SCAN Supply Chain Analysis for Nutrition

Supplementary Tools



March 2020 version

TABLE OF CONTENTS

ST-01

CLUSTER ANALYSIS—SIX CAPITALS)1 01
	03
Background and instructions	03
SUPPLY CHAIN MAPPING	05
Background and instructions	05 05 05 06 07
CREATION OF A SUPPLY CHAIN HEAT MAP	09
ST-04	
PRICE MARK-UP MAP	11
Background and Instructions	11 11
ST-05	
SWOT ANALYSIS	13
Background and Instructions	13
ST-06	
PORTER'S FIVE FORCES	15
Background	15 15 15 15 15 15
ST-07	
	17
Background	17 17 17
ST-08	
STAKEHOLDER INTRODUCTION LETTER	25 25
ST-09	
CHALLENGE MATRIX	27 27
ST-10	
TRAFFIC LIGHT MODEL	29 29
ST-11	
OPPORTUNITY MATRIX	30 30
ST-12	
SCAN USER SURVEY	32 32

CLUSTER ANALYSIS—SIX CAPITALS

Background

A cluster analysis of the six capitals help to define what value means for the project and the themes or nutrition lens that will be applied to the other SCAN tools. This type of cluster analysis is helpful in identifying potential cross-cutting issues that relate to supply chains that may not explicitly fall within the three SCAN dimensions (supply chain stages, supply chain aspects, and drivers of the food environment).

The six capitals include:

- **Social capital:** the power or dynamics between stakeholders in the supply chain, such as gender or prestige
- Natural capital: water, land, and other natural resources
- Human capital: knowledge, skills, and systems of communication
- Physical capital: infrastructure and machinery
- Financial capital: access to credit, money, cash flow, and ability to make loans
- Political capital: laws, regulations, lobbying, and political connections

Although all these forms of capital may not directly cause constraints in nutritious food supply chains, they are important to investigate to ensure that the SCAN is considering any factors that may be indirectly affecting the food system. This is also a framework used by the United Nations Sustainable Development Goals.

Organising information around various clusters helps to break down the complexity in the food system, narrow an intervention's focus, and identify what specific values are most relevant to the desired goals. It is also useful in identifying research gaps or repeated themes, which can be expanded upon during a literature review or stakeholder interview.

An example cluster analysis is shown on the following page in Table 1, which organises information from an analysis of political capital relevant to the dairy supply chain in Zambia.

NUTRITION	 Efforts to introduce a new Nutrition Act (superseding one from 1975) and the Code of Marketing of Breastmilk Substitutes has been underway since 2015. There is increasing awareness among government bodies, including National Commission of Food and Nutrition (under Ministry of Health) of the importance of reducing dietary dependency on maize to combat malnutrition. As part of Zambia's Five-Year Flagship Stunting Reduction Programme 2018-2022, the "First 1000 Most Critical Days Programme (MCDP II) has bene introduced as a joint commitment of six ministries. There is a need to mobilise support to accelerate programme implementation. Lack of efficient enforcement of nutritional standards results in the emergency of private standards, such as the Good Food Logo, created by the SUN Business Network Civil Society Initiative and WFP. Current government efforts to diversify the economy with agriculture being a strategic sector. The 2010 Dairy Industry Development Act presents a strategic focus to strengthen the dairy sector and established the Dairy Association of Zambia, focused on lobbying and advocacy for the dairy sector. National level financing for nutrition: The 2017-2027 Profiles Model was established in 2017 to serve as a basis for advocacy for increased spending on nutrition by tracking nutrition budgets. The UN, a network of donors, and 10 Zambian Ministries successfully lobbied for an increased budget for nutrition during 2019-2021. Continuous pressure to increase government spending on nutrition is needed, along with strengthening budget tracking mechanisms.
	with strengthening budget tracking mechanisms.
	 Zambian legislation around food safety (The Food and Drugs Act; The Plant and Pest Diseases Act; The Stock Disease Act) are compliant with international standards. The Zambian Bureau of Standards and the Food and Drugs Control Laboratory are tasked with monitoring, but enforcement is non-functional due to the lack of human and financial resources. Under the Good Food Logo project, product samples are now being tested as of April 2019.
	 Activities related to food safety enforcement are contained under the new Nutrition Act, which has been delayed. Currently NGOs, international organisations, and the private sector are working to improve the situation in the nutrition and food safety space.
FOOD SAFETY	 Private initiatives to improve food safety have emerged in light of poor government enforcement. Dairy processors demand a certain quality from milk collection centres and provide testing equipment.
	 The Good Foods Logo project is helping private processors introduce food safety standards. The project goal is to help processors introduce and maintain food safety and quality standards internally without tight controls from the Zambian Bureau of Standards.
	 Laws forbid milk collection centres from selling raw milk through informal channels; however, these sales remain widespread.
	• The Dairy Association of Zambia is working to establish more cooperatives and supporting relationships between processors and milk collection centres, all in an effort to formalise the supply chain.
SHELF LIFE	• Supermarket chains have considered safety standards in light of the short dairy product shelf life, which threatens stores' reputations if milk is sold past its sell-by date.

Table 1: Example of a Cluster Analysis: Dairy Political Capital in Zambia

INTAKE SURVEY

Background and instructions

An intake survey is used to map characteristics of the supply chain to guide a further literature review. It is not intended to provide all the answers or in-depth knowledge, but rather an intake survey is used to gain a quick overview of the supply chain, the country context, and the culture, that might be useful in planning for a more in-depth literature review as a next step.

An intake survey should result in stakeholder agreement on:

- The desired scope of the SCAN, in terms of geography, food commodity, and supply chain stages
- The desired scope of the literature review
- Any tools which will be used to conduct the SCAN
- A basic understanding of what is already known about the food commodity and its supply chain
- The roles and responsibilities of key stakeholders, both internal and external to the organisation leading on the SCAN
- The desired impact on nutrition that would be sought from an eventual intervention

Information can come from a variety of sources, including internal and external documents, donor, or project agreements; discussions with local stakeholders and target beneficiaries; and discussions with GAIN staff or other organisations who have previously conducted similar work in the past.

