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Value Chains for Nutrition

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Foreword

In recent years we have learned a great deal about how agriculture, nutrition, and health are linked. We experience that policies designed to increase agricultural production can either improve or threaten people's nutrition and health—and conversely that people's nutrition and health status can contribute to or interfere with agricultural production. Researchers have shed light on some of the specific paths through which these links play out, but gaps in our knowledge remain. There is still much to be learned about how agriculture, nutrition, and health are connected, how they interact, and, especially, how we can use those interactions to advance goals in all three sectors.

To help close the knowledge gaps, the 2020 Vision Initiative of the International Food Policy Research Institute (IFPRI) has commissioned a series of papers as part of a larger global consultation that includes the February 2011 international conference “Leveraging Agriculture for Improving Nutrition and Health” (<http://2020conference.ifpri.info/>). Developing effective policies in agriculture, nutrition, and health will require a strong foundation of evidence. It is our hope that these papers will help lay the groundwork for greater understanding of the issues and lead to policies that will enhance healthy, productive lives for all people.

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Value Chains for Nutrition

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I. Introduction

I.1 Background and objective

CURRENTLY, CLOSE TO 1 BILLION PEOPLE SUFFER FROM HUNGER AND FOOD insecurity, which is defined as not having enough food to live a healthy life (FAO 2010). Although these numbers are staggering, the problem of poor access to nutritious foods¹ and to diets of adequate quality is even more daunting (World Bank 2007a). Typically, poor households subsist on monotonous staple-based diets and lack access to nutritious foods such as fruits, vegetables, animal-source foods (such as fish, meat, eggs, and dairy products), or wild foods of high nutrient content. Lack of diversity in the diet is strongly associated with inadequate intake and risks of deficiencies of essential micronutrients such as vitamin A, iron, and zinc (Ruel 2003; Arimond, Wiesmann, et al. 2010; Arimond, Hawkes, et al. 2010). Micronutrient deficiencies have far-reaching health and nutrition consequences in both the short and the long term (UNICEF and Micronutrient Initiative 2004; Black et al. 2008; Micronutrient Initiative 2009). These deficiencies affect the survival, health, development, and well-being of those afflicted. Children and women of reproductive age are especially vulnerable because they have particularly high micronutrient requirements (Black et al. 2008; Micronutrient Initiative 2009; UNSCN 2010a). Poor diet quality is a problem that affects not only the poorest of the poor, but also marginal populations in developing, transition, and developed countries. These populations rely on cheap sources of energy and consume excessive amounts of energy-dense, nutrient-poor foods, a situation that leads to increased risk of overweight, obesity, and related chronic diseases (see, for example, Eckhardt et al. 2008; Tussing-Humphreys et al. 2009).

Limited availability of nutritious foods, economic constraints, lack of knowledge and information, and related lack of demand for nutritious foods are critical factors that limit poor people's access to such foods. In theory, the agricultural sector could help address inadequate access to micronutrient-rich foods by contributing to income generation of at-risk groups and by making nutritious foods more accessible (available and affordable), more nutrient-rich, and more acceptable (Box 1.1). Empirical evidence from agriculture-based development programs suggests that actions in the agricultural sector can lead to improved nutritional outcomes at

¹ Nutritious, or nutrient-rich, foods are foods with a high nutrient content. They include animal-source foods (fish, meat, eggs, and dairy products), fruits and vegetables, biofortified staples, fortified foods, and traditional local crops (including neglected and underutilized species and wild foods). Special processed and fortified foods for populations with special needs (such as acutely malnourished children, HIV/AIDS patients, infants who are being fed complementary foods) are also included in the category of nutritious foods.

a local level (see World Bank 2007b; Leroy et al. 2008). In these projects, though, agricultural production and consumption by producer households is the primary focus. Yet the links between what is produced on the farm, the consumer, and the income received by the producer do not stop at the farm gate. Far from it: food is stored, distributed, processed, retailed, prepared, and consumed in a range of ways that affect the access, acceptability, and nutritional quality of food for the consumer. Producing for consumption in the home or for local markets remains important in many places, but the more market-oriented nature of agricultural policies today means that more farmers are net food buyers and are affected by commercial markets. Agricultural markets thus play a more important role in determining food availability and access—a shift reinforced by the role of urbanization in increasing the ratio of market consumers to market producers (Hawkes and Ruel 2006; von Braun and Diaz-Bonilla 2008). Moreover, these markets are producing an increasingly differentiated array of products targeted at segmented consumer markets (Hatanaka, Bain, and Busch 2006).

Box 1.1 — Concepts central to the supply of and demand for nutritious foods

Food availability: The presence or absence of a specific food in a specific location	}	Food access
Food affordability: Whether at-risk households are able to afford the available foods		
Food acceptability: Whether the available foods are acceptable to food consumers		
Food nutritional quality: The nutrient profile of the food, measured in terms of the density of essential nutrients		

For this reason, if the agricultural sector is to play a more effective role in improving nutrition by increasing the access, acceptability, and quality of diets, there needs to be a greater focus on what happens between production and consumption (including in producer households). This new focus will require the engagement of not only the agriculture sector, but also the other sectors involved, and approaches are needed to help overcome intersectoral barriers, which create disincentives to closer cooperation (Benson 2006). One way of addressing these issues is through the adoption of “value-chain” concepts. Value-chain approaches are already used in international development to enhance the livelihoods of food producers, but they rarely consider diet quality and nutrition. The objective of this paper is therefore to identify if, why, and how value-chain concepts could and should be applied to enhance the ability of agriculture to achieve better nutrition. Specifically, it aims to

1. provide background information for the nutrition community about value-chain concepts, approaches, and uses in practice;
2. discuss why the adoption of value-chain concepts could contribute to improving nutrition (including their potential benefits and limitations);
3. begin to develop some principles and frameworks concerning how value-chain approaches could be used as a tool to improve nutrition; and
4. identify core opportunities for leveraging agriculture for better nutrition.

The paper is written from the perspective of nutrition, with a focus on increasing the supply of and demand for foods that are rich in essential micronutrients such as fruits and vegetables, meat, fish, dairy products, and biofortified staple foods by the poor. Improving this supply and demand is essential to solving malnutrition in all its forms (for a more obesity-oriented approach, see Hawkes 2009). Food value chains can also be examined from the perspective of food safety and health (Trench et al. 2011).

1.2 Structure of this report

The report is structured in five sections. Following this Introduction, section 2 sets out key terms and concepts and describes how value-chain concepts have already been used in areas outside of nutrition. This review aims to identify if and why the concept is suitable for application to nutrition. Though few earlier applications of value-chain concepts involve food or nutrition, examples from food are provided where possible. Section 3 then provides the rationale for why value-chain approaches could contribute to improving nutrition. It also highlights some of the core limitations. Case studies are presented in section 4 to highlight the different ways in which value-chain concepts have been, or could be, applied to nutrition. Section 5 then draws on the case studies, as well as the material earlier in the report, to develop a series of principles to guide how value-chain concepts

could and should be applied to achieve nutrition goals. It also defines the terms applicable to the nascent subdiscipline of “value chains for nutrition” and identifies specific modes of application, which provide the core opportunities for value-chain approaches to consider both agriculture and nutrition. The report ends with some concluding remarks in section 6.

2. Key terms, concepts, and applications

An understanding of value chains has several aspects (here referred to collectively as value-chain concepts) consisting of value chains, value-chain analysis, and a value-chain approach to development (see Box 2.1). These different aspects of value chains are often referred to interchangeably. Moreover, different disciplines and sectors have considerably different ways of describing, analyzing, and developing value chains, making it difficult to obtain a coherent picture. This section describes these different understandings and applications of value-chain concepts.

Box 2.1 — Key value-chain concepts

Value chain. A supply chain in which value is added to the product as it moves through the chain. It is described by the series of activities and actors along the supply chain, and what and where value is added in the chain for and by these activities and actors.

Value-chain analysis. The analysis of where, how, and why value is added and created along the chain. Its objective is to understand why the value chain is structured as it is and how it could be leveraged for change.

Value-chain approach to development. An approach that applies the concept of value chains and value-chain analysis to creating new and different forms of value chains to enhance development.

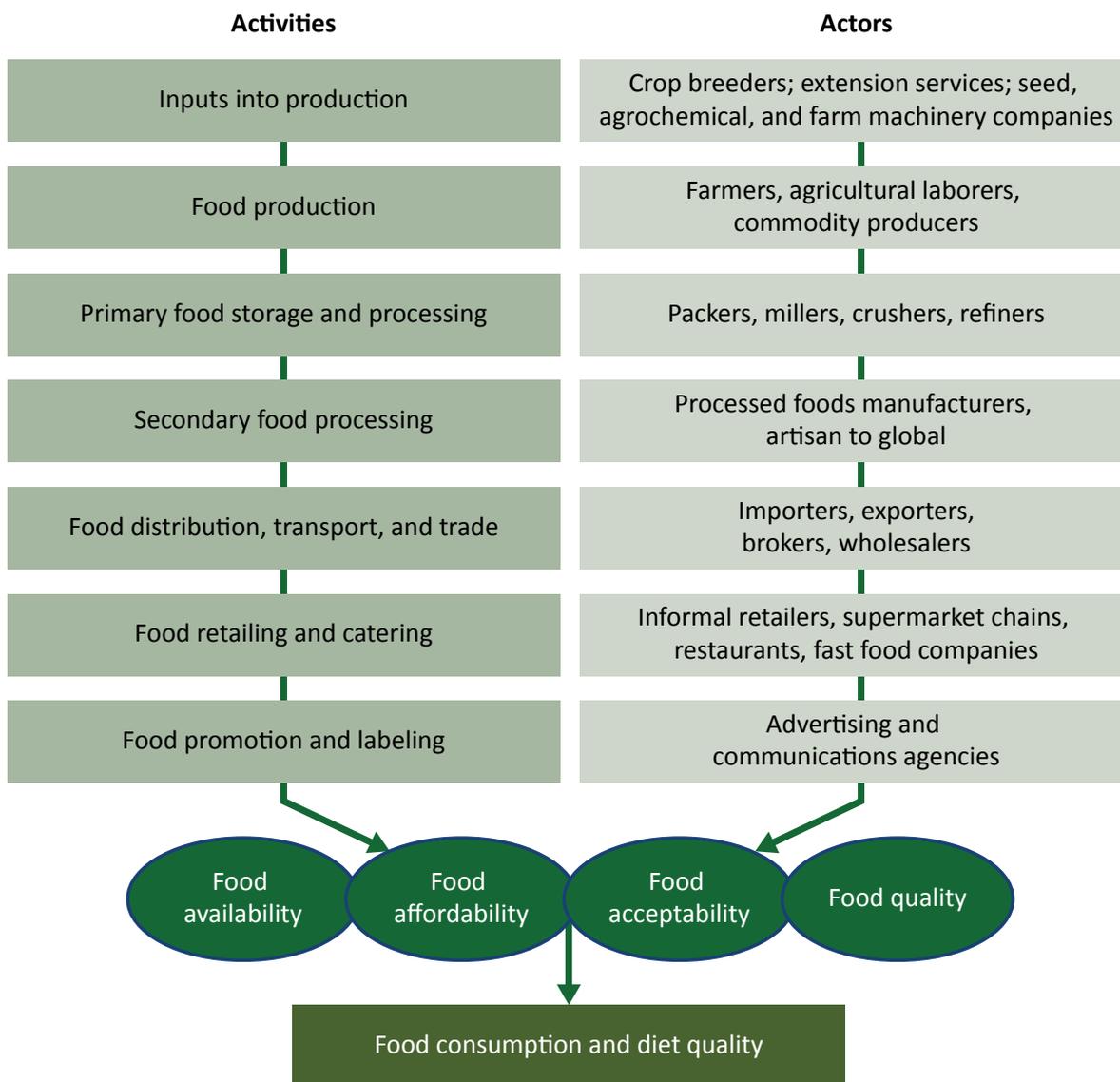
2.1 Value chains

Two core elements are embedded in definition of a value chain: chain and value. The chain component of value chain refers to a supply chain—the processes and actors that take a product from its conception to its end use and disposal (this chain can also be seen as the life cycle of the product). For a single food or commodity product, a supply chain comprises the processes and actors that take a food from its production on the farm—including the inputs into that production—to the consumer and to its disposal as waste. The supply chain incorporates each of the transformations required to turn it into the final product. Figure 2.1 illustrates some of these activities and actors in a simplified manner. Most food supply chains involve the basic steps depicted in Figure 2.1, but the activities may be either more or less extensive: supply chains can be highly complex, involving multistage production systems with multiple types of actors in multiple locations, or they can be very simple. Each of the actors involved in the chain—and the list in Figure 2.1 is far from exhaustive—contributes in some way to the determination of the final product. Food supply chains can be depicted in many different forms, with the differences arising from the food product itself, its scale, the level of detail presented, and, notably, the reason for mapping and analyzing the chain in the first place. In all cases, however, the term chain implies an interlinked system in which the different components are interconnected, with a change in one part of the chain affecting other parts, whether intentionally or not. The entire chain is also affected by a range of cross-cutting inputs and processes, including natural and human resources, capital, technology, and policy.

A value chain is a form of supply chain, but the value component imbues it with greater meaning: a supply chain becomes a value chain when it is perceived as a process of value addition. A value chain can thus be described by the series of activities and actors along the supply chain and what and where value is added in the chain for and by these activities and actors.

“Value” refers to the value *added* to the product by activities at each step in the chain (for example, rice sells for \$X at the farmgate, but cleaning it makes it worth \$X + 4), as well as the value *created* by the product and activities and then *captured* by each of the actors involved (for example, \$X for the farmer and \$X + 4 for the retailer) (Box 2.2). The “added” part means the difference between the total revenue created by the product and the costs of the materials, labor, and other inputs used to produce it, which can then be captured by the actors along the chain. “Upgrading” refers to the various ways that actors can capture more value by changing their products, processes, and functions (Box 2.3).

Figure 2.1 — A simplified representation of a food supply chain



Source: Adapted from Hawkes (2009).

Box 2.2 — The many meanings of “value”

Value of the product. What the product is worth in economic terms.

Value added. Value is added to the product as it passes through the chain by value-adding activities, which create this benefit. The “added” part means the difference between the total revenue created by the product and the costs of the materials, labor, and other inputs used to produce it, which can then be captured by the actors.

Value for the actors. The economic value that is created and captured by the actors in the chain. Actors can upgrade their activities in order to capture more value.

Value for the consumer. The benefit of the product relative to its price, as perceived by the consumers of the product.

Values. The attribution of moral or ethical perspectives.

Box 2.3 — Upgrading: Capturing more value

“Upgrading” can be defined as “increasing the competitiveness of the value chain by moving it in a new direction—toward a new market, market segment, or customer; toward increased efficiency within the value chain; or toward adding operations within the value chain” (Webber and Labaste 2010, 69). Alternatively, it can be defined as “something that happens to a specific actor inside the chain; it directly improves the performance or position of this actor, thereby increasing rewards and reducing the exposure to risk” (Riisgaard et al. 2010, 198).

Research on global value chains has developed and advanced this concept, identifying five different types of upgrading (Riisgaard et al. 2010):

- **Process upgrading.** Improving processes, such as increasing the efficiency of internal processes, improving client management, or reducing waste.
- **Product upgrading.** Introducing new products or improving old products to give them greater unit value, complying with standards for those products, or shifting away from high-value markets to gain more value from bulk markets.
- **Volume upgrading.** Producing more of the product.
- **Functional upgrading.** Changing the mix of activities conducted to gain more value from the chain, such as taking on a new function in the chain (for example, farmers involved in processing as well as growing) or offloading such a function.
- **Improving value-chain coordination.** Improving coordination in the chain to improve performance.

Somewhat confusingly, “value” may also refer to the value added for the *consumer* by the value-adding activities in the chain, which is rather different. In this case, value refers to the benefits of the product (such as nutritional quality or reduced time required for preparation) relative to its price, as perceived by the consumer. The consumer’s perception plays a key role. If, for example, the nutritional value of the product is improved relative to an earlier version of the product but consumers are unaware of the improvement, they will not value the product any more if the price does not change. If the consumer is made aware of the improvement, however, the product may gain value relative to its price. Thus, consumers may be willing to pay more for a product with added value than for one to which little value has been added, and this willingness in turn has implications for the allocation of value gained by different actors in the chain. Value chains do not necessarily involve adding value for the consumer, but they often do.

Finally, the term “value” can also be interpreted as “values”—implying that a value chain should consider moral and ethical concerns. This meaning is not typical in the value-chain literature, but it is sometimes incorporated into the meaning of value chain (see section 2.3.4).

2.2 Value-chain analysis and its applications

Describing a value chain typically involves identifying and mapping (1) the actors involved in the chain and the relationship between them; (2) the activities performed by each actor and their location; and (3) some form of attribution of value corresponding to the activities and actors in the chain (such as specific economic accounts or the degree of economic power held by the actors).

Value chains can be put together using different sources of information, such as government data on food, prices, and labor markets; industry data; surveys of the actors involved; and in-depth interviews. After mapping, different tools can be used to interpret the data. This process involves analyzing how value is created and added at different steps in the chain and its implications or consequences. This latter process is value-chain analysis. Its basic objective is to understand why the value chain is structured as it is and how it could be leveraged for change.

What is distinctive about value-chain analysis is that it assumes that the value created and added through the chain is affected by how the different actors and activities interact, not just the isolated behavior of individual actors in that chain. It thus examines the different activities according to if and how they add value in the production and delivery of a product, while at the same time focusing on how the relationships between the different actors and activities influence the creation of value.

Another distinction of value-chain analysis is its incorporation of different sectors, even if the focus is on an individual business or sector (Kaplinsky and Morris 2001). In this way, it “overcomes several important limitations of traditional sector assessments which tend to ignore the dynamic linkages with and among productive

activities that occur outside the particular sector under assessment or involve informal operations” (UNIDO 2009a, 4–5).

What is the purpose of mapping and analyzing value chains? What does it add? The answers can be found in the origins of this type of analysis. Value-chain analysis arose for three broad applications:

- to enhance competitive strategy in individual companies;
- to examine the processes, causes, and consequences of global industrial integration; and
- to examine how value chains can augment agricultural income and competitiveness.

