

Forging partnerships among industry, government, and academic institutions for food fortification

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Abstract

This decade commenced with a declaration by the heads of state attending the World Summit for Children that they would pursue the virtual elimination of iodine and vitamin A deficiencies and reduce iron deficiency by 33% before the year 2000. The World Bank has estimated that the economic, socio-economic, and health benefits of sustained elimination could contribute as much as 5% of gross domestic product annually to an affected country for an investment of less than 0.3% of gross domestic product. By 1996, tremendous progress towards the elimination of iodine deficiency had been made, largely due to the involvement of the private food industry in the production and distribution of iodized salt. For goals in preventing vitamin A and iron deficiencies to be achieved, a similar commitment on the part of the food industry is necessary. In 1995 we conducted a survey of 95 representatives of multinational and national food companies and 68 representatives of government and international agencies about private-public partnerships to eliminate micronutrient malnutrition. The survey showed a lack of communication from the public sector to the private sector, although both sides suggest that such communication would be effective and desirable. An international dialogue entitled "Sharing Risk and Reward: Public-Private Collaboration to Eliminate Micronutrient Malnutrition" was held in Ottawa in December 1995, where a framework for communication was established. From this foundation, many countries have initiated or reopened dialogues among governments, industry, agencies, academia, and civic organizations to support the elimination of micronutrient malnutrition.

Background

The physical deformities of goitre, cretinism, and blind-

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ness resulting from micronutrient deficiencies have been evident in populations through the ages. Mayan pottery and Chinese carvings bear witness to the more visible toll of micronutrient malnutrition [1]. The correction of these deficiencies through food fortification began with salt iodization in the United States and Switzerland in the 1920s. In the 1930s and 1940s, iron was added to cereal flour to reduce losses due to milling. Food fortification continues to be a widely used mechanism in many industrialized countries due to rapidly changing lifestyles and increasing reliance on more highly processed foods to provide nutrients lacking in the normal diet of the population. Urbanization and the relatively high costs of fresh meat, fruit, and vegetables are used to justify the addition of nutrients to a range of low-cost or subsidized foods to ensure that the dietary intake of micronutrients is adequate [2].

It is important to note that there is no consensus regarding the extent to which food should be fortified, and the prevailing attitude towards it varies in countries of the industrialized world. Europe has restrictive legislation regarding the addition of micronutrients to foods. Such restrictions have again put populations at risk of iodine deficiency even in the 1990s [3]. In North America food fortification is viewed more positively. However, the use of iodine compounds to sterilize milking machines contributes to the protection of the population from iodine deficiency. Iodine intake in the United States has also been enhanced by adding iodine to the bread-making process, such that iodine has been available adventitiously rather than through planned public health intervention [4]. It is clear, however, that the elimination of micronutrient deficiencies from these countries has been attributed in large part to food fortification. Food scientists have risen to the challenges posed by micronutrient fortification. Evidence of their success is clearly shown on the supermarket shelves in most developed countries. Technical problems have been overcome for an ever-widening range of applications. These barriers include the interaction of added nutrients with the food carrier matrix due to the pro-oxidant and catalytic properties of many essential minerals and

the susceptibility of vitamins to destruction by heat, light, and oxygen [2].

Key issues

At the National Advocacy Meeting to End Hidden Hunger in 1993, President Ramos said, "I reaffirm our country's commitment to the 1990 World Summit for Children to end malnutrition, preventable disease, and illiteracy. I likewise reaffirm the Philippine delegation's support for the Montreal Conference of just a few years ago on ending hidden hunger before the turn of the century." At the same meeting, then Secretary of Health and now Senator Juan Flavio Velasco said, "To the country, every individual saved from hidden hunger is an added resource—one more pair of strong arms to build and produce, one more good pair of eyes to find solutions to the nation's problems, one more intelligent brain to plan the course of development." More than 123 other nations around the world have made similar commitments. These commitments were supported by corresponding resolutions at the FAO/WHO International Conference on Nutrition (ICN). International agencies, including UNICEF, the United Nations Development Programme (UNDP), and the World Bank, committed support to these goals. Government development agencies, including those of Canada, the United States, Australia, and the Netherlands, to name a few, reaffirmed their support for these goals and made substantial commitments towards their achievement.

In 1994 the World Bank issued the following statement: "The control of vitamin and mineral deficiencies is one of the most extraordinary development-related scientific advances of recent years. Probably no other technology available today offers as large an opportunity to improve lives and accelerate development at such low cost and in such a short time. Deficiencies of just vitamin A, iodine, and iron could waste as much as 5% of gross domestic product, but addressing them comprehensively and sustainably would cost less than 0.3% of gross domestic product [5]."

