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Markets for Nutrient-rich Foods: Policy Synthesis from Three Country Studies

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Acronyms

ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ADDO	Accredited Drug Dispensing Outlet
ATA	Agricultural Transformation Agenda
BOP	bottom (or base) of the pyramid
CAADP	Comprehensive Africa Agriculture Development Programme
DFID	Department for International Development
FAO	Food and Agricultural Organization of the United Nations
GAIN	Global Alliance for Improved Nutrition
GHS	Ghana Health Service
GSS	Ghana Statistical Service
IDS	Institute of Development Studies
IFPRI	International Food Policy Research Institute
IHVN	Institute of Human Virology Nigeria
ILRI	International Livestock Research Institute
IU	International Unit
IYCN	Infant & Young Child Nutrition Project
KNBS	Kenya National Bureau of Statistics
KSh	Kenyan shilling
LNS	lipid-based nutrient supplement
LNS-P	preventative LNS
M4P	Making Markets Work for the Poor
MNP	micronutrient powder
NEPAD	New Partnership for Africa's Development
NGO	non-governmental organisation
OFSP	orange-fleshed sweet potato
ppm	parts per million
RUTF	ready-to-use therapeutic food
SSA	sub-Saharan Africa
SUN	Scaling up Nutrition
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization

Executive summary

This Evidence Report examines the potential for and limitations of promoting business and market-based approaches to reducing undernutrition through increasing the availability and accessibility of nutrient-rich foods for the undernourished. There is an increasing emphasis by development agencies on the benefits of involving the private sector in strategies to increase food production and consumption and tackle undernutrition. Recognising this trend, the report analyses the effectiveness of market-based approaches in meeting the challenge of micronutrient malnutrition through the provision of nutrient-rich foods to populations at risk of undernourishment. By examining how markets in particular countries operate in practice, the report identifies the situations where market-based approaches are likely to be successful in producing sustainable and effective reductions in undernutrition, and also where they are not. It identifies where there are potentially good returns to promoting markets and the private sector, and where these need to be complemented by alternative approaches in order to provide comprehensive access to nutrient-rich foods. It is based on work carried out in three countries in sub-Saharan Africa – Ghana, Nigeria and Tanzania – complemented by a review of the literature on food market nutrition.

A successful market-based approach to improving consumption of nutrient-rich foods among the undernourished requires business models that are not only sustainable from a business point of view, but also capable of providing undernourished populations with good quality foods that they are able and willing to purchase. There are two major obstacles to achieving this. The first is low incomes. Those most at risk of undernourishment have limited resources, and nutrient-rich foods tend to be relatively expensive. Nevertheless, rates of undernutrition (as indicated by levels of stunting) remain high even for households in the second, third and even fourth quintiles in a number of African countries, and so there may be direct benefits from market development even if it does not benefit the poorest. The second obstacle relates to market failures. The capacity of market-based approaches to achieve the desired results can be undermined by market shortcomings such as incomplete markets, lack of reliable information about food quality and high costs of distribution. While food businesses can frequently address these issues, doing so usually involves incurring extra costs, which exacerbates the income problem.

Using a modified version of the access to healthcare framework, the report considers how different food-based approaches tackle the problems of nutrient quality, geographical accessibility, food acceptability and financial accessibility. It considers these issues from the perspective of potential consumers and considers the implications of these challenges for business sustainability. These factors then explain the extent to which food-based initiatives are likely to benefit those most in need of improved diets.

This framework is used to assess the effectiveness of two food-based strategies. The first is mandatory fortification of staple products. Mandatory fortification uses the force of law to make the addition of micronutrients compulsory in certain products – typically widely-used products such as flour, cooking oil and salt. Mandatory fortification has the potential to address some of the market failures that are characteristic of food markets. However, it is subject to two shortcomings. The first is the extent to which mandated levels of fortification are achieved in practice, which relates both to the capacity of businesses to fortify products consistently and the capacity of regulatory agencies to enforce legal requirements. The second challenge relates to the purchasing habits of the poor. The poorest consumers, and particularly those in rural areas, may rely to only a very limited extent on purchases of products that are most easily incorporated into mandatory fortification programmes – widely-used products produced by large food processing companies. The poorest may buy few of

these products and may prefer to purchase low-cost substitute products that do not fall within the scope of mandatory fortification programmes.

The second food strategy covered in the three country studies is the promotion of fortified foods offered to consumers in contested markets. Complementary foods for infants are one example of such foods. Selling nutrient-rich, processed foods in such markets encounters many of the challenges associated with bottom of the pyramid strategies. Distribution costs tend to be high, and markets characterised by false claims and fraudulent products. For consumers, the benefits of many nutrient-rich foods are impossible to assess either at the point of purchase or through consumption. They are what economists call credence goods, and this difficulty in identifying nutritional value creates opportunities for markets to function in ways that harm not only consumers, but also businesses trying to sell good quality products. The businesses, promoting credible brands and convincing consumers of both the benefits of consuming the product and the truthfulness of claims made about its characteristics adds costs and undermines affordability. These problems are not uniform. The analysis of the literature on marketing of complementary foods for infants showed that the market challenges were significantly lower in urban areas than in rural.

These findings provide guidance for where and how to promote market-based approaches to reducing micronutrient undernutrition. First, there is clearly a substantial difference between the potential for market-based interventions in urban and rural areas. Urban consumers have higher incomes and more familiarity with the purchase of processed foods. At the same time, the costs for businesses of supplying these urban markets are lower. Market-based approaches are more likely to be effective in urban areas.

Second, increasing the viability of market-based strategies targeted at rural areas will involve initiatives such as cross-subsidisation of urban and rural, or high- and low-income consumers, the use of social enterprises to target priority groups and government support for, or involvement in, distribution to more isolated areas and to the poorest. Even well-functioning markets will not be able to address all of the problems of undernutrition, and market-based strategies must be complemented by strategies more directly focused on the poorest. To the extent that this means partnerships between private actors of various sorts (formal and informal sector businesses, social businesses as well as for-profit businesses) and a range of non-private actors (including non-governmental organisations, communities and government) clarity is required about the basis on which such collaborations should be structured and the specific objectives that they are expected to meet.

Third, food markets need to be regulated. This not only protects consumers, but also enables good businesses not to be driven by bad. Nevertheless, food markets are difficult to regulate and state capacities limited. While the many existing efforts to improve state regulatory capacity for food should continue, it is also worth investigating whether there are alternatives. These might include community regulation as well as private sector-based strategies such as private certification schemes or franchising models which might provide an additional way of tackling these issues. There may be lessons to be learned from experiences in other sectors, such as health provision, about the potential for non-public approaches to regulation.

Fourth, many of the challenges encountered in markets for nutrient-rich foods lie outside the arena of market transactions. Instead, they arise in the areas of norms, laws and regulation, or in the areas of support services and infrastructure. In other words, the challenges that businesses face in developing viable business models for products that might reduce undernutrition among the poor relate to institutions and services that are needed to make markets operate, rather than the core business transactions of markets. This implies that a narrow value chain approach to market development will not identify and resolve key challenges to market development because it is not designed to analyse the broader market context. Therefore, greater use of market systems approaches is advisable.

Fifth, much of the focus of development agencies and public interventions around nutrient-rich products for the poor has focused on formal sector businesses and food processing. In many cases food processing companies manufacture products centrally and then face high distribution costs when moving them to areas distant from the point of production. In contrast, informal sector provision of food has the advantages of low cost and proximity to consumers. Poor people already purchase many products from informal sector businesses. These advantages, however, are offset by lack of consistency in nutrition quality and in some cases (but not all) food safety issues. More work needs to be done in identifying how these problems can be mitigated and the potential of informal sector food companies (producers and traders) to increase the accessibility of the poor to safe, nutrient-rich foods.

Markets are part of the solution for micronutrient undernutrition, but it is important to identify, first, the circumstances in which they are likely to succeed and the population groups that are most likely to benefit. Even well-functioning markets will not be able to meet all the needs of the poorest, and a comprehensive nutrition strategy will combine market and non-market approaches. Within such a strategy, it is important to complement the focus on private sector actors with a better understanding of the role of public agents in providing the framework within which markets can operate more effectively, providing incentives for businesses to target priority population groups and supplying the resources and capacity to intervene at particular points in nutrition value chains where incentives for businesses are weak and the effectiveness of market-based approaches limited.

1 Introduction

There has been increasing emphasis recently on the potential for businesses to contribute to reducing undernutrition by selling nutrient-rich foods to poor households. Enthusiasm for promoting an increased role for the private sector in reducing undernutrition has been expressed by leading donor agencies such as the United States Agency for International Development (USAID) and the Department for International Development (DFID). Private sector involvement could range from agricultural investments that increase the supply of food through to initiatives that aim to increase the accessibility of foods for poor and undernourished populations. This report focuses on the latter issue. Based on research into food value chains, food policies and food businesses in three African countries – Ghana, Nigeria and Tanzania – and complemented by an examination of the literature on food markets on food businesses in sub-Saharan Africa, it poses questions relating to the effectiveness of market-based approaches.

Evaluating the potential for market-based approaches requires an understanding of how food markets operate and how they serve different population groups. A range of initiatives will be required to meet differing nutritional needs and differing capacities to engage with food markets. In this context, the critical question to be asked is not about whether food markets 'work' or 'do not work' for the poor, but rather which types of approaches to promoting markets for nutrient-rich foods appear to be more or less effective in meeting the demands of particular categories of undernourished populations, and how to improve the effectiveness of these markets. What constitutes 'working' will be discussed in Section 4, but at present, the key questions are:

1. What are the circumstances in which market-based interventions are most likely to produce effective and sustainable reductions in undernutrition, and where are such interventions less likely to be successful?
2. Where do households with members at risk of nutrient deficiency tend to purchase their foods, and how can functioning of these markets be improved?
3. What is required to extend the reach of market-based solutions so that they benefit larger numbers of undernourished people?
4. How important are the income constraints on households in limiting the ability of markets to supply sufficient food to reduce undernutrition?
5. How can public action improve the functioning of markets for nutrient-rich foods so that they meet nutritional needs more effectively and benefit greater numbers of undernourished people?
6. If purely private and profit-driven initiatives to produce and sell nutrient-rich foods frequently encounter difficult challenges, where might public–private partnerships and the activities of social enterprises provide more effective market-based initiatives?

This means understanding how markets function in practice and how businesses (large and small, formal and informal) and collaborations between public and private actors might improve the *effectiveness* of market-based approaches for reducing micronutrient deficiencies. Effectiveness is not the same as efficacy. Suchdev *et al.* (2012: 1223–24) observe that 'numerous efficacy trials… have demonstrated that MNP [micronutrient powder] use is associated with a significant reduction in the incidence of anaemia… However, the effectiveness of MNP programmes in real-world settings has rarely been assessed'. The effectiveness of market-based approaches is the central concern of this report.

The next section of this report outlines expectations with respect to the contributions of business to reducing undernutrition. Section 3 describes the research work carried out on

nutrition businesses and markets for nutrient-rich foods in Ghana, Nigeria and Tanzania. Section 4 provides a conceptual framework for analysing markets. It introduces a conceptual framework on barriers to access taken from the health sector and applies it to food and nutrition. Section 5 examines the specific challenges facing food-based strategies that were encountered in the studies undertaken in Ghana, Nigeria and Tanzania: mandatory fortification and fortified products sold in contested markets. Section 6 draws more general lessons from the studies of the three countries, arguing that in the context of heterogeneity in the nutrition challenges facing different population groups and the way in which markets operate across urban and rural areas and for households with differing income levels, a range of food market initiatives need to be developed that will provide partial and imperfect solutions to the challenge of micronutrient deficiencies. Section 7 draws conclusions.

2 Food, businesses and undernutrition

Human nutrition is now recognised as a central and persistent challenge for global development, and within the broad area of nutrition increasing attention is being given to chronic micronutrient deficiencies (see Box 2.1). This reflects not only the massive scale of these deficiencies, which affect one quarter of all children under five (De Onis, Blössner and Borghi 2012), and contribute to one in three child deaths (UN Inter-Agency Group for Child Mortality Estimation 2011), but also the slowness with which micronutrient undernutrition levels have been falling.

Box 2.1 Hidden hunger

Hidden hunger, also known as micronutrient deficiencies, afflicts more than 2 billion individuals, or one in three people, globally (FAO 2013). Its effects can be devastating, leading to mental impairment, poor health, low productivity, and even death. Its adverse effects on child health and survival are particularly acute, especially within the first 1,000 days of a child's life, from conception to the age of two, resulting in serious physical and cognitive consequences. Even mild to moderate deficiencies can affect a person's wellbeing and development. In addition to affecting human health, hidden hunger can curtail socioeconomic development, particularly in low- and middle-income countries (Welthungerhilfe, IFPRI and Concern Worldwide 2014: 21).

There are various strategies for addressing this issue. Undoubtedly, nutrition-specific interventions such as vitamin supplementation, improvements in health care for women and young children and better caring practices for infants will play a very substantial role in tackling undernutrition. The evidence shows that a range of low-cost initiatives should lead to considerable improvements in nutrition outcomes (Bhutta *et al.* 2013). Equally, however, it has been argued that nutrition-sensitive interventions in sectors such as agriculture also have a role to play (Ruel, Alderman and The Maternal and Child Nutrition Study Group 2013), and some organisations have argued strongly that improvements in food and diets are essential for achieving sustainable and affordable reductions in undernutrition. The Food and Agricultural Organization (FAO) has argued that:

> Nutritional outcomes depend on many factors, but food systems and the policies and institutions that shape them are a fundamental part of the equation. A common denominator across all types of malnutrition is the appropriateness of the diets consumed. At the most basic level, food systems determine the quantity, quality, diversity and nutritional content of the foods available for consumption.
> (FAO 2013: 6)

There are many food-based approaches. A large number of agriculture-based initiatives are tackling this problem through increasing the production of nutrient-rich foods by poor farm households and by encouraging consumption of at least some of this production on-farm (see, for example, Le Cuziat and Mattinen 2011). We refer to these as pre-farmgate strategies. Nevertheless, many poor households secure all or part of the food they consume through markets. The need to purchase food in markets is obvious for the cases of the urban poor and rural non-farm households. Such households clearly depend on markets for securing household food supplies. Less obvious, but equally important, is the fact that many farm households purchase foods to supplement their own production for some or all of the year. The crops they grow will be insufficient to meet the full range of their food needs for some or all of the year. Some categories of food are predominantly purchased through market channels. Studies in urban Ghana and rural Kenya have found that foods essential

for the feeding of infants (either ready-prepared foods or the ingredients for home preparation) and young children depend substantially on market purchases (Pelto and Armar-Klemesu 2011; Pelto 2013).

It follows that a better understanding of food markets and what happens beyond the farmgate would be an important contributor to defining effective post-farmgate strategies for reducing undernutrition. Unfortunately, knowledge in this field is limited. While there is some agreement on the components of a healthy diet and the fundamentals of good household nutrition (Hawkesworth *et al.* 2010; IYCN 2011), and while there is good knowledge of the foods that would constitute a healthy diet, backed up by extensive efficacy trials that indicate which foods and in what quantities are likely to reduce undernutrition, knowledge about the capacity of businesses (of all types and sizes) to deliver these foods in ways that both enable and encourage consumption and meet nutritional requirements is far less extensive.

There are a broad range of initiatives involving businesses and the production and marketing of nutrient-rich foods. These range from the widely promoted collaborations between food processors and governments for the fortification with micronutrients of foods such as flour and cooking oil, to initiatives such as Grameen Danone Foods. Some studies of the evidence in this area are optimistic about how businesses can contribute. A recent study of 141 private sector food initiatives came to the conclusion that:

> From the wide range of the cases studied, whether in depth… or as reviewed from the database, the evidence has emerged that companies can develop a value proposition that both promotes financial sustainability and facilitates better access to food and improved nutrition.
> (Chevrollier *et al.* 2012: 48)

Both DFID's 2011 position paper on undernutrition and USAID's Feed the Future programme have argued in favour of mobilising greater private sector involvement in development initiatives around food and agriculture:

> We believe the private sector has a much greater role to play in tackling undernutrition through the food they produce, their ability to reach people in remote areas and their communications, marketing and distribution capacity.
> (DFID 2011: 23)

> The private sector brings necessary financial resources, human capital, technological resources and intellectual property, market access, cutting-edge business practices, in-country networks, and other expertise related to food security.
> (USAID 2010: 6)

Businesses, business associations and business leaders have also proposed a wide range of ways in which they might contribute. A presentation by David Yach, Senior Vice President of Global Health and Agricultural Policy at PepsiCo listed eight ways in which large food companies could help reduce worldwide undernutrition, including investment in agriculture, support for fortification programmes, complementary feeding initiatives, new business models, low-cost nutritious foods and advocacy for nutrition-friendly trade policies (Yach 2011). The nutrition initiatives listed on the Business Call to Action website[1] include micronutrient sprinkles and powders, provision of safe and affordable water, support for small farmers, micro-irrigation, hygiene products and fortified products for children.

In spite of this optimism, the ability of food businesses to successfully target those at risk of micronutrient undernutrition with products that contain the types and levels of vitamins and

[1] www.businesscalltoaction.org/?s=nutrition (accessed 4 November 2015).

minerals that would reduce levels of micronutrient deficiencies is far from clear. There are some striking successes (for example, the large reductions in iodine deficiencies following salt iodisation in South Asia, as shown in the case of Pakistan in Masuood and Janjua 2013), but also many cases where initiatives failed to provide foods that were affordable, easily purchasable and easy to prepare. As will be discussed further in Section 4, markets for nutrient-rich foods have the characteristics of base of the pyramid (BOP) markets, along with some additional nutrition-specific challenges. In the course of examining food businesses and food markets in the African countries (described in more detail in Section 3), a wide variety of ways in which different types of foods might reach undernourished consumers were found. Equally, a variety of problems that businesses confront when trying to market nutrient-rich foods were also encountered. Food producers, food products, food consumers and food markets are extremely heterogeneous. As is noted by the FAO, 'there is no single food system but rather a multiplicity of systems with characteristics that vary, for example, with incomes, livelihoods and urbanisation. Even these multiple systems are in the process of constant change' (FAO 2013: 6). There is no one-size-fits-all solution.