The sample intake survey on the next page can help guide the line of questioning and discussions. It can be modified or added to as needed, depending on the objectives and goals of the SCAN.

SAMPLE QUESTIONS	ANSWERS
General SCAN information	
 What is the scope of SCAN? What is the food supply chain and geography of interest? Are there any supply chain stages, supply chain 	
actors, or drivers of the food environment that this SCAN should particularly focus on?	
 How does this SCAN complement or support national goals or objectives? 	
• What is the expected timing of this SCAN? Are there any project deadlines, anticipated complementary events, or any political reasons to schedule the SCAN or its dissemination for a certain time period?	
Supply chain actors	
• What supply chain actors are most present in this supply chain and what are their sizes and characteristics? (e.g. Are there more farmers than traders? Are there fewer retailers than distributors?)	
 Are there any important relationships or linkages between supply chain actors? 	
• What are the roles of institutional stakeholders in the supply chain, including banks, research institutes, governments, or other NGOs?	
 What innovative stakeholders exist in this supply chain? 	
Desirability and cultural norms	
• What are the ambitions of the beneficiaries or target stakeholders?	
• How desirable are the various types of foods or products in question? Are some types or brands seen as luxury foods, staple foods, or eliciting any other emotions?	
• Are there any cultural or religious values, constraints, or taboos associated with the food in question?	
Preliminary SCAN hypotheses	
• What threats or challenges exist in the supply chain that might negatively affect the accessibility, desirability, or quality of foods?	
 What opportunities might exist for new distribution channels, product formats, or new supply chains? 	
 What initial ideas does the team have for interventions that might create value or provide solutions to challenges or barriers within the supply chain? 	

SUPPLY CHAIN MAPPING

Background and instructions

Mapping the supply chain is a useful way to depict all the moving parts within the system. By identifying all the various supply chain actors and the supply chain stages they are active in, it can be easier to identify where barriers and opportunities might exist to improve the accessibility, desirability, and quality of nutritious foods.

A supply chain map provides the assessment team with:

- A general overview of the supply chain within the geographic area for the particular food in question
- An overview of the flow of goods and their volumes across the supply chain of a specific business or broadly across an entire market or geographic area
- A few preliminary ideas on where there might be challenges and opportunities to intervene and improve the supply chain
- A preliminary list of key stakeholders and value chain actors who could be interviewed and provide greater insights

A supply chain map is most useful when created as a flow chart, noting the various types of supply chain actors and how goods, services, or information is flowing between them. This work instruction details how to conduct a mapping of the supply chain and some examples that can be used or modified.

Steps to creating a supply chain map

There are three basic steps described in this section for mapping a supply chain. The level of detail required will depend on the SCAN goals and objectives and not all steps may be necessary. For example, if the supply chain model is only being used to complement other research, it may be sufficient to end after the first step. For SCAN objectives that are more detailed and require a full food accessibility assessment, it may be necessary to continue through steps 2 and 3.

1. Identify key stakeholders along the supply chain stages

The first step to conducting a supply chain map is to list all the possible supply chain actors involved in the food's supply chain. Using Figure 1 below, which outlines common stages in a supply chain, determine who exactly is involved in which stages. Examples of potential actors are outlined in the table below. Be as specific as possible.



Figure 1: Common supply chain stages with example stakeholders identified

The supply chain being analysed may have more or fewer stages than those listed above. Based on the specific goals and objectives of SCAN, the supply chain can be broader or more focused as necessary.

2. Detail the relationships between the stakeholders

The next step is to create a two-dimensional flow chart or map that shows the relationship between each of the identified supply chain actors. The relationships are noted with lines and arrows connecting the actors to each other. Figures 2-4 show some examples of generic supply chain maps created for the dairy, pulses, and vegetable supply chains, which can be modified as necessary or adapted for other types of foods.



Figure 3: Sample supply chain map for pulses



Figure 4: Sample supply chain map produce (fruits and vegetables

3. Provide details about the flow of goods, services, and information

The final step is to add details about the types of goods, services, or information that flows along those relationship lines and their indicative volumes, quantities, or other characteristics. Gaps in this information can provide a helpful indication of targets for the literature review or stakeholder interviews. The goal with this step is to provide any details that show how specific supply chain actors affect and influence the quantity, quality, price, location, and time—common metrics or standards that help benchmark and track improvements in a supply chain. These are defined as follows:

- **Quantity:** The right amounts of products are moving through the supply chain to meet consumer demand
- **Quality:** The products are not damaged or adulterated, have been safety and quality assured, and are received in the expected or agreed upon quality, including packaging
- **Price:** Actors buy and sell at agreed-to and negotiated prices for the quantity and quality of goods received
- Location: The products are delivered to the agreed upon locations and meet the demand of those locations
- **Time:** The products are delivered on time so that it does not impede the operations or work of the next supply chain actor

Figure 5 provides an example of an in-depth supply chain map, which expands upon the dairy supply chain map in Figure 2 with further details regarding flows of goods, services, and information in both the formal and informal markets of Kenya.

One can easily see from this more detailed mapping that although there are over 1 million dairy farmers in Kenya, there are only 200 chilling plants and 3 large-scale dairy processors. This could signify a barrier to entry for Kenyan farmers, or could be interpreted as an opportunity for better food safety and quality control by channelling all dairy through these 3 larger-scale processing facilities. Further literature review and stakeholder interviews will help to determine the context in which to interpret the data presented in the supply chain map.

Note that this is only one way of detailing a supply chain. Based on the goals and objectives of SCAN, such details can focus on any of the five metrics described above or any other metric of interest.



08

Geographic

CREATION OF A SUPPLY CHAIN HEAT MAP

In the data analysis phase of SCAN, the supply chain heat map is one tool that can be used to organise and capture challenges, bottlenecks, and opportunities along the supply chain. The heat map can show where there might be poor flows of goods, services, and information between supply chain actors and any specific drivers of a food's accessibility, desirability, or quality that should be pinpointed for intervention.

Starting from the supply chain maps in Figures 2-4, the supply chain heat map highlights the supply chain actors most involved or most influential in challenges such as food safety, food loss and waste, prices, or other characteristics of interest. The five metrics described in Part I (quantity, quality, price, location, and time) can also be used to describe the types of challenges that SCAN may want to focus on in such a heat map.