2.2.1 VALUE-CHAIN ANALYSIS AS A TOOL TO ENHANCE COMPETITIVE STRATEGY IN BUSINESSES

Value-chain analysis was developed in the 1980s as a tool to help businesses manage their activities to more effectively generate profits. Still used widely today, it focuses on identifying where and how value can be more successfully created in the internal business chain. By identifying how much value is created by different activities, a firm can focus on, or add, activities that create the most value (and therefore profit), thereby becoming more competitive (its origins are often attributed to an influential business text published in 1985 by Michael Porter, *Competitive Advantage: Creating and Sustaining Superior Performance*). In contrast to more traditional techniques of supply-chain management, which involve minimizing costs and introducing efficiencies, here the focus is on creating an enabling environment for maximizing value.

As businesses have globalized and technology has advanced, opportunities for gaining—and risking—value in the chain have risen, and demand for value-chain analysis to support individual companies’ strategic development has increased. To enhance profits, corporations use value-chain analysis to answer questions such as the following:

- What would the value chain of product X need to look like to maximize the value of the product to our portfolio? Answers will influence decisions about what raw materials should be used, what actors should be involved, and what the consumer market is.
- Which activities in the chain are best undertaken by our business, and which by others? Answers will be used as the basis of decisions about outsourcing and contracting arrangements.
- Would our company gain more value by being involved in activities elsewhere in the chain? Answers will help decide about the degree of vertical integration, mergers, and acquisitions.
- How can the value chain be better organized to create value for our business? Answers will influence sectorwide decisions about industry strategy and identification of synergies.

2.2.2 VALUE-CHAIN ANALYSIS AS A TOOL TO EXAMINE THE PROCESSES, CAUSES, AND CONSEQUENCES OF GLOBAL INDUSTRIAL INTEGRATION

Another strand of value-chain analysis is concerned with entire industrial sectors on a global scale. Drawing on world systems theory (Hopkins and Wallerstein 1986), economic sociologists developed the method of commodity chain analysis in the early 1990s to examine industry restructuring in the context of globalization (Gereffi and Korzeniewicz 1994). With an underlying concern about the modern trajectory of global capitalism, they developed this analysis to understand how global production systems were being reorganized into new types of structures. The name of the technique was changed to global value-chain (GVC) analysis in 2000 because it was believed to be a more unifying concept (Bair 2005).

Along with its focus on industrial sectors rather than individual companies, GVC analysis differs from the business tool in several other key ways. Most important, GVC analysis is concerned with the differing amounts of power exerted by the different actors in the chain, how this affects their ability to control chain activities and actors (for example, the power to set market prices, bargain about employment conditions, and change the way the chain is organized), or how lack of power hampers their ability to participate in the chain. Indeed, the entire analysis centers on how these power relations affect the behavior of the chain and the actors in it (termed “value-chain governance”). This form of analysis thus provides a framework for understanding the levers of power.

Global value-chain analysis involves identifying the actors in the chain (in the same and different companies) and the linkages between them as they crisscross international borders and sectors. It then assesses the power of these actors (such as by examining the number of companies involved at each step of the chain) and analyzes in a generalized manner the value accruing to the differing actors based on their differing levels of

power. It rarely involves the actual quantification of economic value at each step of the chain (Raikes, Jensen, and Ponte 2000).

A second difference is that GVC analysis is concerned with the social consequences of the chain, particularly for the more vulnerable chain actors. A third important characteristic of more recent GVC analysis is its focus on policy implications, particularly for upgrading (see Box 2.3) (Bair 2005). Much of the work on GVC analysis has been conducted by the Global Value Chain Initiative at Duke University (United States) and the Institute of Development Studies (IDS) (United Kingdom). It has also been adopted by researchers in universities around the world, usually in departments of sociology, geography, or international development. To date, its applications have largely focused on the following:

- **Examinations of how global industries are structured and governed.** Value chains' incorporation of interrelated activities across national boundaries makes GVC analysis a useful tool for examining the strategies of large global industries, such as the auto and pharmaceutical industries (see, for example, Humphrey 2003; Holweg, Luo, and Oliver 2009; Haakonsson 2009). The focus on power and governance also means it can be used to identify who is governing the chain, such as in the case of supermarkets and global fruit and vegetable chains (Kaplinsky 2004b).
- **Impact of policies on global industry restructuring.** Analyses have assessed, for example, the impact of environmental certification schemes on agrofood chains (Neilson 2008).
- **Impact of product differentiation strategies on value-chain organization and technology.** Analyses have looked at, for example, the differentiation strategies pursued by global agribusiness (Humphrey 2005).
- **Why and how the globalization of industries influences price formation.** The inclusion of power relations in this form of value-chain analysis means it can be used to help explain price formation of products (such as the influence of the power of the coffee-processing sector on coffee prices for producers and consumers) (Kaplinsky 2004b).
- **Employment arrangements as a driver and consequence of the structure of global industries.** In a relatively common application, GVC analysis has been used to examine employment in changing global supply chains, especially for the apparel industry (Gereffi and Frederick 2010; Kessler 2004). It has also been used for agrofood chains, examining, for example, employment in food processing (for example, Dolan 2004) and the implications for the livelihoods of smallholders (Humphrey 2006; Fold and Gough 2008).
- **Consequences for environmental and health concerns.** Most recently, GVC analysis has been used to examine the leverage points in the value chain to influence practices that damage the environment (Lowe and Gereffi 2008) and contribute to obesity (Gereffi and Christian 2010).
- **Upgrading as a policy response.** Across all these applications, GVC analysis has been used to identify where and how smaller firms can upgrade their activities to gain greater value in the value chains (see Box 2.3).

2.2.3 VALUE-CHAIN ANALYSIS AS A TOOL TO INFORM AGRICULTURAL DEVELOPMENT STRATEGIES

Global value-chain analysis has been applied extensively to agrofood chains, and there is a strand of value-chain analysis that focuses almost exclusively on agrofood chains. This technique stems from two sources: (1) the *filière* technique developed by French industrial economists and adapted by leading agricultural research and development institutions in France² in the 1960s (Raikes, Jensen, and Ponte 2000); and (2) the subsector study technique developed in the United States in the 1960s to study agricultural markets (Altenberg 2006). Unlike the focus on power in GVC analysis, these techniques focus on quantification and are probably the most straightforward (Tallec and Bockel 2005).³ Like other forms of value-chain analysis, this form involves identifying the actors and activities in the chain for a specific commodity and the organizational linkages between them.

² These institutions are the Institut National de la Recherche Agronomique (INRA) and the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD).

³ In 2005 the Food and Agriculture Organization of the United Nations (FAO) produced a guide to using this form of value-chain analysis—*Commodity Chain Analysis* (Tallec and Bockel 2005)—as part of its resource materials for capacity development in policymaking for food, agriculture, and rural development. It includes a useful overview of the different forms of commodity- and value-chain analysis, but it is essentially concerned with the quantitative approach described here.

Then, however, it focuses on quantifying some aspect of costs, prices, profits, and returns in the chain for the sector of interest. The idea is that by understanding the costs and returns to farming and the other stages in the chain, policymakers can begin to identify what incentives the actors have for performing different activities, how farmers can benefit, and, therefore, which policies and investments are needed for the greatest impact on income, profitability, and growth (Tchale and Keyser 2010).

Early applications comprised local- and national-level studies in France and its colonies, often in the context of vertically integrated chains. Agricultural economists and agricultural development practitioners have since applied it more widely in the Francophone and Anglophone worlds, especially to global food chains. It has had the following objectives:

- **Examining how different value chains affect smallholder incomes.** Quantifying the returns in the chain makes it possible to compare the returns to smallholders in different chains. For example, studies have examined the amount of returns accruing to farmers in developing countries from participating in chains connected to supermarkets abroad and at home (for example, Minten, Randrianarison, and Swinnen 2009; White 2007; Huang, Zhang, and Chen 2009; Miyata, Minot, and Hu 2009).
- **Identifying competitive advantages for different commodities and companies.** Its focus on identifying how costs and profits are related to prices means that quantitative value-chain analysis can be used to examine the competitiveness of a country's key agricultural commodities. For example, Tchale and Keyser (2010) mapped the composition of supply-chain costs for Malawi's key staple commodities, examined how these costs affected the competitiveness of each commodity, and then analyzed whether Malawi has cost and competitive advantages in these different crops.
- **Identifying the potential to add value to maximize returns from consumers.** By quantifying the components of the final retail prices of different but related foods, value-chain analysis can estimate how differentiation between products affects what consumers are willing to pay, the impact on returns to producers, and therefore the investments needed to maximize returns. For example, a recent analysis of value-chain costs for grapes produced in Afghanistan mapped out chains for differently packaged products in order to estimate the potential margins obtained with different packages (Zach Leas 2010). In another example, an analysis of the influence of quality characteristics of cowpeas on consumers' willingness to pay led to the identification of strategies for improving returns (Mishili et al. 2009). Another example from Senegal examined how the retail price of milk is related to quality differences arising from variations in the way the supply chain is organized (Dieye et al. 2005).

2.3 Value-chain approaches to development

The different strands of value-chain analysis have come together in different ways to form what can be termed value-chain approaches to economic development. A value-chain approach applies the concept of value chains and value-chain analysis to creating new and different forms of value chains to enhance development. As is the case for value-chain analysis, there is no one single value-chain approach; some approaches incorporate the notion of power relations, for example, whereas others do not. Some focus on the business management of the chain; others on technology. All, however, involve value-chain development as their central focus.

To date, value-chain approaches have been applied in four related areas of development: pro-poor economic development in developing countries; pro-poor agricultural development (as part of pro-poor economic development); value-chain development by individual companies in the context of pro-poor economic development; and the development of local food chains in the United States.

2.3.1 VALUE-CHAIN APPROACH TO PRO-POOR ECONOMIC DEVELOPMENT

The value-chain approach to pro-poor economic development has its roots in the globalization of the development agenda. Beginning in earnest in the 1980s, policies and processes were put into place to encourage the free flow of market forces, with the idea that reducing government intervention and restructuring the economy would accelerate economic growth and maximize global welfare. Opening up developed-country markets for developing economies was seen as a key opportunity for growth.

One of the results of this policy shift was a change in the competitive landscape for private enterprises. Enterprises in developing countries increasingly had to compete with enterprises from all over the world in both local and international markets. Yet traditional production systems proved inadequately equipped to compete in international markets (OECD 2007; UNIDO 2009a). The concern thus arose that poor people at the bottom

of the value chain were becoming excluded from the economic growth opportunities presented by more open markets.

The value-chain approach to pro-poor economic development was developed to encourage greater participation by poor people in modern value chains. An increasing number of international development agencies and donors⁴ became interested in this approach based on the following beliefs (OECD 2007; USAID 2010; Kula, Downing, and Field 2006; Campbell 2008; Altenberg 2006; Roduner 2007):

- Increasing the competitiveness of private enterprises in developing countries is needed to promote economic growth.
- Understanding how modern markets operate—and the value chains in them—is important to understand how developing-country enterprises can be more competitive
- Participation in these value chains has the potential to enhance the competitiveness of developing-country enterprises
- Developing competitive value chains in activities in which poor people are involved, and have a comparative advantage in performing, can enable them to move out of poverty.
- Poor people need support to participate in these value chains or to change their role in existing value chains to generate benefits.
- Participating in value chains will create wealth in poor communities and promote equitable economic growth.

The value-chain approach to economic development is thus a market-based framework focused on private sector development in the activities and sectors in which poor people are concentrated (for example, labor-intensive industries, natural products, agriculture, and small enterprises). It often involves linking informal to formal markets. The U.S. Agency for International Development (USAID), for example, takes a value-chain approach in its work supporting the development of microenterprises in developing countries (USAID 2010). The United Nations Industrial Development Organization (UNIDO),⁵ a technical cooperation agency, takes a value-chain approach to capacity building for market access and development in developing countries, including for agrofood chains (UNIDO 2009a). As part of its Job Creation and Enterprise Development Department, the International Labour Organization (ILO) has a Value Chain Development Program that seeks to develop value chains that “channel more benefits to the poor and create more jobs effectively” (ILO 2010; Herr and Muzira 2009).

Recent work has begun to identify how such value-chain approaches could be improved with regard to their consideration of gender, the environment, and some of the nonincome dimensions of poverty (such as lack of access to public services). For example, with the aim of supporting value-chain approaches that work better for women, Gamage (2009) developed a gender-sensitive form of value-chain analysis that identifies how many men and women are involved in the different activities in the chain and how the different marketing activities are targeted to different genders. Bolwig et al. (2010) have also developed a conceptual framework to integrate poverty and environmental concerns more fully into value-chain approaches to development.

2.3.2 VALUE-CHAIN APPROACH TO PRO-POOR AGRICULTURAL DEVELOPMENT

One of the most common applications of the value-chain approach to pro-poor economic development has been to agriculture. This is perhaps not surprising given the large proportion of poor people who work in agriculture, their vulnerability to the consequences of global agrofood restructuring, and their problems of market access. Organizations like USAID (2010), FAO (2010), IFAD (2010a, b, c), UNIDO (2009a), ACDI/VOCA (2009), and Winrock International (2010) are increasingly applying a value-chain approach to their agricultural development projects.

The basis of these approaches is that poor farmers will benefit if they can appropriate a greater amount of the returns accruing from the chain, particularly in light of the differentiation strategies pursued by global agribusiness (KIT 2010). This has been a neglected area:

⁴ These agencies and donors included the U.S. Agency for International Development (USAID), the Swiss Agency for Development and Cooperation, Germany’s Gesellschaft für Technische Zusammenarbeit (GTZ), the World Economic Forum, the World Bank, the Royal Tropical Institute in the Netherlands (KIT), ACDI/VOCA, the United Nations Industrial Development Organization (UNIDO), the International Labor Organization (ILO), the Food and Agriculture Organization of the United Nations (FAO), and the International Fund for Agricultural Development (IFAD).

⁵ UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization, and environmental sustainability.

In developing countries, a significant proportion of national funds are used to support agricultural production inputs—primarily seeds, fertilizers, and irrigation systems. Traditionally, little attention has been paid to the value chains by which agricultural products reach final consumers and to the intrinsic potential of such chains to generate value added and employment opportunities (UNIDO 2009a, 5).

The value-chain approach assumes that the supply of goods from producers to consumers should be demand-led—that is, it should respond to the needs and preferences of consumers (either the final food consumers or the food-consuming industries). The idea is that development projects should work with farmers so that they can better meet the demands of consumers (rather than being isolated from market signals), albeit taking into account the limitations on production (RIU 2010).

Development projects related to the agricultural value chain have tended to focus on some form of upgrading as a means of increasing returns (and therefore incomes) of farmers, as shown by the following examples:

- **Increased managerial and technological efficiency of the relationship between farmers and markets.** For example, the Kenya Maize Development Programme aims to increase returns to farmers through technological advances in input supplies, improvements in postharvest handling, and the provision of price information to farmers (ACDI/VOCA 2009).
- **Participation in commercial supply chains with food manufacturers and retailers (the food-consuming industries).** With the rise in consumption of processed foods and large chain supermarkets, development agencies have focused on helping farmers participate in what they perceive to be more organized, lucrative, and secure markets (relative to wholesalers). Providing technical assistance has become more critical as the food-consuming industries, particularly retailers, have developed strict quality standards for their supplies (Henson 2008). In a project supported by USAID, value-chain analysis was used to assess the volume, delivery, quality, and cost requirements of crops to Wal-Mart. Technical support was then provided to enable farmers to meet these requirements, thereby replacing crops originally supplied through imports (Painter 2009). In another example, ACDI/VOCA worked with several Indian NGOs and larger corporations to improve farmer productivity and product quality to supply the growing organized retail sector (ACDI/VOCA 2011b).
- **Participation in export value chains.** Export markets are also perceived as lucrative because they have a large number of consumers willing to pay for differentiated foods with added value and large supermarkets keen to source them (Humphrey 2005). Value chains have thus been developed to enable farmers and microenterprises to participate in these high-value markets. As in the case of domestic markets, reaching export markets involves providing technical support for upgrading productivity and quality, but it can also involve added-value certification schemes for characteristics such as organic and fair trade as a means of differentiating products (Humphrey 2005). Participation in export value chains is also viewed as an incentive for countries to diversify their national production. For example, in the 1990s, the Malian government developed a strategy to diversify agricultural exports and selected mango as a crop for diversification. Projects supported by the World Bank and others successfully improved the value chain to increase the volume of mangos exported through the development of a multimodal transport system, production and postharvest technologies, and access to finance (Sangho, Labaste, and Ravry 2010).
- **Greater involvement in the process of value addition.** Developing countries have historically provided raw agricultural commodities to world markets rather than becoming involved in value addition (such as through processing). Moving into value-adding activities is thus another means of increasing returns. For example, in a case presented by UNIDO, a value-chain approach was used to establish a small model chocolate factory in Ecuador to produce products featuring premium Ecuadorian cocoa. The idea was to obtain more value from the raw cocoa beans, which are worth three times less than intermediate products and chocolate and have higher price volatility. Partnering with a women's NGO, UNIDO trained women in chocolate production and then linked the factory to a market supplying a multinational company (UNIDO 2009a).

As explained in a World Bank guide to value-chain development in agriculture, value-chain analysis can be used to support these approaches in many different ways, including choosing priority sectors for value-chain

interventions and identifying how to position products and value chains for greater value and competitiveness (Webber and Labaste 2010).

2.3.3 COMPANY APPROACHES TO VALUE-CHAIN DEVELOPMENT

For global businesses, the world's poor represent a "fast-growing consumer market ... demanding higher-value and more diverse food" as their incomes grow (WEF 2009, 6). Lower supply costs and a higher degree of explicit supply-chain coordination has enabled food companies to convert undifferentiated commodities into highly differentiated, added-value products that create considerable value for these companies (Hatanaka, Bain, and Busch 2006). This practice has become one of the core strategies of the global food industry and led to the growing emergence of value chains for food focused on adding value for the consumer through product innovation and marketing.