3 Studies in sub-Saharan Africa

This report is based on work carried out in three countries in sub-Saharan Africa – Ghana, Nigeria and Tanzania. Undernutrition is a serious problem in all three countries, although there are considerable variations across regions (greater, for example in the northern parts of both Nigeria and Ghana than in the south), between urban and rural areas and between richer and poorer households. Levels of stunting continue to be high, particularly in Nigeria and Tanzania, and they have fallen slowly over the past two decades. Similarly, particular vitamin and mineral deficiencies are widespread across all three countries, particularly deficiencies in iron and vitamin A, with their associated consequences for health and development.

It is clear that undernutrition is, at one level, a broad problem that affects many parts of the population. The level of stunting among young children in Tanzania is 42 per cent, which means that it is not only the children in the poorest households that are affected. Similarly, levels of anaemia are high across the three countries, both for children and pregnant women. While it is certainly the case that undernutrition and micronutrient deficiencies are most severe for the social groups that have lower incomes and poor access to food, levels of undernutrition remain high even among higher-income groups and in urban areas.

At the same time, undernutrition and deficiencies in food intake[2] can be seen as a set of problems, not a single one. Just as there are a multiplicity of food systems, there are also a multiplicity of nutritional deficiencies that might be addressed through different food-based strategies. At the same time, particular population groups have more to lose from nutritional deficiencies because these deficiencies matter more at different times of people's lives. This is the logic of focusing on the 1,000 day window.[3] Therefore, it is best to consider undernutrition and the role of food-based approaches in reducing it in terms of differentiated problems and differing strategies that might address them. This issue is taken up further in Section 4.

In each country, the first step in the analysis was to consider the potential for linking agriculture to nutrition more effectively by considering a range of potential crops that might improve the nutritional status of low-income households and to analyse the value chains that linked production to consumption. Local researchers familiar with markets for nutrient-rich foods in each of the three countries were contracted to carry out this research. The choice of which products to consider in each country was made through a consultation with key informants about product potential based on a scoping exercise that identified particular crops and products that offered a high potential for reducing undernutrition (as described in Anim-Somuah *et al.* 2013a: 20–22). The products chosen through this process were as follows:

- **Ghana.** Groundnuts and complementary foods for infants (Anim-Somuah *et al.* 2013a).
- **Nigeria.** Cowpeas, soya and complementary foods for infants (Robinson *et al.* 2014b).
- **Tanzania.** Cowpeas, orange-fleshed sweet potato (OFSP) and complementary foods for infants (Temu *et al.* 2014; Waized *et al.* 2015).

[2] As has been noted before, undernutrition is the result of multiple factors, with food being just one element.
[3] The '1,000 day' window refers to the period from conception through to two years of age. This is the period in which micronutrient deficiencies (of the mother or child) have the most severe and long-lasting effects on health and development.

The decision to focus on complementary foods across all three countries was based on the fact that markets are particularly complex for complementary foods (as will be discussed in Section 5.2) and the importance of the nutrition content of complementary foods in preventing substantial and damaging nutrient deficiencies in the period from 6 to 24 months old (as discussed, for example, in Amagloh *et al.* 2012).

The second stage of work consisted of an overview of policy options in each of the three countries (Anim-Somuah *et al.* 2013b; Robinson *et al.* 2014a; Robinson *et al.* 2014c). This drew on the value chain studies but also looked more broadly at markets, the policy framework within which markets operate and the nutrition challenges across the three countries. This analysis considered not only food value chains but also more general questions relating to food-based strategies to improve nutrition, including compulsory fortification, voluntary fortification and public distribution programmes. Finally, case studies of the activities of particular businesses were carried out in Nigeria (Nwuneli *et al.* 2014) and Tanzania (Maestre *et al.* 2014). These focused on domestically-owned businesses. In Nigeria, two companies, Dala Foods and Lisabi Mills, were studied. These sold some fortified products in the domestic market (in the northern part and the southern part of Nigeria respectively). In Tanzania, the analysis focused on one business, Power Foods/Power Flour, which produced fortified food products for sale in the domestic market and also a ready-to-use therapeutic food sold to aid agencies (Maestre *et al.* 2014: 7–8).

This work encountered a broad range of food types (different ways of incorporating nutrients into food products) and delivery models. These included mandatory fortification of staple foods, the sale of fortified products in contested markets, the production and sale of biofortified products (rice, maize, sweet potato, etc.)[4] and markets for naturally nutrient-rich foods – which include not only fresh fruit and vegetables, meat and dairy products, but also products such as soya and cowpeas that can provide important vitamins and minerals for diets.

For this analysis, attention is focused on the first two categories: mandatory fortification and fortified products sold in contested markets (including complementary foods for infants). This does not represent any judgement as to the importance or value of these particular food-based approaches. It is a reflection of (1) the extent of the material available from the three countries on these approaches, (2) the richness of the literature on these approaches, and (3) the insights generated with respect to the effectiveness of food-based approaches in general through the analysis of these two approaches.

Mandatory fortification 'is the practice of deliberately increasing the content of an essential micronutrient, i.e. vitamins and minerals (including trace elements) in a food, so as to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health' (Allen *et al.* 2006: xxvii). Mandatory fortification programmes make the addition of fortificants to certain products legally compulsory. Typical examples include iron and vitamin A added to staple foods such as cooking oil and flour.

There are also products whose nutritional content is enhanced by the addition of vitamins and minerals that are sold in contested markets and/or distributed through non-profit or public channels. The studies in the three countries found various examples of foods that were fortified and then offered to consumers in contested markets. These included biscuits, mixes for adding to porridges, fortified porridges and flours (Maestre *et al.* 2014; Nwuneli *et al.* 2014). Included in this category, and given special attention, were complementary foods for infants. Infants in the age range from 6 to 24 months old make a transition from breastmilk to solid foods and during this transition children's developmental progress may

[4] The nutrient content of staple products (rice, maize, sweet potato, etc.) can be increased through plant breeding or agronomic approaches in order to 'increase concentrations of key nutrients in staple food crops' (Miller and Welch 2013: 119). Orange-fleshed sweet potato and quality protein maize are examples of biofortified products created through plant breeding.

deteriorate rapidly (as discussed by Amagloh *et al.* 2012 and Menon 2012). There are many ways of preparing these foods (both commercially and at home) and many products are available for low-income households.

The study of these food categories provides a detailed analysis of the value chain challenges facing the production and distribution of particular types of nutrient-rich foods, an overview of the broad policy context which shapes food markets and within which food businesses operate, and an understanding of how particular businesses responded to the opportunities and challenges that they faced.

4 Conceptual framework

There is a general consensus that global and national efforts are needed to alter food systems in order to reduce undernutrition, and this includes a central role for food markets and the private sector. However, the extremely high rates of chronic undernutrition and micronutrient deficiencies experienced in many countries make it abundantly clear that markets are currently failing to provide adequate nutrition for substantial portions of the population – particularly low-income groups. The problem is not a lack of products – country studies, together with associated literature reviews,[5] identified a number of nutrient-rich foods available in each of the countries studied. However, these nutrient-rich foods were generally marketed to more affluent consumers. Products that could improve the nutritional position of low-income households are frequently too expensive for them to purchase with any regularity.

A market-based approach to improving consumption of nutrient-rich foods among the undernourished has to meet two requirements. The first is that the business models that might deliver such foods have to be sustainable – capable of delivering incentives and returns to the businesses involved. This point will be discussed further. The second is that food markets will only succeed in increasing consumption of nutrient-rich foods if they sell food that has good nutritional value (quality) and is presented to potential purchasers in ways that make it likely that they will purchase and consume it (access). The questions of quality and access have been discussed extensively in health-care provision, and the issues raised are pertinent to nutrition. Peters *et al.* (2008) provided a summary of the issue of access to health care and barriers to access. The Peters *et al*. model (Table 4.1) identifies four dimensions of access, with quality added as a central element because 'it is an important component of each dimension and is ultimately related to the technical ability of health services to affect people's health' (Peters *et al.* 2008: 162).

Table 4.1 Conceptual framework for assessing access to health care

Dimensions of access	Demand element	Supply element
Geographic accessibility	Location of user	Location of service
Availability	Right type of care for those that need it	Appropriate type of service providers
Financial accessibility	Willingness and ability to pay	Price of services
Acceptability	Social and cultural expectations of communities	Responsiveness of providers to community expectations

Source: Adapted from Peters *et al.* (2008: 162).

The four dimensions are listed in Table 4.1, each with both a demand element, relating to users of health services, and supply elements that relate to service provision. This approach suggests that when there are mismatches between what is required by consumers, purchasers or users of health-care services and the services that are provided across one or more of the four dimensions, then the health system will provide less than effective health care. These mismatches may arise because of a gap between (1) where the services are

[5] See, for example, Hawkes, Turner and Waage (2012); Koh, Hegde and Karamchandani (2014); Hystra (2014) and Suchdev *et al.* (2010, 2012).

provided and where potential users are located (geographical accessibility), (2) the type of service/care needed and the type offered (availability), (3) the price of the service and the willingness/ability to pay,[6] and (4) the appropriateness of the service to the particular social and cultural context within which it is offered (acceptability).

Buried within this table are some more complex challenges related to markets. In particular, financial accessibility is not presented simply as a question of ability to pay. The concept is extended to include the idea of willingness to pay, and this raises issues about how much consumers value particular services offered by health providers. In order to be willing to pay, the consumer/user must believe that they have a problem that needs resolving and that the proposed service is both relevant to this problem and of sufficient quality to resolve it. These issues are quite challenging in the health sector because of what economists refer to as 'information asymmetries' – situations in which either the buyer or the seller can take advantage of knowledge that the other party to the transaction may not have. In health provision the patient may neither know fully what the problem is nor be able to judge whether the treatment selected by the health-care provider is appropriate and cost-effective. As a result, patients have, to some extent, to trust the provider.

Economists have a framework for describing this type of challenge. Products whose characteristics are easy to judge at the time of purchase are known as 'search goods'. In contrast to this, some characteristics can only be judged by consuming them (for example, the tastiness of a particular food). Such products are referred to as 'experience goods'. The characteristics of a third category of product, however, cannot even be judged after consumption. For example, no amount of consumption will enable the purchaser to know whether or not a product that claims to have been produced in an environmentally friendly manner has actually been produced in this way. Such goods are known as 'credence goods'. Consumers are left with the choice of either believing or not believing the claims that are made, and there may be a range of ways in which they come to a judgement on this (for example, brand reputation, recommendations of expert people or organisations, the opinions of friends or relatives, certification by independent bodies, etc.). As will be shown below, some nutrient-rich foods have the characteristics of credence goods.

Hawkes and Ruel (2012) use a modified version of the access framework presented above in their discussion of food value chains and nutrition. They took nutritional quality as a central requirement and then examined the issues of food availability, affordability and acceptability. The Hawkes and Ruel model differs from the approach of Peters *et al.* (2008) in two important respects. First, the 'availability' dimension in Table 4.1 is not included.[7] Second, they do not distinguish between the demand and supply sides of the market.

An application of this model to nutrition is provided in Table 4.2. This follows Peters *et al*. (2008), but excludes the 'availability' dimension. Given that the concern here is business provision and business sustainability, the table considers the demand side in terms of the factors that influence decisions to purchase foods by particular members of households,[8] and the 'supply side' is reworked to consider the challenges posed for businesses by the need to meet these demand-side requirements. If some of the purchaser requirements and business sustainability criteria are not met, then the market for food will not work well. To the extent that they are met, then market-based solutions for increasing accessibility of food should be viable.

[6] The Peters *et al.* analysis refers to the charging of user fees for public services rather than private provision.
[7] Hawkes and Ruel refer to food availability, but this is used to denote what Peters *et al.* define as geographical accessibility.
[8] The purchasers of food for households need not be the people that consume it. Who purchases food for the household and how they interpret nutritional needs within it may have an important impact on what food is purchased and by whom it is consumed.

Table 4.2 Aligning market objectives and development objectives for nutrition

Preconditions for improving nutrition		Business model challenges
1.	**Provide nutritional value.** Food must contain key micronutrients that address deficiencies in the population, and these must be maintained throughout the value chain. It must also be safe to eat.	**Maintaining nutrient content.** Designing a product with sufficient nutritional value and then ensuring that this value is maintained through processing, storage and distribution. Achieving the right level of nutrients and safety may create problems if good quality, safe products are not readily available on the market.
2.	**Targeting and coverage.** Foods must reach the populations most at risk of micronutrient deficiencies, and must be eaten in the right quantities, and nutrients must be absorbed into the body. The most important groups to target are pregnant and lactating women and children under the age of two, often known as the 1,000 days' group.	**The costs of targeting.** It may be difficult for businesses to target particular groups, and to the extent that effective targeting reduces potential demand, it may also reduce economies of scale in production and distribution.
3.	**Geographical accessibility.** Low-income purchasers cannot travel far to make regular food purchases. Sales points must be located close to where they live.	**The distribution challenge.** Food must be distributed to the places where the poor can obtain it without undue difficulty. Distribution is a major cost, and particularly challenging in rural areas.
4.	**Acceptability.** Products must also meet consumer preferences for taste, texture, packaging and food preparation time, as well as cultural norms.	**Uncertainty and innovation.** Meeting consumer expectations with respect to food is a complex challenge. For businesses, this means that there are considerable risks involved in introducing new products or opening up new markets because there is uncertainty about how consumers will respond. Second movers[9] may profit from the experiences of the first movers, and this can lead to underinvestment in innovation.
5.	**Financial accessibility.** Potential purchasers must: • value good nutrition and health • recognise the nutritional benefits of the food • believe that the particular food being purchased possesses these benefits, and • be able to pay for it. Food purchases compete with other uses of scarce incomes, and how consumers recognise and value nutrition affects their views on affordability. As a result, consumers must believe claims made about the benefits of products, especially when nutrient-rich products are more expensive.	**Affordability.** Foods must be sold at prices that enable regular purchases. **Push goods.** Nutrition is a 'push good': consumers are unaware of the values it provides. It has to be 'pushed', and a single business can rarely capture the value of investments made to raise awareness. **Product differentiation and fraud.** Nutrient quality is, to a substantial extent, a credence characteristic. This information problem makes it easy for false claims to be made about food, and businesses investing in nutrition run the risk of false claims by competitors, imitations and fakes. These undermine incentives for legitimate producers and marketers. Businesses need to find ways to convince consumers that claims about their products are true and to distinguish their products from inferior or fraudulent copies.

Source: Authors' own.

[9] The first mover is the organisation that takes the first steps to initiate change. Second movers follow later, sometimes imitating first movers, but also having the opportunity to benefit from the first mover's mistakes and learn from its experience.

The left-hand column of Table 4.2 shows key conditions that must be met in order to improve nutrition (the development objective), while the right-hand column displays the challenges these pose for creating sustainable business models. The first two preconditions for improving nutrition in the table are overarching requirements that would be required for any food-based approach to improving nutritional status, whether through markets or through other means. First, the food consumed has to possess particular nutrients whose quality must be maintained up to and including the point of consumption, and the quantities consumed must be sufficient to provide nutritional benefit.[10] Efficacy trials, which test whether particular foods can contribute to reducing levels of nutrient deficiency, are designed to study what happens if particular foods whose quality is assured are consumed at certain specified volumes.

Second, nutrient-rich foods have to be targeted at the undernourished if they are to reduce levels of nutrient deficiency. The targeting issue is a complex one and must be considered carefully. In particular:

- Nutrition specialists have highlighted the severe and long-term damage caused by undernutrition in early life, emphasising not only nutrition for infants under the age of two, but also the nutrition status of women before they become pregnant and when they are pregnant or breastfeeding. Nutrient deficiencies among these groups have substantial impacts on child development, with the implication that the greatest gains from improving nutrition arise from focusing on these groups. This is the logic behind the emphasis on the '1,000 days', and this suggests quite narrow targeting of the most at-risk groups. School feeding programmes and nutrient-rich products targeted at quite narrowly defined population groups would not be a priority.
- However, it is also the case that levels of undernutrition, as measured by stunting, are extremely high in some countries of sub-Saharan Africa, and still substantial even in high-income households, as shown in Table 4.3. In the third quintile, only Ghana has a stunting rate below 30 per cent, and even in the fourth quintile, stunting rates are over 30 per cent in Nigeria and Tanzania. This implies that there is a need for nutrition interventions (food-based or not) that target a very broad range of households, including those that would certainly not be classified among the poorest. As Segrè *et al.* (2013: 1) have observed for the case of Ethiopia, 'While international programmes have understandably been focused on resource-poor families, there is clearly a need for better nutrition among the middle- and upper-wealth segments of the population as well'.
- It is also clear that even the poorest of these households will buy some food in markets – the poorest households spend a high proportion of their incomes on food – and these markets need to work better if they are to enable the poor to purchase the foods that they need to reduce undernutrition.
- Finally, it is clear that because the gap between the level of household income and the costs of purchasing a nutritionally adequate diet faced by many households is substantial, market-based approaches will have limitations.

For these reasons, it becomes important to understand how markets work for these populations, how they can be made to work better for them, and when other approaches to increasing either access to food or availability of nutrients will be necessary.

[10] In fact, nutritionists would extend this consideration to uptake of nutrients into the body. Dietary factors – such as eating starchy foods with high levels of phytates – and health conditions – such as chronic, low-level infections – can severely reduce the body's capacity to absorb micronutrients in foods. This report stops at the point of consumption.

