition literature. Indeed, GAIN cites several peer-reviewed articles in these cells as supporting evidence for these key food environment assumptions. We agree that these assumptions can be evaluated almost purely on the basis of the related literature and will offer a preliminary assessment in the subsequent section.

Orange cells are outside the direct control of N3F contracts and SME engagement and require a mix of methods to evaluate, including empirical evidence from the literature, theoretical or conceptual perspectives on firm and consumer behavior in market settings, and experiences of key informants and stakeholders. At the interface of the yellow and orange cells (i.e., where direct control of SMEs and N3F fades), in particular, theory can also help fill in gaps (e.g., the theory of competitive markets and the demand elasticities for relevant foods or groups of foods).

Finally, GAIN’s social-impact grid includes four “pathways to scale” that, according to the TOC, will enable the N3F to eventually have an outsized impact relative to its initial scale of operations. Table 4 lists these four pathways as a note below the grid. We color-code the numbering of these pathways

using the same convention described above, with the addition of **green** to denote assessment based primarily on the experiences and perspectives of key informants, mainly from the impact-investment sector. Pathway **(1)** is mechanical and direct: If N3F scales up the number of SMEs it supports—and if these increasing numbers of SMEs are concentrated to some extent in specific markets—the overall impact of the N3F on food environments potentially increases. We will not evaluate this pathway in detail, but simply observe that the ability of the N3F to scale in this way hinges crucially on the profitability of the SMEs it supports and on their ability to generate a return on investment to attract additional capital to the N3F. Pathway **(2)** will feature in a subsequent deeper assessment of these local economy multipliers as part of Activity 2 in our engagement with USAID Advancing Nutrition and GAIN.

Having situated the N3F in this broader conceptual context and introduced some of what we consider the key issues and questions related to its TOC, we now turn to a more systematic discussion of these issues and our recommendations for improving the TOC and enhancing the attractiveness of the N3F as an impact investment initiative.

Table 4. The N3F TOC as Articulated in GAIN’s Social-Impact Grid

	Firm activities	Outputs	Immediate Outcomes		Ultimate Outcomes	Impact	
Input: GAIN (technical support) + N3F (capital)	Invest in technology, staff, or training to increase production, improve efficiency, or cut loss	Increased number of nutritious foods	Greater availability and affordability of nutritious foods within market served by the firm	Outcomes Pathways: Scale & Multiplier Effects#	<p><i>When aggregated over time and across numerous firms serving diverse markets, with demonstration effects, these outcomes should result in...</i></p> <p>More available & accessible nutritious foods</p> <p>Increased access to nutritious foods through wider distribution, improved affordability, variety, and desirability</p> <p>Reduced food loss</p> <p>Reduced environmental impact of nutritious food supply chain through decreased food loss during production</p> <p>More nutritious foods</p> <p>Increased supply of nutrients and reduced occurrence of harmful elements through improved reformulation</p> <p>Safer foods</p> <p>Increased food safety and reduction in contaminants during production</p>	<p><i>Based on extensive evidence (e.g. Roy et al. 2015, Holsten 2009, Driessen et al 2014, Pitt et al 2017, Engler-Stringer et al 2014, Perez-Ferrer et al. 2019), it can be assumed that changes in the food environment (food availability, accessibility, affordability, and quality) will have effects on individuals’ diets, leading to....</i></p> <p>Improved diet quality (e.g., more nutrient-dense foods, greater diversity, greater quality and safety)</p>	<p><i>Based on extensive evidence (e.g. Afshin et al 2019, Arimond & Ruel 2004, Costa et al 2019, Fung et al 2001, Hu et al 2001, Key et al 2002, Kirk et al 2015, Ruel & Menon 2002), it can be assumed that improved diet quality will lead to...</i></p> <p>Improved nutritional status, health & wellbeing (e.g., reduced undernutrition where relevant, reduced micronutrient deficiency, lowered NCD risk, improved immunity)</p>
		Increased production of targeted foods					
		Increased efficiency of production *					
		Improved food affordability	Nutritious foods increase in importance to the target firm				
		Increased revenue from targeted foods *	Reduction in food waste from targeted firm				
		New equipment installed					
	Improve marketing and strategic consumer targeting	Target more priority consumer groups	Greater accessibility of target food for priority consumer groups				
		Increase distribution range *	Greater availability of target foods in new areas				
		Market research conducted and used	Better targeting of customers and marketing of products to them				
		Research on targeting low-income consumers	Greater appeal of nutritious foods to customers				
	Identify new sales channels or geographies	Improved packaging or nutrition-related labelling					
	Undertake research and development	Product reformulation R&D completed	Greater variety of nutritious foods available within market served by the firm More nutrient-dense, appealing, accessible, and/or convenient foods produced by target firms				
		New or reformulated products developed					
	Invest in processes, training, and certifications to improve food quality	New/improved management practices adopted*	Improved quality and safety (decreased risk of contaminants) in targeted foods				
		Relevant certifications obtained *					
		Staff trained in food safety					
		Increased quality of inputs sourced					
		QA processes developed or improved (e.g., testing for contaminants)					
		New equipment installed for safety or QA					
	Suppliers trained in food safety, QA						

Note:

- Colors denote the primary basis for evaluating a given link in the TOC: **yellow** = N3F contracts and SME engagement; **orange** = mix of empirical evidence in literature, interviewee perspectives, and theory; **blue** = empirical evidence in literature. Outputs denoted by * are potentially aligned with SME profitability. (Source: Adapted from GAIN.)
- # “Outcomes pathways” include (1) expansion of N3F scale (i.e., number of supported SMEs); (2) local demonstration effects due to successful N3F SMEs, including copycat products and spinoffs; (3) crowding-in of other nutrition-focused impact investment and blended financing; and (4) “supply begets increased consumer demand” (i.e., build it and consumers will come).

4. Key Issues Affecting the Attractiveness and Impacts of the N3F Investments and Technical Assistance

The N3F fundamentally aims to help correct a market failure. Both private- and public-sector decision makers undervalue the benefits of more nutritious foods; willingness to pay is too low and hence demand and consumption are socially suboptimal. The economics of market failures has a long history (Coase 1960), and has been particularly important in the domain of environmental and natural resource economics (Keohane and Olmstead 2016), as well as in credit markets (Besley 1994), but nutritionists also have used market failures to motivate changes in public policies and investments (Gillespie and Haddad 2001). These publications identify the key missing-market and property-rights sources of market failures, many of which are relevant for under- and overnutrition. The core issues include—

- the undervaluation, publicly and privately, of improved nutrition
- the incentives provided for staple foods (e.g., cereals, oils, sugar) through agriculture policies that often do not apply to nutrient-dense foods
- the often-absent links between stakeholders who stand to benefit from improved nutrition and those who are called upon to pay for it
- the lengthy time lags between the investments needed to improve nutrition and the payoffs from them (Karnani et al. 2016).