Figures 6-8 provide examples of supply chain heat maps using the dairy, pulses, and produce maps created above.

In the dairy example, food loss and waste were identified as highest in the milk production stage with the raw milk farmers. The distributors and agents are those that set prices and often add the highest margins affecting the final cost of dairy to the consumer. Largest risks to food safety that need to be controlled are present in the transportation stage from raw milk farmers to milk chilling plants and onward to the processors and distributors. Another risk to food safety is present in the storage at retail level, just prior to purchase and consumption by consumers.

Figure 6: Example Supply Chain Heat Map for Dairy



Figure 7: Sample Supply Chain Heat Map for Pulses

In this example, the mills and processors are driving the prices due to their ability to sort, grade, and have a diversified portfolio of products. They are also able to negotiate their supply prices down based on the amount of usable raw materials. Food loss and waste are greatest at the farming stage where often a significant portion of the pulses grown are unusable for further processing for safety and quality reasons and their ability to be sorted from other farm refuse and debris. The assemblers, bulkers, and traders pose the greatest risk to food safety, particularly in the conditions and duration of storage. Limitations of economies of scale mean there are relatively few alternatives to the services bulkers and processors offer.



Figure 8: Sample Supply Chain Heat Map for Produce (Fruits and Vegetables)

Similar to the pulses example, those with greatest control of prices for produce are the processors and wholesalers who have the greatest market insights and are able to capture the value of sorting and grading. Both food safety and food loss and waste are most at risk during production, packaging, and storage, particularly in the existence (or lack) of cold chain transportation and storage that may be necessary for some produce to extend their shelf life.

PRICE MARK-UP MAP

Background and Instructions

A price mark-up map helps to assess the affordability of a food within a supply chain by displaying the cost of goods at different stages in a supply chain. It shows how each supply chain step is contributing to the final price of the good in question. This can help identify stages in the supply chain that are driving the price of goods. Potential operational inefficiencies might be identified at these supply chain stages and mitigated to lower the price of goods.

To create a price mark-up map, first identify all stages and sub-stages in the supply chain that the good passes through. Include stages starting from the very first raw materials through any taxes imposed on the consumer when purchasing.

Next, collect price information for a single unit or common group of units. Prices should reflect what the goods were purchased for upon arrival in each stage, not what prices the goods are being sold for to the next business or entity in the supply chain.

It may be helpful to create more than one price mark-up maps if there are significant price variations based on seasonal availability, because of supply chain actors of different sizes moving through each stage, or because of varying packaging sizes. An example price mark-up map for milk-based yogurt products in Ethiopia is shown in Figure 1.



Figure 1: Example Price Mark-Up Map: Milk-Based Yogurt Products in Ethiopia

Interpretation of a Price Mark-Up Map

There are many ways to interpret a price mark-up map and these should be validated with key stakeholders to determine the reasons for the mark-up at each supply chain stage. Price mark-ups may be due to the actual costs of operations; or due to market forces, competition, or policies that are artificially inflating or deflating prices. An operational example might be food safe packaging, which is an expensive input is passed along to consumers, but which adds a worthwhile cost increase. A market forces example might be where there is limited market competition and the suppliers have the power to increase or set prices for all buyers.

Note that many businesses in developing countries may not keep detailed records of these prices or may want to keep information around profit margins private. This may make it difficult to create a price markup map based on concrete figures. If this is the case, it may be more important to discuss with multiple stakeholders where their largest costs come from and what the drivers of this might be and triangulate approximate mark-up values or proportions. For example, many food processors may note they face challenges with the high cost of packaging. This might be due to high import costs or because there are few packaging suppliers who are inflating their prices because of limited competition. The fillable template on the next page can be used to create a price mark-up map. Simply fill each supply chain stage and the total price of the goods arriving at each stage. The table will automatically calculate the mark-up at each stage and the proportion of the total price attributable to each stage. The graph will automatically update.

SUPPLY CHAIN STAGE	PRICE OF GOOD	MARK-UP	MARK-UP PROPORTION
Total		0	0%



Price Mark-Up Map for [Food] in [Geography]

Supply Chain Stage

SWOT ANALYSIS

Background and Instructions

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a commonly used model that presents positive and negative, internal and external factors that affect supply chain actors. It enables the assessor to understand the market of the commodity in question and how current business interactions are creating supply chain barriers that limit accessibility, desirability, and quality. It also helps to understand linkages and identify the commercial, technical, and logistical triggers that can affect prices and improve the supply chain.

A SWOT analysis can be completed for each supply chain actor, or for a set of actors who are the focus of the SCAN. Comparing the SWOT of one supply chain actor to another can provide an assessment of the relative power of an actor over other participants in the supply chain.

To undertake a SWOT analysis, it is useful to consider six questions which consider the role and effect of each supply chain actor on the supply chain itself:

1. How easy is it to start a new business in this stage of the supply chain?

- » If it is easier to start a business, it means other businesses will also have an easy time to enter, creating competition (*Example of a Threat*).
- » The market could also then be divided up by more participants, which limits each of their profits (*Example of a Weakness*).
- » Laws, patents, and permits can create barriers for other participants to start a business and enter the market (*Example of a Strength*).

2. How much competition exists in this sector of the market?

- » If there are many competitors, it would be difficult for one business to negotiate a higher price since it would have to compete with the other competitors (*Example of a Weakness*).
- » If there is an oligopoly or monopoly, it is possible to limit market competition between each other *(Example of a Strength).*
- » If such an oligopoly has the ability to set market prices together, it could mean each receives the best profit margins (*Example of an Opportunity*).
- 3. What power do the suppliers, or businesses prior to this one in the supply chain, have to increase the cost or limit supply?
 - » If there are only a few suppliers, they can decide to skip deliveries or store more goods, waiting until there is a more limited supply to drive prices up (*Example of a Strength and/or Opportunity*).
 - » If the goods are highly perishable and cold chain capacity is low, suppliers need to sell quickly or the product will go to waste, thus they have limited power to demand higher prices (*Example of a Weakness*).

4. What power do the customers, or buyers after this one in the supply chain, have to negotiate costs down or increase demand for a product?