Table 4.3 Proportion of children under five years classified as stunted in four sub-Saharan African (SSA) countries by household wealth quintiles (%)

Quintiles	Ghana	Kenya	Nigeria	Tanzania
Bottom quintile	35.1	44.4	52.1	48.4
Second quintile	34.1	39.2	49.0	45.1
Third quintile	28.3	34.4	41.8	44.3
Fourth quintile	21.4	29.1	33.6	39.2
Top quintile	14.4	24.5	24.2	26.3

Source: National Demographic Health surveys: (Ghana Statistical Service *et al.* 2009; Kenya National Bureau of Statistics and ICF Macro 2010; National Population Commission and ICF Macro 2009; National Bureau of Statistics and ICF Macro 2011).

The next three preconditions for effective food-based nutrition interventions listed in Table 4.2 are specific to approaches that require people to pay for particular food products, and they correspond to the categories put forward by the analysis of barriers to access to health care. The third precondition is that food must be available close to where people live in order for purchases to be made without undue cost or inconvenience. Fourth, products must be acceptable to consumers, which means satisfying a complex range of requirements. Foods may have unfamiliar or unpleasant textures or tastes – particularly if they have been modified in some way. Foods also have cultural and social significance.[11]

The last precondition from the consumption perspective is financial accessibility, which requires a more extensive discussion. This issue is often presented in terms of affordability. Are low-income households prevented from making regular purchases of nutrient-rich foods because of budgetary limitations? This happens. Studies have shown that poor households spend large amounts of their total available income on food, and that purchasing a diet adequate in macro- and micronutrients would exceed household income.[12]

However, financial accessibility includes two further elements. Many low-income households have some discretion over what they purchase, and the willingness to choose one product over another partly depends both on how product characteristics are valued and how particular food products are assessed in terms of the credibility of the claims they make. The first element relates to nutritional awareness and the relationship between foods and health in general. Do households believe that particular foods are important for health and therefore worth purchasing, even if they are a little more expensive than other foods? But even if households do recognise the case for purchasing nutrient-rich foods, they still have to believe that particular products on offer possess the benefits that they claim. As food nutrition quality may be a credence characteristic that can be judged, at best, imperfectly by inspection or consumption, market failures may arise due to the asymmetry of information between provider and buyer and the scope this offers for mislabelling and false claims, low-quality imitations of good products, and fake products.

These five preconditions for effective, market-based interventions must be met by businesses operating in the market if improved nutrition is to be the outcome, and yet they pose serious challenges for businesses. These challenges are set out in the right-hand column of Table 4.2. Many of these business challenges are not unique to nutrition. They are typical ‘bottom of the pyramid’ challenges that face businesses selling products targeted at

[11] For example, one obstacle to the spread of orange-fleshed sweet potato (OFSP) in some sub-Saharan African countries is the fact that it is a food associated with hunger or famine or poverty.
[12] A study by the World Food Programme of food markets in Mozambique (2011), for example, found that the incomes of 80 per cent of households were insufficient to purchase what was calculated as the ‘cheapest nutritionally adequate diet’ not reliant on fortified products.

low-income consumers. In a discussion of the barriers to scaling up BOP businesses, Koh *et al.* classify the challenges facing BOP businesses into four categories (2014: 11):[13]

- **Firm.** Shortcomings in the business model.
- **Value chain.** Weaknesses in the inputs to businesses or distribution of its outputs, finance and business support services.
- **Public goods.** 'Lack of customer, producer or channel awareness of the new market-based solution and appreciation of its benefits', absence of standards, and lack of hard infrastructure.
- **Government.** Laws, regulations, procedures, taxes and subsidies that inhibit business, as well as political bureaucratic interference.

Many of the challenges outlined in the right-hand column of Table 4.2 fall into the second and third categories above. This means that they are issues relating to market structure and the institutions that shape the functioning of markets (norms, rules and regulations, etc.) that are outside of the direct control of the businesses trying to produce and sell nutrient-rich foods. Both the results of the studies in Ghana, Nigeria and Tanzania, as well as the broad literature on foods and markets point to a number of common problems. These include value chain challenges such as difficulties in sourcing inputs reliably and the costs of distribution. Work in Ghana, for example, highlighted the difficulties faced by businesses attempting to produce complementary foods using groundnuts in acquiring aflatoxin-free inputs when the traders acting as intermediaries between farmers and food companies appeared to have little incentive to separate and classify products according to contamination levels (Anim-Somuah *et al.* 2013b: 23–24). Similarly, reaching out to low-income households, particularly in rural areas, requires finding distributors that are targeting these rural markets already, as businesses selling one product are unlikely to incentivise distribution companies to extend the scope of their operations.

The 'public goods' issues highlighted by Koh *et al*. (2014) found in the studies across the three countries include lack of consumer awareness and also a lack of effective regulation. Some businesses were able to market nutrient-enhanced products, albeit to predominantly more affluent consumers, but were subject to competition from counterfeit products that could reach high levels. One business in Nigeria found that up to one third of sales of its leading branded product in retail outlets appeared to be accounted for by products not made in its own factories (Nwuneli *et al.* 2014: 8). This challenge is, in turn, linked to the credence goods issue.

While it is not impossible for these challenges to be overcome, it is frequently the case that overcoming them incurs costs. Establishing the credibility of the product and promoting consumer awareness of the value of the product can also be costly. If these challenges are overcome at the cost of increasing costs and, therefore, reducing affordability, then the effectiveness of the initiative in nutrition terms is undermined.

In this context, the policy space for markets and nutrition covers a number of different approaches to using markets as a vehicle to reduce undernutrition:

1. Identifying market failures and how to overcome them. The previous paragraphs have identified some of the ways in which markets for nutrition can fail to work well, and this will be discussed further. How does the incidence of these market failures vary across different types of nutrient-rich foods and different ways of distributing them? In particular, in what ways do collaborations between public and private organisations provide effective solutions to market failures?

[13] What follows is an abbreviated summary of the points made in the Koh *et al.* (2014) report.

2. Identifying business models that are capable of making nutrient-rich foods accessible to low-income households. Much of this approach will be concerned with bottom of the pyramid strategies and might include the promotion of social enterprises that will prioritise targeting the poor and undernourished (which mainstream businesses may not have an incentive to do), consideration of how informal sector enterprises might have particular advantages with respect to price and geographical accessibility, and collaborations between private and public entities that might address some of the challenges listed above.
3. Considering policy options that will address the needs of households whose incomes are below the levels at which they are likely to purchase nutrient-rich foods in markets. These households may be a sizeable proportion of all households (see Table 4.3), and market approaches might have to be complemented by non-market approaches (for example, public distribution – free or subsidised) or social protection policies that supplement household income and direct its use towards food (for example, food vouchers).

In the next section, these issues will be explored through an examination of different food-based approaches to increasing the nutrient content of diets. It will be argued that different ways of delivering nutrient-rich foods face these problems to markedly different extents, avoiding some through the strategies they adopt, but encountering others. Then, in Section 6, some broad challenges facing market-based approaches to improving food consumption will be considered.

5 The effectiveness of different food-based approaches

The market failures described in Table 4.2 are widespread in food markets, but they are far from uniform across them. This section takes two different types of food products encountered in the studies of food value chains in Ghana, Nigeria and Tanzania (see Section 3) and considers the ways in which they encounter or avoid the problems highlighted in Table 4.2. The aim is to identify the *effectiveness* of different marketing channels for nutrient-rich foods – how successful they are in delivering nutrient-rich foods to undernourished populations *under real-world conditions* and in *real markets*. Do those that need the food have access to it so that it is consumed and reduces undernutrition? This question can be broken down into the five issues outlined in Table 4.2: nutrient quality; geographical accessibility (do the distribution channels actually deliver food to places where the undernourished can gain access to it?); acceptability; financial accessibility (including both affordability and credence issues); and targeting and coverage (the extent to which food is consumed by, or likely to be consumed by, those groups that are at risk of micronutrient undernutrition).

5.1 Mandatory fortification of staple products

Food fortification in general has been widely implemented as a food-based nutrition strategy. *Mandatory* fortification uses the force of law to make the addition of micronutrients compulsory in certain products – typically widely-used products such as flour, cooking oil and salt. It has been identified as a highly cost-effective strategy through which to enhance micronutrient intake within the population at large (Horton *et al.* 2010), and more than 20 years ago the World Bank estimated food fortification as having the potential to be one of the most cost-effective strategies for addressing micronutrient undernutrition (World Bank 1994). Mandatory fortification fortifies products that are used very widely, building on existing distribution networks to reach large numbers of people. The fact that fortification is mandatory means that the credence problem should be minimised, as one fortified product should be the same as another, and consumers are not being asked to make a choice between a fortified and a non-fortified product – all products in the particular category should be fortified to the same extent.

There have been some spectacular successes claimed for micronutrient fortification strategies, such as fortifying salt with iodine in Pakistan (Masuood and Janjua 2013) and fortifying sugar with vitamin A in Central America (Mora *et al.* 2000). Nevertheless, the success of mandatory fortification initiatives has been patchy, and the studies in Ghana, Nigeria and Tanzania have pointed to some of the limitations of this strategy.

What then are the challenges involved in ensuring that at-risk populations receive fortified products with the correct levels of added nutrients? Why are the results of fortification initiatives so varied? Evidence from the three countries and from the literature suggests the following:

- **Nutrient quality.** When fortification requirements are made mandatory, nutrient quality targets are specified by government. However, meeting and enforcing these requirements is itself challenging. The technical challenges of consistent and accurate fortification have to be met, and investments must be made in the necessary

skills and equipment.[14] At the same time, it is not enough for governments to lay down rules for fortification. These rules need to be enforced.

- **Geographical accessibility.** Mandatory fortification has the advantage of building on existing, well-developed value chains for staple products. This means that new distribution systems do not have to be created. However, if controls over fortification are most effectively imposed where production is centralised in the hands of a few large companies, this does increase the possibility that distribution networks will fail to reach poor and remote populations. In this situation, the poorest may not have access to the fortified product, even though they might be most in need of it. This will be discussed further in this section.
- **Acceptability.** Fortification of staples should have relatively little effect on taste, food preparation times or cultural acceptability. Acceptability is not likely to be an issue.
- **Financial accessibility.** It is frequently argued that the costs per unit of mandatory fortification are relatively low. This observation may be based on the costs of fortificants and not reflect the costs of capability acquisition, equipment, effective enforcement and the promotion of fortification among both producers and consumers. With respect to the financial accessibility for poor households, one critical issue is whether there are alternatives to the fortified products available in the market. If there are available alternative products (for example, maize flour as a substitute for fortified wheat flour, or local cooking oils to replace fortified products made by large food processing companies), then consumers have choices and the issues of awareness of the benefits of the fortified product and belief that such products really do contain fortificants come back into play.

Across the three countries, the two key issues were the consistency of levels of fortification and the extent to which the poor households actually purchase products that are most commonly and easily included in fortification programmes. In one of the three countries studied, Nigeria, there was evidence of the failure of fortification initiatives to meet target levels of nutrient quality. A study of mandatory fortification of vegetable oil, sugar and cereal flours in Nigeria sampled products available at retail outlets. It found that between 60 and 90 per cent of products failed to meet the fortification standard (Ogunmoyela *et al.* 2013), as shown in Table 5.1.[15]

Table 5.1 Levels of compliance with fortification standards at retail level in Nigeria

Staple type	Fortificants	Micronutrient content		Percentage of samples meeting or exceeding standard
		Minimum acceptable	Median in market samples	
Vegetable oil	Vitamin A	10,000 IU/kg	1,100 IU/kg	24.2%
Sugar	Vitamin A	12,500 IU/kg	4,500 IU/kg	26.2%
Cereal flours (wheat, semolina, maize)	Vitamin A	15,000 IU/kg	7,100 IU/kg	10.2%
	Iron	34.6 ppm	27.4 ppm	37.8%

Notes: IU: International Unit; ppm: parts per million.

Source: Adapted from Ogunmoyela *et al*. (2013).

[14] There are some other technical issues relating to the effectiveness of mandatory fortification. Not all micronutrients can best be supplied through this route, and levels of fortification may best be adjusted to the needs of the population as a whole, rather than those with the greatest micronutrient deficiencies. FAO has discussed these issues (Allen *et al.* 2006; FAO n.d.), but they are not of direct relevance to the discussion of mandatory fortification works in the market context.

[15] This is not a problem confined to Nigeria or sub-Saharan Africa. Deficiencies in the regulation of food fortification has, for example, also been identified as a problem by the government in Pakistan (Planning Commission 2012).

This case suggests that enforcement is not straightforward. It should be easiest to achieve in situations where there are a small number of businesses responsible for the fortified product, as this makes both capability acquisition and oversight easier to manage. Even so, it still requires both commitment and capacity on the part of the regulatory agencies.

But this is not the only problem for fortification. Large-scale businesses that are geographically concentrated may provide the easiest route to achieving reliable mandatory fortification of staples. But this raises the question of whether these businesses are likely to produce and sell the products that are purchased by the poor. There is evidence that the poorest may not purchase staple foods manufactured by large food processors, and they may instead purchase non-fortified versions of fortified products, or switch to alternative products. These issues emerged clearly in Tanzania, where the National Demographic and Health Survey (National Bureau of Statistics and ICF Macro 2011) included a consumption survey that showed that the majority of the poor source most of their food from informal markets. While mandatory fortification for maize flour is being introduced among large manufacturers, the surveys suggest that less than one fifth of people in the bottom three wealth quintiles purchase maize flour from these businesses (Robinson *et al.* 2014c). Similarly, less than half (46 per cent) of the poor purchased brands of cooking oil produced by large manufacturers, with the remainder presumably buying from the informal sector. Even where the poor do buy fortified products (for example, imported wheat flour or salt), purchases are often in very small quantities – the poorest 20 per cent of Tanzanians consume on average just 3g of centrally-produced wheat flour per day (Robinson *et al.* 2014c).

These challenges point to the continuing need for targeted efforts to reach the poor. One possibility is that fortified products are just beyond the financial reach of poor consumers, either because the costs of fortification raises the price to beyond what they are willing to afford, or because the fortified products were already beyond their purchasing capacity even without fortification. In other words, they rely on cheaper substitutes. This is the 'income problem' once again. A second possibility is that these consumers do not appreciate the worth of the fortified product, and this points to a continuing need for promotion and engagement with the public even in the context of mandatory fortification. Such efforts may have further benefits in terms of public support for fortification.

Overall, these limits to the reach of fortified products produced by formal sector food processors point, first, to the need to establish which marketing channels reach the poor, and second that there may be a need to consider working through informal sector businesses. The role of the informal sector is discussed later in this policy overview.

5.2 Contested markets for fortified foods

In contrast to the case of mandatory fortification just discussed, the second category covered in the three country studies is fortified foods offered to consumers in contested markets. Here, producers compete against each other for market share and have to convince consumers that the products they are offering are worth purchasing.

As well as the complementary foods for infants that will be discussed later in this section, the studies in the three countries found a range of products that were fortified in some way. These included custards, flours (bean, cowpea, yam and wheatmeal), biscuits, wheat cereals, cereal mixes and millet and spice mix. These were produced and marketed by medium-sized domestic food processing companies. Generally speaking, these products were sold at a premium and were not aimed at low-income markets (Nwuneli *et al.* 2014). In addition to the challenges of reaching the price points needed to access these markets, the companies would have had to develop effective distribution models. They were not large

enough to have dedicated distribution systems and depended upon local wholesalers for much of their distribution. The wholesalers did not necessarily reach rural areas.

Where these companies did produce products aimed at low-income markets, they were made possible by partnerships with development agencies. One of the companies studied, Dala Foods in Nigeria, made a product called 'Action Meal', a fortified mix of maize, groundnuts and soya, which it produced in collaboration with the Institute of Human Virology Nigeria (IHVN). This product is formulated to aid recovery from severe acute malnutrition and is only sold to institutional buyers. Similarly, Power Foods in Tanzania has worked with aid agencies. It began fortifying some of its foods following demand from the Tanzania Food Aid programme, which supports school feeding. Later, it began production of a ready-to-use therapeutic food (RUTF) product through a franchise agreement with Nutriset which it sells to donors and relief agencies. This part of Power Foods' business is totally export-oriented so that it can benefit from tax advantages (Maestre *et al.* 2014).

There is some potential for these donor-oriented products to spill over into the consumer market, particularly once donor demand has established scale and also to help to reduce the uncertainty surrounding innovation. However, for such initiatives to succeed it is necessary to develop distribution networks that reach consumers, be able to signal the product's enhanced nutritional value and benefits to potential buyers, and protect the new brand against competitors and counterfeiters (Nwuneli *et al.* 2014: 11). These are formidable challenges. In Nigeria, one company found that sales of one of its leading nutrition products were significantly higher than its total output, implying considerable circulation of fake products (*ibid.*: 8–9). Such practices undermine customer confidence in the genuine product, as well as taking away sales and returns that would offset the risks of innovation and brand building. While it might be considered the job of government to control product labelling and stamp out fraudulent products, the capacity of governments in the three countries to do this was very limited.

The challenges of promoting nutrient-rich, processed foods in contested, competitive markets have been highlighted by Lybbert (2011), who emphasises the importance of credence characteristics and the difficulties businesses face in establishing the superior characteristics of fortified products. His argument is based on a comparison between the distribution models for RUTFs, which are used in situations of severe, acute malnutrition and organised by international development agencies, and how markets might develop for preventative lipid-based nutrient supplements (LNS-Ps) that would be taken regularly by children to prevent malnutrition.

Although these two products are similar in composition and effect, Lybbert argues that the business challenges are quite different. The widespread success of RUTFs relies upon their use by development agencies in situations of severe acute malnutrition. Their production is overseen by the major agencies involved (WFP, UNICEF and Médecins Sans Frontières), and they are given without payment in a medicalised environment. In this context, the quality of the product is guaranteed by international agencies, and its distribution in a medicalised environment largely eliminates the challenges of geographical accessibility, acceptability and financial accessibility.

