Food Fortification for Reducing Micronutrient Deficiencies: Public-Private Partnerships

image

The overt effects of micronutrient malnutrition, such as blindness, anemia and goiter, have been known for many centuries. In more recent years, scientific research has revealed that the impact of micronutrient deficiencies (MND) extends far beyond these effects, positioning their elimination as a global priority. Vast populations with MND in developing countries are unable to achieve their full mental and physical potential due to stunted growth, low physical work capacity, reduced IQ and lower resistance to infection. Elimination of these deficiencies is essential not only to improve health but also for sustained economic growth and national development. Heads of the States that gathered at the World Summit for Children (WSC 1990) and the International Conference on Nutrition (ICN 1992) made a commitment to eliminate vitamin A deficiency (VAD) and iodine deficiency disorders (IDD) and substantially reduce iron deficiency anemia (IDA) by the year 2000. Although some progress has been made in the past decade, it falls short of permanent elimination. Most previous efforts to control these deficiencies have been driven by national activities dominated by the public sector. It is now recognised that national governments alone cannot solve the problem. Partnership with the private sector

offers the possibility of achieving the goal by 2010.

Magnitude of Micronutrient Malnutrition

Thirty percent of the world's population is affected by vitamin A, iron or iodine deficiency. About 700 million persons suffer from clinical forms of these deficiencies and another two billion from sub-clinical forms. Apart from these three major public health problems, deficiencies of other micronutrients such as zinc, calcium, folic acid and other vitamins are widely prevalent in the developing world. Three quarters of the populations suffering from these deficiencies live in Asia. Over the last decade, the proportion of Asian households consuming iodized salt has increased significantly, resulting in lower goiter rates. Yet, nearly one billion people in the region remain uncovered by Universal Salt Iodization (USI). The prevalence of xeropthalmia and blindness is reduced to a great extent but one third of the preschoolers still have sub-clinical VAD, which increases the risk of disease and death. IDA affects 60 percent of women of reproductive age and is an important cause of maternal mortality. It reduces physical work capacity and productivity in adults and impairs learning ability and scholastic achievement in children. Both iron and iodine deficiencies have a negative impact on psychomotor development of children, which may be permanent if not corrected early in life. Thus micronutrient malnutrition poses a serious threat to national health and development.

Fortification Strategy to reduce MND

Effective nutrition interventions are available to prevent MND and their consequences. Short-term strategies such as nutrient supplementation (giving a large dose of the micronutrient as a medicinal supplement) have been effective in providing immediate relief in several countries, but there is

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concern that this approach is not sustainable in the long term. Food fortification is a more cost-effective and sustainable solution. It plays a major role in improving the diet and meeting the micronutrient needs of the population. This must be viewed as part of an integrated food-based strategy; others include dietary diversification, homestead production and improved food processing and storage.

Food fortification has several advantages over other interventions as it does not necessitate a change in dietary patterns of the population, can deliver a significant proportion of the recommended dietary allowances for a number of micronutrients on a continuous basis, and does not call for individual compliance. It could often be dovetailed into the existing food production and distribution system, and therefore, can be sustained over a long period of time.

The technical considerations in food fortification include selection of appropriate food vehicles that are consumed by a sizable proportion of the population and lend themselves to centralized processing on an economical scale. The product should be distributed through a wide network so that it reaches all parts of the country. Salt iodization is a good example of successful large-scale fortification in the developing world, the main reason for success being the simple and low-cost technology. Staple foods like rice, wheat and corn flour are some of the commonly consumed foods that can be fortified. However, these foods are often eaten where they are grown and processed at the community level. This limits fortification control and safety. When there is no single universally consumed vehicle in a country, fortification of a number of foods may be considered. The choice of food vehicle depends on local availability and consumption patterns.

Fortified foods may not reach all segments of the population who need micronutrient supplements.

mortality in rural western China: double blind cluster randomized controlled trial

When access to commercially or centrally processed foods is limited due to low economic status, public health and welfare approaches to deliver fortified foods to the target population are the only options. Supplementary feeding programs are widely implemented in many developing countries. Food supplements, often based on locally available foods, are provided to undernourished children primarily to fill the energy and protein deficits in their diets. However, 'macro' and 'micro' nutrient deficiencies often co-exist and both affect physical growth, mental development and immunity. Providing fortified foods can solve both kinds of problems.