» Similar to the previous question, there are several ways that a limited number of buyers, perishability of the goods, and other factors can limit supply or demand, affecting prices.

5. What other substitutes are there for this good or service?

- » If there is a low price elasticity for substitutes, consumers will continue to buy the good regardless of price (*Example of a Strength*).
- » If there is a high price elasticity for substitutes, consumers will readily choose another good to substitute (*Example of a Weakness*).
- » Note that consumer perception of quality can affect price elasticity, and consumer perception of quality is often tied to the actual price of a good; more expensive products are often perceived as being of higher quality and thus more desirable, even if there are readily available substitutes at a lower price.

- 6. What reasons and challenges are there for this business to improve nutrition, food accessibility, desirability, or quality?
 - » If there are policies in place to incentivize business engagement and involvement in improving nutrition, businesses might feel more compelled to do so (*Example of an Opportunity*).

Completion of a SWOT analysis should provide answers to the following questions:

- » What are some of the logistical inefficiencies, such as food loss and waste, long supply chains, and others that increase costs?
- » What might help improve supply, grow the market, or improve market linkages?
- » What are some technical challenges, such as food safety, low yield, and limited equipment or expertise that cause supply chain constraints?
- » What are some consumer trends and behaviours?

In addition to listing the strengths, weaknesses, opportunities, and threats, it may be useful to cross-compare these to identify business strategies to address each. At the intersection of strengths and opportunities is a growth strategy; strengths and threats is a defence strategy; weaknesses and opportunities an improvement strategy; and weaknesses and threats a retreat strategy. This is depicted in Figure 1 with an example for dairy collectors and hawkers in Kenya. This figure can be used as an editable template for your own SWOT analysis.



Figure 1: SWOT Analysis for Dairy Collectors and Hawkers in Kenya

PORTER'S FIVE FORCES

Background

The Porter's Five Forces Framework, developed by Michael Porter of Harvard University in 1979, is a tool for analysing and describing the competitiveness of an industry and thus, it's attractiveness or profitability. "Attractive" industries are those in which the effect of the five forces improves overall productivity, while "unattractive" industries are those in which the effect is the opposite.

The Five Forces are described below and depicted in Figure 1 along with the determinants of each force.

Force 1: Threat of New Entrants

A company's power, profitability, or ability to grow is affected by how many new businesses can easily enter and compete in its market. The less time, money, and political restrictions it costs for a competitive business to enter the industry (the "barriers to entry"), the more it weakens a company's position, lower its profits, and limits its growth.

Force 2: Threat of Substitutes

Competitive substitutes are products or services that can be used in place of a certain company's product or service. An example from the transportation field is one car brand or model substituting another car brand or model. Substitutes can also include other forms of transportation, such as bus, bicycle, subway, or mobile taxis such as Uber, which can replace the need for one to own a car.

For undifferentiated food commodities, substitutes are based on culture and climate zone. For some categories of foods like staple grains (e.g. rice, wheat, or maize), each could be substitutes for one another assuming this is culturally and socially appropriate. When wheat is unavailable, consumers can choose to substitute their purchases with maize. For other categories of foods, such as dairy, there may not be a close substitute available. In this case, consumers might choose to eliminate this product from their diet when unavailable, or substitute with other categories of foods, such as eggs or pulses. Consumers may not always have the knowledge to choose to substitute foods with those that are equally or more nutritious, and such foods may not always be accessible to them for a number of reasons.

Force 3: Bargaining Power of Customers/Buyers

Customers and buyers often have some power or ability to drive down prices, generally based on how many customers there are or the size of the market they represent, the cost or ability for the customer to find a suitable substitute, and the price sensitivity customers are to those products. If there are only a few large buyers, they can use their exclusivity power to drive down the cost of goods from their suppliers. If customers are price sensitive to substitutes or substitute products are not available, they will have a difficult time affecting prices.

Force 4: Bargaining Power of Suppliers

Suppliers also can have some power or ability to affect prices and often they prefer to drive up the price of goods or services to their benefit as a seller. This power is generally based on the number of suppliers; how unique or limited substitutes are; and the economic, social, and political cost for buyers to switch suppliers. The fewer the number of suppliers and the more a buyer depends upon a supplier, the more power the supplier holds to drive prices up.

Force 5: Competitive Rivalry

Competitive rivalry refers to the number and size of other businesses in direct competition. If a company has many rivals competing for the buying or selling of goods and services, the lower power they have and the greater likelihood that the cost of supplies and goods will go up. With only a few competitors, a company has better ownership of the market and will be more likely to have higher sales volumes and thus profits.



Figure 1: Porter's Five Forces

ENTRY BARRIERS

Economies of scale Proprietary product difference Brand Identity Switching costs Capital requirements Access to distribution Absolute cost advantage Proprietary learning curve Access to necessary inputs Proprietary low cost product design Government policy Expected retaliation

RIVALRY DETERMINANTS

Industry growth Fixed (or storage) costs/value added Intermittent overcapacity Product differences Brand identity Switching costs Concentration and balance Informational complexity Diversity of competitors Corporate stakes Exit barriers

DETERMINANTS OF SUPPLIER POWER

- Differentiatian of inputs Switching costs of suppliers and firms in industry
- Presence of substitute inputs
- Supplier concentration
- Importance of volume to supplier
- Cost relative to purchases in the industry
- Impacts of inputs on costs or differentiatian

Threat of forward integration relative to threat of backward integration by firms in the industry

DETERMINANTS OF OBSTETRICIAN THREAT

Relative price performance of substitutes Switching costs Fire propensity to substitute

DETERMINANTS OF BUYER POWER

Bargaining leverage

Fire concentration vs. firm concentration Buyer volume Buyers switching costs relative to firm switching costs Buyer information Ability to backward integrate Substitute products Pull-through

Price sensitivity

Price/total purchases Product differences Brand identity Impact on quality/performance Buyer profits Decision-makers incentives

INTERVIEW GUIDE

Background

Based on the results of the Intake Survey and Literature Review, an interview guide should be adapted as appropriate to address identified gaps and provide relevant data necessary to complete the SCAN objectives. The interview process should collect information to confirm or supplement information from the literature review, fill in gaps, and enable identification of areas along the supply chain where the accessibility, desirability, and quality of foods are affected or can be improved. Such field interviews are often the best way to get insights into consumer and business behaviour, the desirability of a food, and emerging innovations and recommendations.