The development of added-value products applies to everything from highly processed products, such as snacks and prepared foods, to the most basic vegetables. For example, an analysis by Humphrey and Oetero (2000) shows that differentiation in the carrot market (loose carrots, carrots ready-packed in a plastic bag, ready-washed and peeled carrots, carrot sticks for children, grated carrots in pre-bagged salads) can have a striking impact on adding value to the product in Western supermarkets, with "mini-crunch carrots selling at 15 times higher price than loose carrots." Even if this differentiation generates greater value for the original producer, it also creates huge added value for the supermarket since "clearly, not all of the increased price of the processed carrots could be accounted for by the extra work involved in making the product" (Humphrey and Oetero 2000, 15).

Companies are also incorporating value-chain approaches into their corporate social responsibility strategies. Nestlé, for example, takes an explicit value-chain approach to its corporate social responsibility (CSR) strategy, called "Creating Shared Value" (www.creatingsharedvalue.org; Nestlé 2006). Unilever also adopts value-chain terminology in much of its CSR work (see, for example, Clay 2005). In 2009 the World Economic Forum produced a guide called *The Next Billions: Business Strategies to Enhance Food Value Chains and Empower the Poor* to show how changing the organization of value chains could improve livelihoods for food producers and consumers, while opening up "opportunities in a growing, profitable, and largely untapped market" for the private sector (WEF 2009, 6). The guide outlines a series of ways that businesses can intervene in the food value chain to achieve both objectives, including the following:

- **Vertical integration and contract farming.** Many commercial chains involve contracts⁶ between manufacturers or retailers and farmers. The company provides technical support to the farmer, and no donor intervention is involved. General Mills, for example, contracted farmers in China to grow corn for the company's food products, providing them with seeds and financing for purchasing inputs (WEF 2009).
- **Provision of business-enabling products and services.** Companies can increase farmers' access to financial services, invest in infrastructure, and provide new technology to enable farmers to obtain more accurate, up-to-date information about prices (WEF 2009).
- **Product positioning and marketing for poor people.** Companies have also taken a value-chain approach to developing and marketing processed, fortified foods targeted at low-income markets. They have developed supply chains geared toward providing products perceived as affordable by consumers and marketed these products to improve acceptability (WEF 2009).

2.3.4 VALUE-CHAIN APPROACH TO DEVELOPING LOCAL FOOD CHAINS

The applications described have focused on global development, but the value-chain concept has also been used to enhance the development of local, sustainable food chains in North America. This application shares key characteristics with other approaches but is conducted in an entirely different realm—and never cited in the literature elsewhere.

This food value-chain approach to developing local food markets has been applied for the most part by the National Good Food Network at the Wallace Center at Winrock International and the Value Chain Partnerships project at the Leopold Center for Sustainable Agriculture at Iowa State University (Wallace Center 2010; Value Chain Partnerships 2010a). The approach grew out of the burgeoning local food movement in the United

⁶ In these contracts, a farmer provides an agreed amount of a crop directly to the company at an agreed time, often but not always at an agreed price, with the farmer supplying the land and labor and the company supplying the material inputs and technical advice.

States—and the realization that business models were needed to successfully link local producers to the market and meet growing consumer demand for such products.

Food value chains distinguish themselves from conventional business models, which typically involve vertical integration and arm’s-length market relationships with suppliers (Stevenson and Pirog 2008). Rather, they are values-based supply chains defined as “long-term networks of partnering business enterprises working together to maximize value for the partners and end customers [final consumers] of a particular product or service” (Stevenson and Pirog 2008, 120). Although the focus is firmly on business development, it is in the context of the ethical value of sustainability (the sustainability of value creation and the natural environment). “Sustainable value chains emphasize long-term, significant economic return to all firms in a chain, particularly producers who follow production practices using the highest standards of environmental and community stewardship” (Value Chain Partnerships 2010). However, like value chains that involve more conventional business relationships, they focus on differentiated products to create value for producers and align with their values.

The approach is explicitly integrative. In a value-chain business arrangement, each actor in the chain must make a mental shift from simply “What is best for my firm now?” to “What can I do in my firm to maximize the economic, environmental, and community benefit to all the members of this value chain?” The focus is on partnerships between the different actors in the chain and integrating *value* with *values*.

The concept of community benefit includes healthy food. The National Good Food Network, for example, explicitly focuses on moving nutritious local food from small- and medium-sized growers to commercial retailers and food service providers. The Value Chain Partnerships program also focuses on producing and marketing nutritious farm products with a high potential for product differentiation, such as fruits and vegetables, flax, and grass-fed beef, aiming to develop more sustainable markets for small- and mid-sized farms.

3. The potential of value-chain approaches to achieve nutrition goals

3.1 A missed opportunity?

Value-chain approaches have, to date, rarely been used explicitly as a tool to achieve nutritional goals. Nor have value-chain analyses been conducted in a way that is sensitive to nutritional concerns. Rather, as shown by this overview, applications to food and agricultural issues have focused on enhancing the economic benefits of food production. Yet the examples highlighted in the previous section suggest that the characteristics of value chains have critical implications for food availability, affordability, quality, and acceptability. For example, the inclusion of small-scale processors in dairy and fruit and vegetable value chains can result in changes in product quality (such as appearance, nutritional content, or safety). The adoption of quality standards by supermarket chains can affect the availability and prices of these products and their access by the poor. Likewise, policies on agricultural diversification and trade, as well as companies’ repositioning and marketing of food products to poor people, all have the potential to influence the availability, quality, and acceptability of nutritious foods for poor people.

Value-chain approaches have also tended to adopt a fairly narrow conceptualization of the consumer. Consumers are often (albeit not always) seen as simply driving demand, with the marketplace defined as the last active component of the chain. What consumers eat, however, is influenced by supply-side constraints as well as taste, preferences, income, and prices. The value chain could certainly be used more systematically to help augment or create demand and to better tailor products to the specific demands of different population groups. More knowledge about what influences demand—including nutritional and health concerns and purchasing power—would enable value-chain approaches to more effectively respond to the demands of different types of consumers and contribute to creating or increasing demand.

Meanwhile, in the nutrition community, efforts to address problems of poor diet quality and resulting micronutrient malnutrition have largely focused on quick fixes, including supplementation, food fortification, and the development of specially formulated and fortified products for different vulnerable groups. These direct nutrition interventions have the potential to improve micronutrient intake in the short term, but their sustainability is questionable if they are implemented without simultaneously addressing the key underlying determinants of undernutrition (Leroy et al. 2008). Value-chain approaches, with their focus on the functioning of the supply chain, are one way to tackle one of the key underlying determinants of undernutrition—the lack of access to high-quality foods and balanced diets. They also have the advantage of explicitly including actions in other sectors; it is well recognized that this type of multisectoral approach is needed, since actions in other sectors “often have haphazard or negative effects that work against the objectives of improving nutrition” (World Bank 2006,

62). The recent Scaling Up Nutrition (SUN) framework and road map endorsed by more than 100 organizations also highlights the critical role of multisectoral approaches that integrate nutrition in related sectors, including agriculture (UNSCN 2010b).

Given the clear, yet untapped, potential of value-chain approaches and analysis to address nutrition concerns, this paper takes a closer look at how value-chain analysis and development could help contribute to fulfilling the following ultimate goals:

- Goal 1: Increase the supply of accessible (available and affordable) nutritious foods for the poor (and for different target groups) all year round.
- Goal 2: Increase the demand for and acceptability of nutritious foods for the poor.

The paper also looks at how value-chain approaches and analysis can help achieve two intermediary, operational goals, which are critical for reaching the two main goals stated above:

- Goal 3: Increase the coordination among value-chain actors and activities that are essential to increasing the supply of and demand for nutritious foods for the poor.
- Goal 4: Address the trade-offs between the economic returns and nutritional benefits of agriculture in the value chain.

In the following sections, we draw on the value-chain concepts and applications reviewed in section 2 and provide a rationale for why value-chain concepts could help achieve these goals.

3.2 Cross-cutting benefits

Value-chain approaches are concrete and solution-oriented because they involve identifying specific nodes and segments along the chain where change is needed.

Value-chain approaches are at once very focused and quite expansive: looking upstream and downstream, they explicitly consider all the activities and actors in the chain at all scales and in all sectors. For example, all the sectors involved in the chain from food production, distribution, processing, retailing, and marketing, and from global to local, can be tapped to improve access to and acceptability of nutritious foods and to determine where better coordination between actors and activities is needed. The potential to identify solutions thereby increases: there are more places to look, including places that may otherwise appear unconnected, irrelevant, or even counterintuitive. Moreover, the focus on attributing value to the actors and activities is a means of identifying concretely where the most value for nutrition could be added. The adoption of value-chain approaches thus becomes an effective way to identify causes of inadequate food access, quality, and acceptability, implement effective solutions, and create long-term, sustainable benefits for nutrition.

Value-chain approaches have already been widely tested by international agencies, donors, businesses and business groups, and local farming movements. In developing countries, these approaches have focused on alleviating poverty through income generation. Recent efforts to examine how value-chain development could take a more comprehensive approach to poverty alleviation, such as by being more sensitive to gender, suggest that there would be receptiveness to building in nutritional concerns. With greater international attention being paid to investing in agriculture for development, there is an increasing focus on developing value chains that can benefit smallholders and small food-processing enterprises. This focus presents an opportunity to develop value chains to enhance nutritional outcomes for the different actors involved as well as for consumers.

Finally, value-chain concepts and approaches are versatile: they can be applied in many ways and tailored to different contexts and needs. There are unifying characteristics—consideration of the whole chain, attribution of value, and focus on coordination within the chain—but there is no one value-chain approach.

3.3 Nutrition goals

Goal 1: Increase the supply of accessible (available and affordable) nutritious foods for the poor all year round

Value-chain analyses and approaches lend themselves well to addressing issues of food availability and accessibility. First, value-chain approaches can be used to identify why foods are not available in specific communities and to identify and implement ways to break down these constraints. Are certain foods unavailable because they are not profitable for producers (for example, do pest-related production costs outweigh the benefits of production)? Or because producers lack technology (and, for example, suffer postharvest losses)? Or because there is a poor relationship between key actors (leading to lack of information, for example)? Or because the

policy environment creates disincentives (to export rather than retain products domestically, for example)? This knowledge could be used to identify what changes are needed to reduce these constraints and open up the bottlenecks. Similarly, value-chain approaches can be used to understand why products *are* available. What factors have enabled this availability, and what can be learned?

Second, value-chain approaches can be used to explain why the available (or unavailable) food costs what it does and then to leverage the chain for change. One of the key applications of value-chain analysis in agriculture has been to quantify the costs, profits, returns, and prices of the food commodity as it passes through the chain, as well as identify who captures the value. This analysis can then be used to understand why some foods are less affordable than others and what can be done to make them more affordable.

Third, value-chain approaches can be used to identify if, where, and how the nutrient quality of the food changes through the chain and how nutrient losses can be prevented. Research and technologies can be used to identify the nature and magnitude of the losses, to test potential approaches to prevent nutrient losses, and to add nutrients and quality to the food as it moves along the value chain. Improvements could thus be made along the chain—using technology or by reorganizing the chain—to ensure that nutritious foods reach consumers at peak nutritional quality.

Goal 2: Increase the demand for and acceptability of nutritious foods for the poor

Value-chain concepts can help increase the demand for and acceptability of nutritious foods because they incorporate the notion of value from the consumer's perspective (that is, the consumer's perception of the benefits of the product relative to its price). This notion of value goes beyond price into issues of what is acceptable and indeed desirable for consumers, and thus what they are willing to pay for and willing to afford. For example, consumers may be willing to pay for only a small quantity of a product that is just available in large quantities. Providing the product in smaller quantities would add value for consumers and increase their willingness to pay.

This business- and consumer-oriented notion of value could be useful in a field where issues of access are often narrowly defined in terms of availability and affordability. Value-chain approaches could be used to identify

1. what kind of value needs to be added to the product to make it more acceptable and desirable for the consumer, thereby increasing demand, while at the same time taking into account value creation by the actors in the chain and the affordability of the product; and
2. if improving nutritional quality (such through biofortification or postharvest techniques to reduce losses) alters the way consumers value the product, and therefore if they would be willing to pay more (or less) for the product.

Cutting across Goals 1 and 2, value-chain approaches can be used to develop business strategies for increasing the availability, affordability, quality, and acceptability of nutritious foods for the poor. Value-chain analysis can be used at an enterprise-specific or sectorwide level to identify how companies or sectors can accrue the most value from making a high-quality product available and affordable and how they can increase demand (and acceptability) by adding value for consumers. It can then be used to develop value chains to make high-quality products available, affordable, and acceptable in a particular community and to identify the type of business (for example, microenterprise) that would be best positioned to provide it.

Goal 3: Increase coordination among value-chain actors and activities

Value chains explicitly involve coordination between actors, which enhances the ability of businesses or sectors to create value. Actors and activities are viewed as linked entities that affect each other, making coordination key to achieving goals. GVC analysis of industry restructuring, for example, shows that it is the ability to coordinate that has enabled global industrial sectors to expand their transnational activities. As such, it is an approach well suited to solutions that require coordination.

This characteristic is particularly relevant for coordination between agriculture and nutrition. A value chain provides a framework for coordinating the actions and actors from farm (what and how much is produced) to fork and beyond (the availability, affordability, quality, and acceptability of nutritious foods). This approach reframes how agriculture is linked with nutrition: the link between agriculture and what is consumed is not just what and how much is produced, but what happens in the value chain in between. And, as already noted, value chains are also explicitly cross-sectoral. Value-chain approaches can thus be used to identify and engage the sectors that need to be involved to improve the coordination between agriculture and nutrition—not just the agricultural and health sectors, but other sectors too.

Goal 4: Address the trade-offs between economic returns and nutritional benefits from agriculture in the value chain

Besides being a potential tool to enhance coordination, value-chain approaches can provide a framework for measuring and addressing some of the trade-offs between economic returns and nutritional benefits from agriculture. Specifically, value-chain analysis can, first, provide a framework for examining who is coordinating (governance) and where the levers of power are. This information can be applied to see why economic and nutritional benefits are distributed as they are. Second, it can be used to help identify how value chains could be differently organized to balance the trade-offs between generating sufficient returns for agricultural producers and providing affordable nutritious foods for net food consumers. Third, it can help identify producers' incentives to consume their own production or sell it in the market. Existing value-chain approaches that explicitly aim to increase market sales could take into account the potential trade-offs between economic and nutritional benefits.

Value chains also provide a concept for understanding these trade-offs in the search for solutions, such as upgrading. The economic benefits of upgrading for the actor of concern could be assessed against the nutritional benefits for the consumer. For example, if a farmers' cooperative in a developing country upgrades by obtaining organic certification from a developed-country certifier, how does this change affect the availability and affordability of the cooperative's products in the local market? If farmers upgrade by adopting a new crop variety to reduce postharvest losses, how will the economic benefit to the farmers be balanced against the potentially different nutrient quality of the crop? Value-chain analysis could help identify solutions for achieving both economic benefits and nutritional gains.

3.4 Limitations of value-chain approaches for nutrition

Value chains clearly have the potential to contribute to achieving nutritional goals. Yet there are also potential limitations to applying value-chain concepts to nutrition.

The focus on value addition and differentiated products may leave out poor consumers. The focus of value-chain development so far has been on adding value in the chain to create value for value-chain actors. Upgrading has often implied differentiating products in a way that makes them more expensive, albeit more convenient or attractive for consumers, as the example of carrots clearly shows (section 2.3.3). The result has been a focus on developing value chains for wealthier consumers willing to pay higher prices in richer countries and at home. In the mass domestic market, in contrast, prices paid may be too low to generate sufficient benefits for producers (Adato and Meinzen-Dick 2002; Humphrey 2005). Thus, producers' potential gains from agricultural innovations in value chains may be offset if they target poor consumers rather than consumers who can afford highly differentiated, value-added products. There may be less scope to add value to the major part of the food market for poor consumers—undifferentiated commodities, often outside of formal food markets—making these chains an apparently less appropriate target for value-chain development.⁷

Consumers are not actors in the chain. Because consumers do not conduct activities that add or create value for the product (unlike, say, agricultural producers), consumers are not direct actors in the chain. Rather, in expressing their preferences, they serve as arbiters of what the chain could supply. Although they influence the actors and activities in the chain, they are not responsible for the activities that respond to this influence. It is, then, perhaps not surprising that value-chain approaches involving consumers as anything but an end market have not been adopted.

“Value” means economic value. A values approach to chain development has been one form of value-chain approach, but most applications define “value” in the economic sense of the word (Box 2.2). However, the value of concern for nutrition is the nutritional value or the value for nutrition and diet quality (that is, how the chain could lead to enhanced nutritional value of foods and improved nutrition outcomes). This concept is not only different from the economic value concept, but it may also conflict with it as value chains are developed. This problem is linked to the value-added and consumer limitations: if value chains focus on creating economic value, then what if the products produced are unaffordable by the people who most need them? Alternatively, if the product produced and marketed has enhanced nutritional value but does not create economic value for the value chain, it cannot really be seen as the product of a value-chain approach even if value has been created for nutrition.

⁷ The examples of popularly positioned products made by transnational food manufacturers suggest that value chains can be aligned to produce products perceived as affordable, nutritious, and available. However, this business-oriented approach has tended not to focus on value-chain development for the agricultural sector or on basic commodities (Nestlé 2010).

The focus on single food commodities neglects dietary diversity. Value chains involve a single commodity or food product from farm to fork. Although this narrow focus offers a potential advantage from a practical standpoint, it deviates from the whole balanced diet concept underlying dietary quality: one food does not lead to overall diet quality; rather it is the combination of different foods of the right quality and in the right amounts that constitutes a healthy and high-quality diet. The focus on the single chain fails to take account of the other chains operating alongside it and so does not consider the linkages between the whole food system and the total diet.

The focus on competitive markets leaves out other markets. To date value-chain approaches in international development have focused on improving competitiveness in private markets—often global, high-value, and export markets. This focus on building economic systems has the potential advantage of being a market-based solution as opposed to just aid. However, it means there has been little focus on making nutritious foods available in markets that are not private and open in the same way, such as food aid or institutional markets like schools. Although evidence of the impact of these programs on farmers is limited (Bundy et al. 2009; Ahmed and Sharma 2004; Vaitsman and Paes-Sousa 2007), these avenues of availability are potentially important for specific at-risk groups.⁸ The overall focus on competitive markets may also create disincentives to overcoming the four previously discussed limitations: the need to generate value for the actors may mitigate against focusing on nutritional value for the at-risk consumer.