Decision makers at all levels have to deal with these issues as a practical matter. Our task in this report is to reflect on what role the N3F might play in addressing one or more of these market failures; the TOC could be adjusted to make the N3F more appealing to potential investors and enable it to generate greater health and nutrition benefits for target populations in priority countries.

With very few exceptions, all of the issues discussed below have been contemplated by the N3F team and integrated into their draft TOC. The added value of this review is in “bundling” and prioritizing what they have considered, and re-viewing these issues through three lenses, which highlight—

- *experience*—as articulated to us by individuals active in domains relevant to the N3F program
- *evidence*—the scant bits of literature that exist in the specific contexts of SMEs in the food sector in LMICs, and other literature that we deemed useful
- *theory*—the bodies of literature on nutrition, on consumer demand for food, on firms involved in food value chains, and on markets for foods.

As is always the case in reviewing TOC documents, questions arise regarding how high a “bar” to set. At one extreme, a purely academic review first would seek to understand the details underpinning *all* of the TOC ingredients and the proposed linkages among them. At the other extreme, a TOC can simply consist of a set of boxes and arrows that suggest potential links among broadly defined inputs and outputs. Given the paucity of data, models, and literature regarding SMEs in the food sector in LMICs, the purely academic standard will be challenging for the N3F TOC to meet. At the same time, a vague collection of boxes and arrows will not be convincing to potential investors looking for profitable investments and/or social impact. Therefore, in our view, the TOC should aim for the “sweet spot” that contains as much academic rigor as possible and that is sufficient to attract potential investors, depicting the impact pathway presenting the projected (social) return on their investment. In fact, there may be

no single sweet spot, but rather a “sweet range” that may appeal, at the one end, to profit-driven investors aiming to showcase some social impacts, and at the other end, to impact-driven investors who are less demanding and more patient when it comes to profitability. Achieving this, in our view, will require pruning and reorganizing the current TOC. Below, we set out some key issues that we have identified in the context of this review, and their associated implications for modifications to the TOC. We present them in four subsections: Credit-Market Backdrop Issues, Investor Objectives, Social Impact Issues, and Other Issues.

4.1 Credit-Market Backdrop Issues

4.1.1 Need for Targeted Credit and Technical Assistance

Over the past several decades, the midstream of agri-food value chains has transformed quickly, including not only a huge expansion in volume, with a proliferation of small and medium enterprises (SMEs), but also concentrating and multi-nationalizing. Moreover, these value chains have been affected by technology change characterized by capital-led intensification, as well as by the ongoing emergence of branding, labeling, and packaging; new organizational arrangements in procurement and marketing interfaces with farmers and retailers; and private standards and contracts (Badiane and Makombe 2015; Reardon 2015; and Reardon and Timmer 2015). Most SMEs participating in this rapid transformation would like more and lower-cost credit, and all claim to have profitable projects that could be pursued with it. In reality, most SMEs do not have track records in securing commercial loans, and many have never formally attempted to do so, often because they lack the collateral needed to approach commercial lenders (AgriProFocus, Rabobank Foundation, and ICCO Cooperation 2018). Nevertheless, there is a need among a subset of SMEs for targeted packages of credit and technical assistance (TA) in the food sector, especially SMEs with little or no collateral (the vast majority) (IFC 2012). Candidate SMEs need not have long track histories of profitability, but must be managed by teams of managers who are trained and trainable technically, have market-led growth as their primary objective, and who are committed to repaying loans. In brief, candidate SMEs must have the demonstrated capacity to recognize and respond to market signals and economic incentives, and to do so in a very dynamic market environment; those without this capacity cannot be adequately “trained” or sustainably backstopped by N3F.

Suggested Modifications to the TOC

The TOC table would benefit from a “first step” (a column, prior to GAIN “inputs” in the form of firm level activities), which describes in greater detail how (specifically) the N3F will identify SMEs with the necessary scale, team skills, objectives, and market experience. The TOC should then articulate, after this set of promising SMEs is identified, how the N3F would choose among the “candidate” firm activities or products to select an optimal portfolio of diverse investments and TA activities for the chosen firms. Considerable skepticism remains about how well the N3F will be able to select the “right” SMEs and the right target investments within these firms, and it would be advantageous for N3F to address and resolve these concerns early on. An N3F mechanism guidelines document could describe SME selection and eligibility criteria in further detail.

4.1.2 Availability of N3F-Type Credit and Technical Assistance

There seems to be a growing appetite for impact investing in general, particularly in the context of sub-Saharan Africa. Most impact investing seeks to align itself to one or more of the SDGs, and investment bankers and others who design and manage impact-investing funds are becoming more adept at defining what “align” means in this context, and at addressing the timing and other considerations that need to be considered to make these markets work for all stakeholders involved (e.g., Calvert 2021). The challenge for N3F is that few impact investors have experience in the nutrition domain. On the one hand, this indicates a clear niche for N3F; on the other hand, it complicates the N3F’s task because the

program cannot easily “piggyback” on lessons learned from other impact-investing domains (e.g., renewable energy).

Suggested Modifications to the TOC

Adding a final column to the TOC that explicitly mentions one or more of the SDGs might be useful. Noting which of the SDGs are related to the various “Ultimate Outcomes” and “Impacts” might be sufficient. GAIN staff have at times suggested that the N3F will address nearly all of the SDGs. A more specific focus on a few of the more promising SDG linkages would be both more plausible and more compelling.

4.1.3 Why Has this Investment/Technical Assistance Space Not Already Been Filled?

The perennial question is “Why has this ‘space’ not already been filled?” The answer has several components. First, while investors and large funds are increasingly interested in impact investing, especially in the context of Africa, human nutrition per se has not been among the most attractive of social impacts; this is true for the overall donor community as well (Sethi et al. 2017). Second, and related, aligning *any* of the SDGs to large investment portfolios is challenging to define and to do, and stakeholders are choosing some of the more established social-impact domains to experiment with (e.g., environment/natural resource management and renewable energy) (UNCTAD 2020; Calvert 2021; SDG Funders 2021). Third, loans made and repaid in inconvertible domestic currencies are very challenging to manage. Fourth, and perhaps most important, SMEs can have a spotty track record regarding profitability and “endurance” in the marketplace; both are important conditions for consideration by investors and of increasing interest to researchers (Ciampi et al. 2021).