The interview guide should be pre-tested with participants to ensure all questions are being understood and interpreted in a way to generate the most useful data. This is also useful to determine how long the interviews will take. Interviews should then be given to multiple individuals from multiple sectors at each stage of the supply chain to compare their views on the challenges and potential solutions. Because many actors may be reluctant to share business records and may be biased in how they frame the problem and potential solutions, interviewing from many angles can help to triangulate the reality and provide recommendations for interventions that truly address root causes in a sustainable manner.

Instructions

To develop an interview guide, first consider all of the relevant information gathered through the Intake and Scoping Step and the Literature Review Step of SCAN. Organize information in alignment with the cube diagram (Figure 5 of the SCAN Procedure) along the three dimensions of SCAN. Based on this, the assessor can identify key pieces of information that need to be field-validated and key gaps in information. These will be the focus of the interview. Refer also to the IFAD *Nutrition-Sensitive Value Chains: A guide for project design* for further questions and information that might be useful in designing the interview guides (https://www.ifad.org/en/web/knowledge/publication/asset/40805038).

Other questions that might be relevant to answer during the interviews include:

- What are the needs and motivations of each supply chain actor? Do any have shared interests or challenges?
- How do relationships between supply chain actors maximize the flow of nutritious foods in the supply chain or minimize nutrients flowing out of the supply chain?
- What are the key challenges and opportunities to improve the flow of nutritious foods or address accessibility, desirability, and quality?
- Are there any nutrient gaps in the diets of the target community that could be filled?
- Are there any operational or policy inefficiencies that could improve accessibility, desirability, or quality of nutritious foods?

On the pages that follow, sample interview questionnaires have been provided for several different types of supply chain actors, including buyers and suppliers; consumers; and banks and investors. These questionnaires can be utilized in their entirety, in part, or modified according to the specific requirements and objectives of SCAN.

QUESTIONNAIRE 1: GENERIC RESPONDENT INFORMATION

Instructions: Use for each interview to record respondent information. If necessary, include other data segregation information, such as demographics, education level, and wealth level.

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES
1.1	Respondent Name	
1.2	Respondent Geographic Location	
1.3	Respondent Location Along Supply Chain	Production, logistics, transportation, processing, value addition, distribution, retail, consumption
1.4	Respondent Affiliation and Title	Employment details—specific company if relevant, or sector/type of occupation
1.5	Respondent Demographics	Age, gender, ethnicity, family size, etc.
1.6	Respondent Education Level	By years of schooling
1.7	Respondent Income Level	By wealth quartile/quintile

QUESTIONNAIRE 2: FOOD AVAILABILITY AND AFFORDABILITY

Instructions: Use to gain a better understanding of the food availability, affordability, stability, and seasonality in various locations of food purchase by consumers.

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES
Ava	ilability	
2.1	What types of food purchasing locations are available in this geographic location?	Local markets, retailers, wholesalers, supermarkets, shops, stalls, etc.
2.2	What types of foods are available at each location listed in 2.1?	Crops, livestock, fish, processed foods, etc.
2.3	Has there been any change in availability of these foods in recent years?	Increasing or decreasing availability of certain foods
2.4	Which types of households access foods from each of the locations listed in 2.1?	Segment households by wealth index, urban vs. rural, primary economic activity, or other method
Aff	ordability	
2.5	For smallholder households, are foods they produce mostly consumed by the household or sold?	Percent consumed vs. sold
2.6	Are poorer households able to purchase the foods they desire or are certain food items or food groups too expensive?	Limit to certain "higher cost" foods or foods of interest
2.7	How does affordability of foods vary between seasons?	Use a seasonality calendar to chart prices over different seasons.
2.8	Have there been major changes in recent years to the affordability of foods?	Increasing or decreasing price of certain foods, outside of seasonality trends

QUESTIONNAIRE 3: CONSUMER HABITS

Instructions: Use to map characteristics of consumers and their purchase and consumption habits and trends. Questions should be targeted towards specific foods or food groups of interest, or asked multiple times for multiple foods.

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES
Hou	sehold Income and Control	
3.1	How much money do you make?	Limit to a typical week, month, or year, depending on what is convenient for the respondent.
3.2	How much money do you typically spend on food?	Limit to a typical week, month, or year, depending on what is convenient for the respondent.
3.3	Where do you buy your food?	Local markets, retailers, wholesalers, supermarkets, shops, stalls, etc.
3.4	How often do you buy food for your household?	Trips per day or per week
3.5	Who makes decisions on what foods to produce and purchase?	Household member with control
3.6	How is food distributed among household members, especially for women, adolescents, and children?	Greatest portions or highest quality portions to certain family members
Foo	d Storage and Preparation	
3.7	Do you prepare your food at home or purchase it already prepared? Describe the food preparation conditions.	Food preparation conditions, including cleanliness, availability of soap and water, pest mitigation
3.8	How does your household store food? Describe the storage conditions.	Food storage conditions, including cleanliness, temperature, light, humidity, pest mitigation
Foo	d Purchasing Behaviours	
3.9	What are the food groups and food items most commonly consumed by the household?	If more detailed information on food consumption is needed, a minimum dietary diversity score can be calculated for either women or children ¹ , or a 24-hour food recall can be completed ² .
3.10	How often is a certain food consumed?	Daily, weekly, monthly, etc.
3.11	Are there any key beliefs, socio-cultural norms, or taboos that affect your food choices and diets, particularly for pregnant and lactating women or children?	Norms and taboos that both encourage and discourage consumption of certain foods.

(continued on next page)

¹ For the minimum dietary diversity for women, refer to the measurement guide: <u>http://www.fao.org/3/a-i5486e.pdf</u>. For minimum dietary diversity for children, refer to the measurement guides: <u>https://inddex.nutrition.tufts.edu/data4diets/indicator/minimum-dietary-diversity-mdd</u>. For minimum dietary diversity at household level, refer to the measurement guide: <u>http://www.fao.org/3/a-i1983e.pdf</u>.