Overall the potential of value chains for nutrition is considerable. Yet the limitations to value-chain approaches to nutrition are real and should be recognized in order to guide the effective development of value chains for nutrition.

4. Case studies of emerging value-chain approaches to nutrition

This section describes some early attempts at linking value-chain approaches with nutrition and health concerns and highlights some of the challenges and opportunities of the approaches used. To date, value-chain approaches have not been applied in the field of nutrition in a consistent or comprehensive way. Nevertheless, for this study, an extensive search of the published and gray literature was conducted, and contacts with people identified from this literature (and personal contacts) were established to identify case studies that illustrate (1) why the value-chain approach can be useful for achieving nutrition goals; and (2) how the value-chain approach has been used in ways relevant to improving nutrition and increasing poor people's access to nutritious foods.

The following criteria were used to select case studies:

- The project had to incorporate some aspect of value-chain concepts.
- The project had to fulfill at least one of the following nutrition-related criteria:
 1. have explicit nutrition goals;
 2. incorporate some nutrition or health concerns and an explicit consideration of consumer demand; and
 3. involve processed, fortified products targeted to nutritionally vulnerable population groups.

Although the focus was on poor populations living in developing countries, two case studies from the United States were used because they met some of the general criteria regarding nutrition goals and nutrition or health concerns. The search did not identify examples that evaluate the effectiveness of value-chain approaches for nutrition outcomes, but it did find some emerging cases of value-chain approaches to nutrition and nascent ideas circulating in the international development community, as well as on a local level in North America. Overall, eight case studies were identified and organized according to the three categories (1–3). The case studies are summarized in Table 4.1⁹ and described in the following subsections.

⁸ For example, the World Food Programme's Purchase for Progress (funded by the Bill and Melinda Gates Foundation) aims to connect farmers with commercial markets in combination with school-feeding programs (WFP 2010).

⁹ Because the projects identified had either not yet been written up or had not been reported in an explicit value-chain framework, the case studies were prepared by the project managers or associated experts and written from a value-chain and nutrition perspective. The authors are listed at the start of each case study.

Table 4.1—Summary of case studies

Commodity	Country	Objectives	Examples of Actions along the Value Chain to Leverage Improved Nutrition Outcomes	Case Study Authors
Case studies with explicit nutrition goals and related activities				
Beans	Uganda	<p>Overall: Improve sustainable livelihoods in rural communities</p> <p>Nutrition-related:</p> <ol style="list-style-type: none"> 1. Improve bean quality and yields 2. Enhance nutritional value and appeal of beans through appropriate handling and processing practices and technologies 3. Identify ways to overcome constraints to increased market access and consumption 	<p>Production: Work on improving varieties to boost yield</p> <p>Postharvest handling: Analyze nutrient quality at different postharvest stages</p> <p>Processing: Identify best practices to maximize retention of nutrients and reduce or eliminate antinutrients; develop a quick-cooking bean flour</p> <p>Consumer demand: Conduct survey to understand preferences and demand; raise awareness of nutritional and health benefits; provide training on cooking</p>	R. Mazur et al.
Orange-fleshed sweet potato (OFSP)	Mozambique and Uganda	<p>Overall (nutrition-related): Improve vitamin A intake and status through increased consumption of OFSP</p>	<p>Production: Distribute OFSP vines through agricultural extension; train farmers on marketing; use mass media to educate farmers about OFSP</p> <p>Trader-level marketing: Raise awareness of nutrition benefits of OFSP; disseminate results of willingness-to-pay studies</p> <p>Consumer demand: Use mass media and promotional events to raise awareness of nutritional benefits of OFSP and promote its consumption</p>	A. Westby, C. Coote, and K. Tomlins
Multiple	Sierra Leone	<p>Overall (nutrition-related):</p> <ol style="list-style-type: none"> 1. Develop and test national models to boost nutrition programs and scale up demand for nutritious foods by purchasing locally from small farmers 2. Identify food-based interventions that can increase incomes of smallholder farmers and improve nutritional status of women and children 	<p>Production: Provide farmer training; facilitate access to input and credit</p> <p>Postharvest processing: Transfer technology, set up facilities, and provide financing for food fortification</p> <p>Marketing: Provide market information and access; provide nutrition education; procure processed nutritious foods locally for food assistance programs</p> <p>Consumer demand: Provide messaging to households and communities about nutritional needs of mothers and children; conduct innovative marketing of processed nutritious foods</p>	S. Torgerson, E. Rhodes, E. S. Wieggers, M. van Dorp, and B. Ljungqvist
Various nutritious, locally grown foods	Iowa, USA	<p>Overall (nutrition-related):</p> <ol style="list-style-type: none"> 1. Ensure that health-promoting food is available and affordable in all communities, neighborhoods, and institutions 2. Increase the opportunities for existing and new producers to grow their markets 	<p>Production: Invest in production technologies</p> <p>Consumption: Educate and inform final consumers; engage institutional markets (including schools) and food service markets</p>	B. Ranum and T. Wiemerslage
Case studies without specific nutrition goals, but with some nutrition or health concerns and/or explicit consideration of consumer demand				
Milk and dairy	Zambia	<p>Overall: Reduce household food insecurity among vulnerable households through increased incomes from the sale of milk and other dairy-related products</p> <p>Nutrition-related: Increase availability of and demand for dairy products</p>	<p>Milk production: Provide education to increase knowledge and use of farm and household hygiene practices; promote year-round milk consumption by producers</p> <p>Milk collection and storage: Establish collection centers to increase availability of safe, high-quality, cool milk</p> <p>Dairy processing: Train farmers, dairy cooperatives, and processors to increase availability, demand, safety, and quality of dairy products</p> <p>Dairy sales and consumer demand: Increase dairy marketing to improve consumption of milk and dietary diversity all year round</p>	F. Grant and M. Russell

(continued)

(continued)

Commodity	Country	Objectives	Examples of Actions along the Value Chain to Leverage Improved Nutrition Outcomes	Case Study Authors
Chilli peppers, shallots, man-goes, and shrimp	Indonesia	<p>Overall: Help poor farmers and consumers adapt to the transformation of food demand and the retail food sector</p> <p>Nutrition-related: Assess how changing food and shopping preferences influence health outcomes of consumers</p>	<p>Value-chain analysis of high-value foods: Conduct formal and informal surveys of producers, traders, and processors to identify incentives and actions undertaken to maintain quality at each stage of marketing channel and the constraints faced by participants at each stage in meeting the quality demands of customers</p> <p>Consumption: Conduct survey of urban and rural consumers to examine household diet, the determinants of food demand, the share of food purchased from supermarkets, and the anthropometry and incidence of selected diseases among family members</p>	N. Minot
Various nutritious, locally grown foods	USA	<p>Overall: Meet growing demand for locally produced food by reorganizing the value chain</p> <p>Nutrition-related: Add value for consumers by providing nutritious, local foods produced using sustainable techniques</p>	<p>Production: Work with local farmers to enhance production</p> <p>Distribution: Introduce an aggregator; communicate with customers and sales staff regarding the value of the new brand to enhance distribution and demand</p> <p>Consumers: Enhance demand through branding</p>	J. Colyn et al.
Case study without nutrition goals but involving processed, fortified nutritious products targeted to nutritionally vulnerable groups				
Ready-to-use therapeutic foods (RUTFs)	Ethiopia	<p>Overall: Work with local producers to eliminate aflatoxin contamination in peanuts and give them access to the RUTF production market</p> <p>Nutrition-related: Enable the local production and supply at reduced cost of a nutritious processed food product aimed at addressing severe acute malnutrition</p>	<p>Production: Improve the quality and safety of peanuts, including by supplying inputs, holding regular field days, monitoring aflatoxin contamination, and sharing results with producers</p>	C. J. Jones

Source: Compiled by authors based on case studies.

4.1 Enhancing the nutritional value and marketability of beans through research and strengthening key value-chain stakeholders in Uganda

Authors: Robert Mazur, Iowa State University, USA; Dorothy Nakimbugwe, Makerere University, Uganda; Michael Ugen, National Crops Resources Research Institute, Uganda; Henry Kizito Musoke, Volunteer Efforts for Development Concerns, Uganda

4.1.1 BACKGROUND

Under the framework of the USAID-funded Dry Grain Pulse Collaborative Research Support Program (CRSP) (2008–2012), Iowa State University (United States) and local partners are working to improve the bean value chain in the Kamuli District of Uganda.¹⁰ Beans are a major food and cash crop in Uganda, accounting for 7 per cent of the national agricultural gross domestic product. Yet owing to low production levels, the smallholders who produce them remain food insecure and very poor. Farmers face problems with soil fertility, seed quality, pests, diseases, and erratic bimodal rainfall patterns. Postharvest losses for beans are also high.

Beans are rich in protein and essential micronutrients. To date, the potential nutritional benefits of beans consumed locally or sold in the marketplace have been compromised by inadequate pre- and postharvest handling techniques—namely, late harvest that exposes beans to fungus, damage, and breakage during threshing, and high levels of insect infestation among beans stored in farmers’ homes for consumption and sold on the market. There are few value-added bean products with shorter preparation times, so bean preparation is laborious and has high fuel requirements. Consumers also tire of the monotonous flavor. Among urban residents, an increasing number of people are reducing or abandoning consumption of beans despite their documented high nutrient content and health benefits. Little information is available regarding the prospects for increasing demand for beans and agroprocessed products.

Beans are widely consumed by producers and, when sold, earn higher prices than other crops. The majority of farmers involved in producing, harvesting, and marketing beans in the Kamuli District are women (77 per cent), who also play central roles in preparing food and caring for children’s health and education. This situation offers great potential to enhance food security, improve household members’ nutritional status, and increase incomes.

4.1.2 PROJECT OBJECTIVES AND APPROACH

Given the interrelated nature of problems that extend along the value chain—from production, postharvest handling, and processing to marketing—the leaders of the project adopted a value-chain approach to identifying and testing solutions. With the ultimate goal of improving sustainable livelihoods in rural communities, the objectives are to (1) improve harvested bean quality and yields; (2) enhance the nutritional value and appeal of beans through appropriate handling and processing practices and technologies; and (3) identify solutions for overcoming constraints to increased market access and consumption. The approach involves addressing all of these constraints in a coordinated manner to improve the economic value earned by producers while also increasing the nutritional value gained by rural and urban consumers.

4.1.3 PROJECT ACTIVITIES THROUGH THE VALUE CHAIN

The first phase of project involved meetings and focus group discussions with farmers and other stakeholders to identify specific production, postharvest, and market access problems. Following these stakeholder meetings, a range of actions were taken to implement the stated goals, involving research on management practices and technologies, development of extension materials, and farmer-to-farmer training and outreach.

To address limitations in production, a set of field trials using new bean varieties, which were developed by the National Crops Resources Research Institute (NaCRRI) in Uganda, are being implemented alongside farmers’ locally preferred varieties. The trials involve soil and terrain analysis, organic and inorganic treatments to enhance soil fertility, and various planting methods. Farmer training to support the trials is conducted by NaCRRI and an indigenous Uganda nongovernmental organization called Volunteer Efforts for Development Concerns (VEDCO). A farmer-led field day was held to demonstrate and explain practices and technologies and share with other farmers the knowledge gained to date through project activities.

¹⁰ Further reading, see R. Mazur et al., “Enhancing Nutritional Value and Marketability of Beans through Research and Strengthening Key Value Chain Stakeholders in Uganda and Rwanda,” in *Dry Grain Pulses Collaborative Research Support Program (CRSP): 2009 Technical Highlights*, 14–23 (East Lansing, MI, USA: USAID Dry Grain Pulses CRSP, Michigan State University, 2009), <http://pulsecrsp.anr.msu.edu/Portals/0/docs/FY09%20Technical%20Reports/Pulse%20CRSP%20FY%202009%20Highlights.pdf>; R. Mazur et al., “Enhancing Nutritional Value and Marketability of Beans through Research and Strengthening Key Value Chain Stakeholders in Uganda and Rwanda,” in *Dry Grain Pulses CRSP Technical Progress Report (October 1, 2009–September 30, 2010)* (East Lansing, MI, USA: USAID Dry Grain Pulses CRSP, Michigan State University, 2010).

The postharvest phase involves three types of actions. First, training on management practices and technologies was initiated to reduce losses due to insect damage, which is farmers' primary concern. Second, to improve nutrient quality, scientific analysis was conducted on bean varieties to determine how different post-harvest drying and storage techniques affect nutrient content. Third, on the processing side, analyses were conducted to identify best practices (such as optimal sequencing and duration of processing methods such as soaking, dehulling, and sprouting) to maximize the retention and bioavailability of nutrients, such as protein, iron, and zinc, and to reduce or eliminate antinutrients such as tannins and phytic acid, which inhibit iron and zinc absorption. These analyses also sought to reduce cooking time (and therefore fuel needs) and enhance consumer acceptability of bean products. A quick-cooking bean flour protocol was also developed at Makerere University to add value by making bean-based composite flours. These flours are being assessed for sensory properties and consumer acceptability. A partnership is being developed by Makerere University's Technology Business Incubation Centre with a private company (Nutreal Ltd.) to refine, brand, and market bean-based composite flours suitable for use in both porridge and sauces.

A variety of techniques were used to achieve the objective of improving market access. The first was a series of analyses of components of the value chain. Three separate analyses were conducted to identify the following:

- **Main market channels.** It was found that 80 percent of the beans marketed were sold at the farm gate, of which 58 percent were sold to intermediaries; of the 20 percent sold at local village markets, 54 percent were purchased by local retailers.
- **Drivers of the marketing decision.** Smaller household size, higher household resources, higher prices for beans, greater harvest size, and better conditions of the road to market all had a positive effect on the amount sold by households.
- **Presence of nutrient-enhanced food in Kampala.** A limited range of such products was observed, implying strong potential to increase the range.

Second, training sessions were conducted to improve farmers' business skills. These skills included keeping records of inputs and outputs and increasing the acceptability of beans in the marketplace by sorting grain according to condition and appearance and packaging and labeling beans in smaller quantities rather than selling in bulk.

Third, price information was improved through weekly updating of public market price boards and dissemination of market prices for crops through cell phone messages to farmers.

Fourth, VEDCO brought together diverse stakeholders across the value chain (farmer marketing groups and associations, government agencies, nongovernmental organizations, private sector traders, transporters, distributors, and processors) to share information and best practices and develop new approaches to improving market access. The participants in the first workshop, held in September 2010, agreed to, among other actions, establish a forum for stakeholders to meet regularly and share information, strengthen the role of business principles and profit orientation in producer organizations, develop an accessible and effective market information system, and increase the expertise and capacity of all stakeholders in the value chain.

Activities were also taken at the level of consumer demand. To better understand consumer preferences and demand, a consumer survey was conducted. Among VEDCO-assisted rural producer households, beans are regarded as an important food for their nutrient and dietary benefits and are consumed by every individual in the household starting as early as six months of age, on average four days a week. Processing of bean products is minimal, however, and done by only a small proportion of households in Kamuli. To increase awareness of new ways of preparing beans and to stimulate demand for value-added products, Makerere University and VEDCO conducted cooking training for farm-consumer households using recipes developed by NaCRRI. A Bean Cook Day, organized for family members, included the use of bean flour. Members of the community from different backgrounds and age groups tasted and evaluated the prepared foods for their overall acceptance as well as attributes like taste, flavor, and appearance. The project team inquired about participating farmers' and farmer groups' knowledge of the nutritional benefits of beans, ways of combining beans with other foods to improve diet quality, the importance of hygiene in food preparation, and the appropriateness of different bean dishes for different age groups and individuals.

The next stage is a planned survey by Makerere University, in partnership with Nutreal Ltd., to understand urban consumers' awareness of beans' nutritional and health benefits, their consumption of nutrient-enhanced

products (porridges, weaning foods, ready-to-eat snacks and foods, and bread), and their values and preferences regarding purchase of value-added products.

4.1.4 VALUE-CHAIN ADVANTAGES AND CHALLENGES

This project aimed to understand barriers and develop solutions for producers and consumers in different parts of the bean value chain, through participatory research involving improved management practices and technologies, development of training materials, peer extension and outreach, and monitoring and evaluation. By developing solutions for key points of the value chain, coordinating these activities so that they reinforce each other, and including diverse partners and sectors, the project reflects the core value-chain concepts and theories and has good prospects of effectively promoting sustainable change and development. Notably, the project focuses on adding value by improving postharvest handling of staple products and by differentiating products for consumers as a means of increasing income for rural producers.

The challenges of team building are continuous in a five-year research and development project that spans the value chain, involves multiple research institutions and diverse disciplines, includes development practitioners, and forms direct linkages with private sector traders and processors. Fortunately, these challenges are significantly outweighed by the benefits of the diverse perspectives that partners bring, based on their real world experiences, to understanding problems, identifying promising solutions for testing, and evaluating results at all project stages. The ultimate goal is to contribute to the knowledge base of the global scientific community and help identify management practices and technologies that are scalable on a national or regional basis to transform rural livelihoods and the well-being of consumers.

In this program, better nutrition is being achieved by increasing both supply and demand, focusing on the nutritional value of the bean for consumers as well as the economic value to producers, and integrating activities, actors, and sectors engaged in production and consumption. In the future, it would be useful to measure nutritional outcomes as rural and urban consumers increase consumption of beans through new value-added products. Future action-oriented research should also pay attention to potential economic and nutritional trade-offs between marketing beans and retaining them in the home for own-consumption.

4.2 Increasing the production, availability, and consumption of vitamin A–rich sweet potato in Mozambique and Uganda

Authors: Andrew Westby, Claire Coote, Keith Tomlins, Natural Resources Institute, University of Greenwich, United Kingdom

4.2.1 BACKGROUND

Most sweet potatoes consumed in Africa are white fleshed. Replacing these in the diet of the rural and urban poor with orange-fleshed varieties rich in beta-carotene has the potential to reduce vitamin A deficiency. To help achieve this potential, HarvestPlus's Reaching End Users project undertook a series of activities to increase the production, availability, and consumption of orange-fleshed sweet potato (OFSP) among rural producer households; raise the incomes of producers who sell excess production; and stimulate consumption by nonproducing households that purchase this excess production. This case study reports on the approach and activities taken along the value chain to increase the incomes of producers and the consumption of OFSP by both producers and nonproducers.