Suggested Modifications to the TOC

The issues identified here have little to do with the TOC per se. Rather, they represent a set of obstacles that must be overcome before N3F can fill this space. A strong case has to be made for investing in improved nutrition (Strauss and Thomas 1998; Martorell 1995; World Bank 2006; Black et al. 2008; Hoddinott et al. 2008). GAIN already makes this case, but some sort of “reminder” in the TOC document will be useful. As indicated above, alignments with one or more of the SDGs within the TOC will be useful. There is no easy solution to the challenges related to inconvertible currencies. However, adding an initial column to the TOC identifying the criteria for selecting candidate SMEs would be useful, similar to the suggested modification made under 4.1.1.

4.2 Investor Objectives

4.2.1 Profitability, Sustainability, and Risk—First-Order Objectives of Many Investors

As would be expected, there is a continuum of potential investors with an interest in generating social impacts associated with their financial investments. At one extreme along this continuum, profit-focused investors aim for market returns and accept examples of social impacts that can be quite narrow; at the other end of the spectrum, impact-focused investors are willing to patiently await submarket returns but insist on large and demonstrable social impacts. For the first group of investors, securing funding commitments for the N3F initiative requires that the proposed investments in SMEs be profitable over an agreed-upon time frame. This is a necessary condition regardless of the blended nature of the funding sources being tapped by N3F; indeed, profitability may be a conditioning factor that may, in some cases, trigger, for example, changes in interest rates on loaned funds and/or delivery of loan installments. Both groups of investors also will have a keen interest in the sustainability of the *processes* that their investments brought about, once funding and TA provided to SMEs have expired. Do firms continue to innovate in ways that improve the, say, nutrient content of their products? Are their more nutritious foods gaining market share? There are risks associated with investment payoffs and social impacts, and

different investors will have different risk preferences regarding both. At the N3F program level, the *collection* of SMEs included in the N3F portfolio also must fall at or below a level of risk that is acceptable to investors.

Suggested Modifications to the TOC

The “firm activities” are choice variables for N3F. Not all will be chosen for each SME selected for investment/TA. The TOC should note this and emphasize the N3F decision-making process associated with regard to these activities. The N3F TOC contains firm-level “outputs,” some of which are more likely to affect profitability than others; these outputs should be highlighted to remind readers that profitability is key to the N3F program. Missing from the output list is improved management of available supply chains, which can have large implications for profitability. The “Outputs” column should be condensed and simplified; throughout this section we provide suggestions for trimming and clustering. For one, references to R&D should be removed.

Practically, elevating the issues directly related to profitability will help N3F select investment-ready SMEs, and identify the types and amounts of TA and funding they will require. The issue of risk associated with investments and impacts is “above” the current TOC, which traces N3F investments through *individual* firm activities and outputs, to meso-level immediate outcomes, and so on. However, given the importance of the levels of risk associated with the *portfolio* of N3F investments, the N3F program should address this issue directly as it moves forward with the preparation of “sales materials” and the “sales team” that will directly engage with candidate investors.

4.2.2 Impacts on the Food Environment

There is some evidence that changing the food environment (availability, accessibility, and affordability of nutritious foods) can lead to improved dietary intake (Anggraini et al. 2016; Duran et al. 2016; Miller et al. 2016; Waterlander et al. 2019). Food environment interventions, which improve the affordability of nutritious food, are associated with purchase of more healthy and nutritious foods (Miller et al. 2016). A systematic review on low- and middle-income countries showed that market access is associated with improved dietary quality (Nandi et al. 2021). Several studies on African countries reported better market access associated with better quality of foods consumed (Ambikapathi et al 2021; Madzorera et al 2021). But how should we interpret this evidence when viewed through the lens of impact investing?

The first “pass” at impact investing is simply expanding the accounting practices used by investors, moving from money-in/money-out to include a broader set of firm-level characteristics that were always present but not accounted for, such as number of jobs involved, number of minority-run businesses, or number of solar panels installed. The core challenge for N3F will be artfully and convincingly “expanding” the accounting framework to include outputs/outcomes in the nutrition domain that are unfamiliar to investors and more challenging to measure or predict. However, investors will be drawn to the overall “vision” of an improved food environment, especially if it is linked to one or more of the SDGs (e.g., Zero Hunger, Good Health and Wellbeing, Gender Equality [Calvert 2021]). Investors will expect measurable and noteworthy social impacts, and most will require that categories, at least, of expected impacts be predetermined as part of the SME funding/TA packages. Moreover, investors will require (to differing degrees, depending on investor objectives) that financial and human resources in funded SMEs *and* in the N3F program be allocated to cultivating, measuring, attributing, and “packaging” impacts in ways that are useful to them. Categories of social impacts can be woven into conditionality documents, with some flexibility regarding the specific measures of impact and the time frame for achieving these impacts. Development and nongovernmental organization (NGO) partners will have a keener interests in social impacts; data and tools either already exist or could be collected/developed to address these interests, and to report back to a broader array of stakeholders supporting N3F.

Suggested Modifications to the TOC

None of the “Immediate Outcomes” in the TOC will actually be immediate; perhaps “short-term” would be a more appropriate term. Predicting the specific types and magnitudes of effects of individual or collections of N3F investments is very challenging and predicting ultimate impacts on health outcomes is even more so, and zero or even negative outcomes (e.g., increased amounts of sugars/fats in the food environment) are possible. The TOC itself cannot embrace this uncertainty; the TOC documents used by other apparently successful impact-investment firms have not done this. However, the TOC structure, and especially wording, can be modified to emphasize a first stage focused on selecting and providing credit and TA to promising SMEs, and a second stage that would intensify and direct funds and TA in ways that promote specific impacts that may not be easy to identify a priori.

4.2.3 Market Responses to N3F Investments—A Conditioning Factor for Profitability and Impact

Investors will be keenly interested in market responses associated with N3F investments. Existing and evolving markets are tailored to meet consumer demand (Reardon et al. 2021a), a process that has been accelerated and fundamentally changed by the recent pandemic (Reardon et al. 2021b). Rapid market expansion of one or more nutritious foods can quickly result in flooded markets, driving down prices and eroding profit margins to below acceptable levels, and hence potentially jeopardizing N3F investments. Or an N3F-supported SME might gain substantial market share for a more nutritious product at the expense of other firms, leading to no net changes in the availability (or perhaps affordability) of a specific more nutritious food. Or the overall availability of a particular more nutritious food could well increase, but because of non-price competition practices the retail prices of these foods does not change (de Roos and Smirnov 2021; Stigler 1968). It is challenging for a single SME via marketing, for example, to manage or overcome these market forces. The N3F team is aware of these issues and has/will engage in market-assessment work alongside their background work in targeted markets and countries. The question remains how to “flag” these activities in the TOC document.

