New Business Models to Help Eliminate Food and Nutrition Insecurity

Roadmap for Exploration

J.B. Cordaro

1 Consultant, Global Food and Nutrition Business Advisor
jbcordaro@hotmail.com
The momentum for ending hunger and malnutrition has increased dramatically with focused intensity, expanded scope and increased financial commitments. The clearest signal that the cycle of despair was changing was sent in 2012 by U.N. Secretary-General Ban Ki-Moon when he launched his Zero Hunger Challenge to serve as a stakeholder’s compass to assert that not a single person should go hungry in our world of plenty.

Dr. David Nabarro, his Special Representative for Food Security and Nutrition, believes that this momentum reached a critical mass in 2013, and the world is near the tipping point to end hunger. For the first time in our lives, it is reasonable to contemplate a world without malnutrition and the scourges of its social, economic and health consequences. Cumulative, unfolding events, commitments and interest in expanded private sector roles have brought the world to this guarded optimism. Below are a few illustrative examples of initiatives that have laid the foundation for high expectations of what may be possible by 2030.

- An Anti-Hunger Demonstration in London’s historic Hyde Park, with tens of thousands of people in support of Enough Food for Everyone IF campaign, supported the G-8 focus on addressing global food insecurity through business and science and included speakers Bill Gates, the head of the Bill and Melinda Gates Foundation; Rowan Williams, the former Archbishop of Canterbury, and other celebrities.
- In addition, there were collateral, major events in fifteen other cities around the world, and Civil Society Organizations (CSO’s) from 30 countries met with U.S. Agency for International Development (USAID) Administrator Rajiv Shah in Washington, DC to discuss how to achieve better food security results.
- The Global Nutrition for Growth Compact—Beating Hunger Through Business and Science launched by the UK Government, Government of Brazil and the Children’s Investment Fund Foundation (CIFF) prior to the G-8 meeting was endorsed by almost 100 stakeholders and generated new funding pledges of over US$ 4 billion.
- The USA and UK launched Global Open Data Initiative for Agriculture and Nutrition prior to the G-8 to support international partners in their efforts to make agriculture and nutrition data available for global public use.
- The Global Alliance for Improved Nutrition (GAIN) initiated a process, along with 10 pioneering food companies, to design a platform to allow companies to collaborate on pre-competitive research to address global malnutrition and catalyze new investments into food products, tools and technologies that promote healthy, nutritious and affordable solutions for consumers at all income levels.
- FAO’s 2013 report, "Food Systems for Better Nutrition," the first edition since 1947 to focus on the nutritional impact of agriculture and food systems, makes the case “that good nutrition begins with food and agriculture” and argues that agriculture and the entire food system can contribute much more to the eradication of malnutrition.
- FAO’s 2013 report follows decisions by 194 member countries that govern FAO to make the eradication of hunger and malnutrition its number one strategic objective.
• The Lancet 2013 re-evaluated its 2008 assessment of the problems of maternal and child undernutrition, examined the consequences of obesity for women and children in low- and middle-income countries, assessed progress in national nutrition programs and international efforts to fulfill earlier recommendations, and underscored the strengthening of scientific proof to support benefits from both nutrition and nutrition-sensitive interventions.

• At least forty countries from Africa, Asia and Latin America are participating in the Scaling Up Nutrition (SUN) Movement, with assistance from hundreds of CSO and NGO partners, the business and the development communities who are supporting national nutrition plans, designed, and owned in-country.

• The UNICEF Conference on Malnutrition among Sub-Saharan Africa (SSA) Women and Children complemented the release of the most recent UNICEF report on global progress on child and maternal development; the launch of the 2013 Lancet series on nutrition; developed perspectives and recommendations for the G-8 Nutrition Summit in London; updated stakeholders on the progress and mobilization around major initiatives, especially SUN; highlighted the urgent need to address child undernutrition in SSA; and underscored the need to strengthen social and economic progress and resilience in SSA which has fallen behind the rest of the world in addressing child nutrition issues.

• Pope Francis, as a part of the UN launch of an Anti-Food Waste Campaign to mark World Environment Day, denounced the “culture of waste” especially when it comes to food and likened throwing away food to “…stealing from the table of those who are poor and hungry.”

• The Center for Strategic & International Studies report, "Our Shared Opportunity: A Vision for Global Prosperity," encourages the U.S. Government and the private sector to use existing tools, technologies, and capabilities more effectively to help reduce poverty in developing countries.

• The UN Committee on World Food Security (CFS), the preeminent body for global governance of food, has forged its leadership position with governments, CSO/NGO and the private sector to address key challenges to long term sustainable agriculture production, food waste and nutrition.

• And finally, a roundup of several top-line development news stories to showcase recent successes:
  o Ethiopia—reducing undernutrition with national planning
  o India—Improving nutrition governance to reduce child stunting in Maharashtra
  o Nepal—Making steady progress for women and children in meeting the MDGs
  o Peru—Reaching the most disadvantaged by concentrating on equity
  o Rwanda—Reducing stunting through consolidated, nationwide action
  o Democratic Republic of the Congo—Scaling up community-based management of severe, acute malnutrition
  o Sri Lanka—Reducing under 5 mortality by expanding breastfeeding
  o Kyrgyzstan—Reducing iron deficiency with home fortification of food
  o United Republic of Tanzania—Institutionalizing vitamin A supplementation
  o Viet Nam—promoting breast feeding via legislative support
INTRODUCTION

This paper will explore the hypothesis that food manufacturers can deliver nutrition solutions to help eliminate global food and nutrition insecurity. The hypothesis will be tested by examining three interrelated aspects of the food and nutrition insecurity problem: (1) the statistics and grim consequences of hunger and malnutrition; (2) the obstacles that often present roadblocks for business to effectively utilize its range of expertise and capabilities to successfully market nutritious products to needy people in developing countries; and (3) the lack of successful experiences by food companies in building new business models to deliver market-based nutrition solutions.

Next, the paper will express today’s more optimistic perspective for successfully addressing food insecurity, perhaps even eliminating malnutrition by 2030, and describe the growing momentum to do so through: (1) increased recognition of the need and value that development agencies, international organizations and other stakeholders see for supporting more transparent and essential roles for the private sector, particularly food manufacturers; (2) increased recognition of the adaptability of tools, expertise and capabilities of food companies to address food insecurity; and (3) a greater recognition by food companies of the longer term values of efforts to build new business models adapted to existing conditions among the underserved in developing countries, including inclusive and other innovative characteristics that involve local communities.

Finally, the paper will offer a new methodological tool for business and other stakeholders to use in order to help overcome existing problems and obstacles by thorough assessments that seek to better understand consumer demand, supply requirements and specific enabling components and partnerships to reach success. This Roadmap is detailed in the form of a Decision-Tree Mapping Matrix (Tree) as the framework to help guide food companies and others in exploration of new business models for launching sustainable and resilient nutrition solutions. The Tree provides a roadmap for winning the battle against food and nutrition insecurity for hundreds of millions of vulnerable individuals in developing countries.