4.2.2 DEVELOPING A MARKET FOR OFSP

Conventional approaches to introducing a new crop typically involve working with producers who cater to a guaranteed market, with little effort made to work with the traders to facilitate supply. In this case, however, there was no guaranteed market, so the project focused on developing and adopting a facilitative marketing strategy, working with existing sweet potato value-chain and market actors, including producers (small and large scale), traders, and consumers. Traders were initially hesitant to market OFSP because they feared their customers would not buy this unfamiliar product. This situation necessitated wide-scale efforts to raise awareness of the benefits of OFSP for consumers.

Actions taken to develop the value chain at the three levels—farmer, trader and consumer—are presented in Figure 4.2. The justification for these actions is as follows:

- At the *farmer* level, it was important to build confidence that market demand existed, increase marketing skills, and ensure a market for the produce.

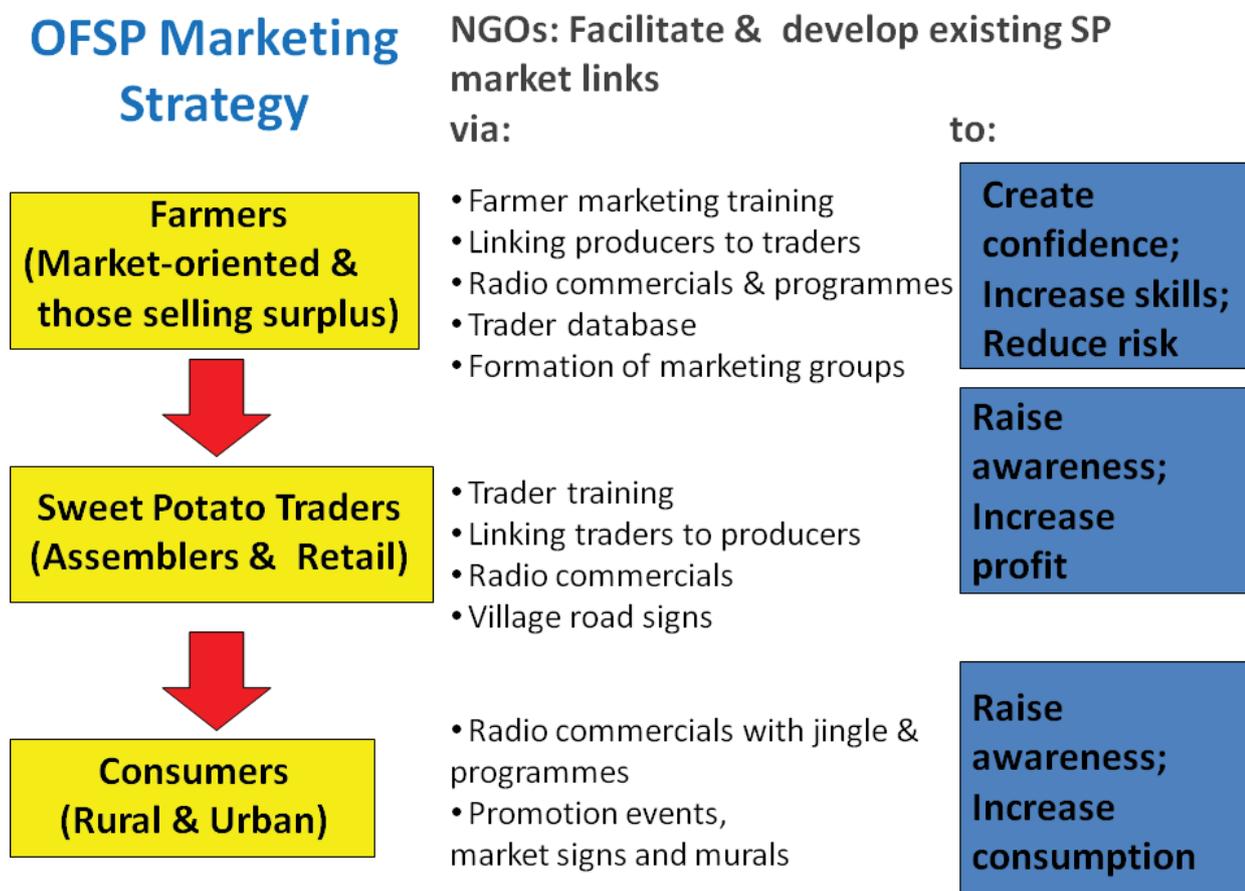
- At the *trader* level, it was important to raise awareness of the nutritional advantages of OFSP, identify where it could be sourced, and define the role traders could play in promoting consumption. It was also important to show traders that they could make higher returns from selling OFSP because it was often sold at a higher price, according to studies of purchasers' willingness to pay.
- For *consumers*, it was vital to raise awareness of OFSP's nutritional benefits and encourage replacement of white-fleshed varieties with the more vitamin A-rich orange variety.

During the diagnostic work, sweet potato traders in both countries talked of the limited demand for OFSP and, in some locations, a refusal by purchasers to accept it when OFSP was mixed in the heap. As a consequence, research was conducted to understand the acceptability of OFSP to consumers and consumer willingness to pay (WTP) for the product. Results showed that the orange trait of OFSP was not a barrier to acceptance—of 474 sweet potato consumers in Uganda, 89 percent of adults and 84 percent of children like this trait—and that it could be used to support the marketing and promotion of OFSP. The WTP study explored the effect of providing nutrition information to consumers and showed that OFSP would still be salable in the absence of nutrition information. Providing nutrition information, however, translated into premiums for OFSP of 17 percent for light orange to 54 percent for deep orange. This finding concurred with some traders' belief that OFSP could be sold for a higher amount (reflected in a smaller heap size) where people were aware of its benefits. The activities in the OFSP marketing strategy are shown in Figure 4.2.

To address traders' concerns about the perceived lack of demand for OFSP, training for more than 400 traders was undertaken at rural markets in the project areas and at urban markets outside the project areas. Delivered in the local language over a couple of hours, training covered the profitability of trading in OFSP, its nutritional benefits, ways to prepare it, and the importance of telling customers about it.

Trained traders were provided with small folding painted boards advertising the nutritional benefits as well as t-shirts, wraps (for women), and caps. They were also taken to production areas and introduced to producers with OFSP for sale. A database of traders and their contact details was maintained. In Mozambique, OFSP

Figure 4.2 — Elements of the OFSP marketing strategy



Source: Case study authors.

started to be produced in significant quantities in certain locations early on because of a bridging project that included some medium-scale, more market-oriented producers. About 50 medium-scale producers produced OFSP for sale in the first year, with some reporting difficulties in selling the product.

To engage OFSP purchasers and consumers, promotion days were organized in urban markets. Orange market and road signs and murals were put up to advertise OFSP in the markets. Radio advertisements reminded listeners of the benefits of OFSP and were accompanied by a catchy song. These ads were regularly broadcast along with radio programs covering farming and nutritional aspects in more detail. One production area was on the border with Malawi, and Malawian traders were traditional buyers. Promotion work was undertaken in a cross-border buying zone through a local priest who gathered together local leaders and traders for the promotion days. Radio ads were broadcast in Malawi to alert traders and consumers to the availability of OFSP in Mozambique. Village road signs, advertising the presence of an OFSP production group, helped traders locate OFSP sources.

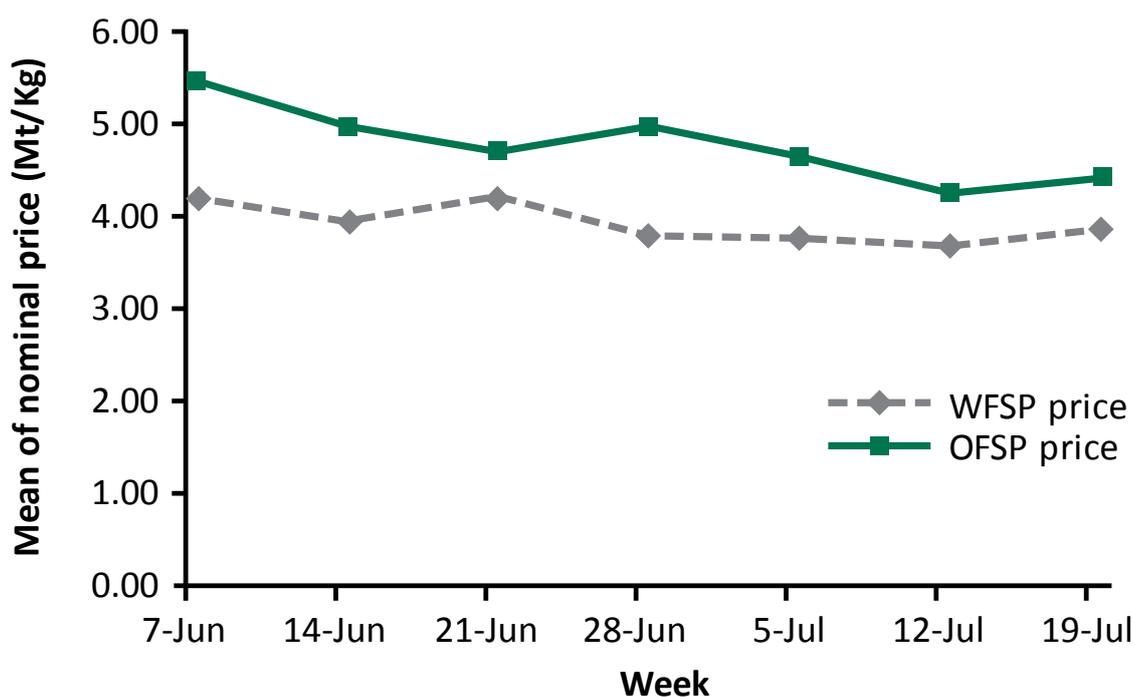
Farmers received training in marketing (which covered business aspects of farming and costs of production), grading and sorting produce, linking with traders, and promoting and selling their produce, including selling as a group. In two project areas in Uganda, this training led to the emergence of OFSP bicycle traders—young entrepreneurial men who saw an opportunity to earn an income by buying OFSP from farmers (women particularly appreciated this service) and selling it to retail traders in the district capital.

4.2.3 IMPACT

4.2.3.1 Market development

The proportion of OFSP, compared with white sweet potato, sold in four urban markets in Mozambique increased from virtually 0 percent in 2006 to 18 percent in 2008 and to 50 percent in 2009. In three of these markets, a price differential in favor of OFSP evolved, and in the fourth, the prices of the two varieties were broadly equal. Figure 4.3 shows the price differential observed in one of these markets. A number of factors contributed to this differential—product promotion; urban consumers’ concerns about the health of their families, particularly of young children; traders’ understanding of the value of the produce; and the limited supplies reaching the market.

Figure 4.3 — Orange- and white-fleshed sweet potato price differentials, 2009 season Ana Rita market, Gurué (Mozambican meticaís/kg, all heap sizes)



Source: Case study authors.

In addition to obtaining higher prices for OFSP (through selling in small heaps), traders in urban and roadside markets also found that OFSP sold more quickly—a result that enabled them to spend more time collecting new supplies or engaged in other activities.

From 2007 to 2009, the market for OFSP evolved in both countries. In Mozambique, 82 percent of 128 medium-scale producers¹¹ (MSPs) sold or exchanged OFSP in 2009, with amounts varying between 7 and 24 sacks. Some 44 percent of MSPs intended to maintain or increase their OFSP production areas in 2010 because of easy market access and the favorable price received. Where market access was poor, OFSP was reported to be used in payment for casual labor or exchanged in equal volume for maize. Among smallholders, an investigation of 98 households in 2008 in Mozambique revealed that 61 percent had sold the target quantity not needed for home consumption, and 85 percent intended to increase their OFSP plot size in 2009 to take advantage of market opportunities.

4.2.3.2 Consumers

In Mozambique in 2009, 82 percent of 491 sweet potato purchasers in 10 markets reported that they would buy OFSP in the future. More than 50 percent said they bought it because of its nutritional and health benefits, which they had learned about from the educational messages (radio ads, programs, promotion events, market signs, and murals) implemented as part of the project. The highest percentages were in urban and roadside markets. In rural markets there was less awareness of the nutritional benefits, particularly among women, possibly because of a lack of access to radios. A survey of 100 consumers in two markets in Mbale, Uganda, in 2009 showed that in the market where OFSP had not been promoted, only 4 percent purchased it, whereas in a market where it had been actively promoted, 41 percent of purchasers bought it.

4.2.4 CONCLUSIONS

Where marketing linkages were made, traders were trained, and the product was promoted, it was possible to create a market for OFSP. The main reason for planting OFSP was household consumption, but it was important for smallholders that a market existed for the sale of surplus production. The orange color was important in identifying the produce in the market, and the nutritional information helped promote the product (especially in Mozambique). Traders were vital in finding trading opportunities and were willing to embrace OFSP if given information about it. A high proportion of consumers in both countries reported that they would purchase OFSP in the future.

For this study, the value-chain approach helped coordinate actions across the supply chain while also assessing the acceptability and demand for the product. Agriculture was linked to nutrition not just through greater production of the product, but through market linkages created in the value chain, with a focus on the organizational aspects of the chain. Value had two aspects: economic value for producers and traders, and nutritional and health value for consumers. Notably, consumers were willing to pay more for the product when they learned it could bring them greater nutritional value. Because the overall project focused on encouraging consumption among producer households, the potentially negative trade-offs between selling to market and retaining for home consumption appeared to be avoided.

4.3 Developing nutrition programs in Sierra Leone: The case of REACH

Authors: Senoe Torgerson, Renewed Efforts Against Child Hunger (REACH); Edward Rhodes, Sierra Leone Agricultural Research Institute; Esther S. Wieggers and Marianne van Dorp, Wageningen University and Research Centre; Bjorn Ljungqvist, REACH

4.3.1 BACKGROUND

In 2010, Renewed Efforts Against Child Hunger (REACH)¹² launched an operational research project in Sierra Leone to develop and test national models to boost nutrition programs. Developed in close conjunction with the Government of Sierra Leone, the focus is on scaling up demand for nutritious foods by purchasing locally from smallholder farmers using a value-chain approach. The objective is to identify food-based interventions that can

¹¹ MSPs are more commercially minded farmers able to grow a larger area of OFSP—between 0.25 and 1 hectare—primarily as a cash crop to help kick-start the flow of OFSP into markets.

¹² REACH was jointly established by the United Nations Food and Agriculture Organization (FAO), the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and the World Food Programme (WFP). It is a global partnership committed to meeting the nutritional needs of the world's most vulnerable children and women, through evidenced-based analysis and innovative programming that builds government institutional capacity, strengthens policy planning skills, and prioritizes scarce resources. The REACH interagency team provides technical expertise and program, managerial, and administrative support from its headquarters in Rome, hosted by the WFP, and from regional hubs hosted by partner agencies. More information about the REACH partnership is at www.reach-partnership.org.

increase the incomes of smallholder farmers and improve the nutritional status of family members, particularly mothers and children in the critical window of opportunity up to two years of age. The value-chain approach is being taken because it enables the project team to systematically “unpack” and analyze the complex interactions between the different actors and activities across agriculture, health, social protection, and education that influence how smallholder farmers can help improve the effectiveness and sustainability of nutrition programs.

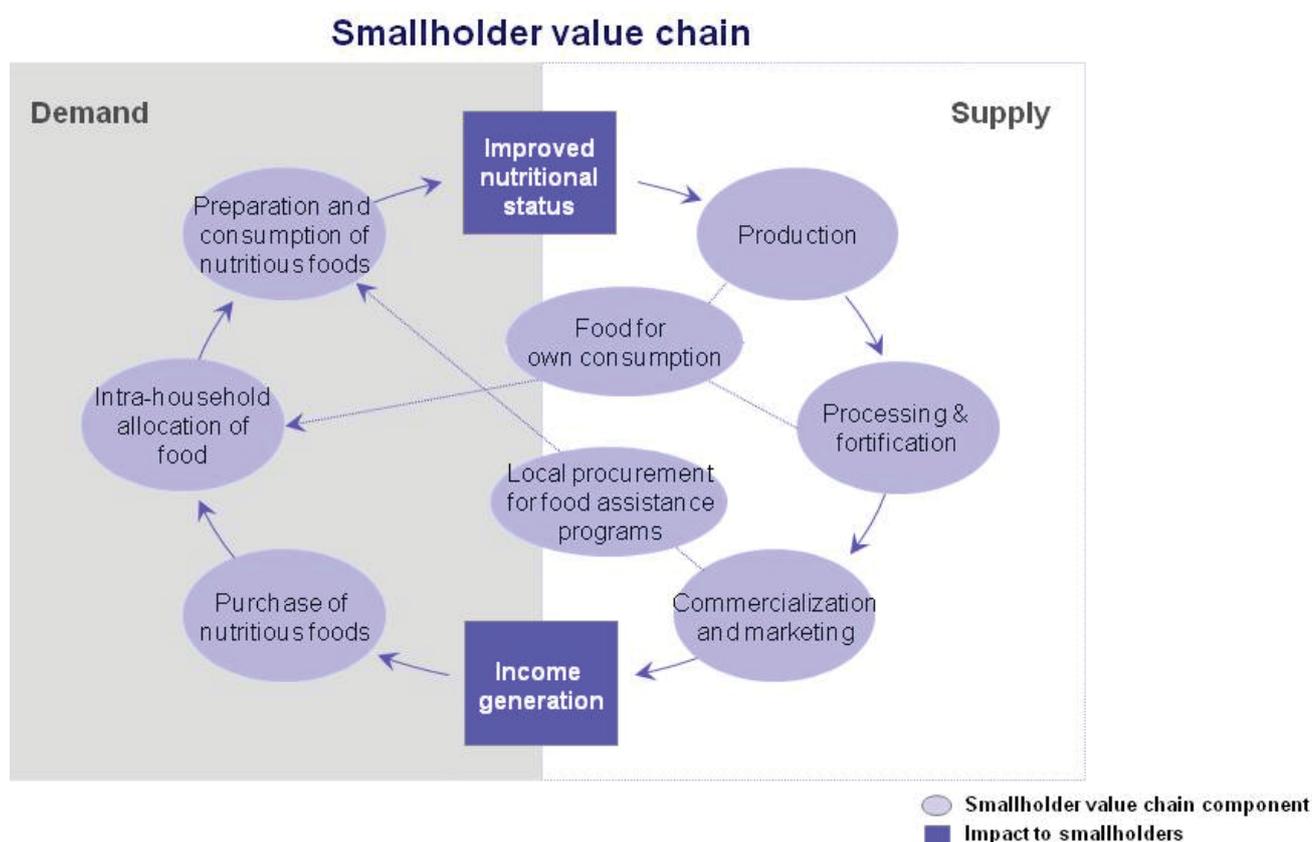
4.3.2 VALUE-CHAIN APPROACH

The specific value-chain approach taken in the project is depicted in Figure 4.4. It identifies the actions in the value chain that have the potential to improve nutritional outcomes. The adoption of the value chain provides a framework for mapping these actions into pathways.