² For instructions on completing a 24-hour dietary recall, refer to the methodology described as follows: <u>https://inddex.nutrition.tufts.</u> edu/data4diets/data-source/24-hour-dietary-recall-24hr.

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES	
Food	Food Purchasing Behaviours (continued)		
3.12	What factors affect the purchase of this food?	Do consumers purchase based on price, taste, quality, food safety, nutrition, variety, colour, ease of preparation, perceptions of health or wealth, etc.	
3.13	How much are you willing to spend on a specific food?	Ask to provide an acceptable range	
3.14	Under what conditions would you be willing to pay more for this food?	To guarantee better quality, better taste, better nutrition, improved convenience, specific branding, etc.	
3.15	How has your household's consumption patterns or diets changed in the past five years? How do you expect it will change over the next five years?	Probe what the respondent thinks the reasons are for the change. Has their household income changed or is the change due to changes in accessibility, desirability, or quality of the food?	
3.16	How important is nutrition and consumption of vitamins and minerals to you?	Use Likert-type scale to grade	
3.17	Are there any programmes in place to create demand for a food?	Promotional campaigns, advertising, policies, incentive structures, etc.	
3.18	Do smallholder producers and rural populations like consuming the food?	Specify by food	
3.19	Do women, men, and children have different preferences for the food?	Specify by food	
3.20	What can be done to increase the acceptability and desirability of the food?		

QUESTIONNAIRE 4: MARKET ORGANIZATION AND RELATIONSHIPS

Instructions: Use to gather information about buyer and supplier power, ease of entry, and supply chain relationships for actors involved in these types of activities. The focus is on supply chain actors who are buyers and suppliers of goods at various supply chain stages.

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES
Buy	er Power	
4.1	Where do you sell your products?	Local markets, retailers, wholesalers, supermarkets, shops, stalls, other businesses or processors, etc.
4.2	What are the selling prices at the various points of sale listed in 4.1?	Use local currency
4.3	How do you determine prices for your products? What influences you to raise or lower prices at each point of sale?	Numbers or types of buyers, sale volumes, packaging sizes, seasonality, etc.
4.4	Where do buyers travel from?	

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES		
Buye	Buyer Power (continued)			
4.5	With whom do you prefer to do business? What makes these buyers preferable?	Characteristics of businesses or outlets to do business—on-time payments, trust, longevity of business relationship, etc.		
4.6	What factors influence demand for your products?	Seasonality, quality, price, availability of substitutes, etc.		
4.7	How would you describe the demand for your products from various types of markets?	Local, national, or international markets serving consumers		
4.8	How would you describe the demand for your products from various types of institutions?	Schools, government purchasing programmes, food assistance, etc.		
4.9	Is there an unmet demand for your products?			
4.10	How do you decide to trust or work with a new buyer?	What factors instil trust?		
4.11	Describe the competition you face in selling to various buyers	Level of competition, other suppliers, seasonal variation, advantages and disadvantages of competitors, etc.		
4.12	How do you get paid for your products and how long does it take to get paid?	Cash, check, credit, other forms?		
Supp	olier Power			
4.13	Where are the suppliers you are buying from?	Local markets, retailers, wholesalers, supermarkets, shops, stalls, other businesses or processors, etc.		
4.14	What are the buying prices at each of the various suppliers listed above?	Use local currency, ask about various qualities or grades of products.		
4.15	How do suppliers determine prices for their products? What influences them to raise or lower prices at each point of sale?	Numbers or types of supplier, sale volumes, packaging sizes, seasonality, etc.		
4.16	Where do suppliers or their products travel from?	Origin of products		
4.17	How often do you have a business exchange with your suppliers to purchase products?	Weekly, monthly, other time period		
4.18	With whom do you prefer to do business? What makes these suppliers preferable?	Characteristics of businesses or outlets to do business—on-time payments, trust, longevity of business relationship, etc.		
4.19	How do you decide to trust or work with a new supplier?	What factors instil trust?		
4.20	Describe the competition you face in purchasing from suppliers.	Level of competition, other suppliers, seasonal variation, advantages and disadvantages of competitors, etc.		
4.21	How do you pay for your products from suppliers and how long does it take to pay them?	Cash, check, credit, other forms?		

(continued on next page)

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES		
Ease	Ease of Entry			
4.22	If you were to start your business again, what would the main barriers to entry be?	Policies, permits, competition, branding, etc.		
4.23	If demand were to suddenly increase dramatically, what are the major constraints preventing you from doubling the amount you sell?	Equipment, human resources, access to capital or loans, access to transportation or distribution networks, etc.		
4.24	What is needed in terms of services and capacities to upgrade?	To increase supply, to undertake higher value- added activities, to capture more end-price share, to increase efficiency, etc.		
4.25	What is needed in terms of infrastructure and technology to upgrade?			
4.26	Currently, how do you access loans or credit to pay for business upgrades?	Banks, microfinance, etc.		
4.27	What are some challenges in maintaining your equipment?	Availability of parts, human resources, access to capital, etc.		
4.28	What was your last business innovation? Describe how successful it was.			
4.29	What are your business ambitions or goals?			
Sup	oly Chain Actor Relationships			
4.30	How are relationships among your buyers and suppliers regulated?	Formal agreements, contracts, informal or verbal arrangements, short- vs. long-term, etc.		
4.31	How is the supply chain coordinated? Are there coordination platforms, stakeholders' meetings, or associations to share information about market trends and prices?			
Tran	sportation, Logistics, and Distribution			
4.32	How is the food transported to and from the supply chain actors on either side of your business? How long does this take?	Truck, rail, boat, etc.		
4.33	What is the cost of transportation?	Use local currency		
4.34	Who along the supply chain bears the cost of transportation?			
4.35	What are the different distribution channels in place?	Market access, institutional buyers, local or informal platforms, etc.		
4.36	What is the nature or condition of infrastructure (rail, roads, etc.) that allow for physical access to markets? How do these change during various seasons?			
4.37	How often is transportation delayed? What are the main reasons for delays?	Weekly, monthly, etc.		
4.38	Describe any issues that you face with importing or exporting products.	Taxes, duties, trade rules, subsidies, customs processing delays, etc.		