SETTING THE STAGE:
THREE ASPECTS OF FOOD AND NUTRITION INSECURITY PROBLEMS

The UN World Food Programme (WFP) describes food security as people having all-time access to sufficient, safe and nutritious food to maintain a healthy and active life. Three elements help determine the distinction between conditions of being food secure or food insecure: (1) Food Availability—food must be available in sufficient quantities and on a consistent basis; (2) Food Access—people must be able to regularly acquire adequate quantities of food, through purchase, home production, barter, gift, borrowing or food aid; and (3) Food Utilization—consumed food must have a positive nutritional impact on people. It entails cooking, storage and hygiene practices, individual health, water and sanitation, feeding and sharing practices within the household. (See Appendix A-figure 1)
The expectation that food manufacturers can provide nutrition solutions to help eliminate global food and nutrition insecurity is better understood in the context of these interrelated components of food insecurity problems:

- The human, economic and social statistics and grim consequences of food insecurity as exemplified by the faces of hunger and malnutrition with a Sub-Saharan focus represented by two sides of a coin—the problem of stunting and the progress of SUN;
- The physical, institutional and human obstacles that present roadblocks for business to effectively utilize scientific, technological and managerial expertise and capabilities to successfully market nutritious products to needy people in developing countries; and
- The lack of successful experiences by food companies in building new market-based business models innovative enough to deliver sustainable nutrition solutions.

STATISTICS AND CONSEQUENCES OF GLOBAL HUNGER AND MALNUTRITION

According to the FAO's "2012 State of Food Insecurity in the World," 870 million people do not have enough food to eat and micronutrient deficiencies affect 2 billion men, women and children. Ninety-eight percent of the world's hungry people live in developing countries where almost 15% of the population is undernourished. While this number represents a decline from 1990, progress has slowed since 2008 and an uncertain future emerges as we move closer to assessing the achievements of the decade-long MDG’s and framing those that will follow. Even with progress, hunger and malnutrition and their grim consequences remain the number one global health risk, killing more people every year than HIV/AIDS, malaria and tuberculosis combined.

The UNICEF/WHO/World Bank first joint-harmonized child malnutrition estimates in 2012 provide the facts and figures to support these observations through prevalence and burden number estimates for child stunting, underweight, wasting and overweight. The key global estimates for Stunting, Underweight, Wasting and Overweight as of 2011 are:

- 165 million children under five years of age, or 26%, of children worldwide were stunted (low height-for-age) with Africa at 36% and Asia at 27% representing more than 90% of the world’s stunted children.
- WFP's Two Minutes to Learn About School Meals reports that 66 million primary, school-aged children across the developing world attend classes hungry, with 23 million in Africa alone, affecting their ability to learn.
- 101 million children under 5, or 16%, worldwide were underweight (low weight-for-age).
- 52 million children under five years of age, or 8%, worldwide were wasted (low weight-for-height) and are at substantially increased risk of severe malnutrition and death.
- Undernutrition contributes to one-third of the global total of childhood deaths estimated at 2.6 million deaths of children under five each year.

The good news is that since 1990 the prevalence of stunting, underweight and wasting among children under five years of age worldwide has decreased; however, overall progress is insufficient as current estimates demonstrate millions of children remain at risk.
Unfortunately, the increasingly prevalent problem of global obesity has worsened as an estimated 43 million children under five years of age, or 7%, are overweight (weight-for-height). This represents a staggering 54% increase from the estimated 28 million in 1990. Increasing trends in child overweight have been noted not only in developed countries where prevalence is highest, but also in Africa where the estimated prevalence for under-five overweight increased almost twofold from 4% in 1990 to 7%, or about 12 million. Thus, obesity has expanded the challenges of malnutrition and must be accorded the highest level of priority to mitigate and resolve as part of nutrition related initiatives.

The health consequences of hunger and malnutrition are manifest in widespread infections in people who are highly susceptible to debilitating diseases and premature deaths, trapping future generations in cycles of social and economic despair. (See Appendix A-figure 2) The key causes of undernutrition are not limited to lack of adequate nutritious food, but can also be caused by: (1) frequent illness, (2) poor care practices, (3) lack of access to health and other social services and (4) poverty. Thus, the solution cannot be limited to a single intervention such as nutritious food, but optimal nutritional status can be enhanced with: (1) access to affordable, diverse, nutrient-rich food; (2) appropriate maternal and child care practices; (3) adequate health services; and (4) a healthy environment, including safe water, sanitation and good hygiene practices.

If vulnerable populations become more food secure, the result will stimulate reduction and removal of economic, institutional, human and governance barriers more rapidly than trying to deal with each obstacle directly. Nutritious products along with a range of other nutrition, health and nutrition-sensitive interventions would be game changing and help to: (1) reduce woman and child morbidity and mortality, (2) improve cognitive capability, (3) increase learning and farming skills, and (4) enhance employment opportunities.

SHARPER FOCUS ON SSA

On one side of the coin there are challenges and despair since nowhere in the world is hunger and malnutrition more pronounced than among the women and children of SSA. Food and nutrition insecurity is the most significant obstacle impeding rapid growth and development of SSA, thwarting human development and expansion of consumer demand.

The highest levels of hunger and malnutrition are in SSA countries where women and children are especially vulnerable. Deficiencies of vitamins A, B, C and folic acid, and the minerals iron, iodine, calcium and zinc are widespread and have devastating impacts. Scores of other obstacles and needs in SSA seek attention, but food insecurity is the most significant.

Among children in SSA:
- 38.5% (>56 million) are stunted
- 19.6% (>30 million) are underweight
- 9.0% (>15 million) are wasted
- Nearly 50% of children are at risk of blindness due to vitamin A deficiency
- 4 million low birth weight babies are born annually
• 80% of children have iron anemia deficiencies, associated with at least a 3% drop in wage earning potential for the survivors.

The impact on mothers is also significant:
• The highest rates of neonatal mortality in the world with a range of 1 in 16 to 1 in 45 from causes associated with childbirth
• 1 million annual stillbirths
• More than 1 million infant deaths within the first month, including mortality rate of 50% within one day of delivery.

These few facts underscore the special challenges that undernourished women face during their pregnancy and the complications at delivery for both mother and child. The survivors are at higher risks for various illness and cognitive impairment throughout life. (See Appendix A-figure 3)

These grim statistics have serious and long-term human, health and economic consequences in SSA, especially among stunted children and other forms of malnutrition.
• Human impacts trap future generations in cycles of social and economic despair and are major contributing factor to child mortality, disease and disability:
  o Reduced chance of survival
  o Hindered optimal health and growth
  o Physical and mental retardation, immunological impairment, and metabolic abnormalities
  o Associated with suboptimal brain development:
    • Long-term consequences for cognitive ability
    • Hinders school performance
    • Reduces future earnings capability
• Stunting serves as a marker for poverty and underdevelopment
• Children enter adulthood with a greater propensity for developing obesity and chronic diseases:
  o Will most likely create an epidemic in many low and middle income countries
  o Creates new health, economic and social burdens and life-challenges, especially among vulnerable groups
• Economic impacts affect national development potential:
  o Malnourished survivors suffer a loss of schooling years, are subsequently challenged to learn, and later in life often struggle with the day-to-day functions
  o >10% potential reduction in lifetime earnings
  o Gross Domestic Product (GDP) losses estimated at 3-5%
  o UNICEF estimates annual global cost at US$ 20-30 billion

Global health and nutrition challenges are magnified when maternal nutrition and health is added to the equation. Women's impacts on nutrition and health within their families underscore the likelihood of eliminating food insecurity more quickly by use of these interwoven linkages as highlighted by the United National Population Fund (UNFPA):
- Women's reproductive health: reduce maternal mortality and morbidity which represent major and preventable causes of death and disability for women in developing countries.
- Women's key food and nutrition roles: women are the backbone of the family as well as the portal for the family’s food supply—production, purchasing/bartering, preparation and distribution.
- Women's literacy: 2/3 of the illiterate adults in the world are female. Higher levels of women's education are strongly associated with lower infant mortality and lower fertility, as well as with higher levels of education and economic opportunity for their children.
- Women resource empowerment: in addition to food, women are also the portal for other key resources such as water and fuel.
- Women's economic and political empowerment: More women than men live in poverty due to economic disparities from unpaid work within families and discrimination in economic and political spheres—control of land or other resources, employment and earning, and political participation. The Gates Foundation argues that increasing women's income is likely to have a proportionally greater impact on children's health, nutrition and educational opportunities than comparable increases in men's income.