Progress in Food Fortification

In the industrialized countries, where processed foods are widely consumed and the industry is streamlined, food fortification has played a major role in improving the diet and several nutritional deficiencies have been eliminated in the past. For example, in the early 1900s in Denmark, there was a high incidence of night blindness due to VAD in children. The problem disappeared after margarine was fortified with vitamin A. Vitamin D deficiency and rickets was widespread throughout Europe and North America until milk was fortified with both vitamins A and D. In the US, pellagra caused more than 3000 deaths during the 1930s. Fortification of bread with niacin eliminated the problem. In Newfoundland, thiamin and riboflavin deficiencies were eliminated after flour fortification with B vitamins was introduced in 1944.

In the developing countries, food fortification has been rapid since the early 1990s, when the WSC and the ICN focused the attention of the international community on the goal of reducing MND. Major progress has been made in reducing iodine deficiency through salt iodization. Many countries have achieved the goal of USI, but the progress has not been even

across the regions. In Latin America, where 90 percent of all households have access to iodized salt, all nations have mandatory legislation to this effect. In South and South East Asia, iodized salt coverage ranges from 20-90 percent. In areas where households consume iodized salt, the total goiter rate in children has dropped dramatically. Progress with other crucial micronutrients like iron and vitamin A has been modest. In some countries of Central America like Guatemala and Honduras, fortification of sugar with vitamin A demonstrated a significant improvement in vitamin A status of the population. In the past decade, flour fortification has been implemented in many Latin American countries. In Chile and Venezuela, iron fortification resulted in a dramatic improvement in the iron status of the population and the IDA rate is less than 1 percent. Asian societies are predominantly rice eating and the technologies to fortify rice are limited. Nevertheless, as wheat flour consumption in Asia rises, many countries in the region such as India, Indonesia and the Philippines have initiated programs for fortification of flour with iron, vitamin A, folic acid and other B vitamins. In Thailand, other foods like noodles and fish sauce are fortified with micronutrients. Thus there has been considerable progress in fortification technology. Yet, vast populations in the region still remain affected by MND. The public and private companies could achieve elimination of these deficiencies through organised production, marketing and distribution of fortified foods.

It is important to address micronutrient malnutrition in early life to reduce long-term effects on growth and development. In areas where iodine deficiency is endemic, an average child loses about 13 IQ points. IDA depresses psychomotor skills and intelligence but the effects are reversible if the intervention is early enough. Targeting fortified foods to infants and young children will improve their physical and mental development. In the US, the prevalence of iron

deficiency in children was reduced from 30 percent to less than 5 percent through iron fortification of infant foods. While fortified complementary foods are now widely used in industrialized countries, they are beyond the reach of the poor in developing countries. The challenge is to increase the density of complementary foods with multiple fortifications of essential vitamins and minerals at an affordable price. The industry has an opportunity to create such nutritious foods and improve the growth potential of poor children.

Public-Private Collaboration

Success in food fortification requires active collaboration between several sectors including the scientific community, government agencies, private industry, consumer groups and international organisations. The scientific community has identified the problems of micronutrient malnutrition and possible solutions including enrichment of foods. The research efforts continue at the country level to identify the target population, find the appropriate food vehicle and the most bioavailable micronutrient for fortification. National governments play an equally important role in providing administrative support and prescribing the framework within which solutions can be implemented and regulated. Food fortification serves the need of the public sector to reduce malnutrition and sustain economic growth. The private food industry has equally compelling reasons for the production of fortified foods. Raising product quality through fortification will stimulate demand for regional products, and intensify competition and trade. The consumer must be educated regarding the benefits of food fortification in order to create a demand to which industry would have to respond. International agencies could provide initial advocacy and technical /funding support for development of intervention strategies.

The *Sangkap Pinoy Seal* program in the Philippines is a good example of public-private collaboration. Since the program was launched in 1995, over thirty products from sixteen companies have attained the seal from the Department of Health. In Guatemala, the national program of sugar fortification with vitamin A is implemented with full cooperation of the sugar industry. In Viet Nam, an alliance of private companies, research institutes, NGOs and donor organisations have jointly developed an iron-fortified fish sauce as well as vitamin-A fortified sugar. Proctor & Gamble developed a fortified drink called *Nutri-Delight*, following an advocacy meeting on Food Fortification. Although they have all the required technical expertise in product development, they worked with the governments, NGOs and universities to confirm the efficacy of *Nutri-Delight*.