Suggested Modifications to the TOC

The TOC might include an additional column (perhaps introduced in the far-left of the table) focused on market characteristics or conditions necessary for N3F to achieve its ambitious objectives through very competitive local food markets. These conditions should include a discussion of effective consumer demand and likely responsiveness of market prices to increases in the supplies of nutritious foods.

4.3 Impact Issues

4.3.1 Multiplier Effects of N3F Investments

Although the multiplier effects of N3F investments may be important to development partners and NGOs involved in the blended-financing and TA supplied to SMEs, these spillover effects, whether positive or negative, local, regional, or international, will be second-order concerns to investors whose primary concern will be the direct profitability and impacts of N3F investments. Multiplier effects will be welcomed by investors if they do occur, of course, but investors understand that they will not directly benefit *financially* from such spillovers (indeed, some N3F investments might be undermined by them) or have any control over them (Maestre and Poole 2018).

The timelines involved for different steps in the current TOC are quite substantial, with stated time horizons of 7–10 years required for N3F support to ultimately enhance local food environments. The indirect effects hinge on spatial and temporal dynamics as well, but are very challenging to predict. These spillover effects and local economy multipliers will be shaped by the nature of competitive interactions between firms. Similarly, the extent to which these indirect effects are positive or negative will turn on the nature of these competitive interactions and the dynamics among firms. Interactions with informal enterprises—for example, on the retail side of food value chains—could lead to profitable vertical

integration opportunities for SMEs. How these temporal and spatial dynamics play out will directly shape how and how much the N3F is able to impact local food environments for the better.

We understand that these multiplier effects may be of secondary importance from the point of view of N3F, but the prominence given to them (labels such as “Ultimate Outcomes” and “Impact,” and the amount of space dedicated to them on the TOC table) suggest otherwise. Moreover, impact investors will be drawn to the term “impact”; the current TOC suggests that impacts, indeed, will be delivered by N3F investments. In reality, the pathway linking inputs and impacts is quite messy and uncertain: profitability might not be achieved, and hence no impact generated; or profitability might be achieved but N3F investments might be out-competed by larger or more efficient firms, which could lead to greater impact but would make it challenging to attribute impact to N3F.

Suggested Modifications to the TOC

The columns dedicated to “Ultimate Outcomes” and “Impact” might be merged or otherwise condensed, with two sources of impacts (direct and indirect) identified. The “Outcome Pathways” box could be placed below the new “Impacts” box and be the conduit through which multiplier effects might be achieved. The only references to the literature included in the TOC appear in the final pair of columns on “Impact.” This introduces an asymmetry to the table (especially as references for all other suggested direct and knock-on effects are listed). Even more importantly, the references provided in those columns are neither convincing nor especially relevant in the context of LMICs. We suggest that these references be dropped. *Moreover*, there are many examples of very direct improvements in diet quality that did *not* bring about improvements in nutritional status, health, et cetera (e.g., Ashorn et al. 2015; Stewart et al. 2019).

4.3.2 Food Habits and Food Product Evolution

Food habits and consumer demand are generally predictable and hard to change, especially in poor communities, and depend on factors well beyond the control of the SMEs targeted by the N3F. There are many ways to improve diet quality that fall within the two general options of improving the nutritional value of foods already part of consumers’ diets, or inducing consumers via price or other mechanisms to change what they regularly eat in ways that improve diet quality—but focusing on SMEs that produce foods that are *already* widely consumed and on innovations to these foods that make them more nutritious, more convenient, and attractive will likely be more profitable and impactful than focusing on developing and introducing completely new products. This is true whether the new food product is proposed by the SME as the basis for N3F engagement or is suggested by the N3F directly. However, while many routinely consumed products are managed at some point along the supply chain by SMEs, these firms may not have much latitude for changing the nutritional quality, desirability, or convenience of these foods. Moreover, some of the “space” associated with improving the nutrient content of foods has already been claimed by other organizations (e.g., HarvestPlus for staple foods) (HarvestPlus 2019). Annex 4 provides additional information as well as data on food consumption, food sources, and dietary intake from a select number of sub-Saharan countries and how this relates to the nutritious foods as defined by the N3F.

Suggested Modifications to the TOC

A vertical box/bar could be introduced at the very outset of the TOC, containing text indicating that background work on diets has been/will be done to identify areas/markets/populations where N3F investment impacts are expected to be greatest. This will also help N3F answer potential investors’ questions regarding what specific changes in the food environment are expected, and what the consequences of these hoped-for changes might be for target consumer groups.

4.4 Other Issues

4.4.1 Food Losses and Waste, and Food Safety

Food losses and food waste have received considerable recent attention (FAO 2020), with ripple effects on sectoral, national, and international policy discussions. However, definitions and measurement issues at each link in the value chain loom large (Bellemare et al. 2017), and precisely where losses occur along food value chains, and why, are not always known (see Minten et al. 2021 as an exception). Hence, more and better information regarding food losses and waste, and more careful consideration and assessments of alternative policy instruments for cost-effectively dealing with food losses and waste are warranted. While some investors will be interested in the potential for N3F investments and TA to reduce food losses and food waste, it will be incumbent on N3F to be more concrete (even at the level of the TOC) about the environmental benefits to be achieved, and the mechanism for achieving them.

Savvy investors will also note that even if there may be environmental benefits associated with reductions in food waste, investments in and TA provided to SMEs are likely to be inefficient instruments for securing these environmental gains. Such investors will likely recognize further that some improvements to the food environment (e.g., increased availability of leafy greens) will put additional pressure on the natural environment (e.g., scarce freshwater supplies). Even increasing food convenience has the potential for environmental harm—millions of smaller plastic packaging materials will not likely be recycled. The bottom line is that economically optimal quantities of food losses and food waste are never zero, and can be quite large in some settings. N3F should not presume that the food losses/wastes that they encounter at SMEs have not been properly understood and considered (Schultz 1953, Bellemare et al. 2017). Nevertheless, firm decisions can be “nudged” in ways that reduce food losses; such nudges from N3F can come in the form of conditions associated with financing and TA.