Lybbert then considers the challenges facing businesses promoting LNS-P for preventative use, which would be consumed by children on a regular basis. Regular use by large numbers of children – in many countries half of children may be at risk of stunting – is likely to rule out public provision, and so households with children would have to buy the product. Tripp *et al*. observe that 'Entirely free programmes are increasingly unsustainable due to limited government and donor funds, and other approaches are needed to support nutrition interventions' (Tripp *et al.* 2011: 83), while Segrè *et al.* argue that:

> It is crucial to assess the retail potential of complementary foods for several reasons. First, the malnutrition problem is far larger than what donor-driven and government programmes can tackle alone. Roughly one third of children under 5 years of age in the developing world are stunted… and most will never be reached by free food programmes.
> (Segrè *et al.* 2013: 2)

However, to meet these needs successfully, businesses would have to manage their supply chains to ensure reliable quality, raise nutrition awareness and be able to signal the nutritional value of their products to consumers, as well as distinguishing them from competing products that are nutritionally-inferior, and preventing fraudulent products and false claims by competitors. In the context of the weak regulatory environment, there may be very real risks that competing suppliers will 'cheat', and that consumers would be (justifiably) suspicious of all LNS-Ps on the market. While this problem might be overcome through strong branding, this would exacerbate the challenge of making such products affordable to consumers.

Evidence from attempts to commercialise such products suggests that these challenges are real. Claeyssens *et al.* (2011: 46) emphasise the importance of starting and sustaining public information campaigns in promoting demand for LNS-P products, but many researchers have pointed to the high costs of such programmes. Similarly, questions have been raised about consumers' willingness to pay. Segrè *et al.* (2013) suggest that, given the number of poor consumers willing to pay the unsubsidised price for nutrient-dense spreads such as Nutributter in Ethiopia, the market remains too small to be viable for commercial companies.

These issues can be explored further through consideration of markets for complementary foods for infants. These foods are a subcategory of fortified foods sold in contested markets. The studies of business and nutrition across the three countries all included complementary foods for infants. This is because the nutritional quality of these foods for infants between 6 and 24 months of age has a substantial impact on their development, both mental and physical. At the same time, many households, even rural households, rely on purchases from markets for obtaining either ready-made products or the ingredients needed for home preparation.

Complementary foods come in four main types: unfortified foods such as maize or millet porridges; foods fortified at home with products such as powder, oil or roasted groundnuts; foods fortified with prepared combinations of micronutrients often sold as 'sprinkles'; and prepared foods for infants sold as commercial products. Caregivers in developing countries offer a wide range of such foods to children. In their analysis of complementary feeding practices in Accra, Pelto and Armar-Klemesu (2011: 70–73) list a wide variety of different foods given to children aged between 6 and 24 months, both cereal and non-cereal products, and investigate the attributes of 24 of them.

The prepared products are supplied by a wide variety of providers. Many households depend on products supplied by the informal sector. In Ghana, one widely implemented policy initiative strategy to improve the availability of complementary foods at affordable prices was the promotion of weaning mixes produced by women in the informal sector. The promoted formulations combined cereals with locally-available sources of vegetable protein such as soybeans, cowpeas and groundnuts (Anim-Somuah *et al.* 2013a: 33–35; Masters, Kuwornu and Sarpong 2011: 7). Small businesses, generally run by women, emerged to produce and sell weanimix products, developing many different cereal-protein mixes to appeal to infants' different tastes. Equally, there are products provided by commercial companies, both domestic and transnational, with Nestlé's Cerelac being a market leader in a number of African countries. Third, there are complementary foods that are produced and distributed by social enterprises, as discussed by Claeyssens *et al.* (2011) and Bruyeron *et al*. (2010).

Both micronutrient sprinkles and LNS-Ps are distributed by social enterprises, and the Ghana Nutrition Improvement Project developed by Ajinomoto also uses the social enterprise model to distribute foods aimed at infants.

In what ways did these widely varying products meet the requirements set out in Table 4.2? First, with respect to nutrition quality, the quality of these products varies considerably. At one end of the scale, there are the traditional cereal-only complementary foods widely-used in Africa (such as *koko* in Ghana). These do not provide sufficient energy, protein, fat and micronutrients, and consumption of these foods has been linked with poor nutritional status among infants in Nigeria and Ghana (Ijarotimi and Ogunsemore 2006; Appoh and Krekling 2005). The quality of both informal sector prepared products and complementary foods prepared in households is highly variable. A study in Nigeria by Ijarotimi and Ogunsemore (2006), for example, compared the composition of home-fortified weaning foods and Nestlé's Cerelac, arriving at the following conclusion:

> We observed that the nutritional compositions of these local weaning foods could possibly adequately support growth and development in children compared with the commercial weaning food (Cerelac), but since some of the recipes [used by women for home fortification] were deficient in some vital nutrients, the nutritional composition of the formula may not be as robust as expected.
> (Ijarotimi and Ogunsemore 2006: 332)

In other words, some home-prepared foods could be of a quality sufficient for infant health, but others might not. The same is true for products prepared within the informal sector. Commercially-prepared products might be more consistent in quality, but it is worth noting that the studies in the three countries found that businesses making complementary foods did encounter problems with securing food inputs that were safe for children to eat.

Second, how well do complementary foods for infants manage the challenge of geographical accessibility? There appears to be significant differences between geographical accessibility in urban and rural areas. A number of the studies of complementary foods already cited refer to the difficulties of reaching rural populations, and this applies to social enterprises as well as profit-oriented concerns. The costs of achieving effective distribution in rural areas are high, and this matches the evidence from other studies of promotion and distribution costs for BOP products (Hystra 2014).[16]

It might be thought that geographical accessibility – the availability of products in locations close to where people live – would be greater for informal sector products and possibly for the foods used for home fortification than would be the case for commercially-produced fortified complementary foods. Informal sector activities are decentralised, with production and consumption closer together, whereas formal sector food processing is more likely to be centralised, which creates a greater distance between production and consumption and raises the costs of distributing products far from where they are made. This does appear to be the case in rural areas. Ogunba's study of the use of complementary foods in Nigeria showed that use of 'special weaning foods' (i.e. commercially produced)[17] was much higher in urban areas than in rural areas (27.2 per cent of respondents, compared to 3.4 per cent in rural areas), although price as much as availability seems to be a factor here (Ogunba 2012: 175, 180).

Within urban areas, how geographically accessible are different types of complementary foods for infants? Both Masters *et al.* (2011) and Pelto and Armar-Klemesu (2011) have addressed this question, but using very different methodologies. The Masters *et al*. (2011)

[16] There are a number of significant differences in the challenges for marketing products in rural as opposed to urban areas, and these will be discussed in more detail in Section 6.1.
[17] Masters *et al.* (2011: 7) refer to these products as 'pre-packaged infant cereals'.

study surveyed shops in arbitrarily selected geographical quadrants within the city and found that Nestlé's Cerelac was widely available, present in 194 out of 232 shops in the survey. It was almost as widely available as soap and toothpaste (203 shops). In these shops, Cerelac was also much more widely available than locally-produced infant food (Masters *et al.* 2011: 11–12). Pelto and Armar-Klemesu carried out a focused ethnographic study in Accra that interviewed a small sample (24 caregivers) about complementary feeding. This covered many of the issues discussed in this report through asking the caregivers about what they fed the children in their care and their evaluations of the characteristics of different complementary foods. On the question of 'ease of acquisition' of the foods, Cerelac scored highest among all of the cereal-based options (just outscoring even the maize and millet porridges), largely because of its widespread availability in shops and kiosks (Pelto and Armar-Klemesu 2011: 73–77). Pelto and Armar-Klemesu also noted that the 24 women interviewed rarely mentioned informal sector weanimix products when recalling the foods they were giving to their children.[18]

Acceptability was also raised by the Pelto and Armar-Klemesu study, and in two different ways. First, there was acceptability to the child. The ease with which a child accepts a particular food and does not resist eating it is a factor that the women in the study ranked second in importance, after 'healthiness' which is the term used by women to denote the perceived nutritional value of the product. Second, there is the question of acceptability to the mother, and in particular, convenience. Here, foods that required processing at home (home-fortified foods or porridges not made from maize or millet) because of the preparation time involved (Pelto and Armar-Klemesu 2011: 73). The issue of preparation time also came up in other studies. A study of the Nutridev programme in Madagascar showed that promoting recipes for home production of complementary foods proved to be excessively time-consuming for 'busy caregivers', and the programme switched to marketing 'easy-to-use fortified products' (Suchdev *et al.* 2010).

Finally, there is the question of financial accessibility, which includes (1) understanding and valuing nutrition and health and the role of food in this, (2) belief in the fact that foods available for sale actually possess the positive characteristics claimed for them (the credence issue), and (3) affordability. The first of these issues is linked to nutrition awareness. The study of caregivers in Accra demonstrated quite clearly that women do have some clear ideas about food and healthiness and what would be desirable ways to feed their children. They were also able to rank different products according to their nutritional benefits with some degree of accuracy (Pelto and Armar-Klemesu 2011). Basic nutrition knowledge, therefore, at least in urban areas, does not appear to be a barrier. However, if businesses introduce new products, it is still necessary to explain what they are for, how they should be prepared and frequency with which they should be given to children. These issues arose, for example, in the Nutridev programme described by Bruyeron *et al*. (2010). Promotion activities can make a big difference. Claeyssens *et al*. (2011: 46) reported that sales of a ready-to-use nutrient supplement in Niger 'decreased significantly when the public campaign ceased but quickly picked up again when the information campaign was relaunched'. However, it is also generally accepted that such campaigns can be expensive, and in particular door-to-door campaigns that rely on direct interactions with potential users are effective, but also very expensive (Bruyeron *et al.* 2010).

The second aspect of financial accessibility is the credence one. On what basis can potential purchasers/users of products be confident that they have the benefits claimed for them? One strategy businesses are adopting in this situation is branding, and Masters *et al.* (2011: 3) argue that in the absence of information about the quality of products, reputation and high prices can act as signals of product quality. In fact, there may be other bases on which

[18] This finding echoes the earlier work of Nagai *et al.* who also noted the contrast between extensive knowledge of Cerelac and little knowledge or use of weanimix products in Accra (2009: 1950).

purchasers might be able to come to judgements about different products. Pelto and Armar-Klemesu (2011) show that women had accurate judgements about the nutritional quality of a range of complementary foods, and these ideas appeared to be based on collective knowledge about products. It also appears to be the case that the benefits of well-formulated complementary foods become evident to caregivers quickly enough for this to be considered as a possible consumption characteristic, rather than a credence characteristic. Tripp *et al.* (2011: 87) studied the use of Nutributter (an LNS-P) and micronutrient sprinkles in Niger, and they found that the benefits of the product became evident in the form of increased appetite and weight gain during a four-week trial period in rural households consuming either Nutributter or micronutrient sprinkles. While in the absence of a control group a placebo effect cannot be ruled out in this case, the findings suggest that complementary foods are not entirely credence goods. Such a finding may only apply to infant foods because of the speed of reaction of young bodies to changes in diet.

The third issue is affordability. This is clearly a substantial issue. Even if caregivers know which foods are good for their children, they do not necessarily have the resources to purchase them. Pelto and Armar-Klemesu's study in Accra showed that women's assessment of the healthiness of cereal-based complementary foods (both commercially prepared and home-fortified) varied inversely with their affordability, and the authors note that:

> During the course of the interviews, nearly all of the respondents voiced concerns about having enough money to take care of their children… It is clear that having sufficient money to feed and care for their children is a primary concern in the lives of these Ghanaian women.
> (2011: 76)

It is also clear that the problem of affordability is considerably greater in rural areas than in urban areas. Segrè *et al*. (2013: 4) observed that one study of the use of complementary foods showed that 90 per cent of rural women had never purchased packaged complementary food, and Ogunba's study in Nigeria showed substantial differences in the feeding practices of urban and rural women. Urban women are much more likely to feed their children enriched pap or special weaning foods as the first complementary food than was the case with rural women (89 per cent versus 40 per cent), and while more than half of rural women cited 'too expensive' as a reason for not using processed foods, among urban women the proportion was only 12 per cent (Ogunba 2012: 180). Similarly, in the willingness to pay experiment conducted by Tripp *et al*. in Niger, rural women proposed a lower unit price than offered elsewhere and said that 'they would purchase the products when they were able to, but that they did not always have extra money' (2011: 91). Finally, Pelto's (2013) study of complementary feeding in rural Kenya found clear evidence of income constraints, as well as difficulties in obtaining adequate nutrient-rich foods at certain times of the year.

Affordability is clearly a central issue, more in rural areas than in urban, but by no means absent in urban areas. This issue will be discussed further below.

Summarising these results, the findings are as follows:

1. **Nutrient quality.** This varies considerably across different products, with both commercial and home-prepared products being much superior to the lowest-cost, cereal options such as *koko*.
2. **Geographical accessibility.** In urban areas, the different products, including Cerelac, were widely available in low-income areas. In rural areas, the evidence is that products are much less widely purchased, and very likely less available.

The Pelto study in rural Kenya suggested that seasonality was an important issue with respect to locally-available foods for infants.

3. **Acceptability.** For complementary foods there are two elements to acceptability – to the child and for the parent/carer. In urban areas, at least, women appeared to value foods that required little preparation, and some studies of rural areas of different approaches to preparing 'sprinkles' (home-prepared or ready-prepared) found that products that required cooking at home were more difficult to promote than those that did not.
4. **Financial accessibility.** Some studies show that women were aware of which foods were more beneficial to their children, but there were severe income constraints, particularly but not only, in rural areas. Specifically with respect to complementary foods, a credence good issue may not be as big a problem as might have been anticipated.

These findings have consequences for targeting and coverage. Market-based complementary foods are frequently unaffordable to those that most need them, and above all in rural areas. Even complementary foods made at home using purchased, nutrient-rich products may be difficult for women to finance.

6 Policies for nutrition market development

The previous section has focused on just two types of food-based approaches to reducing undernutrition – mandatory fortification and fortification in contested markets (including complementary foods for infants). It has not considered fresh (unprocessed) foods such as fruit and vegetables, pulses, dairy and meat, other than where they form part of complementary foods. Nevertheless, even the analysis of how markets operate for this narrow range of foods raises issues of general relevance for the development of market-based approaches to increasing the accessibility of the undernourished to nutrient-rich foods. The discussion so far has shown that the challenges faced in promoting accessible markets vary considerably in terms of the variations in the effectiveness of markets in reaching particular groups of people. This reinforces the argument that the critical question is not whether markets can deliver nutrient-rich foods to the undernourished effectively, but rather which market-based strategies are capable, or not capable, of delivering nutrient-rich foods to particular undernourished groups.

In this section, five broad issues will be considered:

1. The potential for market-based interventions in urban and rural areas
2. Targeting and distribution
3. Regulations for quality and safety
4. Market systems: beyond value chain approaches
5. Working with informal sector food providers

6.1 The potential for market-based interventions in urban and rural areas

The discussion in the previous section has highlighted important differences between markets in urban and rural areas. These differences occur across three axes. The first is income levels. Incomes are generally lower in rural areas than in urban. The consequence of this was seen clearly in decisions being made about purchases of complementary foods. Women recognise the benefits of these foods, but also recognised clearly that they could frequently not afford them, and this problem was greater in rural areas than urban. This constraint would, presumably, extend to decisions about foods for other household members.

The second axis is consumption patterns. The analysis of both mandatory fortification and complementary foods showed substantial differences in consumption patterns in urban and rural areas. The consumption of processed foods was lower in rural areas. Segrè *et al*. (2013: 4), for example, found that 90 per cent of rural households had never purchased a complementary food package. Similarly, Ogunba's (2012) comparison of urban and rural complementary food purchases showed a much higher incidence of packaged and processed foods consumed in urban areas. Similarly, consumption surveys in Tanzania showed a much lower incidence in rural areas of purchases of products produced by larger food companies, for example wheat flour, with rural consumers more reliant on products originating from small-scale food processing companies.

The third axis is distribution costs. There are clear differences in the costs of distribution in rural and urban areas, and these differences are well known. They are exacerbated by transport and infrastructure weaknesses, but they arise in large part because of distance and population densities. These challenges affect non-profit as well as for-profit enterprises. This was clearly seen in the case of the Nutridev initiative, which was defined as aiming to 'manufacture easy-to-use fortified products marketed to low-income families with young

children' (Bruyeron *et al.* 2010: S154). This showed clearly that marketing costs were significantly higher in rural areas than in urban, leading the authors to the conclusion that these costs in rural areas were sufficient to undermine the viability of the programme: 'To sustain a business approach in rural areas, it will be necessary either to obtain a long-term public grant or to noticeably increase the prices of the products, which would lead to a reduction of their affordability' (Bruyeron *et al.* 2010: S163).