**Perspectives on Undernutrition Relationships, Stunting and SUN**

On the other side of the coin there is hope and progress with the unfolding expansion of the SUN movement and the scientific evidence to support a range of nutrition, health and nutrition-sensitive interventions. Based on accumulating scientific information, the international community has increased the emphasis on stunting to emphasize its role as the indicator for measuring progress toward reducing undernutrition. This has led to a review of national programs and strategies to increase the focus on prevention and integrated programs. New evidence and a better understanding of the short- and long-term consequences of undernutrition place stronger confirmation that undernutrition can trap children, families, communities, and nations in an intergenerational cycle of poor nutrition, illness and poverty. Some facts:

- Evidence from 54 middle and low income countries indicates that growth faltering begins during pregnancy and continues to about 24 months
- This loss in linear growth is not recovered and catch-up growth later in life is minimal:
  - More is known about the mechanisms that link inadequate growth due to nutritional deficiencies before the age of 2 with impaired brain development, cognitive challenges and reduced school performance
  - Longitudinal studies among cohorts of children from Brazil, India, Guatemala, Philippines and South America confirmed the association between stunting and schooling and that stunting was a predictor of grade failure.
- More comprehensive evidence for the need to promote optimal growth during the critical first 1,000 days period (see Appendix A-figure 4).
- Rapid weight gains are avoided that later lead to increased risk of non-communicable diseases, such as diabetes and cardiovascular, in adulthood and in the next generation.
- Child undernutrition is assessed by measuring height and weight and screening for clinical manifestations and biochemical markers
Intervention consequences for child undernutrition due to stunting have shifted from reducing underweight prevalence to prevention of stunting. A better understanding of the critical period of the 1,000 days that covers pregnancy and the first two years of a child’s life continues to be the subject of intense analysis.

The important determinants of stunting include, but may not be limited to: (1) quality and incidence of infant and young child feeding, (2) incidences of infectious diseases, (3) nutritional deficiencies such as vitamin A, iron, zinc, iodine, folic acid have a wide range of harmful effects including premature death, (4) mother’s nutrition and health status since an undernourished mother is more likely to give birth to a stunted child which perpetuates a vicious cycle of undernutrition and poverty. (See Appendix A-figure 5)

The international nutrition community, donor agencies, international organizations, NGO’s and most stakeholders have united behind the SUN movement to advocate reduction of stunting, acute malnutrition and micronutrient deficiencies. Over 40 countries have pledged to scale up their nutrition programs and initiatives via:

- Design and implementation of comprehensive national policies and programs
- Deployment of trained and skilled community workers
- Effective communication and advocacy
- National commitment to accelerate progress to reduce stunting and other forms of undernutrition and overweight
- Working to increase access to affordable and nutritious foods and creating demand for these products
- Multi-sectoral delivery of services to address the other nutritional status factors such as improved feeding care practices, clean water, sanitation, health care, social protection, and initiatives to empower women

Science-based evidence shows that achieving food and nutrition security is the most cost-effective accelerant to activities that, in turn, help overcome preclusive impediments to economic and social progress in SSA. The sources below support these observations, especially use of specially formulated products that deliver missing micronutrients:

- The 2006 World Bank Report "Repositioning Nutrition as Central to Development" provides extensive data that demonstrate nutrition interventions stimulate faster economic impact than economic programs alone. Its analysis and others show a range of 17-to-one to 30-to-1 return on investment (ROI) from micronutrient fortification
- 2008 Copenhagen Consensus—eight of the ten best drivers of economic development are nutrition or gender interventions
- 2012 Copenhagen Consensus urges emphasis on nutrition and fortification initiatives and ranked bundled micronutrient interventions that target malnutrition and disease of children and support for women as the top investment to fight hunger
- Guatemala study demonstrates 50% greater lifetime earnings for well nourished individuals
- Studies from GAIN, Flour Fortification Initiation (FFI), Helen Keller International, Micronutrient Initiatives and others
• Major donors and NGO’s have specifically identified nutrition and gender intervention as critical priority focus areas for priority initiatives

It is clear that the challenges of widespread malnutrition with consequent impacts on economic, environmental, and social factors result in a downward spiral of human and economic conditions that adversely impact all countries. Better nourishment can be a significant component in efforts to create lasting human and economic improvements in SSA and elsewhere.

**OBSTACLES TO ELIMINATING FOOD AND NUTRITION INSECURITY**

The physical, institutional and human infrastructure obstacles that present roadblocks for progress are daunting. We have laid out the significant challenges of stunting, wasting, underweight and surfaced the escalating problem of overweight as well as high levels of morbidity and mortality. Other social concerns stem from unemployment and low income, gender inequality, the disparities between rural, peri-urban and urban areas and lack of access to new technologies.

We also confront economic and political challenges such as: (1) trade policies and other economic barriers, (2) human and capital infrastructure deficiencies, (3) roads, transportation and distribution bottlenecks, (4) corruption and fraud, (5) governance and political instability, (6) land tenure policies, and (7) stifling government regulations.

The agriculture and food sector has its own set of problems: (1) underproduction, (2) poorly resourced small farmers, (3) challenging application of research and development results, (4) lack of food safety and quality assurance, (5) high amounts of food waste from farm to consumer, (6) deficient supply chain management, (7) land tenure problems, and (8) lack of empowerment to women in agriculture. Add population growth and environmental elements that impact food availability, nutritional value, safety, quality and prices such as climate change and weather volatility, water supply and management, sustainability, and land use practices and the obstacles appear staggering.

These few examples are only illustrative of the scores of obstacles and needs that exist in developing countries. Given these mountains of challenges, why should we be even cautiously optimistic that we may be reaching a tipping point in eliminating the twins of food insecurity – hunger and malnutrition? The answer is that food insecurity is recognized as the single most significant factor thwarting growth and development in SSA. Without improvement, the prognosis in SSA is bleak. Making vulnerable populations more food secure will catalyze removal of economic, institutional, human and governance barriers more rapidly than trying to deal with each directly. So, in short, we must try and we can try because we have the tools and capabilities to overcome these obstacles.

On the one hand, a recent United Nations report on the MDG’s concluded that efforts to reduce child mortality and improve maternal health might show no progress or even a reversal over the
next decade in SSA. On the other hand, it was recognized that concerted efforts by both the public and private sectors could avert this dismal prognosis.