Similarly mixed impacts can be identified around food safety, a long-standing issue for the food technology, medical, and demographic communities (Currier and Widness 2018; Focker and van der Fels-Klerx 2020). Firms of all sizes involved in the production, processing, and distribution of foods for which safety can be an issue are aware of the private costs (related to food regulations and the regulatory apparatuses in which they work) and private benefits associated with the investments needed to improve food safety, as well as of infrastructure costs (e.g., extending the electrical grid) on which the profitability of such investments depend. These firms are also aware of and subject to public and private grades and standards, especially export-focused firms (Henson et al. 2005; Reardon et al. 1999). The social consequences of unsafe food have led to regulations and other public-sector actions and investments. Here again, N3F can nudge (via conditionality agreements and M&E) optimizing firms to invest more in food safety.

Suggested Modifications to the TOC

Issues associated with food losses/waste might be included in a box denoted “co-benefits” or something similar, and more concrete examples of such co-benefits might be included, with attention paid to environmental benefit and costs. The same is true for issues around food safety—for example, perhaps the focus could be narrowed to cases of highly perishable nutrient-rich animal products that have the potential to do great harm to consumers if spoiled products are consumed (e.g., dairy products), and that can potentially be addressed by firm-level investments and activities.

4.4.2 Characterizing and Selecting SMEs for Investments

The term *small- and medium-sized enterprise* covers a broad array of firms in terms of objectives, scale of operation, complexity of production processes, sophistication of business management, and more (Reardon et al. 2021a; IFC 2012). While there are certainly examples of entrepreneurial successes at all scales and levels of complexity, et cetera, N3F may not have the human or financial resources to canvas all SMEs to identify good bets, nor will the program be able to convince investors of the profitability or impactfulness of all types of firms. Choices will have to be made, and the TOC should identify them.

The smallest enterprises likely may not be candidates for N3F support. On the other hand, firms at the “larger” end of the spectrum, many of which already have experience with tapping formal credit markets, may be good candidates for investment. While the term SME is already deeply imbedded in the lexicon, the N3F program should make it clear to potential investors that N3F does not intend to target small-scale enterprises. More broadly, N3F should have a vetting process for SMEs based on characteristics associated with profitability and impact (Ciampi et al. 2021), with particular focus on firms directly engaged in processing activities, rather than in trading or logistics. Very few SMEs have the internal capacity to do meaningful R&D (Winger and Wall 2006).

At the firm level, a variety of theoretical perspectives seem relevant to the N3F theory of change. In the hypercompetitive context in which SMEs typically function, the push for cost cutting and product differentiation is incessant. How well firms respond to these changing market conditions and opportunities determines their fate. Within a firm, responding to these variables entails a series of complex optimization challenges that span all productive activities, from procuring inputs to production and distribution of food products. Having a theory of the firm in mind is useful when trying to assess the potential impact of N3F support on firm behavior and, ultimately, on food environment outcomes; the key question is how an infusion of capital and technical assistance from the N3F would alter SMEs’ ability to flexibly meet these challenges across production activities. This question applies to both within-firm productive activities, including selecting/adjusting their product portfolios, and within-product adjustments in ingredients and processing. We consider these two optimization dimensions separately in the context of N3F support.

Within a given firm, the injection of cheap, concessionary sources of capital from the outside, in this case from the N3F, would alter production decisions across the firm, including for products not specifically targeted as nutritious by the N3F. This fungibility of resources within the firm directly shapes the likely effects of the N3F in practice. It also raises important questions about the degree to which the N3F will be able to monitor or restrict the redirection of funds within a given firm with a diverse product menu on offer. Successful environmental impact funds, for example, have discovered ways to address such questions by earmarking funding and linking loan disbursements to meeting specific targets; these tasks may be more challenging in the context of the food environment. Fungibility can also have positive effects, however: there are potentially important adjustments an SME could make to product ingredients or processing in response to specific support for the inclusion of more nutritious ingredients.

Suggested Modifications to the TOC

A vertical box/bar should be added near the beginning of the TOC that indicates that N3F has in place an SME-vetting process that increases the chances of financial and impact success, and that helps select the set and amounts of firm-level investments and TA to be provided. The TOC should drop activities associated with internal SME R&D activities. If possible, the TOC could signal to readers that a mechanism will be in place to help ensure that credit will be used as agreed; a vertical box placed near the beginning of the TOC that calls out the development and management of forward-looking “covenants” or other such formal agreements might achieve this purpose.

5. Final Reflections

We were tasked with reviewing the N3F program, and its TOC in particular, and to offer an evaluation of its likelihood of success in achieving its stated objectives. This report documents this undertaking and our assessment. Complications and conflicting views associated with the N3F TOC abound, but in our judgment, this does not imply that this ambitious effort is not worth pursuing. This does, however, suggest that success is by no means guaranteed and may be limited. Any success that emerges from the N3F will likely require substantial effort and careful attention to the pitfalls and potential problems that lurk behind many of the definitions and linkages in the TOC. Failures may outnumber successes, as they often do in high-risk investment contexts. Yet the N3F remains a worthwhile undertaking to pilot and more broadly launch, in our view. Rather than concluding the report with a summary of its contents, we offer in this final section a set of broader reflections on the exercise, on the N3F, and on USAID's potential engagement with and investment in this impact-investing initiative.

First, throughout this process we have come to see a fundamental tension between this rigorous review exercise that has put the TOC and broader N3F program under an academic microscope, and the way that the impact-investing world generally seems to function and make use of TOC documents. Most TOC documents developed by impact investors are “high-level” in terms of objectives and quite vague in terms of cause-effect relationships among the investments and outcomes they contain. Indeed, most of the issues that we identified in the N3F TOC regarding direct and knock-on effects of proposed investments and TA, along with factors that would condition these effects, would have been things we raised in the context of other firms' TOC documents. The version of the N3F TOC that we reviewed is more detailed than all of the impact-investing firms' TOC documents that we examined. We have suggested ways of trimming, simplifying, and making more concrete the sets of proposed interventions and effects set out in the TOC, in the hopes of making it easier for investors and others to quickly absorb and find credible the core messages the N3F project hopes to convey. The more clearly the N3F can stake its claim on where and how it intends to improve food environments, the more compelling it becomes as one among a rapidly expanding menu of options competing for impact-investor dollars.

Second, the N3F TOC, or any other TOC, for that matter, cannot “succeed” on its own. It seems to us that what comes “before” and “after” the TOC is what will determine the success of the N3F in attracting investors. In this sense, the TOC serves as a critical bridge between the two. “Before” the TOC, investors must be convinced of the social value of the impacts being offered, and of the profitability of the proposed investments that will generate them. While interest in and momentum for investing for food-environment outcomes are building, investors currently seem more interested in other social outcomes, including those that are perhaps more directly linked to SDGs. In contrast, helping food SMEs contribute to healthier local food environments is indirectly linked to a few SDGs, but even these links are not iron-clad. If the N3F succeeds, as GAIN is convinced it will, however, it has the potential for generating invaluable empirical evidence that could strengthen the linkage from SME support to specific SDGs, which almost certainly would unleash considerable follow-on impact-investor interest in enhancing food environments—and not only in sub-Saharan Africa.