What are the implications of these differences for the design and implementation of market-based strategies? Starting with rural markets, the evidence shows that there are substantial income constraints, with affordability further exacerbated by the high costs of distribution for products that have to be transported to rural locations. Typically, these are foods (including fresh foods) that are not available in many rural localities, or processed foods that are manufactured in one or a few locations and then have to be distributed to rural markets. This has the following implications:

1. The challenges of affordability and acceptability mean that new processed foods are unlikely to successfully make inroads into micronutrient deficiencies in rural areas unless there is a very substantial shift in the costs of production and distribution. Initiatives in this field struggle to make headway even in urban areas, and successful new products will have to be quite radically innovative in order to be affordable to undernourished people in rural areas while at the same time covering business costs. But there is a need to seek solutions to this problem. Poor people in rural areas find it difficult to afford nutrient-rich foods from available sources (including fresh food, and locally-produced food). It is quite common for such local foods to have strong seasonal availability (or lack of availability), and for prices frequently to be beyond household purchasing capacity (Pelto 2013). Therefore, effective ways of delivering lower-cost nutrients are needed. However, it is important to be realistic about how innovations in this field need to address the questions of both geographical accessibility and affordability.
2. One way of meeting the pressure to reduce product prices in rural markets is to cross-subsidise products between urban and rural markets, or between low-income and higher-income consumers. This, for example, is the strategy that is central to the Grameen Danone Foods model in Bangladesh. Prices for products aimed at the target markets for the social business (poor rural consumers close to where the processing plant is located) are lower than for products sold in urban areas. Even so, the business as a whole was still not at breakeven point seven years after its 2006 start-up. Other options for reducing distribution costs are discussed in Section 6.2.
3. If the costs of distribution are a major barrier to marketing nutrient-rich foods to rural consumers, then one option is to promote consumption of foods that are produced close to target populations. Increased production of nutrient-rich foods such as pulses, fruit and vegetables or dairy products may be a more viable strategy for addressing the nutritional needs of rural populations. However, it should be recognised that such naturally nutrient-rich foods are frequently moved to where the selling is highest (frequently in urban areas) and even unprocessed food products may face challenges relating to affordability and acceptability. Typical acceptability issues relate to food preparation times, texture and taste.
4. Given the income constraints facing poor households in rural areas, it remains essential to promote on-farm production and consumption of nutrient-rich foods as an alternative to, or complement to, market-based strategies. Such 'pre-farmgate' strategies have been widely promoted (see, for example Bonnard 1999; Le Cuziat and Mattinen 2011). Nevertheless, the work of Pelto in rural Kenya shows that even rural farm households are still likely to rely on markets for some of their food needs, and this points to the need to tackle the income constraint, both in terms of household income as a whole and also the income available to women for food purchases, and most notably purchases of food for infants.

In contrast, there are better prospects for developing market-based solutions for urban households. In urban areas, studies of purchases of complementary foods show that a wide range of different foods for infants are purchased on the market, ranging from fortified cereals through to ingredients for home fortification and ready-prepared products specifically targeted at young children. It was also seen that urban households would be more likely to purchase fortified foods aimed at adults, or the population in general, than was the case for rural (particularly poor) households.

The challenges of developing effective market-based solutions are clearly lower in urban areas, although income constraints are still important. Given that distribution challenges are easier to resolve, the focus should be on supporting innovations that reduce the cost of particular levels of nutrient availability on foods so that the marketed products can be affordable to greater numbers of people.

6.2 Targeting and distribution

The targeting of particular population groups and effective distribution are related issues. Development agencies are interested in targeting particular population groups, most notably women of childbearing age, adolescent girls and infants up to 24 months old, for whom the consequences of nutrient deficiencies are particularly severe and long-lasting. Distribution is a critical issue for market-based approaches to delivering food to the undernourished. It is critical to the questions of geographical accessibility and coverage and, hence, effective targeting. Availability (geographical accessibility), as discussed by Hawkes *et al*. (2012) refers not to the overall availability of products in a country or region, but rather to the presence of products available close enough to poor populations to allow convenient access:

> Foods that are available to consumers (including those who may be producers) in specific settings (e.g. at home, at work, in retail stores, in schools)… It does not refer to national levels of, for example, food availability, or world food prices, but the immediate environment in which consumers access foods and information about them.
> (Hawkes *et al.* 2012: 9)

For development agents, a successful food-based nutrition initiative would meet the requirements set out in Table 4.2 by making nutrient-rich foods available to the groups defined as priorities and ensuring that food is geographically accessible and affordable even for the poorest and most isolated populations.

For businesses, the considerations are a little different. For-profit enterprises might first consider how to reach the ‘low hanging fruit’ – consumers that can be accessed at low cost and whose purchasing power is sufficient to purchase the products being marketed. The groups prioritised by development agencies do not have these characteristics. On the distribution front, studies of business initiatives in the nutrition field use concepts such as ‘last-mile distribution’, with the development of localised delivery systems based on door-to-door or doorstep retail models referred to as ‘proximity distribution’ (Chevrollier *et al.* 2012: 34, 41–45). The personal touch is known to be effective, with the physical distribution of products closely linked to promotion (for example, how the product should be used and its benefits) and to establishing the credibility of the product.

These distribution models are costly to implement. A study of Procter and Gamble’s Nutri-Delight product and the decision to withdraw it from the Philippines market referred to ‘distribution challenges’ and difficulties in reaching ‘the poorest communities’ (GAIN and World Bank Institute 2007: 5). Similarly, a comparison of seven businesses selling nutrient-rich products targeted at poor consumers found that distribution and marketing costs amounted to 50–70 per cent of the end product price (Hystra 2014: 34–35). The same issue

was evident in the social enterprise initiatives promoting complementary foods for children, as discussed in Section 5.2. These challenges are further exacerbated when low-income households are targeted, as the pressure to keep costs down increases, while low purchasing power undermines the search for economies of scale and cost reductions.

The issue of distribution costs is particularly severe for processed products because they are often produced in one place and require distribution to widely dispersed locations. This combination of centralised production and decentralised consumption is particularly problematic when consumption volumes are low, which is frequently the case for fortified, non-staple products. For these reasons, it is important to consider decentralised models for producing food located closer to the neediest populations. This means considering the potential for greater contributions from informal sector providers.

So the fit between what enterprises need for business sustainability and the objectives of development agencies is not good. How can this mis-alignment of objectives be reduced? One argument is that the mis-alignment only exists because businesses do not fully appreciate the potential of low-income households as both producers and consumers. The idea that drives proponents of BOP strategies is that there are markets which, if developed, open up new opportunities for business and simultaneously address the needs of poor people as both producers and consumers. There are widely-cited examples of successful BOP strategies that provide substantial benefits to both businesses and the poor. These usually depend upon some kind of discontinuity in terms of either production and/or consumption that provides a radical break with past practice. Mobile payment systems would be an example. A shift in technology and a new market model greatly changed the costs and benefits of using mobile phones for transferring money between poor people,[19] and once available, social innovations created new ways of using the available technology, expanding the services it could offer.

Are such re-alignments likely to occur in food and nutrition? It could be argued that food fortification represents a similar shift in available options. Fortification of staples as a strategy for delivering nutrient-rich foods, when combined with investments in both capability development and the costs of sourcing fortificants reliably, significantly reduces the costs of providing foods with at least some of the micronutrients required for healthy development.[20] The same argument could be used with respect to LNS-P. While in many countries the great majority of households cannot afford to purchase the cost-optimal selection of foods required for the household to meet all of its nutritional needs (energy, macronutrients and major micronutrients), fortified products reduce the gap between incomes and the costs of adequate diets (see, for example, the calculations by the World Food Programme (WFP) for the case of the Mozambique World Food Programme 2011). This is one important strategy for increasing the accessibility of nutrient-rich foods for the poor, which can be placed alongside other interventions such as cash transfers and biofortification (*ibid.*: 10).

The accessibility to the poor of nutrient-rich foods can be enhanced through the involvement of non-profit actors, such as social enterprises, NGOs and the state. First, there is scope for partnerships between public and private actors to facilitate the access of the poor to nutrient-rich foods. This can take the form of subsidies to encourage businesses to target particular priority groups, but there is also scope for facilitating access to these groups through collaborations between profit-oriented and not-for-profit organisations. These collaborations can take the form of partnerships, and some important food and nutrition initiatives by large

[19] It should be noted that the spread of mobile payments also depends very significantly on the regulatory environment and the political economy of the determination of the regulatory framework. The striking characteristic of the M-PESA model in Kenya has been its enormous success in Kenya and the difficulties of replicating it in other environments. For an insightful discussion of the conditions under which this initiative developed, the YouTube video made by USAID and the Institute for Technology and Social Change is instructive: www.youtube.com/watch?v=i0dBWaen3aQ (accessed 21 September 2015).
[20] Some of the limitations of fortification of staples were discussed in Section 5.1, but the overall impact has been very substantial.

private sector companies have developed collaborations with social enterprises as the vehicle for delivery to the poor. This is the case for Grameen Danone Foods in Bangladesh (Yunus, Moingeon and Lehmann-Ortega 2010) and also for Ajinomoto's Ghana Nutrition Improvement Project (Ajinomoto Co. Inc. 2011).

Governments may also distribute products produced by private sector actors at subsidised rates, or to certain priority groups without any payment. In all three countries studied in sub-Saharan Africa, development agencies and government bodies operated a variety of programmes that procured nutrient-dense products and distributed them to vulnerable populations for free (including various school feeding programmes and distribution of nutrient-rich products such as sprinkles and lipid-based nutrient supplements). In the case of fully-free distribution, public agencies not only subsidise the access of the poor, but may also (1) increase the credibility of the product's claims concerning nutrient quality, (2) promote nutrition awareness in the receiving communities, and (3) reduce the risks of innovation by private companies by offering a guaranteed market that facilitates the achievement of scale.[21] In such arrangements, the private sector can still play a key role in the sourcing of materials and manufacturing, but the division of labour with the public sector enables the greatest bottleneck to be overcome.

The sustainability of these types of collaboration still remains an issue. Ideally, public interventions in markets should be time-limited, enabling businesses to overcome start-up problems and become sustainable over the longer term. However, some cases found across the three countries revealed that public support for product development and launch, as well as other start-up costs for fortified food products, did not lead to sustainable models that could continue once public procurement had ended (Maestre *et al.* 2014; Nwuneli *et al.* 2014; Robinson *et al.* 2014c).

6.3 Regulations for quality and safety

The previous sections have highlighted the role of the public bodies in facilitating food-based initiatives, particularly with respect to distribution. But, it was also clear in Section 5 that the state has an important role to play in regulating food and nutrition. The analysis of the shortcomings of programmes to fortify staple foods with vitamins and minerals provided clear evidence of this. Such programmes require both effective regulation of food processing companies and support for private firms to acquire the capacity to fortify products safely and accurately. In sub-Saharan Africa, this capability development function has been carried out both by governments, by multi-stakeholder fortification initiatives and through the support of non-profit actors such as the Global Alliance for Improved Nutrition (GAIN).[22]

The consequences of weak regulation were also evident in the case of contested markets for fortified products. First, lack of regulation created problems for consumers. Consumers are unsure about whether it is worth paying more for products that claim to have nutritional benefits. There are good reasons for this lack of confidence. There is evidence of gaps between claims made about nutrient content and the verified content of products. A sample of three infant foods taken in Ghana showed some variance between claims on the label and the product as tested (Masters *et al.* 2011: 16). Second, lack of regulation creates problems for businesses. Doubt in the minds of consumers is one issue, and in addition to this, evidence from the three countries showed how businesses suffered from fake products being placed on the market and misleading claims being made by competitors. These issues affect many products and are part of the business environment in general.

[21] This approach can be problematic if government agencies actively promote the products of one business at the expense of others. It should also be noted that public initiatives can be captured by private interests.
[22] See, for example, the analysis of fortification initiatives in West Africa by Sablah *et al.* (2011).

Clearly, one response to these challenges would be to recommend that regulation and state capacity for regulation should be strengthened. A strong regulatory environment would prevent fraudulent pass-off products entering the market and prevent inferior products being passed off as having better nutritional qualities than they really possess. Nevertheless, creating an effective regulatory system is a major challenge. Regulatory capacity is weak, and the fragmentation and diversity of the food industry make regulation difficult. Further, food and nutrition issues are frequently dispersed across multiple government agencies. In Ghana, for example, these issues are spread across the Food and Drug Authority, the Ghana Standards Authority, the Ministry of Health, the Ghana Health Service and the National Board for Small-scale Industries (Anim-Somuah *et al.* 2013b: 45–46). Ministries of Trade, Ministries of Industry and consumer protection bodies may also have a role to play in regulation and labelling. The policy fragmentation issue has long been recognised, and there are some attempts to enhance coordination, particularly through the Scaling up Nutrition (SUN) initiative.

Given the weaknesses of public agencies across all three countries, efforts to improve state regulatory capacity should continue, but this will be a long process and in the meantime witnesses in the regulatory system create uncertainty in the minds of consumers. In this context, markets may become divided between (usually) expensive, branded products and low-cost products whose quality is uncertain, as discussed by Masters *et al.* (2011).[23] How is it possible to improve the information available to consumers in the absence of effective state regulation? The literature on private regulation and private initiatives to provide consumers with credible information suggest two possibilities. The first is the development of private certification schemes that provide consumers with assurances about the quality of particular products. The second is the implementation of franchising schemes.

The first strategy is offered as a potential solution to the information problem by Masters *et al*. (2011: 3), who argue that:

> Quality certification of infant foods could help caregivers meet their children's nutrient needs more cost-effectively, by providing reliable information about the actual nutrient density of the foods they buy. This would overcome asymmetric information between buyers and sellers, by which buyers' inability to observe ingredients and production methods leads them to rely on sellers' brand reputation and high prices as a signal of product quality.

The argument is that with independent certification, establishing credibility would not require building up brands, and the barriers to entry for smaller companies, particularly domestic ones, would be lowered.

The proposal discussed by Masters *et al.* (2011) is to establish an independent, public–private certification agency to which businesses could apply for testing and certification for a fee. The scheme would aim to become commercially sustainable and to provide technical advice, inspect facilities, commission laboratory tests and provide a labelling system (Masters *et al.* 2011: 19–20). The motivation for businesses to participate would be that products that included the certification logo would fetch a higher price, and the authors back up this claim by reference to an earlier experiment in Mali about consumers' willingness to pay for certified products. In this study, the conclusion was that the amount consumers were willing to pay for these products was sufficient to cover the costs of certification (Masters and Sanogo 2002).

[23] Recognising that brands provide assurances to consumers and, generally speaking, better quality products, there have been some initiatives to develop local brands that are able to sell products at lower cost, while still developing brand awareness and brand credibility. One example in Ghana is Yedent Agro, which has been supported by GAIN.

The second option is to consider franchising as a means of providing assurances about quality. In effect, this extends brand reputation from the owner of the franchise to the franchisees. Downstream (nearer the customer) operators are licensed to use a brand if they comply with some behavioural rules and targets specified by the franchise owner. The value of the franchisor's brand lies in the credibility of its claims to provide products or services that have attributes that are valued by customers. Management of the franchise has to ensure that these claims continue to be true in the businesses of the franchisees. A successful franchise scheme requires incentives for both parties. The owner of the franchise may have various incentives, ranging from the income derived from payments made by franchisees to the achievement of social goals in the case of not-for-profit franchise owners. For the franchisees, the incentive is that the costs of complying with the rules of the franchise – which may include developing new systems, showing compliance, training time and purchase of physical capital – will be more than offset by the benefits that might be derived from being part of the franchise – for example, lower costs through bulk purchasing or more efficient operating systems, or higher margins through increased turnover or higher prices.

In what circumstances are these initiatives most likely to work best? The certification strategy is most appropriate for food processing companies, which mostly involves centralised production and consequently the distribution costs associated with reaching poor households. The implications of this have already been discussed in the previous sections. First, the costs of effective certification itself will be lower for larger and more geographically concentrated establishments. Therefore, the distribution issues discussed in Section 6.2 come into play again. Certification is likely to be associated with centralised production and then the high costs of distribution in rural areas. Second, in the discussion of complementary foods in Section 5.2, it was noted that rural households have much lower levels of purchases of processed complementary foods. The use of commercially-produced complementary foods for infants in Nigeria was much higher in urban areas than in rural areas (27.2 per cent of respondents, compared to 3.4 per cent in rural areas) according to Ogunba (2012: 175, 180). Such products are also likely to be more accessible to higher-income consumers.

Similar questions may arise with the franchise option. The costs of franchise monitoring and control increase with geographical distance, making it more expensive to maintain franchise operations in areas with poor infrastructure and low population density. At the same time, the basis for the operation of a food franchise that increases consumer confidence about quality and food safety might well be some form of centrally-prepared product, such as a manufactured 'sprinkle' whose origin and packaging would reassure consumers about its quality and benefits. Once again, this increases the difficulties of accessing rural areas. The challenge – for both public and private regulation – is to devise and implement schemes that are reliable, cost-effective and trusted by consumers. There are strong reasons for believing that this type of approach would be more likely to be successful in urban markets and for consumers that have the resources to pay for the additional costs involved.

In this context, there may be other strategies for providing assurances about quality and safety that are more appropriate for lower-income households and rural populations. In the health service sector, franchising models have been implemented as a strategy for improving the quality of goods and services available to poor populations. In addition, there have also been attempts to reinforce levels of service quality and compliance with good practice (for example, taking steps to reduce the risks of selling counterfeit drugs and selling medicines that are appropriate to the complaints presented by customers) by local enforcement measures.[24] This might be done through the development of peer groups such as trade associations, as referenced in the case of Nigeria by Goodman *et al.* (2007: 204), or the use

[24] See, for example, the case of the Accredited Drug Dispensing Outlets (ADDOs) programme in Tanzania, which provides examples of how a franchise scheme can specify processes of accreditation of outlets, requirements for buildings, staff, pharmaceutical quality and record-keeping, alongside a scheme for regulation, inspection and sanctions (Center for Pharmaceutical Management 2008: 18–19).

of external agents, such as community leaders, to monitor performance and encourage change (see, for example, Iqbal *et al.* 2013: 38–39; Goodman *et al.* 2007: 210).

These findings emphasise the difficulties of reaching rural areas cost-effectively. Increasing the accessibility of nutrient-rich foods to poor rural households is a big challenge and one that is not likely to succeed if it solely depends upon market incentives. It is likely to require some form of subsidy from development agencies, and some division of labour between the public and private sectors to defray private sector costs and risks. The challenge here is to know whether this form of support can be seen as a temporary measure that will promote the basis for long-term, sustainable solutions, or whether the need for subsidy will persist. The studies in Ghana, Nigeria and Tanzania revealed a number of cases where businesses producing fortified foods for public procurement were unable to continue producing these products once this procurement ended (Maestre *et al.* 2014; Nwuneli *et al.* 2014; Robinson *et al.* 2014b).