**Are Food Companies Creative and Innovative Enough to Adapt Their Capabilities to find New Ways to Deliver Nutrition Solutions?**

The impacts of food and nutrition insecurity—stunting, underweight and wasting—are the most significant obstacles to economic and social progress and development. This must be addressed through a combination of meeting the FAO’s estimated needs for increased food crop production of 70-100% by 2050, increased access to safe, affordable and acceptable nutritious food products with fortified micro-nutrients and supportive health and well being initiatives. This is where food manufacturers can play key roles as the question is posed: can food companies deliver appropriate nutrition solutions to needy people in a manner that makes a difference on a sustainable basis?

If the past is prologue, then the future does not bode well for the food industry successfully delivering nutritious food products to the needy. Beginning in the early 1960's, attempts were made to find ways for food companies to provide nutritious food to malnourished target populations, especially children. The key findings of a White House Nutrition Working Group in 1965 provide useful insights for the framework that evolved for several USAID initiatives. These findings were shocking and revealing at the time, but now, almost 50 years later, are well worn from rhetoric and repetition.

In the 1960's most US food companies were not interested in exploring the role they could play to reach vulnerable populations. Samples of the reasons given include:

- Feasibility studies and explorations showed no hope that nutritious foods could be produced and marketed
- Little projected demand for nutritious products
- No or inadequate profit potential
- The neediest could not afford to buy the products
- National governments would not allow foreign firms to profit by feeding starving people
- Inadequate national government support and encouragement
- Impossibility to overcome marketing and distribution problems.

Nonetheless, USAID initiated programs to utilize the expertise and technology of the US food industry based on its belief that food firms could sell nutritious foods through the commercial channels of developing countries and make both a profit and a nutritional impact. USAID was prepared to help companies over the five years they believed would be needed to reach profitability. The food company executives who were initially willing to try did so on the basis that they would have to consider factors other than a return on investment such as future markets, public relations, local government relations value, and social responsibility. In essence, they felt that nutritious food projects could be justified only if one deferred pay-off expectation for two or three generations and used current investment to get a "foot in the door."
A detailed examination of this period and the efforts to encourage US food companies to market nutritious foods on a commercial basis can be found in the author’s 1972 Cornell University Graduate School Thesis—An Inquiry Into the Agency for International Development’s Commercial Studies High Protein Food Program.

What was the result of the several efforts that were made to introduce nutritious food products in developing countries? Bottom line: No product successfully penetrated retail distribution in reaching the needy target groups. Nonetheless, USAID considered that the program efforts had made significant breakthroughs for five reasons: (1) increased awareness of the depth of the malnutrition problem in developing countries and of the potential role of commercial foods versus conventional donated commodities, (2) stimulated the US to fortify all of its formulated food products for existing food distribution and feeding programs, (3) encouraged several companies to investigate protein food potentials in developing countries, (4) provided useful lessons learned about what works and what doesn't and (5) broke ground for future opportunities for cooperation between private organizations in developed countries and governments and other stakeholders in developing countries.

In essence, the efforts of some of the largest multinational food companies were stymied in achieving commercial feasibility of marketing nutritious foods in developing countries. Yet, their research and development to formulate commodity-based nutritious products for feeding programs became a valuable contribution shared with other donors and NGO groups. Indeed, these actions set the stage for the evolution that would occur on several fronts over the next few decades with: (1) focused attention on understanding how to penetrate markets among the underserved, dubbed the Base of the Pyramid (BOP) by 2002, currently a challenge to a new generation of interested business entrepreneurs, (2) more aggressive efforts to break down the legal and regulatory barriers to large scale micronutrient fortification of commodity staples by the FFI and GAIN, (3) the hybrid business models which manufacture and deliver ready-to-use therapeutic foods (RUTF) produced by commercial companies for severely malnourished children with markets guaranteed by donor and NGO purchases as well as other subsidized nutrition product efforts, and (4) the science based evidence needed to formulate appropriate products to specific target populations. These metrics helped contribute to the food security progress and offer a basis for today's expectations for significant game changing roles for food companies.

Realistic Expectations for Food Companies: Not by Nutritious Foods Alone

Earlier we described failures by the private sector in marketing nutritious food products to needy people in developing countries. We also described the evolution for tapping into business capabilities to improve food commodities and blended, fortified products for use in global institutional and emergency feeding programs once awareness of the nutritional needs had been raised and could be matched with private expertise. So although the "commercial, market-based feasibility" was not achieved, active food security roles for the business sector were developed.

Now we shift to focus on whether the lessons learned over the past five decades along with paradigm changes among the major stakeholders present better perspectives for how problems
can be addressed to help eliminate food and nutrition insecurity. This optimism is based on the reality of a major change in the development landscape from public to public-private partnerships and collaborations: (1) increased recognition of the need and the value stakeholders recognize for supporting more open, transparent and essential roles for business to help create sustainable delivery of foods rather than a reliance on food aid and charity, (2) increased recognition of the adaptability of tools, expertise and capabilities of the food companies to address food insecurity, and (3) greater understanding by food companies of the long term values of their commitment and efforts to build inclusive business models.

To accept this opportunity, this paper asserts that food companies are visibly challenged to find ways to modify their conventional business-as-usual for profit model to build new business models and include illustrative characteristics such as: (1) inclusiveness to better involve local communities to stimulate employment and income; (2) co-create initiatives and products within the local communities, (3) adjust ROI length and amounts, (4) reduce gross margin expectations, and (5) factor additional social and economic values with profits to expand for calculating ROI.

Likewise, companies will be challenged to: (1) find new paths to leverage technical knowledge, expertise and overall capabilities, (2) use a robust network of stakeholders as allies and partners, (3) find ways to penetrate multiple routes to market (MRTM), (4) create products through the local lens of habits and consumption patterns of the needy, and (5) launch business models that provide nutrition solutions.

Companies can no longer act as lone rangers, limiting their actions to charity contributions and relying on off-the-shelf home-grown ideas to export. They can no longer operate in a silo as their future is more tied to the global economic and environmental universe. Today, food companies must consider the mutual benefits of working to create new business models that deliver nutrition initiatives in a specific country.

Clearly the opportunity exists to improve the health and well being of individuals, to improve the reputation of the company and perhaps over a longer period to expand business. Companies may ask these questions as it considers the value of building new business models:

- Does the initiative present a market development window to broaden market expansion, grow a brand, and forge ahead of competitors?
- Can the effort be used to open doors that encourage businesses to help address food security and build markets?
- Are new business models an essential link to growing future business through partnerships and relationships that are developed?
- Are commodity interests tied to the country's economic growth, social, education and health improvement and government stability?
- Are company employees interested in applying their expertise, knowledge, tools and capabilities to implement nutrition solutions in the country?
DECISION-TREE MAPPING MATRIX (TREE)
A ROADMAP GUIDES THINKING, PLANNING AND DECISION MAKING

The prequel to this paper expressed a belief that we may have reached a tipping point in being able to eliminate hunger and malnutrition over the next couple of decades. Subsequent discussions detailed the facts of hunger and malnutrition, the grim social, human and economic consequences of nutritional deficiencies, the SUN progress and highlighted the unique roles that food companies can play to help end food insecurity. We then challenged that hypothesis by examining the lack of past successes of food companies seeking to market nutritious foods to vulnerable populations in developing countries alongside the new hope and expectations for their success today.