Fortification will improve the quality of the product, but the flipside is the increased cost. Whether it is salt, sugar or any fortified food, when faced with choosing between a fortified product and a cheaper alternative, consumers will choose the latter. Consumers should be educated about the benefits of the fortified products and to accept a slightly higher price for that product. Social marketing for fortified foods should be a shared public-private responsibility. Governments must provide incentives to industry to encourage fortification; removal of tariff and excise tax will reduce the cost of the product considerably. Food companies, on their part, should try to minimize the costs of fortification and accept lower profits. Giving back to the local community always enhances the image of the business community as partners in development.

Current Constraints and Future Opportunities

Today, in the developed world, synthetic vitamins are

produced to supply the markets for supplements, for food products and animal feed. However, the market for nutrient additives in developing nations has been limited. Opportunities are now arising to fortify staple foods such as rice, wheat and sugar with micronutrients. In the past decade, several Latin American countries have implemented universal fortification programs for wheat and corn flour with multiple micronutrients. In Asian countries, flour fortification was initiated only recently. The technology for double fortification of salt with iron and iodine was developed in India in the early 1990s, but it is yet to find large-scale application. Rice is a logical choice for fortification since it is the staple food in many Asian countries. In Indonesia, attempts have been made to fortify rice with vitamin A and/or iron, but further work is needed to develop suitable products. The industry could be involved in the technology development, production and quality control.

There are a number of factors that constrain private investment in developing markets for fortified foods. Technologies of fortification may be new and product development or start-up costs relatively high. The distribution system may not be developed and regulatory systems are often not in place in developing countries. Lack of public awareness of micronutrient malnutrition and low consumer demand for fortified products is perhaps the most important factor. For private investors, these factors mean higher investment in development, distribution and marketing as well as a relatively slow return. By working together, private companies and public institutions can find ways to share costs and rewards and thereby overcome many of these barriers.

Sharing expertise and resources during product development is a key strategy to reduce barriers. In India, a collaboration of the National Federation of Cooperative Sugar Factories (NFCSF) and the

Micronutrient Initiative (MI) established the stability of vitamin A fortified sugar under local conditions; the Indian government and sugar industry are collaborating to establish its industrial feasibility and efficacy. The MI and Heinz are working together to develop 'micronutrient sprinkles' that can be added to supplements used in the ongoing feeding programs. In Indonesia, Gizindo, along with UNICEF, developed a low cost complementary food called Vitadale by substituting milk powder with soyabean. Nevertheless, costs need to be reduced further to reach the low-income group.

The key area of complementary foods presents some unique barriers to investment. Among them, the WHO Code for Marketing Breast Milk Substitutes, no matter how well intentioned, has created an uncertain environment for the companies. The International Association of Infant Food Manufacturers (IFM), which has an NGO status with the WHO, has an opportunity to influence the policies and strategies on infant feeding through international dialogue.

The other problem with complementary feeding is the potential liability of food contamination due to unclean water or poor personal hygiene. Although the preparation rather than the product itself may be the source, the fear of bad publicity prevents many companies from developing low cost weaning foods for the economically disadvantaged. An industry-friendly policy and social marketing partnership could go a long way in reducing these barriers.

Potential Role of IFM

The IFM, with its global network of food company members, can contribute to the control of micronutrient malnutrition in several ways. The members include national and international food companies that manufacture and market infant foods

all over the world. They may review the composition and cost structure of the available products and focus on development of low-cost fortified complementary/supplementary foods, to meet the nutritional needs of children in developing countries. The food companies can collaborate with the governments at the national level in developing such nutritious products. International/ bilateral agencies like the WHO, UNICEF, USAID, and MI, working through multi-sectoral partnerships, are promoting fortification programs in several countries. IFM could help in providing technical/financial assistance for product development and create demand for fortified foods through social marketing partnerships. It may co-sponsor advocacy and technical meetings, providing a forum for discussing issues related to food fortification. SUSTAIN and MOST, the new initiatives to strengthen micronutrient programs are looking for partners. GAIN, another high profile alliance of public, private and international organisations, is seeking industry cooperation for new projects on food fortification. They offer a good potential partnership for IFM. An alliance with national and international organisations in combating malnutrition will not only enhance the image and visibility of IFM as partners in development, but also offer an opportunity to influence the policy on food fortification.

Conclusion

Food fortification is one of the major strategies to reduce MND in developing countries. It offers a unique opportunity for the industry to simultaneously expand its market and profitability while playing a key role in improving health and nutritional status of the population. In order to have an effective and sustainable fortification program, it is vital that the public and private sectors work in close collaboration, understanding and recognizing each other's interests and concerns.

This paper was prepared by Vinodini Reddy in consultation with other members of the IFM's Advisory Committee on Child Health and Nutrition (ACCN).

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