Alternatively, reaching the rural poor may be a challenge that could be taken up by social entrepreneurs or social franchising. First, some social franchises may be able to mobilise external behaviour control resources because of their reputation. Faith-based organisations, for example, may find it easier to organise the support of community groups. Second, for the same reasons faith-based organisations and other NGOs might find it easier to establish the credibility of the franchising mechanism in the eyes of consumers. Third, social enterprises put value on reaching the poor and may prioritise these markets. Nevertheless, even with these advantages, challenges remain. As franchising schemes are developed, it is still necessary to develop control mechanisms over external partners and within their own organisations. Even well-meaning organisations face challenges with establishing suitable incentives and clear orientations for their staff. At the same time, it was shown in Section 5.2 that initiatives such as Nutridev struggled to meet the costs of distribution systems, with some of the most effective strategies (such as door-to-door selling) prohibitively expensive.

6.4 Market systems: beyond value chain approaches

The challenges discussed in the previous sections raise issues that arise well beyond particular businesses and their value chains. They relate to matters such as regulation, infrastructure and nutrition awareness. This raises the question of what framework should be adopted to analyse these challenges.

Many discussions of food and nutrition make reference to value chain approaches, and authors such as Hawkes and Ruel advocate using a value chain approach to better understand the links between agricultural production and food consumption (2011: 2). The same point has been made in a recent work by Gelli (2014), which argues that, ‘Since 2010, researchers have recognized that value chain concepts can be useful in designing strategies to achieve nutrition goals. Central to this approach is to identify opportunities where chain actors benefit from marketing agricultural products of higher nutritional value’ (2014: 3). These analyses and similar studies (see, for example Hawkes *et al.* 2012) are seen as one way of identifying how to make agricultural projects more ‘nutrition-sensitive’. USAID’s Feed the Future programme refers to investments for ‘improving nutrition throughout the value chain’ (USAID 2010: 14), and government justifications for agricultural programmes in sub-Saharan Africa make frequent reference to agricultural value chains, including the idea of sectoral ‘farm to fork’ strategies.[25] The route by which these interventions improve nutrition is primarily through increasing agricultural output and, through this, reducing the price of food. These increase the supply and affordability of food.

[25] See, for example, the presentation by the Minister of Agriculture and Rural Development of Nigeria of the country’s Agricultural Transformation Agenda (ATA) (Adesina 2012). Similarly, documents produced by The New Alliance for Food and Nutrition Security make frequent reference to agricultural value chains (G8 2012), as does the Comprehensive Africa Agriculture Development Programme (CAADP) (see, for example, CAADP 2009) .

The use of a value chain approach to agriculture, food and nutrition raises two problems. The first is the starting point. Many value chain approaches start from agriculture and then consider how interventions in agriculture might be reformulated in order to produce better nutritional outcomes. The second question relates to the adequacy of the value chain framework. Although there are various ways of defining and using a value chain approach, the common element is a focus on transactions between enterprises and relations between enterprises. How much does this focus enable identification of the key determinants of nutrition outcomes?

With respect to the first question, taking food production as the starting point tends to downplay the importance of value chains beyond the farmgate and the challenges of delivering food to the undernourished. Much of the argument in this report suggests that increasing agricultural production – even if the focus is on nutrient-rich foods – will not necessarily increase consumption of these foods by those most at risk of nutrient deficiency. Nevertheless, not all chains are alike in this respect. Hawkes *et al*. make a distinction between short and long value chains:

> 'Short' chains are present in many rural areas, island communities, urban agriculture, farm-to-school programmes, and in any area where local markets are served by local farmers. They are able to transmit changes in production to consumers and can also have the cultural effect of 're-connecting' people with food and agriculture, for example, by supporting production and consumption of indigenous healthy foods (Kuhnlein 2010). In contrast 'long' chains have a less direct connection between producers and consumers. These chains tend to be longer – especially if they involve some form of cross-border globalisation – but their defining characteristic is that they are designed to increase 'efficiency' at scale. Interventions in these chains are potentially very powerful given the 'upstream' nature of the leverage points that can then have a multiplier effect. However, interventions in such chains must be carefully assessed given the potential for substitutions and transformations of foods and their ingredients through the chain (Hawkes *et al*. 2012).
> (Hawkes *et al.* 2013: 9–10)

It is easier to design and understand the impact of policy interventions in 'short' chains[26] because of the directness of the relationship between production and consumption. Such interventions are also notably more successful when they combine interventions aimed at improving agricultural practices with nutrition awareness and gender issues. In contrast, it might be expected that as 'long' value chains widen the gap between production and consumption both geographically and in terms of the businesses and actors involved, it becomes more difficult to translate nutrition priorities into agricultural action. The quote above suggests that the defining characteristics of long chains is 'efficiency at scale'. If this is the main goal, then nutrition priorities have to compete with production priorities (most notably higher yields and farm incomes), and incentives for nutrition-sensitive agriculture are drowned out by other incentives and priorities in the chain. At its simplest, where is the incentive for a farmer to produce nutrient-rich foods that are needed by undernourished people (even in the locality) if the benefits to farmers and traders for producing either export products or animal feed provide greater income and security? Similarly, in the context of income maximisation farmers and traders have a strong incentive to sell into markets where the price is highest, which are frequently not the ones that serve the poor and undernourished.

[26] These 'short' chains may not be as short as the quote suggests. The effectiveness of 'local' interventions such as the production of biofortified products for local consumption will depend upon quite extensive input chains that draw on research and development, plant breeding, input supplies, etc.

In this context, increasing agricultural production to serve nutritional goals is akin to pushing on a piece of string. It is better to start with nutritional priorities (what are the range of food options that meet known nutritional deficiencies in the most effective ways?) and then identify why markets failed to meet needs of the undernourished and devise programmes to overcome the obstacles identified. This means viewing the potential of specific foods in specific markets for specific populations and intervening to make markets work better in these areas (including policies aimed at informal markets and collaborations involving public and private actors).

The second question relates to the scope of a value chain approach. The narrow definition of value chains characterises a value chain as a sequence of transactions. The key value chain issues relate to the division of labour along the chain, interdependence and the management of that interdependence. Key questions for value chain analysis include the way activities are aggregated within particular enterprises or split between them or not performed at all (the division of labour in the chain) and the management of interdependencies between actors and activities (which includes issues of incentives, communication and trust). Across the three countries studied, numerous examples were found of incomplete markets and poorly-functioning value chains. For example, in West Africa traders in groundnuts did not have incentives to identify and source aflatoxin-free groundnuts, which impose costs on businesses using groundnuts for producing complementary foods. Only larger companies would have the resources to develop dedicated supply chains and provide incentives to farmers or traders to participate in them. More generally, medium-sized businesses in both Nigeria and Tanzania report problems in sourcing inputs reliably (Maestre *et al.* 2014; Nwuneli *et al.* 2014). Similar problems of incomplete markets occurred on the distribution side. Weakly developed distribution systems have been highlighted by various authors working on bottom of the pyramid businesses (see, for example, Gradl and Jenkins 2011), and the businesses studied in Nigeria both referred to the challenges of finding distributors that might target low-income markets.

Value chain analysis provides one part of the story, but not all of it. Analysts of BOP strategies such as Koh *et al*. discuss not only value chain challenges but also the capabilities and strategies of particular businesses. They make it clear that there are many factors located outside of the business itself and outside of the transactional partners along the value chain which also affect how businesses operate and how effective they can be. They classify these factors into two categories – 'public goods' and 'government' (Koh *et al.* 2014). Public goods are those goods that businesses have little or no incentive to provide to the market – either because they cannot be charged for, or because the benefits cannot be confined to the particular business that pays for them. Koh *et al.* list low consumer awareness and appreciation of products, the hard infrastructure of roads, power and telecommunications, knowledge of consumers and their needs and quality standards (and other ways of providing consumers with information about experience goods and credence goods) (Koh *et al.* 2014: 12–13). Government issues refer to activities that inhibit business – 'laws, regulations and procedures that inhibit the firm from operating its model easily, often because they are designed to regulate mainstream models rather than innovative ones' (*ibid.*: 12–13).[27]

Similar ground is covered by the Making Markets Work for the Poor (M4P) approach. In addition to the area of core market transactions (which is the terrain of the value chain), the M4P approach identifies two further parts of the market system:

[27] In addition to this, some authors make reference to the business ecosystem, which refers to the environment created by businesses themselves and which might not be specific to any particular value chain (see, for example, Gradl and Jenkins 2011).

1. **Support functions.** The transactions in a value chain depend on a set of supporting functions and services without which they would not be possible. These functions and services include roads, transport services, financial services, banking, electricity, etc. These support the core market transactions, but they are also mostly based on page market transactions themselves.
2. **Rules.** Transactions take place within 'an institutional context and business environment – laws, regulations, standards, social rules and behavioural norms that influence when, where and how exchanges take place' (BEAM Exchange website). These rules may not be efficient, and there may be systematic biases in the rules themselves because of the capture of rule-making activities by particular economic and political interests (Department for International Development 2000: 6–7; Lea and Dercon 2012: 9).

Market systems approaches suggest that problems with behaviours and incentives may have causes that lie in any of the three market elements: core transactions, support functions and rules.[28] Markets for the poor are the particular focus of most market systems approaches, partly because poverty reduction is a key goal of the organisations that use and support the approach, and partly because it is argued that the poor are disproportionately disadvantaged by poorly-operating markets. They depend on markets for income-generating opportunities, goods and services, but the markets that serve them tend to be disproportionately dysfunctional.

Although market systems approaches have not hitherto been used explicitly in the analysis of nutrition (although they have been used extensively in the analysis of agricultural markets), issues relating to the areas which they highlight (for example, nutrition awareness, regulations, standards and transport infrastructure) are very frequently discussed by nutrition specialists concerned with markets. It is also the case that value chain approaches frequently incorporate some of these issues into their analysis, but without a specific framework to analyse them, the risk is that this is done in a non-systematic way.

One example of how a market systems approach might be applied to nutrition is shown in Box 6.1. This considers the case of aflatoxin contamination, which was noted in Section 4. A number of the interventions discussed in this policy overview have clear characteristics of market systems interventions, even if the protagonists did not identify them as such. For example, some of the interventions designed to promote the marketing of orange-fleshed sweet potato have focused on how markets work and the mobilisation and coordination of various actors along the value chain, as well as paying attention to research and development, consumer awareness and the potential for developing processed products (Bouis *et al.* 2013: 14). The link of OFSP production to markets and how to develop markets is one of the main issues raised in the paper mapping value chains in Tanzania (Temu *et al.* 2014). The important issue is the extent to which the challenges of making these links lie within relationships and the value chain or as a result of issues that are beyond the control of particular businesses, such as infrastructure, rules and regulations, contract enforcement, etc.

[28] Early expressions of this tripartite view of the market can be found in DFID (2005) and in Elliott, Gibson and Hitchins (2008: 114). The account here is based partly on the BEAM Exchange website (www.beamexchange.org/en/market-systems/what-market-system) as it is in some respects clearer than the earlier versions. The BEAM Exchange is an initiative of DFID and the Swiss Agency for Development and Cooperation, and its website contains short, accessible summaries of the thinking behind market systems approaches and links to the materials on this topic – www.beamexchange.org/en/ (accessed 21 September 2015).

Box 6.1 A market systems approach to aflatoxin reduction

There is a potential market for aflatoxin-free products. Why does it not already exist? There could be a coordination problem: farmers do not believe that there is a market for an aflatoxin-free product. There could be an imperfect markets problem: the trading market that is the intermediary between farmers and food processors may be imperfect, with new entrants that might see an opportunity excluded, or some degree of collusion between existing traders. Or, equally, increased prices for aflatoxin-free (or aflatoxin-reduced) supplies might not translate into the increased prices that farmers would need to make the effort to introduce the good farming and storage practices that reduce aflatoxin contamination. Finally, the start-up costs of developing a new and segregated supply system may be prohibitive.

Once the diagnostic step has been completed, then strategies for enabling this market to work better can be devised. These might include value chain interventions (in the narrow sense) but might also include changes in government regulation, the introduction of labelling or certification, promoting consumer awareness and the development of business services to support value chain actors. An example of how a market for a product can be transformed through market system interventions is provided by the case of fertiliser markets in Nigeria (PrOpCom 2011; PrOpCom n.d.).

A market systems perspective also brings to the fore an appreciation of the potential complexity of markets, and this is also relevant for food markets and nutrition. One simple example is related to the aflatoxin issue discussed in Box 6.1. One simple (but usually expensive) solution to the aflatoxin contamination issue is to sort groundnuts, and premium products may use this strategy. However, the rejected product (whose toxicity has been concentrated through sorting) may be channelled towards the informal market, with the result that the risks faced by the poor may increase. Markets bring together many actors that each have their own motivations and strategies, but the interactions between them may produce unanticipated effects. The sobering conclusion from such considerations is that there are limitations to our knowledge of how markets operate in practice and that interventions in markets have to be constructed carefully and revised in the light of how these interventions work out in practice. Writers on market systems refer to this as the complexity issues, and some of them emphasise the complexity of market systems, and consequently the difficulties of understanding how markets work and predicting the impacts of interventions (Ripley and Nippard 2014; Jenal and Cunningham 2013).[29]

The policy implication of adopting a market systems approach to tackling the obstacles to effective operation of food markets highlighted in Table 4.2 is that food markets fail (in nutrition terms) for multiple reasons. Income constraints have been highlighted as a serious obstacle to market-based approaches that requires these approaches to be targeted to those segments of the population in those areas where they are most likely to be affected. But even in these areas, markets for nutrient-rich foods can fail in quite complex ways. Therefore, diagnosing these failures is a considerable challenge. One of the priorities for the development of cost-effective market systems approaches is to simplify and codify the diagnostic process so that it can be achieved more cheaply and more rapidly.

6.5 Working with informal sector food providers

The discussion so far has highlighted many situations in which actors in agri-food value chains operate to varying degrees in the informal sector. These include farmers, traders, small-scale food processors, distributors and retailers. Analyses of markets for products such as fruit and vegetables and milk in parts of Africa also show a high level of involvement of informal sector actors (Grace *et al.* 2010; Omore and Baker 2011). The reliance on informal

[29] It should also be noted that the policy context which addresses market system issues is itself complex. The complexity of the policy context (many actors, different interests, etc.) and the challenges this poses for development agencies wishing to intervene in it has been the subject of recent thinking by USAID (2014).

sector supply appears to be greater for poor people than less poor, and possibly more in rural areas than urban. This was evident from the discussion in Section 5.2 about access to and consumption of different types of complementary foods in rural areas.

In some cases, food may be produced and distributed entirely by informal sector actors, while in other cases the informal sector may be responsible for just one part of the process. It was noted, for example, that some complementary foods produced by multinational companies were available in a very wide range of retail outlets, including street kiosks. In this section, the emphasis is more on food produced and distributed to substantial extents by informal sector operators, and in this context, the key question is how food and nutrition policies might improve the effectiveness of markets with a high level of participation by informal sector providers.

The predominance of the informal sector in African food systems stems from its advantages in serving the needs of poor consumers. Informal enterprises deliver products to locations close to where the poor live and work and in forms that match sociocultural preferences. Most importantly, informal sector products are cheaper than formal sector alternatives, often dramatically so. In Ghana, informal *koko* porridge, which is often used for complementary feeding of young children, is one fifth the price of the multinational brand product designed for this purpose, and half the price of domestic manufacturers' products (Anim-Somuah *et al.* 2013b). Similarly, in Kenya informally-traded 'raw' milk in Nairobi costs KSh50 per litre, while packaged milk costs KSh90 (Grace 2014).

Nevertheless, these benefits come at a cost. The quality and safety of informal sector products can vary substantially, with some not providing the benefits they claim, others capable of causing harm, and others just lacking in micronutrients. The *koko* porridge mentioned in the previous paragraph is an example of the latter problem. It is cheap, but it lacks what is needed for child development (and caregivers know this). Not all products originating from the informal sector are of low quality, but it may be difficult for consumers to distinguish between the products that are nutritious and safe, and the products that are not. The biggest challenge is that there is a considerable degree of variation in performance in the informal sector.

Political support and funding for food-based nutrition among governments and donor agencies have focused predominantly on a small range of policy approaches, including national fortification programmes, promotion of biofortified crops and publically-funded distribution of supplements and therapeutic foods. The majority of food-based nutrition programmes simply do not account for the informal sector in their design and implementation. Where they do so, they may be difficult to implement. It was noted above that the programme for informal sector production of weanimix – complementary foods – in Ghana did not appear to have led to extensive adoption in that country, and programmes such as the USAID project to promote fortification by small-scale millers in Tanzania foundered because of shortcomings in government regulation (Robinson *et al.* 2014c).

How can the performance of the informal sector be enhanced in spite of the limitations of government capacity? While formalisation of the informal sector has been a commonly-adopted approach, the International Livestock Research Institute (ILRI) has tested an alternative approach based around participatory risk and hazard analysis. This involved working with informal business actors and government agencies to identify precisely where risks arise in the value chain, and then working with businesses to identify feasible actions that mitigate risks at the critical points where food safety risks occur (Grace *et al.* 2008). The ILRI interventions provided training to pilot groups of food processors and retailers based on this approach, and also facilitated access to low-cost technologies (Grace 2011). Two of these projects are described next.