Now we examine a new methodological tool for business and other stakeholders to use in order to help overcome existing problems and obstacles by thorough assessments to understand consumer demand, supply requirements, specific enabling components and partnerships needed to build new business models that will likely lead to success. This Roadmap is detailed in the form of a Decision-Tree Mapping Matrix (Tree) as the framework to help guide food companies and others in exploration of new business models for launching sustainable and resilient nutrition solutions. (See Appendix A-figure 6)

The business model for this Tree is a simple concept: **can the company create and market a nutritious product proposition that delivers mutual values on a sustainable basis to target groups and achieve expected impacts?** How to make this assessment and how to build the business model is admittedly not so simple.

The Tree has been developed from the author’s research, business, government and development experiences over the last few decades. A summary assessment and collection of some of the lessons learned are relevant to the Tree. Illustrative of these lessons are:

- All major governments, development agencies, international organizations, NGOs and other stakeholders have identified nutrition, nutrition-sensitive and gender intervention as critical focus areas for priority funding
- Nutrition interventions are the most cost-effective means to accelerate economic development and reduce poverty
- Progress has been made and progress is increasing
- Broad stakeholder encouragement and support exists for increased collaboration and expanded roles for business to help eliminate food insecurity
- Valuable insights have been gained as to how to enhance food security, improve nutrition and health, and create positive social and economic impacts
- There is greater recognition that food companies have a comparative advantage with their technical skills, expertise and capabilities to make better, safer and more nutritious food products
Business has begun to understand the value of adapting its tools and capabilities through in-depth local immersions to understand the product needs, wants and desires that needy people will accept and can afford.

Product propositions must be co-created under local conditions and inclusive techniques must be found to involve local communities to increase employment, generate income and source local materials to help expand effective demand.

A single company cannot overcome all the barriers and obstacles that exist to successfully marketing nutritious products in developing countries and companies must build a robust network of allies and partners.

Allies and partners can add essential value to the roles of food companies and these collateral components must be integrated to overcome impediments and obstacles to increase the likelihood of success for a new market-based business models.

The Tree facilitates the accumulation of scientific, technical, managerial and informational tools and capabilities as a GO/NO-GO process for decision makers to assess market-based business models to launch nutrition solutions. The Tree can help guide a company’s thinking, planning and decision making in its analysis of whether the business proposition is feasible for the company. There are no guarantees for success in delivering nutrition solutions via market-based business models. However, it is highly unlikely that success will occur without a transparent and detailed roadmap to guide the decision making process. The Tree presents a visual perspective of the comprehensive and complex components, desired endpoints, appropriate sequences, dependencies and critical decision points. The Tree yields insights that allow decision makers to appreciate the considerations of diverse inputs, logical thinking and strategic planning and the level of risk for future business considerations.

**THE BRANCHES OF THE TREE and THEIR TOOLBOX**

The two main interactive branches of the Tree are:

- **Consumer Demand** --where the product proposition is developed, tested and the level of effective demand is assessed; and
- **Supply Factors** --where the dependability and resilience of the supply chain-- from raw materials, human, physical and institutional infrastructure requirements, manufacturing and creative solutions for penetrating multiple routes to market (MRTM) are assessed.

These two interactive branches comprise tools to assess distinct but interrelated aspects of the Consumer Demand and Supply Factors assessment process. Activities in each branch can proceed simultaneously as one selects the country or region to test the hypothesis that a food manufacturer can deliver nutrition solutions on a sustainable and resilient basis to help eliminate food and nutrition insecurity. Within these two branches a variety of tools and capabilities can be deployed to collect the information and insights needed to make informed and timely decisions.

The Tree organizes the toolbox into five compartments. The specific tools in each compartment must fit the circumstances and will vary from case to case. The compartments are:
**Product Proposition**
Build and test the product proposition and level of effective demand by defining target countries or regions; identifying target populations; creating and aligning appropriate product propositions via nutrition compositions, profiles and formats to understand acceptability and affordability to the target populations and developing, testing and validating nutrition products.

**Supply Chain**
Map the supply chain and assess raw materials and ingredients viability to support a business model that emphasizes the localized, country driven nature of the value proposition from raw materials ingredients to packaging; personnel capabilities and training; manufacturing facilities, equipment needs and site location; and governance-laws, regulations and national support.

**Market Penetration**
Develop creative methodologies to penetrate multiple routes to market and enhance the expectations for a sustainable and resilient business based on economies of scale.

**Enabling Components and Partnerships**
Facilitate the effective integration of core components in the business plan through a robust network of alliances and partnerships that emphasize country driven local sourcing; employment generation; income creation; technology; empowerment of women and health facilities linkages.

**Business Plan**
Shape the contours of new business models that recognize the differences between the characteristics of a normal for profit business model for more developed markets versus low income markets with modification to the gross margins, levels and length of time for return on investment.

**CONSUMER DEMAND**

Decision makers know that the level of demand for a product represents the life or death of the viability of a product. That fact is as true in reaching vulnerable in the base of the pyramid populations in developing countries as in reaching high income populations in developed countries. Understanding whether ones product proposition has sufficient demand, how to stimulate demand and how to assess the strength of that effective demand is a challenging and critical initial step in progressing through the Tree. The Tree moves through a logical process to collect and assess the information needed to reach a decision point on the level of effective demand. To do so, exploration focuses on country selection, defining population targets, developing product propositions and consumer testing and scaling.

**Select country and or region**
Whether for country by country comparisons or for assessing conditions in a known country of interest, a food manufacturer will need to collect, analyze and assess a wide range of data and
information from current and credible resources. The Tree is not prescriptive as to the specific data that should be used, but is suggested that a useful resource is the 2012 World Development Indicators published by the World Bank. This annual report provides the most current country by country global information for exploration via a detailed assessment of key economic, governance, agriculture crops, food, health, nutrition, social and other useful indicators. A wide range of computer programs and analytical techniques can help company decision makers assess the country selections. Most likely each company will also have a set of internal reasons- pro and con- to add to their decision making process.

Collect consumer information insights and select population targets
At the core of this process is the essential need to develop an immediate and deep understanding of the ethnographic characteristics of the people and the country. This is best done with qualified and knowledgeable experts with technical, country and interpersonal skills to generate the information. Some illustrative information to seek from the ethnographic research, which must begin with recognition of the need to adapt tools such as focus group methodology to local conditions, is:

- local culture, including the social and economic aspirations of the people, especially women
- health and nutrition landscape
- essential information about people and the food system to initiate on-the-ground explorations for developing and delivering nutrition solutions
- potential of the local agriculture supply chain, and the food industry to support a nutritious food venture
- level of priority afforded nutrition and health initiatives by government leaders
- valuation of resources from NGOs, international agencies and others to help overcome challenges and obstacles

After the country or regional focus is established, the population target(s) must be defined for understanding and aligning appropriate product propositions. These groupings represent a useful way to categorize and select potential consumer audiences to explore as market targets for nutritious products.