“After” the TOC, investors must be met by teams of N3F representatives who can quickly and convincingly discuss the linkages across entries in the various columns that comprise TOC, and provide examples of the types of investments that might be both profitable and impactful. With this approach, a successful TOC will help N3F promote impact investments that will create positive and impactful changes in the food environment. It will also assist the N3F “sales team” in preparing to make the detailed cases for impact and profitability, beginning with due diligence in selecting successful SMEs working in markets that are amenable to change in terms of important products consumed by target populations.

Finally, we have come to appreciate in this work just how diverse the impact-investment world is. Of necessity, we have had to generalize across these differences as we have formulated the considerations and recommendations of this report. It is important, however, to reiterate that some impact investors prioritize return on investment more than others. Some may be willing to sacrifice much of this return in order to generate larger social impacts. Among these, some may expect more than glossy brochures as evidence of impact. This rigorous and critical review of the N3F program and TOC sets up the program to speak to a specific set of impact investors who take a rigorous and thorough view of the impact pathways that connect their investments to outcomes they care about. The N3F team may want to more clearly commit to this particular set of investors, which may include USAID and other traditional development agencies. Or, N3F may want to adopt a differentiated strategy that can pitch the initiative at different levels of detail and rigor to different types of impact investors. Regardless, a single TOC should be constructed to serve all types of investors—the information “before” the TOC and especially the analytical rigor “after” the TOC will be different across investor types.

With this final reflection in mind, we conclude with one specific question posed to us: “What role should USAID play in promoting and supporting the N3F?” From our standpoint, there are three useful answers to this question. These responses are built firmly on the premise that the N3F is worth supporting and encouraging as perhaps the best possible articulation of an impact-investment perspective on food environments in urban and periurban settings in sub-Saharan Africa. Its success is far from assured, as we have reiterated in these final reflections, but it is a unique, large-scale experiment that can shed new light on the expanded roles that SMEs—through local food environments—can play in health and nutrition outcomes.

Our first answer to this question is that USAID could play an important role in supporting the N3F teams to further develop the TOC, with particular focus on the spadework “before” the TOC (i.e., convincing potential investors of the importance of investing to change the food system) and the considerable work “after” the TOC (i.e., creating and preparing sales-project management teams that can make the general links in the TOC concrete for potential investors, and develop and manage the processes to deliver profits and impacts).

As a second answer to this question, USAID could play an important blended-finance role, helping to reduce the risk of the N3F program by underwriting some of the investments in the N3F portfolio. Moreover, a partnership with USAID might help set the stage for critical lessons to be learned from the N3F experience. In the heterogeneity of the impact-investment space, USAID can stake out a different point along the return on investment (ROI)-impact frontier and can insist on more rigorous evaluation of health and nutrition impacts. Such a role could create invaluable learning opportunities for a much broader set of investors considering food systems investments, including many unwilling to be the first mover into this novel impact-investing segment.

Finally, USAID cannot afford *not* to be involved in this endeavor, as engagement in the N3F offers the agency a place at the frontiers of food systems, food systems policy, the private sector, and the SDGs. The N3F is positioned at the confluence of these key frontiers at a time when food systems are shaping policymaking and stakeholder decisions like never before. If USAID—and GAIN as well—wish to continue to build and wield influence at this confluence, the N3F represents an ideal platform for doing so, despite its considerable complexities and risks.

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Annex I. List of Interviewees

Name	Affiliations	Areas of Expertise	Date Interviewed
Alice Chapple	Impact Value	Alice has worked in impact investing and related fields for decades. Her firm helps to create impact assessment frameworks to help investors measure, manage, and increase their social impact.	Ongoing as retained consultant on project.
Tom Reardon	Michigan State University	Tom is a recognized expert in agricultural value chains and SMEs in LMICs and currently serves as the Focal Expert for SMEs for the UN Food Summit.	Ongoing as retained consultant on project.
Alem Hadera Abay	Consultant, GAIN (previously)	Alem is a public health nutritionist with experience in national food and nutrition strategy, public-private partnerships and private sector engagement in health, food, and nutrition.	April 2021
Andrew Mude	African Development Bank	Andrew has expertise in agriculture research and food systems, with a geographic focus in Africa.	February 23, 2021
Enock Musinguzi	GAIN	Enock is the Country Director for GAIN in Tanzania. He has managed several relevant predecessors to the N3F, including a marketplace for nutritious food and an SME accelerator with SAHARA Ventures.	March 18, 2021
Gonçalo Neves	Thirdway Africa	Gonçalo has expertise in African finance/banking and agri-SMEs.	April 2021
Jumanne Mtambalike	SAHARA Ventures	Jumanne is an innovator and technology enthusiast and founder of the Tanzanian Startup Association. He has worked closely with GAIN-Tanzania to create the Accelerator Hub for food SMEs.	April 2021
Karim Harji	Saïd Business School–University of Oxford, Possibilian Ventures, and Evalysis	Karim works with investors and ventures to describe, measure, and improve their social impact. He is a co-founder and previous director of Purpose Capital and serves as advisor to the G8 and Rockefeller Foundation on social-impact measurement.	April 19, 2021
Mike McCreeless	Consultant, Root Capital (previously)	Mike has worked with agricultural SMEs for over a decade and helps clients expand the “two-dimensional” efficient frontier of financial risk and impact.	March 25, 2021

Panelists at GAIN-SAHARA Ventures Webinar	Various	Enock and Jumanne co-organized this virtual panel discussion, which included representatives from GAIN, N3F, NMB (national bank in Tanzania), AfDB, AGRA, and two managers of food SMEs.	Recording available here.
Songbae Lee	USAID/RFS	Songbae leads agriculture and finance work and is the main point of contact for Farm Fit and Aceli programs.	April 2021
Tom Adams	60 Decibels (dB)	Tom is a founder and director of 60db, which specializes in lean data and evaluation—often for impact investors. He previously worked several years at Acumen Fund and is well-versed in the sphere of impact investment.	March 23, 2021
Venu Aggarwal	60 Decibels	Venu led the lean data in agriculture initiative at Acumen before joining 60db, where she continues to develop innovative ways of evaluating impact.	April 6, 2021
Claude Marcel	Les Céréales d’Haiti	Claude is production manager of a major flour milling factory in Haiti.	Fall 2020

Annex 2. Key Informant Interview Guide

Introduction

Thank you for taking the time to meet with me today. My name is [name], I am from the University of California, Davis (UCD), and I am conducting interviews as part of a research project that focuses on small- and medium-sized enterprises (SMEs) in the food sector, with special attention paid to the credit and other constraints they might face in expanding their operations and producing foods that are more nutritious. Throughout this interview, please keep in mind that you are the expert, and I am here to learn from you. Please do not feel that any information is too little. Your opinions about these issues are what matter.