The first relates to a smallholder dairy project in Kenya. Eighty-five per cent of consumers in Kenya purchase unpasteurised 'raw milk', which is produced and distributed by informal actors, preferring this to centrally-produced packaged milk (Grace and Omore 2007). The Smallholder Dairy Project,[30] carried out between 1997 and 2005, aimed to provide evidence and to demonstrate alternative approaches for improving the quality of milk in Kenya (Hooton and Omore 2007; Omore and Baker 2011). Concentrating on raw milk, the project generated evidence about where in the value chain contamination occurred and whether this created health risks. Hazard analysis showed that most contamination occurred during distribution and retailing. The study also found that although boiling eliminated pathogens, outlets known in Kenya as 'milk bars' sold soured milk without boiling it, and this could pose a health risk. Based on these findings, the project targeted informal milk traders, aiming to help them upgrade their products and practices. The intervention appeared to reduce levels of milk contamination; the proportion of milk with high levels of contamination fell from 71 to 55 per cent among traders using plastic containers, and from 48 to 42 per cent among those using metal containers.[31]

The second intervention focused on the processing and retailing of animal products in south-western Nigeria. Research by ILRI found that meat in the market contained unacceptably high levels of bacterial pathogens (98 per cent of samples), zoonotic pathogens (67 per cent) and environmental contaminants (46 per cent) (Grace *et al.* 2012). Evidence also suggested that these hazards caused significant health consequences; butchers reported frequently suffering from gastrointestinal illness, and butchers who used bad hygiene practices were the most likely to become ill.

The project worked directly with butchers' associations to disseminate training. It hosted workshops for 63 butchers, where researchers presented the results of surveys on hygiene practices in Bodija market. They also taught butchers about the biology of meat contamination and discussed butchers' own experiences and constraints. At the end of the workshop, a set of improved-yet-feasible hygiene practices were recommended. Butchers who attended were given signs to show consumers that they had been trained. ILRI surveyed hygiene practices before and after the workshop, both for butchers who had participated and those who had not. The aim was to assess whether the butchers' associations had diffused the new knowledge and practices to their members. Training appeared to have helped improve certain hygiene practices. Furthermore, the butchers' associations seemed to have diffused these behaviours among their members – training attendees and non-attendees were equally likely to report using many key hygiene practices.[32] Qualitative evidence supported this conclusion, with leaders of the associations being supportive of the project, and reporting that they were pressuring members who had not been trained to learn from those who had participated in the ILRI training.

These efforts offer lessons for how nutrition-focused projects might use similar approaches to improve the nutrient content of products in informal markets. First, the ILRI research indicates that policies seeking merely to exclude the informal sector are unlikely to improve food safety or nutritional quality – and may actually be counter-productive, leading to lower quality. Although informal markets can contain major hazards – and inadequate nutrient levels – some perform very favourably compared to formal sector alternatives. Interventions should assess market performance on a case-by-case basis, and should target the specific problems faced. Reforming anti-informal sector policies should feature as part of efforts to improve food safety and nutrition. Regulatory pressure creates distrust and makes it more

[30] The project was implemented by the Ministry of Livestock and Fisheries Development, ILRI and the Kenya Agricultural Research Institute, and funded by DFID.
[31] The study methodology does not allow this change to be attributed to the intervention. The study also does not describe what proportion of improvements were associated with using the new milk canisters, compared to simply receiving training.
[32] There were exceptions: attendees had on average significantly cleaner slaughter and sale areas, and were significantly more likely to use disinfectant.

difficult for public and civil society programmes to engage small businesses in order to facilitate better performance. In short, food safety research suggests that food-based nutrition programmes would also benefit from a 'facilitative' approach to informal businesses.

Second, the ILRI projects demonstrate that 'light touch' interventions centred on training can deliver substantial improvements in product quality, even in the absence of technological or infrastructure upgrades. In both the Kenya and Nigeria cases, there were measurable and statistically significant improvements in levels of bacteriological contamination following intervention. Yet the food safety projects also suggest that there are limits to what can be achieved through training alone, and that implementers need to be realistic about the improvements that can be expected in the short term. After the trainings in Kenya and Nigeria, nearly half of all samples continued to have unacceptably high levels of contamination. Yet the fact that 'light touch' interventions do not wholly resolve the underlying problem should not prevent donors and public agencies from supporting this approach; this point is discussed in the conclusion.

Third, the results of these studies show that there is a clear need for more information about how informal sector markets work and how people interact with them. With respect to food, in particular, there is limited information about what people buy, the basis for their choices and the strategies they use to mitigate the lack of reliable information with which to make decisions. In addition, more information is needed about how to improve the operation of markets and how they interact with the people and communities that they are meant to benefit.

7 Conclusions

This policy overview has identified some of the key policy issues for promoting market-based approaches to delivering nutrient-rich foods to the households and populations most at risk from micronutrient deficiencies. The analysis focused on the question of effectiveness. What is the evidence that market-based approaches can actually increase the consumption of nutrient-dense foods among target populations in households? In other words, the objective for market-based approaches to improving nutrition is not just to produce and distribute foods of good nutritional quality, but to ensure that the undernourished have access to them.

With this in mind, the report focused on the issues of nutrient quality, targeting and coverage, geographical accessibility, acceptability and financial accessibility. From this, we draw a number of conclusions with respect to policy and strategy for food-based approaches to reducing micronutrient malnutrition:

1. **Interventions are required to make markets work better.** Food markets for nutrient-rich foods generally do not function well for delivering food to the undernourished, and especially not for 'bottom of the pyramid' populations. Market failures require intervention, although such interventions should be time-limited and catalytic.
2. **Well-functioning markets will not resolve all undernutrition problems.** Even if market failures are eliminated and markets work efficiently, people on the lowest incomes will still struggle to purchase the nutrients they require.
3. **Some markets work better than others.** In particular, the potential for market-based solutions to deliver nutrient-rich foods to the poor is very different in urban and rural areas. The costs of distribution and the issue of affordability restrict the potential for reducing undernutrition through processed foods in rural areas. The use of market-based solutions should be targeted at those areas where they are most effective.
4. **Public and hybrid approaches are needed to reach the poorest.** Given that some market failures may be difficult or impossible to eradicate, and some priority population groups will have low incomes, various forms of public involvement and/or regulation are required to complement market-based approaches. These include both direct public supervision, and also public–private partnerships and the activities of social enterprises and development agencies to resolve key market failures and improve affordability.
5. **Clarity is required with regard to partnerships.** Hybrid approaches are frequently referred to as public–private partnerships. This term covers such a broad range of potential initiatives and collaborations that it does not identify any specific approach to reducing undernutrition through market-based approaches. More clarity and specificity is required when considering collaborations between private and non-private actors, particularly with respect to who the beneficiaries are and how they will be targeted.
6. **Comprehensive nutrition strategies will involve market and non-market approaches.** If market-based approaches are unlikely to work in all situations and rural populations, a comprehensive food-based approach to nutrition will involve non-market as well as market elements, and combinations of the two.
7. **Increasing food production is not enough to reduce undernutrition.** Direct interventions in farm households aimed at increasing production and consumption of nutrient-rich foods may provide a means of translating increased production of nutrient-rich foods into increased consumption, particularly if combined with awareness-raising programmes. However, when considering the broad range of households that rely on market purchases of food, seasonally or year-round, the

challenges of geographical accessibility and affordability become critical obstacles that must be addressed if increased production is to be translated into increased consumption.

8. **Focus on market system issues.** Some of the literature on the role of businesses in nutrition promotion focus on case studies of particular enterprises. However, the report has highlighted the importance of market system constraints that are beyond the capacity of most firms to address or circumvent. Therefore, intervention should focus primarily on making market systems for nutrient-rich foods work better and addressing the affordability problem for the poorest.
9. **Market strategy should start from where people purchase food.** Various interventions have focused on creating new foods and promoting new businesses to produce and distribute them. It is certainly the case that radical innovations are needed to improve the affordability and accessibility of foods for the undernourished. Nevertheless, radical interventions in complex markets create new and unpredictable challenges. Working with existing market channels, and in particular with informal sector providers, may reduce risk and uncertainty.
10. **Donors need to be more strategic about private sector engagement.** The fundamental question for policy interventions should not be 'Where are the opportunities to work with businesses on nutrition?' It should be 'Where do we have evidence to show that business can be effective in reducing micronutrient undernutrition in poor households?' and 'For which food-based approaches to reducing undernutrition do businesses have the capacity in order to make the biggest contribution?' This means that development agents should be much more active and selective in choosing their interventions and should not allow businesses to shape this agenda. Businesses will identify where they can make an impact, but not whether making this impact is a priority.
11. **Targeting the '1,000 day' populations.** Undernutrition during the period from when a child is conceived until two years old has profound, life-long and irreversible health consequences. While it is acknowledged that effective food-based strategies must focus on adolescent girls, women before/during/after pregnancy and children under two years old, it is only with the latter group that clear strategies for targeted food-based approaches (using complementary foods) appear to be available. While some of the needs of pregnant and lactating women may be met through health services, new thinking may be required for the targeting of adolescent girls.
12. **Policy needs more evidence.** At a very basic level, more information is required about what foods undernourished people purchase, where, and through which distribution channels. Some good information is available about purchases of complementary foods (both prepared and for home preparation), and this information has provided unexpected results with respect to issues such as the availability of international brand complementary foods and the extent to which parents could judge whether the health of their children was improving over quite short periods of time. For other food products and for other priority groups, such as pregnant women and adolescent girls, information appears to be much more limited. Planning interventions is difficult when even basic information about the use of markets by the poor and undernourished people are selected. In addition to this, more information is needed about the effectiveness of market-based interventions under real-world conditions. Most of the available evidence is about the *efficacy* of particular products or interventions under controlled conditions, not their long-term performance in real markets. This is a major challenge. However, at a minimum, interventions need to show whether the products whose sale and consumption are being promoted are actually being consumed by poor populations targeted by the intervention.

References

Adesina, A. (2012) *Agricultural Transformation Agenda: Repositioning Agriculture to Drive Nigeria's Economy*, www.emrc.be/documents/document/20121205120841-agri2012-special_session-tony_bello-min_agric_nigeria.pdf (accessed 21 September 2015)

Ajinomoto Co. Inc. (2011) *The Ghana Nutrition Improvement Project*, Tokyo: CSR Department, Ajinomoto Co. Inc., www.ajinomoto.com/csr/pdf/ghana_project_en.pdf (accessed March 2015)

Allen, L.; De Benoist, B.; Dary, O. and Hurrell, R. (eds) (2006) *Guidelines on Food Fortification with Micronutrients*, Geneva and Rome: WHO and FAO, www.who.int/nutrition/publications/guide_food_fortification_micronutrients.pdf (accessed March 2015)

Amagloh, F.K.; Weber, J.L.; Brough, L.; Hardacre, A.; Mutukumira, A.N. and Coad, J. (2012) 'Complementary Food Blends and Malnutrition among Infants in Ghana: A Review and a Proposed Solution', *Scientific Research and Essays* 7.9: 972–88

Anim-Somuah, H.; Henson, S.J.; Humphrey, J. and Robinson, E. (2013a) *Strengthening Agri-food Value Chains for Nutrition: Mapping Value Chains for Nutrient-Dense Foods in Ghana*, Evidence Report 2, Brighton: IDS, http://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/2632/Final%20Web.pdf?sequence=1 (accessed March 2015)

Anim-Somuah, H.; Henson, S.J.; Humphrey, J. and Robinson, E. (2013b) *Policy Guidelines: Enhancing Markets for Nutrient-Dense Foods in Ghana*, Evidence Report 28, Brighton: IDS, http://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/2958/ER28%20Final%20Online.pdf?sequence=3 (accessed March 2015)

Appoh, L. and Krekling, S. (2005) 'Maternal Nutritional Knowledge and Child Nutritional Status in the Volta Region of Ghana', *Maternal & Child Nutrition* 1.2: 100–10

Bhutta, Z.A.; Das, J.K.; Rizvi, A.; Gaffey, M.F.; Walker, N.; Horton, S.; Webb, P.; Lartey, A.; Black, R.E.; The Lancet Nutrition Interventions Review Group and The Maternal and Child Nutrition Study Group (2013) 'Evidence-based Interventions for Improvement of Maternal and Child Nutrition: What Can be Done and at What Cost?', *The Lancet* 382.9890: 452–77

Bonnard, P. (1999) 'Increasing the Nutrition Impacts of Agricultural Interventions', Greater Horn of Africa Regional Workshop on Agriculture Policy Resource Access and Human Nutrition, Addis Ababa, 3–5 November 1999, www.eldis.org/vfile/upload/1/document/0708/DOC7724.pdf (accessed January 2013)

Bouis, H.; Low, J.; McEwan, M. and Tanumihardjo, S. (2013) 'Biofortification: Evidence and Lessons Learned Linking Agriculture and Nutrition', Expert Paper for Second International Conference on Nutrition (ICN2), Rome, 19–21 November 2014, www.fao.org/fileadmin/user_upload/agn/pdf/Biofortification_paper.pdf (accessed March 2015)

Bruyeron, O.; Denizeau, M.; Berger, J. and Trèche, S. (2010) 'Marketing Complementary Foods and Supplements in Burkina Faso, Madagascar, and Vietnam: Lessons Learned from the Nutridev Program', *Food and Nutrition Bulletin* 31.2 (supplement): S154–S167

CAADP (2009) *Raising Competitiveness and Seizing Opportunities in Domestic, Regional, and International Markets*, Pillar 2, Area A, CAADP and NEPAD, http://caadp.net/sites/default/files/documents/Resources/CAADP-guides-and-technical/CAADP%20Pillar%20II%20Framework%20%20for%20Improving%20Rural%20Infrastructure%20and%20Trade%20Related%20Capacities%20For%20Market%20Access.pdf (accessed August 2015)

Center for Pharmaceutical Management (2008) *Accredited Drug Dispensing Outlets in Tanzania: Strategies for Enhancing Access to Medicines Program*, prepared for the Strategies for Enhancing Access to Medicines Program, Arlington VA: Management Sciences for Health, http://projects.msh.org/seam/reports/TANZANIA_Final_ADDO.pdf (accessed August 2015)

Chevrollier, N.; Bults, R.; Sprenger, T.; Danse, M.; Poniatowski, B. and O'Neill, K. (2012) *Access to Food and Improved Nutrition at the Base of the Pyramid*, Utrecht: BoP Innovation Center, www.food-security.nl/sites/default/files/resource/access_to_food_and_improved_nutrition_at_the_base_of_the_pyramid.pdf (accessed March 2015)

Claeyssens, V.; Taha, O.; Jungjohann, S. and Richardson, L. (2011) 'Social Marketing in Public-Private Partnerships as a Tool for Scaling up Nutrition: A Case Study from Tanzania', *SCN News* 39: 45–50

De Onis, M.; Blössner, M. and Borghi, E. (2012) 'Prevalence of Stunting among Pre-school Children 1990–2020', *Public Health Nutrition* 15.1: 142–48

Department for International Development (DFID) (2011) *Scaling up Nutrition: The UK's Position Paper on Undernutrition*, London: DFID, www.dfid.gov.uk/Documents/publications1/scal-up-nutr-uk-pos-undernutr.pdf (accessed May 2015)

Department for International Development (DFID) (2005) *DFID & the Private Sector: Working with the Private Sector to Eliminate Poverty*, London: DFID, www.eldis.org/vfile/upload/1/document/0708/DOC20842.pdf (accessed June 2015)

Department for International Development (DFID) (2000) *Making Markets Work Better for the Poor: A Framework Paper*, London: DFID, www.value-chains.org/dyn/bds/docs/detail/684/6 (accessed March 2015)

Elliott, D.; Gibson, A. and Hitchins, R. (2008) 'Making Markets Work for the Poor: Rationale and Practice', *Enterprise Development & Microfinance* 19.2: 101–19

FAO (n.d.) *Fortification Food with Micronutrients and Meeting Dietary Micronutrient Requirements: Role and Position of FAO*, Rome: FAO, ftp://ftp.fao.org/ag/agn/nutrition/fortification.pdf (accessed March 2015)

FAO (2013) *The State of Food and Agriculture 2013*, Rome: FAO, www.fao.org/docrep/018/i3300e/i3300e.pdf (accessed March 2014)

G8 (2012) *G8 Cooperation Framework to Support the 'New Alliance for Food Security and Nutrition' in Ghana*, http://transition.usaid.gov/g8/GhanaCooperationFramework.pdf (accessed January 2014)

GAIN and World Bank Institute (2007) *Procter and Gamble: Fighting Malnutrition*, Washington DC: GAIN, http://siteresources.worldbank.org/CGCSRLP/Resources/4PGCaseA.pdf (accessed March 2015)

Gelli, A. (2014) *Value Chains and Nutrition: A Framework to Support the Identification, Design and Evaluation of Interventions*, Washington DC: CGIAR, www.a4nh.cgiar.org/files/2012/07/Value-Chains-for-Nutrition-Framework-V-1.1.pdf (accessed March 2015)

Ghana Statistical Service, Ghana Health Service and ICF Macro (2009) *Ghana Demographic and Health Survey 2008*, Accra: GSS, GHS and ICF Macro

Goodman, C.; Brieger, W.; Unwin, A.; Mills, A.; Meek, S. and Greer, G. (2007) 'Medicine Sellers and Malaria Treatment in Sub-Saharan Africa: What Do They Do and How Can Their Practice Be Improved?', *American Journal of Tropical Medicine and Hygiene* 77.6 (supplement): 203–18

Grace, D. (2014) 'Food Safety in Informal Markets', presentation made at IFPRI 2020 Policy Consultation and Conference, Addis Ababa, 15–17 May 2014, www.slideshare.net/ILRI/foodsafety-may2014-grace (accessed March 2015)

Grace, D. (2011) *Agriculture-Associated Disease Research at ILRI: Safe Foods in Informal Markets*, Issue Brief 11, Nairobi: International Livestock Research Institute, https://aghealth.files.wordpress.com/2012/08/ag-associated-diseases-research-at-ilri-issuebrief_111.pdf (accessed March 2015)

Grace, D.; Dipeolu, M.; Olawoye, J.; Ojo, E.; Odebode, S.; Agbaje, M.; Akindana, G. and Randolph, T. (2012) 'Evaluating a Group-based Intervention to Improve the Safety of Meat in Bodija Market, Ibadan, Nigeria', *Tropical Animal Health and Production* 44.1 (supplement): 61–66