- Women, especially those of child bearing age; pregnant and breast feeding
- Infants and young children, especially 2 years or younger
- Other children, from 2 years to school age
- School age
- Elderly
- Individuals with health compromised conditions
- Obese
- People in stress such as conditions of disaster, emergencies and other calamities

The selection of the target population(s) should be shaped and determined by boots-on-the-ground analysis of the economic and ethnographic data generated from the initial analysis of population size, geographic dispersion of targets, ease of reach, need levels, income segments, focus group analysis, consultation with stakeholders, ongoing initiatives and a company’s internal principles, interests and capabilities.
Once the target population has been selected, consideration must be given as to how to build the product concepts and how to deliver the nutritious products to consumers; e.g., direct specific targets versus family meals. In this regard, nutrition compositions, profiles and formats that align with the target populations acceptability and affordability must be maintained. Likewise, it is most likely that a company will not be limited to a single product but will develop a portfolio of products.

**Develop product propositions and build a scorecard**

The vital decision steps to make at this point are to: (1) identify potential product propositions appropriate for the country and population targets; (2) develop products in appropriate formats, physical properties, nutrient profile and composition and organoleptic qualities for sensory testing and evaluation within the target populations; (3) project packaging and labeling requirements; and (4) align with the climate and environmental conditions and distribution routes to ensure that sustainable taste acceptance, safety, affordability and nutritional value will survive.

A starter-set of product propositions that a company can modify can be placed into a tailor made product matrix that can be developed by the company to show relationships between the product and the criteria to assess the value of developing specific products to formulate for testing. These initial considerations could be built around these concepts:

- Pre-cooked cereal products for reconstitution into porridges
- Fortification of already consumed products
- Development of new food concepts
- Savoury dry mix products, condiments for addition to soups and stew
- Functional foods that add desirable qualities such as thickening, meal extenders, etc.
- Fortified biscuits
- Fruit and vegetable based beverages
- Other food drinks
- Fat based paste products

On the criteria side of the scorecard that one develops, these factors can be considered:

- How well the product addresses the nutritional needs
- How well the nutritional product aligns with the target population's food consumption patterns
- How product likely to be viewed; i.e., aspirational, poor person's food; woman or child product
- Level of technical difficulty or ease of manufacture
- Ease of making nutritional improvements to existing product
- Level of challenge for introducing a new product, either as dietary addition or substitute food product
- Collateral components needed to enhance likelihood of success
- Distribution and shelf life considerations
- Affordability for regular consumption
The product proposition matrix examination will help to decide which potential product prototypes to pursue for your target population in the given country. The two interrelated considerations that must be addressed are: (1) consumer acceptance and (2) manufacturing issues.

**Consumer Acceptance Issues: Acceptance, affordability, safety and nutritional benefit**

The product must align with the consumption patterns of the people in the communities where the product will be marketed. Thus, enough consistency must be expected to be found with the nutritious product to be tested and local food purchases, eating habits, health and nutrition needs, and price points. After one has defined the consumer targets, learned all that can be known about their food purchases and habits, patterns of food consumption and typical eating habits, products can be developed and small scale testing done to determine consumer acceptance and likely affordability as a basis for deciding to move to larger micro-testing.

The five key variables for reaching the needy are: (1) whether to use a new or improved vehicle-food staple or product; (2) what should be the added nutrients; (3) what delivery system will get the nutritious food to the target population via market-based, multiple routes to market; and (4) what are the required characteristics of the product, e.g., availability, affordability, acceptability and sustainability; and (5) what price point is likely to build a sustainable business.

Product development must address technical considerations that relate to future manufacturing issues and should be accounted for in the scorecard criteria:

- Potential technical development resources required- plant location, facilities, equipment and personnel
- Formulate products that ensure the nutritional benefits actually reach the target consumer
- Micronutrient fortification stability issues
  - Impact on product flavour and appearance
  - Impact on shelf life
  - Interactions between micronutrients and other components
  - Mineral bio-availability
  - Potential adverse micronutrient and disease interactions
  - Ease of physical incorporation into the product
  - Monitoring and quality control and assurance procedures required

**Tweak, scale, further test and brand**

Several iterations of laboratory and field testing will be required to get the fortification formula correct as one moves from small scale testing and learning, reaction to consumer comments and then on to larger scale testing and packaging and stability testing.

- Field test prototype products for consumer acceptability including home use testing
- Test formulated nutritional product for sensory acceptance in market place
- Further tweak product recipes
- Assess product ingredient costs and seek local sources for ingredients
• Prepare a full set of fortified products with optimum overage requirements to assess packaging requirements and shelf testing to determine stability under local conditions and with non-fortified products as controls
• Obtain third party review on final proposed product concepts and formulation levels
• Establish requirements for consumer testing of larger quantities of prototypes
• Make initial estimates of raw material costs
• Finalize product branding

**SUPPLY FACTORS and RESOURCE NEEDS**

**Supply Chain: Raw Materials, Personnel, Equipment, Packaging, Manufacturing Facilities and Production Sites**

Several supply factors are critical to understanding the availability of the key resources required to assess the likelihood that the full package—raw materials, personnel, equipment, etc.—are available to produce products on a dependable basis at the right price points. Closely aligned with manufacturing is distribution and marketing of the products. One must assess the most feasible ways to work through the several marketing routes in developing countries to deliver the products to customers. This would include regular commercial channels that reach higher income segments to those that reach deep into the Base of the Pyramid to the underserved. The latter is the more challenging and will require creative approaches.

Before moving to this part of the Tree analysis and consistent with the value of interaction between demand and supply, additional manufacturing criteria should be added as a further check in the product scorecard to help select product concepts. For example, products might have manufacturing consequences that could affect product selection such as:

• Ease of manufacture, including dependable raw material availability, identification of potential manufacturers, supporting raw material supply chain needs, and other support in the country or region
• Ease of distribution and potential shelf life issues; i.e. packaging requirements
• Availability and preliminary estimates on manufacturing and raw material cost factors
• Suitability of existing vehicle for nutritional improvement
• What are the trade off opportunities for introduction of nutrition solutions via new product concepts or improving existing products

Market, cost and manufacturing factors that will impact the Business Plan must be developed though the Tree for later inclusion in the Plan:

• Appraise supply chain strengths and weaknesses
• Define the support base needed; i.e., partners, collateral activities, local sourcing, personnel training and education, etc.
• Estimate resource requirements; i.e., personnel, financial, physical and capacity building
• Assess market resource factors and level of risk
• Identify and assess how to penetrate the multiple routes to market and the price point ranges
Marketing
A wide array of creative marketing methodologies must be identified, developed, tried, and shaped to penetrate multiple routes to market and enhance the expectations for a sustainable and resilient business based on economies of scale.

Marketing initiatives need to focus on helping create consumer demand. It is widely believed that within the low income segments of the BOP that below the line (BTL) marketing supported by community leaders and linkages such as health clinics and facilities is more effective than more traditional marketing via advertisement and promotions.

Distribution mechanisms must be flexible to local conditions. Explorations need to be made at the regular commercial channels for the more affluent and, at the same time, two-tiered pricing should be considered in other channels of distribution offering lower prices where the vulnerable populations purchase. Local innovations for reaching the needy target populations must be explored such as direct marketing, mobile distributors, market kiosks, and street hawkers. The added value of long term commitments from international organizations, and national and local government institutional feeding programs should not be ignored as a means of helping to build economies of scale.