We are approaching the closing of this decade, dedicated to achieving the goals of the World Summit for Children. Progress has been made; 70% of the world's salt is now iodized and available in households [5]. Such success shows what can be done when governments, agencies, and private companies cooperate. However, serious gaps remain. Much of the salt labelled as iodinated has either too little or too much iodine. There is a lack of comprehensive quality assurance programmes, infrastructure, and financial systems to maintain salt iodization. In the countries of the former Soviet Union, the relationship of iodine deficiency to post-Chernobyl thyroid cancer is only now being recognized, and iodine deficiency is not being adequately addressed. Efforts have been made to reduce vitamin A deficiency

through capsule-distribution programmes, which only a handful of countries perform to scale. Gardening programmes have not had an impact on vitamin A deficiency. As resources diminish in the public-sector and donor communities, these programmes are in jeopardy of being cut. Little progress has been made to eliminate iron deficiency, the most widespread and economically debilitating of the three deficiencies. In the Philippines alone, it is estimated that more than half of children and mothers are anaemic because of iron deficiency [6, 7].

An assessment of the situation calls for new approaches and a new set of partners to deal with this issue. There are many compelling reasons to look to a private-public partnership to help with the resolution of this problem. There is a power and financial shift away from big government taking action and responsibility for the entire population [8]. The trend is towards devolution of responsibility and resources from centralized to constituent administrative levels and towards reduction in national government spending. International donor resources are diminishing and are becoming less available to promote home gardening and capsule distribution or to purchase and maintain fortification units. Clearly, the development agencies do not have either the resources or the persistent staying power to see the full resolution of this problem. They struggle to reinvent themselves as they look at new issues that become the focus of their attention. The agencies often concentrate on approaches that will demonstrate dramatic results in a short time. There is a trend to incorporate these focused activities within a wide array of other developmental issues, rather than to be called upon to account for these specific commitments.

The problems of micronutrient deficiency affect a much larger proportion of the population than those who have evident clinical symptoms. When more sensitive biological sample testing is applied to populations, it is evident that newborns and mothers are affected in large urban centres as well as in rural settings. This makes it rational to target micronutrient supplementation not only to poor subsistence farmers but also to a much wider population. Fortification cannot reach all people with deficiencies of essential micronutrients, especially those with restricted access to centrally processed foods because of geographic remoteness, poverty, or cultural preferences. But for the bulk of the population, fortification can make a crucial difference. Across geographic, social, and economic lines, consumption of foods fortified with micronutrients can unlock the enormous human and economic benefits suggested by economists and nutritionists. Defined populations beyond the reach of fortified products can be targeted with specific interventions, such as capsule distribution or other food-based programmes.

Another reason for private-public partnerships re-

lates to the fact that neither government nor agencies have the expertise or capacity to produce or distribute food in mass quantities. Because of limited bioavailability, dietary modification may not be as effective as once believed. Furthermore, food fortification is affordable, immediately cost-effective, safe, self-financing, and sustainable, and provides high coverage [9].

“Lend us your expertise. Share with us some of your resources. This is the imperative of good corporate citizenship—a concept that I am happy to say is alive but not yet too strong in our country.” These were the words of President Ramos during his closing remarks at the National Anti-Poverty Summit on 21 March 1996, directed to the country’s business community and asking them to actively support and participate in the government’s effort to fight poverty. Private and public initiatives working together for the benefit of people have become the new catch cry for development of the 1990s. No other issue is better suited to such partnerships as the elimination of micronutrient malnutrition through food fortification, yet this is no simple matter. We are faced with a wide array of barriers, including a lack of trust, a lack of communication, and a different set of objectives, approaches, and realities to relate to. One thing is clear: the voter, the target population, and the consumers are the same people who stand to gain or lose the most, depending upon the success of this partnership.

A survey

In preparation for the meeting “Sharing Risk and Reward: Public–Private Collaboration to Eliminate Micronutrient Malnutrition,” held in Ottawa in 1995, more than 200 private executives and public officials were asked about their experiences with food fortification and with each other [10]. Ninety-five executives of private food companies and 68 public officials responded to the survey. Survey responses were summarized and categorized into 26 issues; the number of times each category appeared in a survey response was totalled. This is not a representative sample and not a strictly scientific analysis. We simply looked for recurring messages and trends that might suggest useful topics for discussion between representatives of the public and private sectors. The results are summarized in figures 1 and 2.

Both public- and private-sector respondents painted a picture of a communications gap between the food business and governmental, non-governmental, and international agencies. Half the private sector reported no contact from public officials about micronutrient malnutrition issues or how they might be part of the solution. Only about 60% of the public sector reported communicating with the private sector about goals to eliminate vitamin A, iron, and iodine deficiencies.