Grace, D.; Makita, K.; Kang'ethe, E.K. and Bonfoh, B. (2010) 'Safe Food, Fair Food: Participatory Risk Analysis for Improving the Safety of Informally Produced and Marketed Food in Sub Saharan Africa', *Revue Africaine de Santé et de Productions Animales* 8.S: 3–11, http://eismv.org/IMG/pdf/GRACE_et_al._RASPA_2010_8_S_p3-11.pdf (accessed March 2015)

Grace, D.; Omore, A.; Randolph, T. and Hussni, M. (2008) 'A Review of Risk-based Approaches for Emerging Diseases Associated with Animal Source-Foods', *Bulletin of Animal Health and Production in Africa* 55.4: 254–65

Grace, D. and Omore, T.R.A. (2007) 'Place of Food Safety in Evolving Pro-Poor Dairy Policy in East and West Africa', *Revue d'Élevage et de Médecine Vétérinaire des Pays Tropicaux* 60.1–4: 153–62

Gradl, C. and Jenkins, B. (2011) *Tackling Barriers to Scale: From Inclusive Business Models to Inclusive Business Ecosystems*, Cambridge MA: Harvard Kennedy School, www.hks.harvard.edu/m-rcbg/CSRI/publications/report_47_inclusive_business.pdf (accessed March 2015)

Hawkes, C. and Ruel, M.T. (2012) 'Value Chains for Nutrition', in S. Fan and R. Pandya-Lorch (eds), *Reshaping Agriculture for Nutrition and Health*, Washington DC: IFPRI, www.ifgpri.org/sites/default/files/publications/oc69ch09.pdf (accessed March 2015)

Hawkes, C. and Ruel, M.T. (2011) 'Value Chains for Nutrition', paper presented at Conference Leveraging Agriculture for Improving Nutrition and Health, New Delhi, 10–12 February 2011, www.ifpri.org/sites/default/files/publications/2020anhconfpaper04.pdf (accessed February 2013)

Hawkes, C.; Thow, A.M.; Downs, S.; Ghosh-Jerath, S.; Snowdon, W.; Morgan, E.; Thiam, I. and Jewell, J. (2013) 'Leveraging Agriculture and Food Systems for Healthier Diets and Noncommunicable Disease Prevention: The Need for Policy Coherence', working draft, prepared as a contribution to FAO's Global Forum on Food Security and Nutrition online discussion on 'Nutrition-enhancing Agriculture and Food Systems', 1–22 July 2013, www.fao.org/fileadmin/user_upload/agn/pdf/HawkesICN2paper_Jul1.pdf (accessed 30 September 2015)

Hawkes, C.; Turner, R. and Waage, J. (2012) *Current and Planned Research on Agriculture for Improved Nutrition: A Mapping and a Gap Analysis*, report for DFID, London and Aberdeen: Leverhulme Centre for Integrative Research on Agriculture and Health and Centre for Sustainable International Development, http://r4d.dfid.gov.uk/pdf/outputs/misc_susag/lcirah_mapping_and_gap_analysis_21aug12.pdf (accessed March 2015)

Hawkesworth, S.; Dangour, A.; Johnston, D.; Lock, K.; Poole, N.; Rushton, J.; Uauy, R. and Waage, J. (2010) 'Feeding the World Healthily: The Challenge of Measuring the Effects of Agriculture on Health', *Philosophical Transactions of the Royal Society B* 365: 3083–97

Hooton, M. and Omore, A. (2007) *Policy Innovations in Small-scale Milk Markets in Kenya and East Africa*, London: International Institute for Environment and Development

Horton, S.; Shekar, M.; McDonald, C.; Mahal, A. and Brooks, J.K. (2010) *Scaling up Nutrition: What Will It Cost?*, Washington DC: World Bank, http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf (accessed March 2015)

Hystra (2014) *Marketing Nutrition for the Base of the Pyramid*, Hystra, http://hystra.com/marketing-nutrition (accessed March 2015)

Ijarotimi, O. and Ogunsemore, M. (2006) 'Weaning Foods and Their Impact on Child-feeding Practices among Low-income Nigerian Mothers', *Food and Nutrition Bulletin* 27.4: 327–34

Iqbal, M.; Wahed, T.; Manzoor, S.; Hanifi, A.; Shomik, M.S.; Mahmood, S.S.; Aziz, R.R.; Rahman, Z. and Bhuiya, A. (2013) 'Lessons from an Intervention Programme to Make Informal Healthcare Providers Effective in a Rural Area of Bangladesh', in G. Bloom, B. Kanjilal, H. Lucas and D.H. Peters (eds), *Transforming Health Markets in Asia and Africa: Improving Quality and Access to the Poor*, Abingdon: Routledge

IYCN (2011) *Achieving Nutritional Impact and Food Security through Agriculture*, Washington DC: Infant & Young Child Nutrition Project, www.iycn.org/resource/achieving-nutritional-impact-and-food-security-through-agriculture/ (accessed March 2015)

Jenal, M. and Cunningham, S. (2013) *Gaining Systemic Insight to Strengthen Economic Development Initiatives*, Mesopartner Working Paper 16, Scharans and Pretoria: Mesopartner, www.mesopartner.com/fileadmin/user_files/MP_WP_16_Gaining_systemic_insight.pdf (accessed March 2015)

Kenya National Bureau of Statistics and ICF Macro (2010) *Kenya Demographic and Health Survey 2008–09*, Calverton MD: KNBS and ICF Macro

Koh, H.; Hegde, N. and Karamchandani, A. (2014) *Beyond the Pioneer: Getting Inclusive Industries to Scale*, Mumbai: Monitor Inclusive Markets, www.beyondthepioneer.org/ (accessed March 2015)

Le Cuziat, G. and Mattinen, H. (2011) *Maximising the Nutritional Impact of Food Security and Livelihood Interventions: A Manual for Field Workers*, New York: ACF International, www.fao.org/fileadmin/user_upload/fsn/docs/Food_security_indicators/ACF_Manual_Maximising_the_Nutritional_Impact_of_FSL_Interventions_FINAL.pdf (accessed April 2012)

Lea, N. and Dercon, S. (2012) *Refreshing DFID's Approach to Growth*, Working Paper, London: DFID

Lybbert, T. (2011) 'Hybrid Public-Private Delivery of Preventative Lipid-based Nutrient Supplement Products: Key Challenges, Opportunities and Players in an Emerging Product Space', *SCN News* 39: 32–39

Maestre, M.; Robinson, E.; Humphrey, J. and Henson, S. (2014) *The Role of Businesses in Providing Nutrient-rich Foods for the Poor: A Case Study in Tanzania*, Evidence Report 66, Brighton: IDS, www.ids.ac.uk/publication/the-role-of-businesses-in-providing-nutrient-rich-foods-for-the-poor-a-case-study-in-tanzania (accessed March 2015)

Masters, W. and Sanogo, D. (2002) 'Welfare Gains from Quality Certification of Infant Foods: Results from a Market Experiment in Mali', *American Journal of Agricultural Economics* 84.4: 974–89

Masters, W.A.; Kuwornu, J. and Sarpong, D. (2011) 'Improving Child Nutrition through Quality Certification of Infant Foods: Scoping Study for a Randomized Trial in Ghana', *Policy Brief*, London: International Growth Centre, www.theigc.org/project/improving-child-nutrition-through-quality-certification-of-infant-foods-a-randomised-trial-in-ghana/ (accessed March 2015)

Masuood, A.K. and Janjua, T.A. (2013) 'Achieving Universal Salt Iodisation (Usi) in Pakistan: Challenges, Experiences and the Way Forward', *IDS Bulletin* 44.3: 57–65

Menon, P. (2012) 'Childhood Undernutrition in South Asia: Perspectives from the Field of Nutrition', *CESifo Economic Studies* 58.2: 274–95

Miller, D. and Welch, R. (2013) 'Food System Strategies for Preventing Micronutrient Malnutrition', *Food Policy* 42: 115–28

Mora, J.O.; Dary, O.; Chinchilla, D. and Arroyave, G. (2000) *Vitamin A Sugar Fortification in Central America: Experiences and Lessons Learned*, Arlington VA: MOST

Nagai, T.; Staatz, J.; Bernsten, R.; Sakyi-Dawson, E. and Annor, G. (2009) 'Locally Processed Roasted-maize-based Weaning Foods Fortified with Legumes: Factors Affecting Their Availability and Competitiveness in Accra, Ghana', *African Journal of Food Agriculture and Nutrition and Development* 9.9: 1945–65, www.ajfand.net/Volume9/No9/Nagai3425.pdf (accessed 21 September 2015)

National Bureau of Statistics and ICF Macro (2011) *Tanzania Demographic and Health Survey 2010*, Dar es Salaam: National Bureau of Statistics, Tanzania and ICF Macro

National Population Commission and ICF Macro (2009) *Nigeria Demographic and Health Survey 2008*, Abuja: National Population Commission and ICF Macro

Nwuneli, N.; Robinson, E.; Humphrey, J. and Henson, S. (2014) *The Role of Businesses in Providing Nutrient-rich Foods for the Poor: Two Case Studies in Nigeria*, Evidence Report 66, Brighton: IDS, www.ids.ac.uk/publication/the-role-of-businesses-in-providing-nutrient-rich-foods-for-the-poor-two-case-studies-in-nigeria (accessed March 2015)

Ogunba, B.O. (2012) 'Adoption of Enriched Local Complementary Food in Osun State: Combating Micronutrient Deficiency in the First Two Years of Life', *African Research Review* 6.1: 171–82

Ogunmoyela, O.A.; Adekoyeni, O.; Aminu, F. and Umunna, L.O. (2013) 'A Critical Evaluation of Survey Results of Vitamin A and Iron Levels in the Mandatory Fortified Food Vehicles and Some Selected Processed Foods in Nigeria', *Nigerian Food Journal* 31.2: 52–62

Omore, A. and Baker, D. (2011) 'Integrating Informal Actors into the Formal Dairy Industry in Kenya through Training and Certification', in International Livestock Research Institute (ed.), *Towards Priority Actions for Market Development for African Farmers*, Nairobi, Integrating Informal Actors into the Formal Dairy Industry in Kenya through Training and Certification, https://cgspace.cgiar.org/handle/10568/16491 (accessed 21 September 2015)

Pelto, G. (2013) *Results and Implications of Fes Studies in Eastern and Western Kenya*, Washington DC: Global Alliance for Improved Nutrition, www.securenutritionplatform.org/Documents/bbl29AUG2013.pdf?Mobile=1 (accessed February 2015)

Pelto, G.H. and Armar-Klemesu, M. (2011) 'Balancing the Nurturance, Cost and Time: Complementary Feeding in Accra, Ghana', *Maternal & Child Nutrition* 7 (supplement 3): 66–81

Peters, D.H.; Garg, A.; Bloom, G.; Walker, D.; Brieger, W. and Rahman, H. (2008) 'Poverty and Access to Healthcare in Developing Countries', *Annals of the New York Academy of Science* 1136: 161–71

Planning Commission (2012) *Stakeholder Consultation Report on Regulatory Monitoring of Salt, Wheat Flour and Oil Fortification Programs in Pakistan*, Islamabad: Planning Commission, Planning and Development Division, www.pc.gov.pk/hot%20links/2012/Stakeholder%20Consultation%20on%20Regulatory%20Monitoring.pdf (accessed November 2014)

PrOpCom (n.d.) *Making Fertiliser Markets Work for the Poor in Nigeria: A PrOpCom Case Study*, Abuja: PrOpCom, www.springfieldcentre.com/wp-content/uploads/2012/11/Oct-2011-Making-Fertiliser-Markets-Work-for-the-Poor.pdf (accessed September 2014)

PrOpCom (2011) *Nigeria PrOpCom Project Completion Report*, London: DFID, www.propcommaikarfi.org/wp-content/uploads/2013/08/Project-Completion-Report-October-2011.pdf (accessed July 2014)

Ripley, M. and Nippard, D. (2014) *Making Sense of Messiness*, Kathmandu and Durham: Samarth and the Springfield Centre, www.springfieldcentre.com/wp-content/uploads/2014/03/2014-02-Making-Sense-of-Messiness1.pdf (accessed September 2014)

Robinson, E.; Akinyele, I.; Humphrey, J. and Henson, S. (2014a) *Policy Options to Enhance Markets for Nutrient-Dense Foods in Nigeria*, Evidence Report 66, Brighton: IDS, www.ids.ac.uk/publication/policy-options-to-enhance-markets-for-nutrient-dense-foods-in-nigeria (accessed March 2015)

Robinson, E.; Akinyele, I.; Humphrey, J. and Henson, S. (2014b) *Mapping Value Chains for Nutrient-Dense Foods in Nigeria*, Evidence Report 65, Brighton: IDS, www.ids.ac.uk/publication/mapping-value-chains-for-nutrient-dense-foods-in-nigeria (accessed March 2015)

Robinson, E.; Temu, A.; Waized, B.; Ndyetabula, D.; Humphrey, J. and Henson, S. (2014c) *Policy Options to Enhance Markets for Nutrient-Dense Foods in Tanzania*, Evidence Report 90, Brighton: IDS, www.ids.ac.uk/publication/policy-options-to-enhance-markets-for-nutrient-dense-foods-in-tanzania (accessed March 2015)

Ruel, M.T.; Alderman, H. and The Maternal and Child Nutrition Study Group (2013) 'Nutrition-sensitive Interventions and Programmes: How Can They Help to Accelerate Progress in Improving Maternal and Child Nutrition?', *The Lancet* 382.9891: 536–51

Sablah, M.; Klopp, J.; Steinberg, D. and Baker, S. (2011) 'Public-Private Partnerships Drive One Solution to Vitamin and Mineral Deficiencies: "Fortify West Africa"', *SCN News* 39: 40–44

Segrè, J.; Winnard, K.; Abrha, T.H.; Abebe, Y.; Shilane, D. and Lapping, K. (2013) 'Willingness to Pay for Lipid-based Nutrient Supplements for Young Children in Four Urban Sites in Ethiopia', *Maternal & Child Nutrition*, first published online 13 December 2012, http://dx.doi.org/10.1111/mcn.12022 (accessed 21 September 2015)

Suchdev, P.S.; Ruth, L.; Obure, A.; Were, V.; Ochieng, C.; Ogange, L.; Owuor, M.; Ngure, F.; Quick, R.; Juliao, P.; Jung, C.; Teates, K.; Cruz, K. and Jefferds, M.E.D. (2010) 'Monitoring the Marketing, Distribution, and Use of Sprinkles Micronutrient Powders in Rural Western Kenya', *Food and Nutrition Bulletin* 31.2 (supplement): S168–S178

Suchdev, P.S.; Ruth, L.; Woodruff, B.; Mbakaya, C.; Mandava, U.; Flores-Ayala, R.; Jefferds, M.E.D. and Quick, R. (2012) 'Selling Sprinkles Micronutrient Powder Reduces Anemia, Iron Deficiency and Vitamin A Deficiency in Young Children in Rural Western Kenya: A Cluster-randomised Controlled Trial', *American Journal of Clinical Nutrition* 95.5: 1223–30

Temu, A.; Waized, B.; Ndyetabula, D.; Robinson, E.; Humphrey, J. and Henson, S. (2014) *Mapping Value Chains for Nutrient-Dense Foods in Tanzania*, Evidence Report 76, Brighton: IDS, www.ids.ac.uk/publication/mapping-value-chains-for-nutrient-dense-foods-in-tanzania (accessed March 2015)

Tripp, K.; Perrine, C.G.; De Campos, P.; Knieriemen, M.; Hartz, R.; Ali, F.; Jefferds, M.E.D. and Kupka, R. (2011) 'Formative Research for the Development of a Market-based Home Fortification Programme for Young Children in Niger', *Maternal & Child Nutrition* 7.S3: 82–95

UN Inter-Agency Group for Child Mortality Estimation (2011) *Levels & Trends in Child Mortality: 2011 Report*, New York: UNICEF, www.childinfo.org/files/Child_Mortality_Report_2012.pdf (accessed 21 September 2015)

USAID (2014) *Local Systems: A Framework for Supporting Sustainable Development*, Washington DC: ACDI/VOCA, www.usaid.gov/policy/local-systems-framework (accessed March 2015)

USAID (2010) *Feed the Future Guide*, Washington DC: USAID, www.feedthefuture.gov/guide.html (accessed March 2013)

Waized, B.; Ndyetabula, D.; Temu, A.; Robinson, E. and Henson, S. (2015) *Promoting Biofortified Crops for Nutrition: Lessons from Orange-fleshed Sweet Potato (OFSP) in Tanzania*, Evidence Report 127, Brighton: IDS, http://opendocs.ids.ac.uk/opendocs/bitstream/123456789/5985/1/ER127_PromotingBiofortifiedCropsforNutrition.pdf (accessed 21 September 2015)

Welthungerhilfe, IFPRI and Concern Worldwide (2014) *Global Hunger Index: The Challenge of Hidden Hunger*, Bonn, Washington DC and Dublin: Welthungerhilfe, IFPRI and Concern Worldwide, www.ifpri.org/sites/default/files/publications/ghi14.pdf (accessed 21 September 2015)

World Bank (1994) *Enriching Lives: Overcoming Vitamin D and Mineral Malnutrition in Developing Countries*, Washington DC: World Bank

World Food Programme (2011) *Why Specialized Nutritional Foods as Solution: The Cost Argument*, Maputo: World Food Programme

Yach, D. (2011) 'The Role of the Private Sector in Improving Food Security and Nutrition', presentation made at IFPRI Washington DC, 7 September 2011, www.slideshare.net/ifpri/the-role-of-the-private-sector-in-improving-food-security-and-nutrition (accessed 29 September 2015)

Yunus, M.; Moingeon, B. and Lehmann-Ortega, L. (2010) 'Building Social Business Models: Lessons from the Grameen Experience', *Long-Range Planning* 43.2–3: 308–25

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