Consumer Demand and Supply Checkpoint

At this point in the Tree flow, one should have a good understanding of the strength of the effective demand and the dependability, risk levels and cost aspects of the various supply factors. By now, several key decisions should have been made based on the interactions of the Demand and Supply Tree branches: country chosen, population group(s) selected, product(s) developed, tested, and tweaked, consumers expressed acceptance and preliminary market assessment indicates expected market demand levels. Likewise, insights have been developed on the dependability of the raw materials, including local sourcing, personnel needs, projected site location, equipment needs, packaging requirements, marketing techniques needed to penetrate the various consumer distribution routes and any challenging governance issues identified and addressed.

At this point the movement towards preparing a Business Plan takes on momentum. The Supply and Demand outcomes should be integrated along with the required partners and allies and the definition of the collateral components that are needed to bridge the gaps in the company’s capabilities. Assembling and assessing the outcomes of these decision consequences will form the information base for the decision makers to answer whether the nutritional product(s) is acceptable to the sensory expectations of the target populations; that the communities
are likely to purchase and use on a regular basis; and at a price point that supports justification for creating a new business model with collaboration from a robust partnership network.

Partnerships and Collateral Components

Collateral Components
No company can do it alone, given the challenges that exist to deliver nutrition products to the needy through the MRTM, unless they are supported by a robust partnership base that provides collateral component that help overcome the preclusive impediments and obstacles. These enabling components can well be the bridge from failure to success.

Here are a few illustrative examples of the areas to seek support via enabling components:

- **Health:** Link health care, nutrition education and breast feeding facilities and providers as focal points to stimulate product awareness and value through nutrition education, breast-feeding and related activities
- **Nutrition:** Access to a portfolio of affordable nutritious foods
- **Information:** Leverage mobile phone and other innovative technologies to expand awareness and link consistent product use with health care, nutrition and information
- **Consumption:** Beyond the nutritious family meals, reach multiple venues for utilization and feeding programs via school and institutions
- **Empower Women:** via micro-finance, business training and income generation
- **Local manufacturers:** Leverage appropriate roles for local manufacturing through training, mentoring and partnering with local entrepreneurs
- **Local sourcing:** Stimulate local commodity sourcing, support improvements in supply chain challenges and build a sustainable partnership base
- **Penetrate multiple routes-to-market:** Define price points, institutional and feeding programs to build economies of scale and increase penetration across all income segments including vulnerable populations
- **Governance:** Reduce burden of laws, regulations, and other obstacles and barriers to the new business model.

Robust Network of Allies, Collaborators and Partnerships

Each partner and ally should bring a special comparative advantage or value to the relationship. Examples of the kinds of support that should be sought include, but are not limited to, partners that can facilitate financial support and special personnel; address infrastructure and policy obstacles; information, networking and in country support; program and development expertise; and lessons learned about food manufacturing, especially local.
**Detail Elements of Business Plan and Business Model**

Every company will have proprietary perspectives on what should be included in the business plan. These details of the financial feasibility plan must provide decision makers with the expected cost basis for the initiative, projected returns and level of risk/reward. This plan must, among other items, determine the facilities, location, building and equipment; projected cost and availability of ingredients; nature of labor force and training needs; marketing plan with market projections, including expected institutional purchases, if any; and the nature and cost of addressing infrastructure barriers. Details from the financial analysis, against a time frame backdrop, should provide decision makers with sufficient information to reach a go versus no-go business decision including the level of commitment required.

Given the expectation of a new business model being developed these core issues need to be addressed: (1) how well does the venture align with the corporate culture, principles and reputation; (2) what additional social, economic, human and environmental considerations will the company’s new business model factor in with the profit expectations; (3) what alterations will be made from the normal for –profit business model regarding gross margins; expected profit levels and length of time to reach sustainability.

Finally, if all is GO, then the implementation, launch, monitor and evaluate steps will be deployed.

**SUMMARY and CONCLUSION POINTS**

Since no magic wand exists to end poverty and provide adequate income to purchase a diverse and nutritious diet, a corollary proposition needs to be examined: Can the food system be adapted to provide more, better quality foods to the needy within their current income levels? If income cannot be increased in the short run, the question is whether adequate quantities of nutritious foods can be provided to the needy at their present income levels.

The optimistic news is that food companies can leverage the expertise, tools and capabilities to deliver nutrition solutions to address food and nutrition insecurity on a sustainable and resilient basis, especially among vulnerable population segments. This paper recognizes several alternative approaches that can be undertaken to offer nutritious foods, but focuses on the role that food manufactures can play to create new market-based business models.

The evolution of the role of business in food security can be seen as past emphasis on charity and philanthropy, giving way to core business cause-related marketing and now to sustainable market-based social business enterprises. A company could decide to return profits into the business of current nutritional needs with the yield of future growth opportunities over a longer time horizon and lower return on investments.
It is important to distinguish new business models from both a classic charitable contribution and profit making. The new business model cannot incur losses indefinitely, but must reach a non-loss level at a point in the business plan.

In sum, most food companies have an overabundance of technical knowledge, experience, resources and contacts to develop and deliver nutritious food products to meet the varied nutrition and health needs of the people in the region. Products could be formulated to address distinct health and nutritional challenges and delivered to vulnerable populations through appropriate regular market channels; distribution and partnerships with experienced NGO’s, national and local governments, bilateral development agencies, international organizations and other allies. A company can enhance its reputation by creating a sustainable, innovative business model that functions in these unique settings, while maximizing potential growth to its core portfolio.

The paper justified optimistic perspectives that these problems can be addressed for future successes by pursuing existing momentum based on:

- Consensus recognition of the need and value stakeholders see for supporting more open, transparent and essential roles for business;
- Increased recognition of food companies ability and willingness to adapt its tools, expertise and capabilities to address food insecurity; and
- Understanding by food companies and stakeholders of the mutual values for eliminating global food insecurity

A Decision-Tree Matrix was urged as a valuable tool for the Roadmap for exploring the framework for inclusive market-based social business models to deliver sustainable nutrition solutions with enabling components and partnerships, where the local populations participate in co-creating and helping implement nutrition solutions.

We close with a list of ten key factors to enhancing the new business model:

**Product Proposition**

- Deliver safe, quality nutritious products that are relevant to the needs and aspirations of the target populations at affordable prices.
- Provide products that offer consumers "health-changing-capable" nutritional value that can be sustained as a part of regular food consumption patterns.
- Don’t expect “successful" developed country product propositions and products to translate easily for success, but rather adapt capabilities, expertise and technological skills to local conditions and needs.
Supply Chain
• Local sourcing of raw materials could be a useful lever to help stimulate community growth and development by increasing agriculture production, guarantying markets and generating income.

Marketing
• Recognize that economic success is more likely to occur if the nutritious products are being purchased and consumed by the entire economic spectrum of the country through a multi-tiered routes (MTRM) strategy.
• Be leery of the income threshold to determine likely success: recognize the population numbers, income levels, percent of income spent on food products, food purchases and the emerging income class being generated by improved nutritional status.