Taking part in this interview is entirely voluntary. It will take about 30–45 minutes of your time. You may skip any questions that you do not want to answer. If you decide not to take part or to skip some of the questions, it will not affect your current or future relationship with me, this research project, or the UCD team. If you do decide to take part in the study, you are free to end the interview at any time. All your responses will be kept confidential. Any information we include in our report will not identify you as a respondent. I will seek your permission to voice-record the session because I do not want to miss any of your comments. Although I will be taking some notes during the session, I cannot possibly write fast enough to get down all you say. I am happy to respond to any questions you may have now. If you have questions later, you may contact me at [interviewer phone and email address—to be sent via email ahead of time].

Are you willing to participate in this interview?

Questions

Professional Responsibilities

- What is your current position?
- How long have you been in your current position?
- What are your primary responsibilities in your current position?

SMEs in the Food Sector—What Does This Mean?

- When I use the term “SMEs in the food sector,” what does that term mean to you?
- Can you provide an example or two of an SME in the food sector?
- Do you have any direct experience in working in or with SMEs in the food sector?

More Nutritious Foods—What Does This Mean?

- There is a lot of attention being paid to improving diets in LMICs. What comes to your mind when you hear/read the term “more nutritious foods”?
- Can you give me example of foods that you consider more nutritious foods?

SMEs in the Food Sector—What Constraints Do They Face in Expanding Production or Changing Product Mixes?

- Given what you know about SMEs in the food sector, what are the major constraints that they face in expanding output?

- Given what you know about SMEs in the food sector, what are the major constraints that they face in changing the products they produce?
- Given what you know about SMEs in the food sector, what are the major constraints that they face in producing foods that are more nutritious?

SMEs in the Food Sector—Influence on the Food Environment and Diet

- How can the SMEs influence the local food environment? What are the constraints for SMEs not to have a larger influence on the availability and affordability of the nutritious foods?
- How can the SMEs be best supported to have a larger influence on the food environment? Would/does providing technical support and other financial support for the SMEs increase the influence of SMEs on the food environment (availability, access, and affordability of nutritious), and if so, how?
- What do you think where (e.g., technology, food safety, marketing, research and development) SMEs would invest if they were to get financial support/credit?
- Where do you think (e.g., technology, food safety, marketing, research and development) SMEs should invest to increase their influence on the food environment?
- In what ways could technical groups such as GAIN help the SMEs contribute to a healthy and nutritious food environment?
- What is the demand for nutritious foods in LMICs? Is it a viable business model for the SMEs to focus on production of nutritious foods?
- Do you think more SMEs would be interested to be involved in production of nutritious foods in LMICs? If not why? What are the barriers?
- What strategies can SMEs in LMICs use to improve the affordability of their nutritious products for a large segment of the population? What are the barriers?

SMEs in the Food Sector—Role of Credit in Addressing Constraints

- Thanks for listing the constraints that you feel SMEs in the food sector face in their efforts to increase production, change their product mixes, and produce more nutritious foods. Now let's discuss the formal and informal sources of credit that are available to SMEs to help overcome some of these constraints.
- What are the sources of credit currently available to SMEs?
- What are the normal terms under which SMEs can secure credit?
- Are there limits on how much these SMEs can borrow? What are these limits and who sets them?
- Are there limits on how SMEs can use borrowed funds? Who decides these limits?
- If an SME cannot secure credit, why do you feel that might be the case?

Hypothetical Thought Experiment

- Let's conclude this interview by engaging in a thought experiment. Assume that you had \$5 million to loan to SMEs in the food sector next year.

- What are the characteristics of the SMEs to which you would lend money? Why these characteristics?
- Would your answer change if you were specifically mandated to loan money to SMEs to increase the numbers and overall amounts of more nutritious foods in the market? If so, how so, and why would this be the case?

Thank you

Thank you very much for your time and your engagement. This has been a great pleasure. I have learned a lot about SMEs in the food sector, what constrains their efforts to grow, to change their product mixes, and the nutritional quality of the products they produce. Once again, the information that you have provided will be held in strict confidence. If you have any questions or if you think of anything else that might be useful to us in this research project, please reach out to me.

Annex 3. Additional Information on Food Habits and Food Product Evolution

Consumer demand theory provides a valuable framework for understanding how consumers respond to new product offerings with new attributes (ref). The concept of income and price elasticity can elucidate how a given change in the market is likely to alter the budget allocations and consumption patterns of different consumer groups (ref). In the case of the N3F, the consumer groups that matter most are those who are nutritionally vulnerable due to deficiencies in their macronutrient or micronutrient intake, combined with their physiological needs and long-term implications of nutrient deficiencies. A key question in this regard, then, is to what extent enhanced food environments will change the consumption patterns of these most vulnerable consumer groups.

Estimates of income and price elasticities of demand are increasingly becoming available for LMICs (e.g., Ojogho 2010), and some are broken down into product categories that might be useful for guiding N3F discussions on which more nutritious products (or product categories) to focus on. For many of the food categories that might be of interest to N3F, such as fruits/vegetables, the expenditure shares tend to be low, especially for low-income groups, and the price elasticities of demand are low, too. For other categories, including high-end grains such as rice, price elasticities are higher, suggesting that making these products more affordable (and fortifying them) might have large impacts on nutritional outcomes. The challenge for these products is the relatively small market “space” that SMEs tend to occupy. While income elasticities of demand can be high for some food categories that might be of interest to N3F, such as meats/fish, the current TOC very rightly does not include a pathway for N3F investments/activities to influence household incomes.