The framework does not attempt to capture all the different possible pathways (see World Bank 2007b). Rather, it highlights the direct pathway through subsistence-oriented production for the household’s own consumption and two indirect pathways: in one, the sale of agricultural products generates income for the purchase of nutritious foods, and in the other, nutritious foods produced by smallholder farmers are purchased and distributed through nutrition programs that target smallholder household members as beneficiaries. Also included in the value chain is a set of demand-side activities (depicted on the left side of Figure 4.4) addressing critical access and utilization functions that contribute to improving the nutritional status of smallholder farm families, particularly pregnant women and children under two years of age.¹³ These functions include intra-household resource allocation and food preparation. As a result, the value chain is articulated not as a linear process but as a loop, acknowledging that the smallholder farmer is both the target producer and a consumer of the nutritious foods produced. In this approach, “value” is defined two ways. First, it refers to “economic value” in terms of how improved nutritional status leads to positive economic impacts (for example, income earned). This concept arises from several studies that find that improved nutritional status has measurable economic benefits because of increased productivity and other factors (Victora et al. 2008; Hoddinott et al.

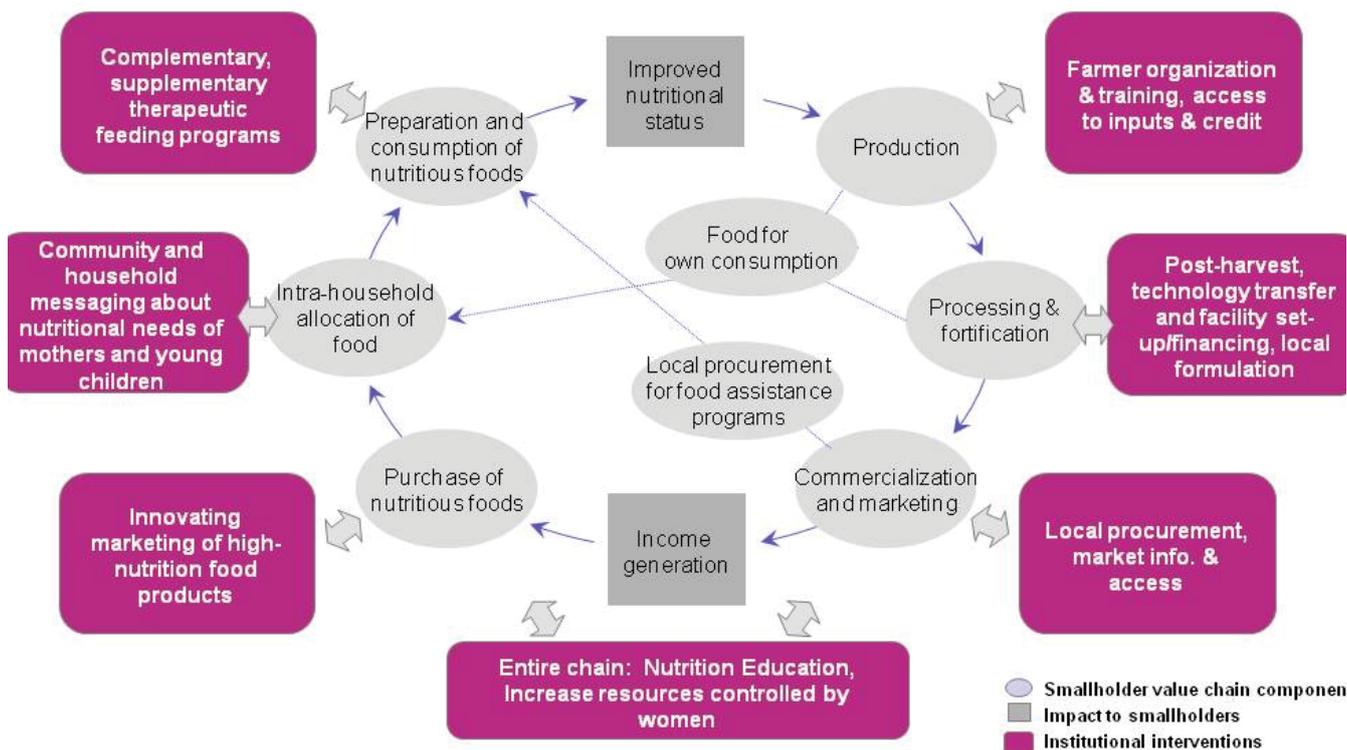
¹³ For the purposes of this operational research, the framework focuses solely on food-based components. The REACH model, however, is based on the UNICEF conceptual framework recognizing that food security, caring practices, and access to health services all are necessary underlying factors contributing to improved nutritional status.

Figure 4.4—Components of the smallholder value chain linking the supply and demand for nutritious foods at the household level



Source: Case study authors.

Figure 4.5—Seven areas of institutional intervention targeted each component of smallholder value chain



Source: Case study authors.

2008). Second, “value” refers to the direct “value for nutrition,” which is perceived here as the social impact of improved nutritional status and clearly differentiated from economic value related to income.

Building upon the direct functions of the smallholder-focused value chain depicted in Figure 4.4, the value chain is also being used to identify a set of support functions, or institutional interventions, to enable smallholders to capture the largest possible portion of the value created along the chain (Figure 4.5).

4.3.3 OPERATIONALIZING THE VALUE-CHAIN APPROACH

Operational research has yet to begin. It will include a two-phase field research component and a desk review conducted by the Wageningen Centre for Development Innovation summarizing existing knowledge on the linkages between the smallholder value chain and nutrition programming. The field research will be led by the Sierra Leone Agricultural Research Institute (SLARI) in collaboration with Njala University in Sierra Leone and Wageningen University and Research Centre (WUR) in the Netherlands. The first phase will focus on a broad mapping of the potential key institutions and actors, as well as constraints and opportunities and their linkages in the smallholder value chain in different agroecological and socioeconomic settings in Sierra Leone. The findings from the mapping exercise will be used to identify specific value-chain actors and linkages for in-depth analysis in the second phase of the field research. The findings will also inform the development of a national action plan for scaling up essential nutrition actions in Sierra Leone. This effort will take place through the REACH-facilitated country process to strengthen capacity for multisector nutrition governance and management, and it will provide a direct opportunity to operationalize the findings. The findings will also be disseminated as part of the REACH *Acting at Scale* series to provide practical programmatic guidance for scaling up food-based interventions, available through the REACH Knowledge Sharing Network to be launched in mid-2011.

4.4 Building food systems and access to nutritious foods in northeast Iowa, USA

Authors: Brenda Ranum, Iowa State University Extension, USA; Teresa Wiemerslage, Iowa State University Extension, USA

4.4.1 BACKGROUND

In 2006, the Leopold Center for Sustainable Agriculture’s Regional Food Systems Working Group, recognizing that northeast Iowa offered a great opportunity for improving access to locally grown food, selected the region

as the site of a pilot program to apply a food values chain approach to developing its local food system.¹⁴ The center provided a grant to Iowa State University Extension, which coordinated the Northeast Iowa Food and Farm (NIFF) Coalition representing youth, farmers, educators, and food producers.

The coalition did not make explicit use of value-chain terminology, but the group started with the concept of the food system, identifying who was in it, what they did, and what they could achieve through mutual cooperation. The coalition considered two particular aspects of the local food system worthy of greater attention. First, Iowa is one of the largest pork, corn, and soybean producers in the United States, but just 1 percent of that food is consumed in the state and only 0.1 percent of the land area is dedicated to fruits and vegetables. Second, the area faces diet-related health problems, notably obesity and type 2 diabetes among children, and very low fruit and vegetable consumption (only about 20 percent of adults consume more than three vegetable servings a day). Moreover, farmers in northeast Iowa who were serving more distant markets were finding no market for their fruits and vegetables because they did not meet the quality standards set by these retailers.

The coalition developed a vision of greater production of health-promoting foods in the state—mainly fruits and vegetables, but also dairy and lean meats—as a means of boosting consumption. The group developed a strategic plan with the aim of ensuring that health-promoting food is available and affordable in all communities, neighborhoods, and institutions, while increasing the opportunities for existing and new producers to grow their markets.

4.4.2 ACTIVITIES

To achieve this vision, the coalition focused its actions on food producers and consumers, and to some extent on distributors and processors. Cutting across these actors were “learning communities” in which the different stakeholders could learn about each other, overcome constraints, and identify opportunities.

At the level of production, three main activities were undertaken:

- **Education and information.** Educational speeches, workshops, and field days were held to train farmers in business skills, the use of technologies, and food safety.
- **Financing.** The coalition provided producers with grants to help with new or expanding local food production, processing, marketing, and distribution. Activities financed included diversification (planting fruit trees, setting up chicken laying facilities), season extension (building greenhouses), and improvements to storage and retail facilities.
- **Food safety standards.** The coalition recognized food safety as a barrier to certain markets, including schools and wholesalers that demanded certification from their fruit and vegetable suppliers. Farmers received training through the U.S. Department of Agriculture’s Good Agricultural Practices (GAP) program and were audited for compliance. A brand was also developed to make customers aware of farmers’ certified status.

At the level of distribution and processing, activities focused on encouraging scaling up, aggregation, and value-added processing to help farmers in northeast Iowa connect to mainstream markets and find new market channels. The coalition provided planning grants to local farmers and entrepreneurs, including a grant to a local farmer cooperative for software to assist with online orders and one to a dairy for a study of the feasibility of processing milk into yogurt.

At the level of the consumer, actions were taken to educate and inform final consumers, as well as to engage institutional and food service markets. The coalition organized a series of educational and informational events, including food tastings, farm tours, and farm-to-school tours. It also developed a local food directory and website. All these activities made use of the existing “Buy Fresh, Buy Local” marketing brand already in place in Iowa.

The coalition also engaged schools in the process. The focus on schools was viewed as the most effective way of reaching children most at risk for diet-related ill health. Pilot programs were launched in six schools, each with a high proportion of low-income children. Distribution channels were set up for local provision of fruits and vegetables to the National School Lunch Program, and actions were taken to incorporate education about healthy eating into the curriculum. A series of training sessions were conducted with teachers and food

¹⁴ For further reading, see “The Story of the NE Iowa Food & Farm Coalition,” <http://www.iowafoodandfitness.org/site/stories.html>; Northeast Iowa Food & Fitness Initiative, Data and Assessments, Assessments of the Local Food System, <http://www.iowafoodandfitness.org/site/data.html>; Farm to School, Iowa Profile, <http://www.farmentoschool.org/state-home.php?id=11>.

service personnel, and school gardens were started in light of studies showing that they increase fruit and vegetable intake in schools.

The coalition recognized that the price of local food would be a major factor for schools. It surveyed school food services about the types of fruits and vegetables served, price, and quantities needed throughout the school year. Armed with that information, the coalition created a list of fruits and vegetables that local farmers could grow at a price point competitive with fresh produce available through conventional sales channels (in some cases, to be price competitive, the local products had to be a lower grade than those available through conventional sales channels).

Schools can also reduce the cost of locally grown produce by buying products they have not traditionally focused on. The group is looking at the use of “seconds” as an affordable option. For example, smaller apples (#2) are usually a lower price, and they are appropriate for children because they represent a single serving.

Involving schools also necessitated a policy change by the state government. Early on in the process, food service personnel had told the coalition that the state prohibited them from sourcing local foods. In response, the coalition asked the Iowa Department of Agriculture and Land Stewardship to clarify its policy. The department released a memo stating that institutions—including schools, care centers, and hospitals—could procure local foods. The coalition is now advocating another change in policy to allow for geographical preference for local foods in procurement by schools.

4.4.3 OUTCOMES

The coalition’s activities generated value for both producers and consumers. Farmers said the quality and quantity of their products increased, as did their ability to market them. Food service directors said that children liked and ate the fruits and vegetables in the cafeteria, and there was no new problem of plate waste.

Most tellingly, there was a dramatic increase in sales of local foods. Tracking the purchases of four to five institutions in 2008–2010, the NIFF Coalition found an increase of more than US\$377,000 in local food purchases. The coalition also documented more than US\$222,000 in increased food sales from local farmers to restaurants, food cooperatives, and other institutions.

The NIFF Coalition has been an influential and invaluable mentor to the 13 other local groups that have joined the Leopold Center’s Regional Food Systems Working Group since 2006. This network of local food groups has increased learning and collaboration to build capacity in local and regional food commerce.

4.5 Land O’Lakes Zambia: Developing a dairy value chain for smallholders

Authors: Fred Grant, Practice Manager for Nutrition and Health, Land O’Lakes; Mara Russell, Practice Manager for Food Security and Livelihoods, Land O’Lakes

4.5.1 OBJECTIVE

Land O’Lakes International Development, a not-for-profit division of Land O’Lakes, Inc., implemented a USAID-funded Title II Development Assistance Program (DAP) between 2004 and 2009 in 12 districts of four provinces in Zambia.¹⁵ The goal of the DAP was to reduce household food insecurity among vulnerable beneficiaries through increased incomes generated from the sale of milk and other dairy-related products. A market-based, value-chain approach was taken that engaged and linked smallholder farmers, input suppliers, animal health workers, dairy processors, and commercial food retailers. Although improved nutrition was not a specific objective of the program, greater availability of and demand for dairy products among producers and consumers were.

4.5.2 WHY A VALUE-CHAIN APPROACH?

Land O’Lakes applies a value-chain approach to its work with small farmers based on the principle that linking producers to markets for which there is demand is essential for positive and sustainable economic development. In Zambia, Land O’Lakes proposed working in the dairy value chain because of significant unmet market demand for milk in urban areas and favorable production conditions (land, feed, water) in nearby rural areas. In addition, dairying provides year-round cash income, important in a country that depends heavily on seasonal agricultural production of staple crops.

Following privatization in the 1990s, the Zambian dairy industry comprised a few large and medium-scale dairy farmers. There was also a strong tradition of cattle keeping, though smallholder farmers were neither well

¹⁵ For further reading, see *Final Evaluation of Land O’Lakes Zambia Title II Development Assistance Program*, http://pdf.usaid.gov/pdf_docs/PDACM615.pdf.

organized nor effectively linked to private sector markets. Agricultural extension was weak, as was the private input supply industry's reach into rural areas. In this context, a value-chain approach was essential to achieving significant and sustainable impacts on vulnerable, smallholder households and the dairy industry more broadly.

Approaching dairy as a business opportunity for smallholder farmers required creating opportunities for farmers to boost milk production and join the commercial milk supply value chain. Accordingly, Land O'Lakes worked to (1) improve the availability, quality, and use of productivity-enhancing inputs and services (such as feed, animal health, breeding, and extension); (2) increase milk production (by providing dairy cows); (3) improve milk collection, storage, and transportation (through technologies for milk aggregation, cooling); and (4) increase market linkages to dairy processors as well as to retailers and consumers. Land O'Lakes specifically targeted vulnerable smallholder dairy farmers and helped them acquire dairy cows, organize into dairy cooperatives, and link to output and input markets.

4.5.3 VALUE-CHAIN REDEVELOPMENT FOR MILK PRODUCTION AND CONSUMPTION

The agricultural value-chain approach used is illustrated in Table 4.2, with the human nutritional outcomes and opportunities italicized.

4.5.4 OUTCOMES

The Land O'Lakes DAP achieved significant improvements in household income, food security, and dietary and livelihood diversity for approximately 22,000 beneficiaries. The number of months households were food secure increased by 36 percent (that is, by three months a year as measured by months of adequate household food provisioning), while household dietary diversity scores were 33 percent higher among project-supported beneficiaries than among nonbeneficiaries. In fact, project beneficiaries consumed greater quantities of animal-source foods, even beyond dairy, than did nonsupported groups, possibly because of the increased disposable income and its food-based source. All households with a milking cow reported improved nutrient intake, particularly among children.

Results for income were also striking. Dairy farmers not supported by Land O'Lakes were earning about \$710 a year, while Land O'Lakes-supported farmers earned an average of \$1,077 a year, or about 52 percent more than those not receiving support. At 10 operational milk collection centers supported by Land O'Lakes, smallholder dairy farmers earned more than \$2.7 million over the life of the project. The infusion of cash into the rural economy from dairy sales also had an impressive ripple effect on many other economic activities for thousands of additional households in these dairy communities. These spillover effects included employment opportunities for community livestock workers, artificial insemination technicians, milk transporters, and dairy retail sellers. Almost all smallholder dairy farmers, whether or not they delivered milk to a collection center, reported practicing some form of barter, exchanging milk for services (such as labor on household fields) or commodities (such as maize or other foods), resulting in a multiplier effect within the vulnerable communities.

Women especially benefited from the program, with women-headed households enjoying higher gains in income than male-headed households. In fact, it was reported that female beneficiaries took better care of cows than male beneficiaries. Moreover, since dairy farming took place at home, women were able to carry out their childcare responsibilities. Land O'Lakes was also able to overcome cultural practices prohibiting women's ownership of livestock and was successful in signing many contracts with women, even among dual-headed households.

By using a value-chain approach to dairy development in Zambia, Land O'Lakes was able to successfully and sustainably bring vulnerable households out of poverty, reducing their food insecurity, improving their income and sources of income, and improving the quality and diversity of their diets. Although nutrition was not a specific focus of this project, producing households achieved increased milk intake and dietary diversity. Moreover, Land O'Lakes has applied the success and learning from this project to other programs to better link beneficiaries of livelihood projects with nutrition interventions and to integrate nutrition and health services and messages into food and agriculture value-chain activities.