New Business Model
• Companies face challenging environments for using their capabilities. It is important to consider lessons learned from the mistakes and failures of earlier food ventures targeted to vulnerable populations.
• To reduce the chances of repeating these mistakes and increase the likelihood of success, use the Tree tools to provide a competitive advantage to deliver breakthrough nutrition platforms.
• Create inclusive business models consistent with local conditions and involve local stakeholders as a part of the co-creation and implementation process.
• Expand the ROI calculation to address the need to accept the reality of reduced profit levels over longer periods of time.
• Seek a robust range of partners and allies for support areas to help round out capabilities and build a broader equity base.
Appendix A

Figures
Cycle of Despair

Source: Todd Benson; IFPRI 2004
Figure 3
WHAT CAUSES MATERNAL AND CHILD MALNUTRITION?

Today, 7,000 young children will die from malnutrition while countless others live out their childhoods in a state of chronic malnourishment. Understanding how this happens is the first step to solving this silent crisis.

FOOD
Insufficient access to affordable, nutritious food. Without sufficient calories or the right nutrients in their diets, women and children are susceptible to the dire, sometimes deadly, consequences of malnutrition.

CARE
Lack of proper care of mothers and children and poor infant feeding practices. Nearly one million child deaths per year could be prevented if children were breastfed exclusively during their first 6 months.

HEALTH
Poor access to health services and unhealthy household environment. Disease, unsafe water, and improper sanitation contribute to malnutrition, particularly in children.

72
children will die from malnutrition by the time you finish reading this infographic. Virtually all of these deaths are preventable.

AT THE ROOT OF THE PROBLEM

POVERTY
Poverty can lead to malnutrition and malnutrition can, in turn, trap people in poverty. For children malnourished early in life, this trap can last a lifetime.

STATUS OF WOMEN
Women’s lack of access to economic resources and educational opportunities can hinder progress toward eliminating child malnutrition. It is estimated that the odds of a child being severely undernourished are reduced by 50% if his mother owns land.

THE SEEDS OF LIFELONG HEALTH & DEVELOPMENT ARE PLANTED IN THE FIRST 1,000 DAYS

The 1,000 days during a woman’s pregnancy and her child’s first 2 birthday are critical to long-term human development. The right nutrition during these 1,000 days produces a lifetime of benefits: healthier growth and brain development · stronger immune systems · higher IQ · better educational performance · greater lifetime earning potential

Better nutrition in the 1,000 day window can help families and societies break the cycle of poverty and lead to:

- Savings of $20-30 billion annually in health costs.
- 3% increases in GDP up to 3% annually.
- Productivity gains of as much as $158 for each $1 invested.

www.ThousandDays.org

1000 DAYS

First 1,000 Days

Figure 4
DEPRIVATION AND MALNUTRITION—TRANSMITTED ACROSS GENERATIONS FROM MOTHER TO CHILD

**ADOLESCENT STUNTED**
Reduced physical labour capacity and lower educational attainment

**WOMAN**
- **LOW WEIGHT GAIN DURING PREGNANCY**
  - Lower birthweight
  - Higher maternal mortality

- **MALNOURISHED**
  - Reduced labour capacity
  - Lower education
  - Restricted economic potential
  - Shortened life expectancy

**CHILD STUNTED**
Reduced mental capacity

**BABY LOW BIRTHWEIGHT**
- Higher mortality rate
- Impaired mental development
- Increased risk of adult chronic disease

**ADULT MALNOURISHED**

Source: Based on Benson (2004), figure 1, p. 3.

Figure 5
Appendix B

Bibliography


Barilla Center for Food &Nutrition. *Healthy growth and nutrition in children*

Bill and Melinda Gates Foundation. 2011. *Agricultural development-strategy overview*


Chevrollier, Nicolas, Bulrts, Rutger, Sprenger, Thom, Danse, Myrtille, Poniatowski, Birgit, O’Neill, Kirstin. 2012. *Access to food and improved nutrition at the base of the pyramid*. Utrecht, Netherlands, BoP Innovation Center

Collier, Paul. 2007. *The bottom billion: why the poorest countries are failing and what can be done about it*. New York, NY


Committee on World Food Security. 2012. *Concept note: technical workshop on harmonization of food security and nutrition actions mapping streamlining with other food security and nutrition systems*


Copenhagen Consensus. 2012. *Expert panel findings*

Cordaro, John B. 1972. *An inquiry into the agency for international development’s commercial studies high protein food program*. Cornell University, Ithaca, NY. (MA thesis)
Counts, Alex. 2008. Small loans, big dreams: how Nobel prize winner Muhammad Yunus and microfinance are changing the world. Hoboken, NJ


FAO. 2010. Global forum on food security and nutrition: knowledge sharing for improved food security and better nutrition: two years of online discussions


FAO. 2010. Sustainable diets and biodiversity: directions and solutions for policy, research and action. Editors Barbara Burlingame & Sandro Dernini. FAO

FAO. 2012. RIO+20: towards the future we want. FAO

FAO. 2012. The state of food insecurity in the world 2012

FAO. 2013. The state of food and agriculture. Rome, Italy. FAO


HLPE. 2012. Social protection for food security: A report by the high-level panel of experts on food security and nutrition of the Committee on World Food Security. Rome, Italy

Hodges, R. J., Buzby, J. C., & Bennett, B. 2010. Foresight project on global food and farming futures: postharvest losses and waste in developed and less developed countries: opportunities to improve resource use. Journal of Agricultural Science


Humberg, Kerstin Maria. 2011. Poverty reduction through social business?: lessons learnt from Grameen: joint ventures in Bangladesh. München


InterAcademy Council. 2004. Realizing the promise and potential of African agriculture: science and technology strategies for improving agricultural productivity and food security in Africa. Amsterdam


Kotler, Philip & Lee, Nancy. 2005. Corporate social responsibility: doing the most good for your company and your cause. Hoboken, NJ


Mutuma, Sandra. 2012. Aid for nutrition: can investments to scale up nutrition actions be accurately tracked? New York, NY. Action Against Hunger, ACF International

Mutuma, Sandra. 2012. Aid for nutrition: can investments to scale up nutrition actions be accurately tracked? Washington, DC. Action Against Hunger, ACF International


Nabarro, David. 2013. Op-ed: are we at the tipping point for ending hunger and malnutrition? (available at www.ipsnews.net/2013/06/op-ed-are-we-at-the-tipping-point-for-ending-hunger-and-malnutrition/)


Save the Children. 2012. *A chance to grow: how social protection can tackle child malnutrition and promote economic opportunities*


The Pan African Nutrition Initiative. 2008. Comprehensive Africa agriculture development programme (CAADP) with micronutrient initiative (MI)


Thousand Days. Nutrition: an investment in growth. 1,000 Days Policy Brief


UNICEF. 2013. *Improving child nutrition: the achievable imperative for global progress.* New York, NY


*USAID. 2012.* *Frontiers in Development.* Edited by Rajiv Shah & Steven Radelet. USAID


Van der Klein, Wendy, Mancheron, Helene, Wertheim-Heck, Sigrid, Collée. 2012. *Insights and key lessons from three pilots for pro-poor innovation.* *BoP insights.* Utrecht, Netherlands, BoP Innovation Center

Willoughby, Robin. *The time is now: the G8’s opportunity to make undernutrition history.* Concern Worldwide. Self-published


World Vision. 2007. *Child health now: together we can end preventable deaths*