QUESTIONNAIRE 5: SUPPLY CHAIN EFFICIENCY, SAFETY, AND QUALITY

Instructions: Use to investigate specific operational efficiencies that affect the safety and quality of food.

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES
Оре	rational Efficiencies	
5.1	What types of storage infrastructure or facilities are in place that you can access?	Cooperative or association owned warehouses,
5.2	Are there points along the supply chain where physical food loss and waste occur?	Spoilage, spillage, etc.
5.3	What are the main drivers of food loss and waste?	Challenges in storage, transportation, waiting for purchase, etc.
5.4	What is the magnitude and importance of these losses along the supply chain?	Monetary and non-monetary importance should be considered
5.5	What would help your business acquire more customers and sell more products?	
5.6	What would help your business decrease operational costs?	
5.7	Would a decrease in operational costs translate to sales of more products?	
5.8	Would you ever decrease your prices to sell more products?	
Foo	d Safety and Quality	
5.9	Do the food safety regulations and standards seem appropriate and reasonable?	Based on ease of compliance for businesses
5.10	Who conducts food safety inspections? Are these effective in reducing food safety risks? How often are such inspections conducted?	
5.11	Which areas along the supply chain are food safety issues most likely to occur?	
5.12	What actions do you take to ensure food safety and quality in your business? How frequently do you conduct these actions?	Inspections, food testing, sorting, storage conditions, etc.
5.13	What challenges do you have in complying with food safety regulations?	Equipment, technology, testing capacity, human resources, access to capital, etc.
5.14	Are there any incentives or disincentives in place to preserve food safety and quality?	Policies, programs, certificates, labelling schemes, etc.
5.15	How long does it take for the food to spoil or become contaminated?	Specify the food in question.
5.16	Is there an adequate level of awareness of food safety hazards among value chain actors?	Use Likert-type scale
5.17	Is there an adequate level of awareness of food safety hazards among consumers?	Use Likert-type scale

(continued on next page)

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES
Food Safety and Quality (continued)		
5.18	How does food safety and quality factors impact demand for the product, including for other value chain actors and among consumers?	
Supply Chain Enabling Environment		
5.19	How is the functioning of the supply chain influenced by the external environment?	Government policies, taxes, import duties, subsidies, land tenure, contract enforcement, trade rules, etc.
5.20	Are there any planned or ongoing infrastructure programmes relevant for the food supply chain's improved functioning?	Dams, irrigation schemes, roads, market infrastructure, etc.
5.21	Are there any planned or ongoing development programmes relevant to the food?	Government programmes, development programmes, private-sector initiatives, etc.
5.22	Are there any relevant nutrition programmes or activities being implemented that might source foods locally?	Nutrition education, feeding or dietary supplementation programmes, child growth monitoring, school or institutional feeding, etc.

QUESTIONNAIRE 6: BANKING AND INVESTING

Instructions: Use to map the characteristics of various banking and investment opportunities.

#	QUESTION / PROMPT	SAMPLE ANSWERS AND NOTES	
Types of Investment			
6.1	What size loans or investments do you offer?		
6.2	What is your current involvement in food supply chain investments?	Specify by food	
6.3	What type of businesses or partners do you prefer to work with?		
Investment Goals			
6.4	What are some of your current priorities, goals, and ambitions when it comes to providing capital and investment in food and agriculture?		
6.5	What challenges do you see in the food supply chain?	Specify by food	
6.6	What opportunities do you see in the food supply chain?	Specify by food	
6.7	What types of projects are you looking to invest in?		
6.8	How would you assess whether to provide a loan or investment to a new venture or project?		
6.9	What would success look like for a project you might invest in?		
6.10	How do you assess the risk of new ventures or projects?		

STAKEHOLDER INTRODUCTION LETTER

Background and Instructions

As with all types of human research and surveys, appropriate ethical approvals and principles should apply. This includes introducing the goals and objectives of SCAN to all stakeholders and survey participants and allowing them to provide informed consent for their participation.

An introduction letter succinctly informs the stakeholder what SCAN is, what its purpose is, how that stakeholder can be involved and participate, any benefits or risks to their participation, and what the information collected will be used for. The letter should be provided on the letterhead of the organization leading the SCAN process and provide contact details in case the stakeholder has any questions. The letter also has a place for a stakeholder to sign or provide other indication that they have read and/or understood their role in the SCAN research. A copy of the letter should be left with the stakeholder for future reference.

A sample stakeholder introduction letter is provided on the next page. There are placeholders where the letter can be modified as necessary to suit the specific goals and objectives of SCAN and/or to include specific information pertinent to one or more stakeholders.

[TYPE OF STAKEHOLDER]	[SPECIFIC TOPICS]
As a consumer	perspective on your purchasing or consumption habits and food preferences .
As a food producer or processor	perspective on your business operations, your flow of inputs and outputs, prices, and sales.
As a distributor or logistics expert	perspective on your business operations, the transportation and storage of goods, and interactions with buyers and sellers.
As a bank or investor	perspective on your business interests and aspirations, financial markets, and investing opportunities for nutritious foods.

The table below provides some examples of how to fill some of the placeholders in the letter.

[Today's Date]

Dear [Participant],

[Organization] is looking to expand consumer access of nutritious foods, such as **[food type]**, in **[geographic region]**. To identify appropriate solutions for doing this, we are conducting research to better understand and identify challenges and opportunities within the supply chain and market.

As a [type of stakeholder], we value your experience and perspective on [specific topics].

We would like to meet with you and discuss the following types of questions:

- 1. How might you assess or determine the accessibility, desirability, and/or quality of [food type]?
- 2. What are some of the challenges you, your organization, or your community face that affect the production, transportation, storage, distribution, or sale of **[food type]?**
- 3. What do you think are some solutions, technologies, or opportunities to address and solve these challenges to improve consumer access to **[food type]**?

There are minimal risks to your participation in this research. We assure all information provided will remain confidential and will be used only to gather broad trends and insights around the business and food environment. Your name or any specific organization or company details will not be connected to the information you provide in any way.