4.6 Value-chain analysis of high-value foods in Indonesia: Implications for producers and consumers

Authors: Nick Minot, International Food Policy Research Institute, Uganda

4.6.1 BACKGROUND

Throughout the developing world, rising incomes and urbanization are changing patterns of food demand away from starchy staples and toward meat, fish, dairy, fruits, vegetables, and processed foods. Greater consumption

Table 4.2—Summary of achievements and activities at different steps of the dairy value chain for smallholders in Zambia

Dairy value-chain key points	Achievements and activities
Input supply	Improve availability of <ul style="list-style-type: none"> - animal feed through dairy cooperatives, - animal health services through trained community livestock workers, - improved breed cattle through trained artificial insemination technicians, and - animal extension services through trained agriculture extension workers.
	Increase knowledge of, demand for, and use of animal feed, animal health and extension services, and cross-bred cattle through training and behavior change communication (BCC) among smallholders.
	Increase household income from increased production and sales of input supplies and services.
Milk production and consumption by producers	Improve availability of <ul style="list-style-type: none"> - dairy cows through heifer distribution and pass-on schemes for vulnerable households and - <i>milk for vulnerable household consumption</i> via productivity-enhancing inputs and services to boost milk production.
	Increase knowledge and use of <ul style="list-style-type: none"> - <i>farm and household hygiene practices</i> via education and BCC and - animal husbandry skills among smallholder farmers.
	Increase household income from increased production and sales of milk through cooperatives.
	<i>Improve dietary diversity</i> via year-round milk consumption.
Milk collection and storage	Improve availability of <ul style="list-style-type: none"> - <i>milk</i> by organizing smallholders into dairy cooperatives, - <i>safe, high-quality, cooled milk</i> through milk collection centers, - milk collection centers by facilitating cooperatives' acquisition of milk cooling infrastructure, and - milk testing at collection centers.
	Increase commercial processors' demand for higher quantities of higher-quality milk from smallholder farmers via improved collection, cooling, and transportation networks.
	Generate higher prices and more favorable contractual terms for smallholders from commercial processors for bulked, chilled milk sold through dairy cooperatives.
	Increase household income from milk transportation services from farm to cooling center.
Dairy processing	Improve availability of <i>nutrient-rich, value-added dairy products</i> , including cheese, yogurt, and butter, produced by private dairy processors and sold through commercial retail outlets.
	<i>Increase demand for and utilization of nutrient-rich, value-added dairy products.</i>
	Increase household income from increased production and sales of value-added dairy products.
	<i>Enhance food safety</i> and quality assurance along the dairy value chain by training farmers, dairy cooperatives, and processors.
Dairy sales and consumption	Improve availability of <ul style="list-style-type: none"> - milk and dairy products in rural and urban, formal and informal markets and - high-quality milk and dairy products for export.
	Increase knowledge of, demand for, and use of <ul style="list-style-type: none"> - milk for donations to friends/family in need and for bartering with neighbors and - <i>milk and value-added dairy products for consumption</i> among dairy farming households and project-targeted communities <i>through dairy promotion marketing.</i>

Source: Case study authors.

of these foods is bringing with it greater attention to food quality and food safety. The use of supermarkets and other modern retail outlets is also growing rapidly, particularly in urban areas and in middle-income countries. These trends are associated with a reduction in poverty and undernutrition, but they also raise two types of concerns. The first is that small-scale farmers will be squeezed out of growing lucrative markets because they are less able to produce high-value agricultural commodities in the quantity and quality demanded by consumers and supermarkets. Second, these dietary changes are associated with a set of negative health outcomes among consumers including obesity, hypertension, heart disease, and diabetes.

4.6.2 STUDY OBJECTIVE

In response to these issues, the International Food Policy Research Institute, the University of Adelaide, and Michigan State University are implementing a study entitled “Markets for High-Value Agricultural Commodities in Indonesia: Improving Competitiveness with Inclusiveness.” The study, initiated in 2008 and to be completed in 2011, has as its ultimate objective to help poor farmers and consumers adapt to the transformation of food demand and the retail food sector. Specifically, the study seeks to address the following research questions:

- How are income and urbanization influencing consumer preferences for high-value commodities and for different types of retail outlets?
- How are these changing food and shopping preferences influencing the health outcomes of consumers?
- To what degree are these changes influencing the competitiveness of small farmers relative to larger farmers?
- What policies, institutional changes, and programs would improve the competitiveness of small-scale farmers and ensure high-quality diets and the prevention of potentially negative health outcomes associated with changing food demand?

To answer these questions, the study combines two components. First, it uses value-chain analysis to examine the potentially negative effects of the upstream changes in the value chain (that is, the rise of the power of supermarket chains) on small farmers. Second, it uses a nutrition and health survey to study the potential negative downstream consequences of changes in food demand and choice of retail outlet on diet quality and health.

4.6.3 VALUE-CHAIN ANALYSIS OF HIGH-VALUE FOODS

The study uses value-chain analysis for the first component because this methodology can provide insights into how the demand for food and the quality attributes of that food are transmitted back along the value chain and what constraints small-scale farmers face in meeting this demand. Specifically, value-chain analysis allows researchers to (1) identify the incentives and actions undertaken to maintain quality at each stage in the marketing channel; and (2) understand the constraints faced by participants at each stage in meeting the quality demands of their customers. The analysis will consider selected high-value agricultural commodities in Indonesia: chilli peppers, shallots, mangoes, and shrimp. These commodities were selected because they are important in the diets of Indonesian consumers, are produced widely by small-scale growers, and are perishable with significant variation in quality. In addition, each commodity is sold both in traditional wet (open) markets as well as in supermarkets and other modern retail outlets. Thus, the markets for these commodities reflect the three types of transformations occurring: the growth in demand for high-value food commodities, the rising concern for quality and food safety, and the growing role of the modern retail sector.

The value chain will be mapped based on data collected in formal and informal surveys of producers, traders, and processors. The producer survey aims to identify the characteristics of farmers that sell into the traditional marketing channel (wet markets) and compare them with those selling into the modern channel (supermarkets). Characteristics to be measured include farm size, education, location, and production methods (for example, use of inputs, irrigation, yields, quality-control practices). The trader interviews will generate information on the quality and quantity requirements of traditional and modern retail outlets, differences in the trader activities (such as sorting and packaging), and estimates of marketing costs. The analysis will shed light on the degree to which quality standards and supermarket requirements adversely affect small farmers, as well as potential interventions to ameliorate these effects

4.6.4 CHARACTERIZING FOOD DEMAND

The second component consists of formal surveys of urban and rural consumers to examine (1) the determinants of changing food demand (including shopping preferences); and (2) the health outcomes associated with changing food demand. The surveys will collect information on the composition of the household diet (household food expenditure), the determinants of food demand (such as income, education, and proximity to supermarkets), the share of food purchased from supermarkets, the height and weight of family members, and incidence of selected diseases. This information will be analyzed to estimate the composition of food demand and the share of each food type purchased from supermarkets. This analysis will in turn make it possible to project the growth of demand for high-value food commodities over time, as well as growth in the share of food purchased in supermarkets. These projections will be used to test the hypothesis that the supermarket revolution risks squeezing small-scale farmers out of lucrative markets for high-value commodities. At the same time, it is hoped that the food consumption data will shed light on the correlates of obesity and other lifestyle diseases, which will provide guidelines for designing policies and programs to address the problem.

Preliminary results based on informal interviews conducted for the value-chain analysis suggest that the growth of supermarkets may have a less adverse effect on small-scale farmers than is often supposed. First, the share of high-value commodities sold through modern retail outlets is still quite small. Even high-income urban consumers often prefer to buy meat and produce in traditional wet markets because it is perceived as fresher. Second, some of the quality requirements of supermarkets can be met by sorting at the trader level rather than by imposing new and expensive quality-control measures at the farm level. These results are preliminary and will be complemented by the information collected through the household consumption surveys.

4.7 Transforming a supply chain into a value chain: The case of Sysco in the United States

Authors: Joe Colyn, Originz, LLC; Consultant to National Good Food Network (NGFN); Marty Gerencer, Morse Marketing; Manager, NGFN, USA; Patty Cantrell, Regional Food Solutions; Consultant to NGFN, USA; John Fisk, Director, Wallace Center at Winrock International, USA

4.7.1 BACKGROUND

In the United States, one group working to develop value chains to increase the availability of and access to nutritious foods is the National Good Food Network (NGFN), housed at the Wallace Center at Winrock International. The objective of the NGFN is to foster regional initiatives to bring “good food” (defined as “healthy, green, fair, and affordable”) into conventional food systems in a way that will ultimately improve access for all communities.

During 2008–2009 the NGFN worked with the Sysco Corporation in three U.S. states. Sysco, a major transnational corporation selling, marketing, and distributing food products to food service establishments (such as restaurants, educational facilities, and lodging), had identified a problem in its supply chain. Sysco had spent decades engaged in supply-chain management techniques designed to gain efficiencies and cut costs as a means of staying price competitive. As a result, it had a “very narrow product selection that many customers were questioning and rejecting” (Cantrell 2010, 2) and inadequate relationships with its suppliers. Because of the way its chain was organized, Sysco was not able to make available a wider range of local farm products for which there was a growing market.

4.7.2 BUILDING A VALUE CHAIN

Together, the Sysco Corporation and NGFN took a value-chain approach to developing a new business model.¹⁶ The value-chain approach offered Sysco a way to move away from a purely transactional business model and toward strong strategic business relationships with suppliers to provide the foods consumers wanted. At the same time, Sysco could increase its competitiveness with other food service suppliers not able to offer the same products and services. The ultimate goal was a “new relationship-based chain that ensures the long term success and diversity of family farming” (Cantrell 2010, 10).

The process involved adding value for customers by providing nutritious, local foods produced using sustainable techniques while creating value for the company and its suppliers. The focus was on enhancing supply to meet growing demand and on creating new demand. To this end, Sysco adopted four main changes:

¹⁶ For further reading, see P. Cantrell, *Sysco's Journey from Supply Chain to Value Chain: 2008–2009 Final Report: Results and Lessons Learned from the National Good Food Network /Sysco Corporation Pilot Project to Source and Sell Good Food*, <http://www.ngfn.org/resources/research-1/innovative-models/Sysco%20Case%20Study%202009.pdf/view?searchterm=sysco>.

- **Communicating and creating demand for the product.** Sysco developed a regional branding scheme that would fit into normal food service ordering systems while at the same time clearly differentiating the product. This branding was considered key to much of the effort's success. The company also innovated with new pack sizes and products.
- **Retaining existing and seeking new suppliers.** When Sysco perceived the potential to benefit from broader product varieties and characteristics from local farmers, it had an incentive to help keep the local farm economy strong. This effort involved not only finding new suppliers, but also building relationships through farm visits and training programs (on, for example, safety and quality standards).
- **Introduction of an aggregator.** It was key for Sysco to intervene not just at the level of the farm and the consumer, but also in between. Local farmers who had previously supplied Sysco with unbranded products sold them directly to Sysco or through various aggregators. However, the branding of the products, the integration of the farmer's story, the need for volume, and the effort to stretch the seasons by including products from different parts of the states resulted in the selection of a dedicated aggregator that could ensure the integrity of the entire supply chain. The introduction of an aggregator presented some advantages to the farmers—for instance, they no longer had to deliver the product themselves—but also presented a problem because of the lack of a direct relationship between the farmers and Sysco. So Sysco made a significant commitment to continue and enhance its relationships with farmers, even while relying on the aggregator for many services. These relationships were key to meeting the customers' desire to know both the product and the people involved. The introduction of new products and the aggregator also required Sysco to develop new codes for the local products in the inventory management systems, a complication that is not typically welcomed in the already complex produce category. However, the new codes proved to be invaluable, given that the business had grown significantly.
- **Communication with sales staff and customers.** Another key step was communicating the value of the new brand to the sales force and the food service customers to gain a mutual understanding of the values involved and to convey technical information on issues like product availability. Sysco also now invites a group of farmers to its annual trade show to interact directly with its full sales force and customers. This direct contact allows farmers to better share their stories and engage and understand the market.

4.7.3 OUTCOMES

The development of a value chain had positive outcomes for Sysco in terms of sales. In Grand Rapids, Michigan, the rebranded local foods contributed to a 10 percent increase in sales, making up for sales losses in other areas. It also provided benefits for farmers, who reported the same or higher profits relative to wholesale channels, with some reporting significant impacts on sales and volume. There were also changes for consumers. In Michigan, for example, Sysco now provides 12 varieties of apples to its food service customers rather than just 2. Consumers in Michigan and Missouri can now get more local produce, traceable back to the farm, in many of the restaurants and cafeterias serviced by Sysco.

This example shows that the incentive for Sysco was ultimately financial—increasing or retaining sales and gaining competitiveness—but this incentive in turn led the company to reorganize its supply chain, support local agricultural development, and provide a greater variety of nutritious foods for consumers. A key contribution of the value-chain approach was its ability to reframe coordination in the chain between company, aggregator, and suppliers to create more value for all. Another key component was the differentiation of added-value local foods.

Although the foods involved were clearly nutritious, the impact of value-chain development on consumption of the products, or overall diet quality, was not measured. Information on pricing strategies was limited, but Sysco did and continues to engage with farmers and aggregators to achieve fair pricing in the context of the broader market to ensure that all participants in the value/supply chain can succeed. The focus on the competitiveness of the individual company also means that it is not clear whether there were any spillover effects in the sector as a whole. Still, one year later, it is known that competitors have reviewed the Sysco case study, and there is evidence that similar programs are being incubated in other companies.

4.8 Shifting functions to create value for producers in the value chain for ready-to-use therapeutic foods in Ethiopia

Author: C. J. Jones, Kenya Country Manager, Global Alliance for Improved Nutrition (GAIN)

4.8.1 BACKGROUND

Hilina is a food-processing company established in 1998 in Ethiopia to manufacture and process a range of food products specifically designed to combat various forms of malnutrition and micronutrient deficiencies affecting children and other vulnerable groups in Ethiopia. The products of interest in this case study are termed “ready-to-use therapeutic foods” (RUTFs) and are appropriate as food supplements for the treatment of severe acute malnutrition.

Hilina was well placed to produce RUTFs because it had a sophisticated aseptic plant capable of meeting demand in the region and was able to secure significant orders from relief agencies working on the treatment of severe acute malnutrition. The company, however, was constrained by the lack of viable locally grown raw materials to prepare the product, particularly groundnuts, a key ingredient in RUTFs. Locally grown groundnuts were infested by aflatoxin, a highly toxic and carcinogenic fungus associated with child stunting. Hilina thus had to eliminate the aflatoxin contamination to be able to produce the RUTFs using locally grown peanuts.

4.8.2 SHIFTING FUNCTIONS IN THE VALUE CHAIN

Importing the raw materials was not a viable solution because of high costs, so Hilina sought solutions among local smallholders. These smallholders had stopped growing groundnuts because of falling prices; lack of fresh, uncontaminated seeds; and shallow markets. Moreover, most growers did not understand the contaminatory nature of aflatoxin. So Hilina stepped outside its normal value-chain activity—processing—to work on the production side of the value chain (this move was essentially functional downgrading as a form of upgrading). The company used its own extension officers to work with producers, supplying inputs, holding regular field days, and following up with growers as crops developed. Most important, Hilina committed to paying higher prices for “clean” products. Hilina regularly invited farmers to its laboratories and shared test results with growers so they could better understand the impact of contamination on their potential income.

Over a period of four years, Hilina eliminated aflatoxin contamination from the nuts supplied from farmer groups, while at the same time quadrupling farmer incomes from groundnuts. Supply of good-quality nuts is now so strong that Hilina is expanding its production capacity and actively looking at new regional markets.

During the period of Hilina’s involvement, farmers continued to spend at least 40 percent of their incomes on food—no matter how large or small the income—implying increased and higher-quality consumption. An initial look at local records also showed that work and school attendance in the community had risen, suggesting lower morbidity rates. (The impact of the use of RUTFs for treatment of severe acute malnutrition in the region was not measured.)

As a result of this success, Hilina has replicated the model to cover soy production. Over the past few years, Hilina has established a successful corn-soya-blend (CSB) operation in Addis Ababa, supplying emergency food rations in the country. This product is intended to be used as the platform for releasing complementary feeding products for infants aged 6–24 months in peri-urban areas in Addis Ababa. Overall, the case suggests that market-driven interventions that affect core business success are a sustainable approach to improving livelihoods and nutrition.

4.9 Conclusions

Altogether, these case studies confirm some of the reasons why the value-chain approach can be useful for achieving nutritional goals (as set out in section 3). They also reveal how value-chain approaches have been and could be used in ways that are relevant to improving nutrition and increasing the supply of and demand of nutritious foods by the poor.

Still, there remains a lack of measured nutritional and health outcomes for these approaches. The set of case studies also does not illustrate all the potentially important contributions of value-chain approaches. Three notable absences are the global nature of food value chains, the role of policy as a value-chain intervention, and value chains linking farmers with institutional markets. There are some potential examples to learn from, but because of the lack of adequate information, they were not included in the set of case studies.

The case of international fish trade illustrates the importance of considering the global scale. Value chains for fish crisscross national borders and have implications for food security: fish exports generate income for local communities, while domestic consumption provides an important nutritional contribution to the diet.

Recognizing the international nature of the fish value chain and the role of fish in food security, the FAO and the Norwegian Agency for Development Cooperation (Norad) are conducting a comprehensive value-chain analysis of international fish trade with an impact assessment of the small-scale sector in developing countries. The study, initiated in 2010, compares domestic, regional, and international value chains to better understand how developing countries can increase the value—economic and nutritional—from their fish supplies.¹⁷

Regarding the role of policy changes in the value chain, cases are needed to examine how the overarching policy frameworks—such as broad shifts in agricultural, trade, and competition policy—affect the incentives faced by value-chain actors at all scales. No such case was identified here, but there are cases of policy and governance changes in different parts of the value chain being used to leverage agriculture for improved nutritional outcomes. Although not developed with explicit value-chain concepts in mind, a good example is the Brazilian Food Acquisition Program (PAA), which procures food directly from family farmers for distribution to populations vulnerable to food and nutrition insecurity (MDA 2010). A recent policy change in Brazil also requires that 30 percent of the food served in the national school feeding program be sourced from family farmers (Sparovek 2007; Currallero and Santana 2007).