Diets in LMICs do not meet all the nutritional needs of consumers; this is particularly true for young children and pregnant and lactating women, who are particularly at risk of micronutrient deficiencies. To effectively enhance the nutritional status of populations in LMICs, one must know the current nutritional status of these populations and the food sources of key micronutrients in their diets, and then focus attention on either increasing the micronutrient contents of these foods or supplanting less nutritious foods in current diets (ref). We evaluated the consumption of items from 7 food groups that fulfill N3F’s definition of nutritious foods in 14 African countries (using each country’s most recent Demographic and Health Survey [DHS] data), some of which is consumed outside of the household (Sauer et al. 2021). Overall, the consumption of nutritious foods among children 6–59 months is low, which supports the founding N3F proposition that improvements in diet quality are needed. Table 5 reports consumption of selected foods groups among children living in urban areas. Although the diet diversity scores are roughly similar across countries, there is great variability in the consumption of foods contributing to the diversity measure. For example, in Angola, approximately 47 percent of children 6–59 months consumed fish in the previous day. However, in Ethiopia, only 4.3 percent of children in this age cohort consumed fish in the previous day. Similar wide variation exists in egg consumption—21.3 percent and 6 percent of young children consumed eggs in Nigeria and Rwanda, respectively.

However, it is not easy to know how to use this information to guide N3F investments aimed at changing the food environment in ways that will affect diets and nutritional and health status. Will, for example, investments in SMEs in the egg value chain be more profitable/impactful in Nigeria (where egg consumption is already routine and can be potentially accelerated) or Rwanda (where egg consumption is low)? This is an important question (for SMEs) to consider and signals the importance of understanding current diet and food consumption patterns—particularly among the vulnerable subpopulations that are ultimately targeted by the N3F—in order to select SMEs and investments in them that increase the chances of acceptable financial returns and of generating positive impacts on the food environment.

Table 5. Percentage of Urban Children 6–59 Months Who Consumed Foods from Selected Food Groups for Four N3F Priority Countries

Country	Dairy Products	Legumes	Fish	Animal-Source Foods	Vitamin A Rich Fruits and Vegetables	Eggs	DDS >= 4
Kenya	4.4	20.5	8.6	23.1	23.8	15.2	8.9
Rwanda	2.5	52.6	12.9	19.1	21.1	6	11.9
Tanzania	2.7	36	28.8	36.7	28	10.1	8.1
Nigeria	5.1	30.6	29.1	42.8	5.6	21.3	10.8

Source: Diet diversity score (DDS) calculated from the seven WHO food groups. Consumption indicates the previous 24 hours. Data from DHS.

To further this illustration of the potential role baseline diet and nutritional intake patterns could play in operationalizing the N3F TOC, we dive a bit deeper into these patterns. The results reported in table 6 and table 7 go beyond diet diversity and focus on the top five sources of vitamin A (VA) and iron in the diets of households of young children in Nigeria, nationally and by region. Note that the vast majority of vitamin A in these children’s diets is derived from unrefined palm oil (table 6); other, less important sources are primarily leafy greens, tomatoes, and selected root crops. These patterns are common throughout the humid tropics of sub-Saharan Africa. If improving the VA content of diets were one of the N3F objectives in Nigeria, there would be several options for doing so, but it is unclear which, if any, SMEs might be targeted in such an effort. The same is essentially true for dietary sources of iron (table 7); it is not clear what, if any, role SMEs might play in the agro-fortification or biofortification of staple crops, nor is it clear what roles SMEs might play in “elevating” consumption of some of the products currently contributing very minor amounts of these micronutrients to children’s diets.

Diets matter, in part because they are the “portal” through which food-based improvements in nutritional status and health must flow, and because core dietary ingredients do not change very much, especially for the resource-poor. Therefore, although N3F has declared that it does not intend to solve any *specific* nutrition problem a priori, knowing dietary intake patterns and the roles of SMEs in delivering these foods can help focus N3F’s search for geographic areas, populations, and markets in/for which impacts might be expected. This work, too, might already be envisioned by N3F. The savvy investor will appreciate knowing, with a quick glance at the TOC, that N3F is “fishing in the right pond.”

Table 6. Food Sources of Vitamin A in Children’s Diets, Nigeria

National		North Central		North East		North West		South East		South South		South West	
Food	Average Daily Apparent Intake (µg RAE) per AME	Food	Average Daily Apparent Intake (µg RAE) per AME	Food	Average Daily Apparent Intake (µg RAE) per AME	Food	Average Daily Apparent Intake (µg RAE) per AME	Food	Average Daily Apparent Intake (µg RAE) per AME	Food	Average Daily Apparent Intake (µg RAE) per AME	Food	Average Daily Apparent Intake (µg RAE) per AME
Palm oil	1,195	Palm oil	1,383	Palm oil	867	Palm oil	1,023	Palm oil	1,150	Palm oil	1,372	Palm oil	1,379
Leaves*	49	Leaves*	50	Leaves*	37	Leaves*	24	Leaves*	49	Leaves*	75	Leaves*	62
Gari—yellow	18	Tomatoes	12	Dry pepper	5	Tomatoes	11	Gari—yellow	37	Gari—yellow	57	Fresh pepper	18
Bananas	13	Fresh pepper	10	Tomatoes	5	Watermelon	9	Pawpaw	28	Bananas	23	Bananas	18
Pawpaw	11.1	Yam roots	9.5	Fresh pepper	4.4	Fresh pepper	4.4	Bananas	16.1	Pawpaw	11.4	Tomatoes	17.0

* Leaves refer to cocoyam, spinach, and other green leafy vegetables; AME refers to adult male equivalent; RAE refers to retinol activity equivalent

Table 7. Food Sources of Iron in Children’s Diets, Nigeria

National		North Central		North East		North West		South East		South South		South West	
Food	Average Daily Apparent Intake (mg) per AME	Food	Average Daily Apparent Intake (mg) per AME	Food	Average Daily Apparent Intake (mg) per AME	Food	Average Daily Apparent Intake (mg) per AME	Food	Average Daily Apparent Intake (mg) per AME	Food	Average Daily Apparent Intake (mg) per AME	Food	Average Daily Apparent Intake (mg) per AME
Guinea corn, sorghum	3.5	Yam roots	4.7	Guinea corn, sorghum	6.9	Millet	11.3	Yam roots	3.5	White beans	3.0	Yam roots	2.8
Millet	3.1	Guinea corn, sorghum	4.5	Millet	5.2	Guinea corn, sorghum	9.5	White beans	2.7	Yam roots	2.6	Brown beans	1.7
White beans	2.7	White beans	3.0	White beans	2.9	White beans	3.5	Cassava roots	1.8	Cassava roots	1.4	Rice, imported	1.6
Yam roots	2.6	Millet	1.7	Rice, local	1.7	Rice, local	1.6	Bread	1.2	Bread	1.2	Bread	1.6
Rice, local	1.1	Rice, local	1.6	Yam roots	1.1	Maize, shelled/ off the cob	1.2	Rice, local	1.1	Rice, imported	1.1	White beans	1.2

AME refers to adult male equivalent.



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