From what we learn, we intend to work with various stakeholders to help shape improvements to markets and supply chains so that consumers gain greater access to nutritious foods necessary for health and economic prosperity. A report will be prepared following this research and we will share that report with you when available. If there is any potential for further partnership in your role to help increase access to these nutritious foods, we will contact you to discuss further.

If you have any questions, please contact [name, title, organization] at [email or phone number].

Thank you in advance,

[Your name, title, organization]

[Your contact information]

For the participant:

I certify that I have understood the contents of this letter and the purpose of this research. I provide my informed consent to participate in the study.

Signature or Mark

Date

CHALLENGE MATRIX

Background and Instructions

A challenge matrix compares key challenges identified in the Supply Chain Heat Map and organizes them into categories, based on how urgent or how important the expected impact they could have if solved, and how difficult they are or the level of effort required to solve. Results are organized in a 2x2 matrix as depicted in Figure 1. Each challenge will fall in one of the four quadrants, which can help to prioritize which to try and solve first by identifying potential interventions, solutions, or opportunities.

The x-axis represents the difficulty or level of effort required to solve the challenge. For example, a low-level effort challenge is something that only requires minimal effort to solve from a small number of people or entities, such as a mild inefficiency in an existing program. A higher-effort challenge might be something that requires significant funding, buy-in, and changes to the way people interact and do business. Examples of these higher-level effort challenges could be poor policies, poor infrastructure, or a lack of coordination among partners.

The y-axis represents the urgency or potential impact the current challenge, if solved, would be for nutrition in the target community. For example, a low-impact challenge might be something that affects a small number of people in a relatively insignificant way, such as a mild operational inefficiency that may impact slightly on cost. A high-impact challenge is something that significantly affects a large number of people, such as a process leading to greater food safety risks.



Figure 1: Challenge matrix

An open discussion of challenges should take place with beneficiaries, key stakeholders, and the SCAN team to assess each challenge across both axes. Then these are charted on a matrix to visualize the data and make decisions on how to proceed.

A fillable spreadsheet and chart template are on the next page. The chart will automatically update based on what has been included in the spreadsheet. Simply list each challenge (up to 15) and assign a numerical value between 1-9 to both the x and y axis, where 1 indicates low effort/difficulty and low impact/urgency and 9 indicates high effort/difficulty and high impact/urgency.

#	CHALLENGE	X (EFFORT/DIFFICULTY)	Y (IMPACT/URGENCY)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			



TRAFFIC LIGHT MODEL

Background and Instructions

The traffic light model helps to prioritize solutions and interventions based on set criteria and ranking against the red, amber, and green colour code.

To create a traffic light model, first determine the criteria by which each intervention will be scored. Each criterion should be clearly defined and noted how to score (e.g. what constitutes a good or green score; what constitutes a moderate or amber score; and what constitutes a poor or red score). Any criteria can be used to rank and prioritize interventions. In the example provided, the criteria of impact, sustainability/scalability, feasibility, and strategic fit are used.

Then, each intervention is listed down the first column and assessed based on the criteria. The fillable template on the next page will automatically colourize depending on the scores typed in the columns under each criterion.

A score of 1 indicates a poor or red score.

A score of 2 indicates a moderate or amber score.

A score of 3 indicates a good or green score.

	Impact	Sustainability / Scalability	Feasibility	Strategic Fit
Sample Intervention				

OPPORTUNITY MATRIX

Background and Instructions

An opportunity matrix, like the challenge matrix compares key opportunities, solutions, or interventions and organizes them into categories, based on how urgent or how important the expected impact they could have if implemented, and how difficult they are or the level of effort required to implement. Results are organized in a 2x2 matrix as depicted in Figure 1. Each opportunity will fall in one of the four quadrants, which can help to prioritize which to try and implement first.

The x-axis represents the difficulty or level of effort required to implement the intervention. For example, a low-level effort intervention is something that only requires minimal effort from a small number of people or entities, such as an addition or a reform to an existing program. A higher-effort challenge might be something that requires significant funding, buy-in, and changes to the way people interact and do business. Examples of these higher-level effort interventions could be a policy change, building infrastructure, or establishing a new coalition of partners.

The y-axis represents the urgency or potential impact the intervention could have on nutrition in the target community. For example, a low-impact intervention might be something that affects a small number of people in a relatively insignificant way, such as making a small operational tweak to improve on an inefficiency that may impact slightly on cost. A high-impact challenge is something that significantly

	Low effort / Low difficulty	High effort / High difficulty
High impact /	Quick	Major
High urgency	wins	undertakings
Low impact /	Fill-in	Thankless
Low urgency	activities	efforts

Figure 1: Opportunity matrix

affects a large number of people, such as modification of a process leading to greater food safety risks.

An open discussion of challenges should take place with beneficiaries, key stakeholders, and the SCAN team to assess each challenge across both axes. Then these are charted on a matrix to visualize the data and make decisions on how to proceed.

A fillable spreadsheet and chart template are on the next page. The chart will automatically update based on what has been included in the spreadsheet. Simply list each opportunity (up to 15) and assign a numerical value between 1-9 to both the x and y axis, where 1 indicates low effort/difficulty and low impact/urgency and 9 indicates high effort/difficulty and high impact/urgency.

#	OPPORTUNITY	X (EFFORT/DIFFICULTY)	Y (IMPACT/URGENCY)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			



SCAN USER SURVEY

Background

SCAN is a living toolkit for supply chain analysis. As such, we request that all users of the toolkit help us to improve and add to the tool. After your experience in using the SCAN Guidance and its Supplementary Tools, kindly share your feedback and reflections using the form below.

QUESTION	RESPONSE
What do you feel were the most valuable features of the SCAN Guidance and Toolkit?	
What do you feel are some opportunities for improvements in the SCAN Guidance and Toolkit?	
What supply chain did you investigate using the SCAN Guidance and Toolkit?	
What are some key learnings and new insights you have gathered about the supply chain you have been investigating?	
Your name, organization, and role	

When sharing the survey back to us at info@gainhealth.org, please also include any new tools or templates you have developed that might be useful for others undertaking a SCAN. Please also share any final deliverables so they can be made available to others looking to gain more information on the supply chain you have investigated.