The PAA and related policies in Brazil are also examples of a value chain meeting an institutional market; placing farm-to-school programs, such as those being pioneered by the WFP (Bundy et al. 2009, Espejo, Burbano, and Galliano 2009), in a value-chain framework could provide some useful lessons. Institutional markets also form part of the WFP's Purchase for Progress program, in which WFP makes purchases directly from smallholders (WFP 2010). That too, when placed in a value-chain framework, could provide valuable lessons.

5. How to apply value-chain concepts to achieving nutrition goals

This section extends the lessons from the case studies to further examine how value-chain approaches can be applied to nutrition.

5.1 Different approaches, common principles

The case studies featured in section 4, as well as the examples of other applications in section 2 and the rationale in section 3, clearly show that there is not just one way to conduct a value-chain analysis, apply a value-chain approach, or examine the implications of an existing value chain. It would therefore be misguided to *a priori* define what a value chain for nutrition would look like or what value-chain development for nutrition should involve in terms of the issues addressed or interventions implemented. Each value-chain problem requires its own set of solutions. The unity of the approach comes from the process of adopting value-chain concepts in diagnosis and implementation. To this end, the review of existing applications and case studies suggest some unifying principles concerning the application of value-chain concepts to nutrition. The nine principles set out below and illustrated with information from the case studies take into account the benefits already set out of applying value-chain concepts, as well as the very real limitations.

1. **Start with explicit nutrition goals.** Although there is no one value chain for nutrition, all value-chain approaches to nutrition should focus on a clearly stated outcome-oriented nutrition goal. This principle fits with the concrete and solution-oriented nature of value-chain approaches. This paper has focused on four possible core goals for value chains for nutrition: (1) increase the supply of nutritious foods that are accessible to the poor all year round; (2) increase the demand for and acceptability of nutritious foods for the poor; (3) increase coordination among value-chain actors and activities that are essential to increasing the supply of and demand for nutritious foods for the poor; and (4) address the trade-offs between economic gains and nutritional benefits of agriculture in the value chain. Each of the case studies presented in section 4 addressed some, but not all, of these goals. For example, increasing the availability of nutrient-rich foods was the focus of the OFSP project in Mozambique; increasing the nutritional quality of a nutrient-rich food was the main focus of the bean project in Uganda; and improving the affordability of healthy foods was addressed in the project in Iowa, which focused on second-grade produce and coordinating price points.

¹⁷ We thank Dr. Trond Bjørndal of the University of Portsmouth, UK, and Dr. Audun Le of the FAO for providing this information. Some further information can be obtained at <http://www.globefish.org/a-value-chain-analysis-of-international-fish-trade-and-food-security-with-an-impact-assessment-of-the-small-scale-sector.html>. The study is a follow-up of a 2004 study on the impact of international fish trade on local food security, published as FAO Fisheries Technical Paper 456 and available at http://www.fao.org/icalog/search/dett.asp?aries_id=106864.

Several case studies also included actions to promote demand and acceptability by the target consumers. The Indonesia case study, for example, did not incorporate nutrition or health concerns directly in the value-chain analysis but looked at the nutritional implications of changes in existing value chains and retail outlets for nutritious foods. Similarly, though the value-chain component of the RUTF case study in Ethiopia did not have direct nutrition objectives, it focused on products that are targeted for use in social protection or health programs aimed at reducing poverty and malnutrition.

2. **Clearly define the nutrition problem.** One potential limitation of value-chain approaches is their focus on a specific food rather than on total diet (see section 3.4). Yet, as shown by the Iowa example, value-chain approaches are not inconsistent with total diet or systems-based approaches when the starting point is identifying the core food and nutrient gaps and associated health problems. Value-chain approaches can then target these gaps—such as the lack of access to fruits and vegetables, dairy, and lean meats in Iowa, to nutrient-rich (and fast-cooking) bean products in Uganda, and to vitamin A-rich sweet potato in Mozambique. The nutrient and food gaps could be identified using existing information or by conducting food consumption or dietary surveys, and more than one food could be targeted at one time if needed. Thus a targeted approach—ensuring that the specific nutrient or food meets the needs of the target population—can emerge within the broader framework of total diet quality.
3. **Create and capture value for nutrition.** A core characteristic of value chains is the attribution of value. In previous applications, value has typically represented some form of economic value (Box 2.2). However, although value-chain approaches to nutrition do need to consider economic value for actors in the chain—a necessary component of any value-chain approach—they should also consider the value for nutrition (that is, value in achieving nutrition goals). In other words, both economic value and value for nutrition should be identified and assessed. All the examples here suggest that increases in economic value for vulnerable value-chain actors can be associated with increased value for nutrition, even if this was not the project’s original intention (as in the case of the dairy value chain in Zambia).
4. **Be expansive in the search for solutions, but tailor to context.** One essential characteristic of value chains is the consideration of the whole chain—including across sectors and scale—and all aspects of the functioning of the chain. Indeed, the case studies illustrate the importance of considering different sectors and disciplines beyond agriculture and health, including education, research, processing, and both the public and private sectors. They also show that different aspects of chain functioning hold potential for solutions. From the case studies emerge five broad categories of actions to achieve nutrition goals:
 - information, awareness building, education, and behavior change communication—such as farmer training, communication and behavior change approaches, and tools to inform different actors along the value chain, including consumers (such as through health promotion and labeling);
 - research and technology—such as research into pre- and postharvest effects on nutrient quality or the adoption of productivity-enhancing inputs and cold-chain technology;
 - reorganization—such as the introduction of an aggregator, the formation of farmer groups and co-operatives, the shift by actors into different functions of the chain, the realigning of power relationships, and the introduction of new governance structures;
 - changes in costs, financial incentives, and investments—such as investments in technology and infrastructure; and
 - development of policies and standards—such as certification for food-safety standards, the adoption of food-quality standards by supermarkets, and changes in policies on procurement and pricing.

Although the search for solutions should take the whole value chain into account, the application of solutions should be tailored to circumstance. *A priori* assumptions about what solutions are needed—such as reorganizing a private competitive chain rather than developing a new institutional-based chain (or vice versa), or a technological rather than organizational response (or vice versa)—are not appropriate. Rather, the expansive approach seeks to identify what needs to be done in each particular circumstance.

5. **Focus on the functioning and coordination of the whole chain in order to create sustainable solutions.** Another essential value-chain concept is coordination. Indeed, a notable characteristic of the case studies was their focus on coordination of the chain—be it a chain dominated by a single private sector company working with farmers (as in the case of Hilina, Land O’Lakes, and Sysco) or multiple suppliers selling to more diverse markets (as in the case of OFSP in Mozambique and beans in Uganda) or to institutional markets (as in Iowa). In all cases, coordination was used to help increase supply and demand. Interventions were made at several points along the chain to enhance coordination of the whole chain, or a small number of actions were taken to fix the problem and create incentives for changes to be made elsewhere in the chain. The development of the dairy value chain in Zambia is a good example of actions throughout the chain at multiple points. In other cases, certain changes had more leverage than others: in the reorganization of the Sysco chain, for example, the simple act of rebranding local food created incentives for other changes. In the Hilina example, the focus was on changes in production alone. However, these changes had knock-on effects in other parts of the chain. The case studies also show that the coordination requires the development of alliances between the actors involved. This process brings challenges: as pointed out in the case of bean value-chain development in Uganda, the challenges of team building and coordination that spans the value chain are considerable.
6. **Add value not only for nutrition (and consumers), but also for other chain actors.** The coordination principle implies that value-chain solutions must also add value for other actors in the chain, since in a value-chain approach, solutions for nutrition that do not work for the rest of the value chain are not value-chain solutions. If, for example, nutrition is built into existing agricultural value-chain development projects, it should not be conducted as if nutrition is a problem to be solved by other actors. Rather, nutrition should become a solution to the problems faced by other sectors as well—thus adding value for all sectors.

It is also important to assess the potential to add value because leveraging agriculture to achieve nutritional goals may be more or less effective for different food commodities and different target groups. This assessment process can be conducted in the context of the type of upgrading that is being proposed or implemented for the agricultural sector (Box 2.3 and section 2.3.2).

7. **Take a broader view of adding value for producers and consumers.** In applications thus far, adding economic value for the producer is often synonymous with making the product more expensive for the consumer, thus creating a tension between higher prices desired by producers and the lower ones affordable for poor consumers. This is potentially one of the major limitations of value-chain approaches to nutrition (see section 3.4). Indeed, many of the products featured in the case studies are differentiated products (for example, biofortified sweet potato, bean flour, RUTFs, local fruits and vegetables), which may be more expensive than substitutes in their market context. However, the case studies show that if an intervention adopts a consumer-oriented notion of value, willingness to pay may actually increase as products offer new attributes (such as greater nutritional value or desirability), even among poor people, as suggested by the OFSP case study. Moreover, value-chain development does not necessarily have to imply the provision of a less affordable product. And as shown by the case of Iowa, affordability issues can be solved through coordination among value-chain actors. Recent studies also suggest that value can be added for producers without making the product less affordable for consumers. Examples include cases where producers receive a higher proportion of the price of a product for the same retail price or where value-chain activities mean that producers can meet a larger market or more effectively meet consumer demand for basic products (Ponte and Ewert 2009). The case of milk in Zambia—a basic, undifferentiated product—is a case in point.
8. **Focus on meeting, growing, and creating demand.** One of the core principles of value-chain development for agriculture is that agricultural producers should be linked to markets in which there is demand for their products. Applying value-chain concepts to nutrition should take a broad approach to demand by including unmet and uncreated demand from consumers, not just existing demand. Poor people, for instance, may have a latent demand for more diverse diets that include a variety of micronutrient-rich foods, but they may be unable to obtain these foods or they may find the nutritious foods available in the marketplace unacceptable. Thus, there is a need to focus on understanding the constraints to meeting demand and then leveraging the value chain to alleviate those constraints—as illustrated by

the Sysco value chain in the United States and the bean value-chain project in Uganda. In other cases, demand may need to be created. Indeed, most of the case studies in this paper used demand creation techniques, including product formulation (for example, value-added bean flour in Uganda), education and exposure (for example, in Iowa), branding and other marketing methods (for example, branding by Sysco and development of health promotion messages for OFSP), and changes in policy (for example, school procurement policy in Iowa). Expanding the market actually expands the possibilities for value-chain development for agriculture—with nutrition becoming a solution for the agricultural sector.

9. **Create a policy environment in which better nutrition is valued.** The case studies here are of specific projects involving some aspect of value-chain concepts and nutrition. Developing value chains for nutrition will be successful at a broader scale, however, only if the policy environment creates incentives for the actors in the chain to value nutrition and change their behavior accordingly. Policy changes in the 1980s—such as those on agriculture and food trade—changed the nature of food markets and altered the incentives for farmers and other chain actors concerning what, where, and how much they produced. Although these policies aimed to create a more market-oriented (and consumer-oriented) agricultural sector, it is not clear whether they produced nutritional benefits as such. Value-chain approaches to nutrition need to engage with these broader policies to create a framework in which all the chain actors have incentives to value nutrition and so lead to sustainable change.

5.2 Common terminology

The principles set out here imply a distinctive subdiscipline of value chains for nutrition. The distinctive nature of this subdiscipline suggests the need to define terms, especially in light of the wide variety of sometimes contested uses of the term “value chain” outside of the nutrition field. Table 5.1 presents nutrition-specific terms that are equivalents to the terms in Box 2.1.

For the first term, “value,” the equivalent term is “value for nutrition,” which is the value created or added in a value chain measured in nutritional or dietary terms. The second term, “value chain,” becomes, in the subdiscipline of value chains for nutrition, “nutrition-sensitive value chain” or “nutrition-enhanced value chain.” This is the desired outcome of the processes of “nutrition-sensitive value-chain analysis” and “value-chain development for enhanced nutrition.” Value-chain analysis can also be conducted to examine the implications of the value chain for nutrition.

5.3 Modes of application: Core opportunities for leveraging agriculture for nutrition

5.3.1 FIRST STEPS

What, then, should be the starting point for applying value-chain concepts to nutrition, especially in the context of leveraging agriculture for nutrition? There are evidently many different approaches and ways forward. In other fields, including agriculture, a wide array of analytical and practical tools have already been developed to support the application of value-chain approaches (see, for example, Webber and Labaste 2010; Tallec and Bockel 2005; Kaplinsky and Morris 2001; UNIDO 2009a; Herr and Muzira 2009; WEF 2009). The nascent nature of value chains for nutrition implies scope for developing a toolbox in the future as experience and interest emerge (for which these earlier tools could perhaps usefully provide a model). In the meantime, we suggest that the starting point is to identify different modes of application of value-chain approaches to nutrition—the context in which value-chain approaches to nutrition would apply in practice—each requiring some basic steps.

5.3.2 MODE I: BUILDING NUTRITION INTO EXISTING VALUE-CHAIN ANALYSES

Value-chain analysis is already being conducted in a number of fields. There is thus an opportunity to build nutrition into these existing analyses, as has been proposed in practical terms for gender (Gammage 2009). As illustrated by the supermarket case study in Indonesia, at the very least this would involve conducting (or identifying existing) surveys of the consumers served by the value chain to identify nutrition gaps and health issues. Ideally, consumption and the health effects of the specific foods being subject to analysis would be measured.

In the case of the Indonesia work, the task would be to determine whether the problems identified by the value-chain analysis for producers and consumers (if indeed there are any) could be addressed jointly. As highlighted in this example, the intention would be to identify policies and programs that would help both vulnerable producers and at-risk consumers.

Table 5.1—Value-chain concepts as applied to nutrition

Area of application	General term	Nutrition-specific term	Definition
Underlying concept	Value	Value for nutrition	The value created or added in a value chain measured in nutritional or dietary terms
Desired outcome	Value chain	Nutrition-sensitive value chain	A value chain that is sensitive to the nutritional needs of the actors within it and the consumers it supplies
		Nutrition-enhanced value chain	A value chain that has been deliberately leveraged to improve nutritional outcomes
Methods	Value-chain analysis	Nutritional implications of the value chain	A study that assesses the nutritional implications of an existing value chain; it may or may not involve a value-chain analysis that measures consumption of the products
		Nutrition-sensitive value-chain analysis	An analysis of any type of value chain that examines how nutrition is affected in the chain
	Value-chain approach	Value-chain development for enhanced nutrition	The process of intervening in a value chain to achieve nutritional goals

Source: Authors.

5.3.3 MODE 2: LEVERAGING VALUE-CHAIN DEVELOPMENT FOR AGRICULTURE FOR NUTRITION

The current international focus on value-chain development for agriculture provides an opportunity to examine how value chains can incorporate nutritional goals for the different actors involved as well as the consumers. The opportunity lies in the upgrading process, as explained in section 2.3.2 and Box 2.3. This agriculture-led but nutrition-sensitive approach is exemplified here by the dairy value-chain development project in Zambia and the Hilina and Sysco chains in Ethiopia and the United States. It involves the following basic steps:

1. Define the nutrition problem and the target nutrients in the community where the value-chain development project is being conducted, and define the nutrition goal.
2. Conduct a rapid appraisal to assess if the nutrition problem can be improved by the value-chain development project and the foods it covers. Then verify if the upgrading process for farmers could also be used to achieve nutrition goals, and in so doing transform the nutrition gap into a solution for the agricultural sector. Any trade-offs between the economic and nutritional benefits of the upgrading process would need to be balanced.
3. Identify and implement joint solutions to leverage the whole value chain.

5.3.4 MODE 3: STARTING WITH NUTRITION

In this nutrition-led approach—perhaps best illustrated by the OFSP case study in its objective to increase vitamin A intake and status—the following basic steps would be needed:

1. Define the nutrition problem, the target nutrients, and the nutrition goals.
2. Conduct a rapid appraisal to assess if the problem could be resolved through a value-chain analysis and solution.
3. Conduct a nutrition-sensitive value-chain analysis. For the foods selected, this analysis would involve the following steps: (1) map the actors and activities from farm to fork; (2) ascribe some form of economic and nutritional or dietary value to each actor and activity; (3) assess the constraints and opportunities in the organizational, financial, technological, policy/standards, and information/education aspects of the chain; and (4) assess the constraints and opportunities related to market demand (existing and unmet demand, ways of augmenting or creating demand) as they affect nutrition and the other actors in the chain.
4. Identify and implement a value-chain approach to leverage the whole value chain.

5.3.5 MODE 4: STARTING WITH AGRICULTURE AND NUTRITION

A fourth mode is to start with agriculture and nutrition jointly. This approach would begin with a gathering of the stakeholders in the two sectors, as well as any other relevant sectors. In this mode—well illustrated by the

Iowan and Ugandan bean case studies—the basic steps would be similar to those of Mode 3, except that the first step would involve defining the problem and setting the goals for the agricultural sector, as well as nutrition, in that particular context.

6. Conclusions

To date, the adaptation of value-chain concepts to nutrition has been minimal; only a few examples exist and none of these actually measure the nutritional impact of using a value-chain approach. Yet value-chain concepts offer considerable potential for enhancing efforts to improve nutrition. They also provide a framework within which opportunities for leveraging agriculture for nutrition can be identified and implemented.

The material presented in this paper suggests that the nascent field of value chains for nutrition should center on identifying and implementing interventions to develop value chains for enhanced nutrition and on identifying opportunities to do so. The interventions cannot be identified *a priori*; each value-chain problem will require its own set of approaches, which could involve anything from information and education, research and technology, chain reorganization, and changes in financial incentives to new policies and standards. Nonetheless, certain principles should be followed, especially the core value-chain concepts concerning coordination, the consideration of the whole chain, and the attribution of some form of value. All value chains inherently involve economic value—a value chain is not a value chain without this. And enhancing nutrition is part of human and economic welfare. However, value chains for nutrition must also identify the value to nutrition, as it is added, created, gained, and lost throughout the chain, as a separate, albeit interlinked, component. The value to the food consumer must also be fully incorporated in its various dimensions.

With a nutrition and health audience in mind, this paper has attempted to provide a primer on the various ways that value-chain concepts have been interpreted and applied, with an emphasis on food and international development. It is now the nutrition community's turn to seize the moment and work with colleagues in other sectors to develop and implement projects, policies, and programs to test the hypothesis ultimately arising from this paper—that it is possible to develop value chains to improve nutrition outcomes while also providing solutions to development challenges in other sectors, not least, in agriculture.

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