This communications gap confirmed the need for

exchange. However, the survey also showed that there is plenty of opportunity. When the public sector did communicate, it was often perceived as effective communication. Eighty percent of the managers who received communication from the public sector reported that it was effective. Similarly, 93% of the public-sector officials reported a positive response to their communication efforts. Moreover, private-sector respondents seemed overwhelmingly interested in regular contact with governments and international agencies about micronutrient malnutrition issues. Eighty-seven percent said they would be interested in regular communications with the public sector and that those communications would have an impact on their business decisions. Eighty-one percent suggested that they would be receptive to collaboration with the public sector, including the sharing of technology and marketing information. Beyond defining a need to talk and suggesting an openness to collaboration, the survey provided a strategic focus on the issues. We asked both public-

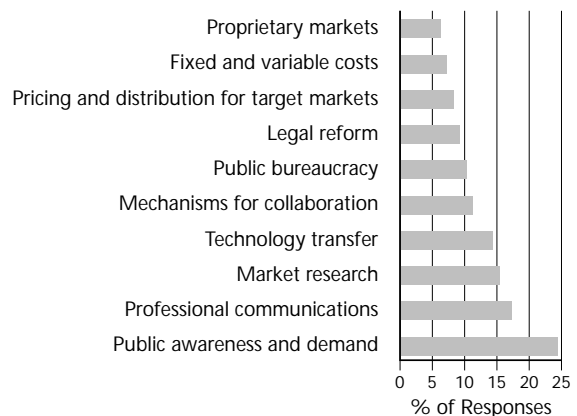


FIG. 1. Private priorities



FIG. 2. Public priorities

and private-sector respondents to “outline the issues for a dialogue on private–public sector collaboration to stimulate the production and marketing of micro-nutrient-rich foods” (figs. 1 and 2). A look at the top 10 issues raised in response to this question shows where issues and priorities match and where they diverge.

For the purposes of a dialogue between the public and private sector, we might divide these contrasting lists of priorities into three general groupings. First, where there already is a general agreement on priorities between public- and private-sector responses, public and private sectors might begin to work on concrete strategies and action plans. Next, where there are diverging perceptions on priority issues, we can listen and learn from each other. Finally, on issues where public and private goals diverge, we are left to recognize that there are limits to our ability to collaborate, and we need to agree not to let our differences prevent us from working together.

Clustered at the top of both lists—reflecting both the frequencies with which the issue was raised and the relative matches between public- and private-sector priorities—is a shared concern for *raising public awareness and creating consumer demand*. Equally strong in terms of shared concern and agreement between public and private respondents is the area of improving *professional communications*. This category includes all survey responses dealing with improving the flow of scientific, nutritional, technical, and marketing information about micronutrient malnutrition in general and fortification in particular. The flip side to this positive agreement on the need for professional communications is a shared concern about the lack of *mechanisms for collaboration*. Our survey responses show that there is awareness of the lack of established rules of engagement between public and private sectors and that our individual roles need to be defined, clarified, and validated. Through a dialogue of public and private sectors, these areas of a consensus can be expanded to include a notion of shared responsibility. This suggests the potential for an action-oriented focus on establishing partnerships for joint education and awareness activities, initiating clear channels of public–private communication, developing professional relationships, and building organizational linkages.

Other issue categories show diverging perceptions of public and private sectors. Our list of 10 priority issues for discussion splits when we come to *market research*, which is tenth on the public-sector list and third on the private-sector list. This category includes references in survey responses to market research, market sizing, consumer profiles, and epidemiology, the traditional market-research tool of public health. Epidemiology works to define the source and extent of the problem and then measure the effectiveness of specific solutions. As a result, social marketing, a rather new activity within the field of public health, tends to tar-

get and promote pre-existing solutions. On the other hand, the food industry, with a longer history of marketing, looks to a fuller marketing mix of product development, pricing, and packaging as well as promotion. One might say that for the private sector, marketing and market research are actually part of developing the solution and not just a way to deliver it.

This different perspective on the role of marketing and market research might help explain why *long-term growth opportunity* is a public-sector priority for discussion but is not included in the private-sector list of priorities. Does this really reflect a differing view of the potential long-term opportunities for fortified food products? Or might it simply reflect the reluctance of business to take risks and judge opportunities without first seeing the market research? Perhaps this divergence in priorities simply reflects a public-sector focus on the size of the need as opposed to a private-sector focus on the size of the opportunity. Perhaps there is more agreement here than the divergence in the public- and private-sector lists of priorities indicates.

Within public institutions and private companies, there is a wealth of resources, data, and personnel upon which good market research can be built. Once we begin to understand each other’s approach to market research, we might begin to address ways we can collaborate not simply on the promotional aspects of raising public awareness and demand (where we already agree), but on developing new and innovative products and solutions. Market research might become a tool for our collaboration—a tool to translate the public-sector focus on the size of the need into the private-sector emphasis on the size of the opportunity.

The survey shows that public officials put more emphasis on economic barriers to fortification. Higher *fixed and variable costs*, in turn, have an impact on *pricing and distribution for target markets* (in other words, low-income consumers). Both categories were raised more often by public- than private-sector respondents. In fact, throughout the survey, public-sector respondents seemed to take a more negative view of the economic environment for fortification than did the private sector. When asked if there were economic constraints on fortification, 75% of the public-sector respondents said that there were. On the other hand, when we asked the private-sector respondents whether they had experienced economic benefits from fortification activities, about half said they had. Likewise, when asked about constraints, about half said there were none. Overall, this represents a balanced feel for the benefits and constraints, as opposed to what seems to be a greater perception of constraints on the part of public-sector respondents.

This split in perception is possibly related to the public-sector focus on and responsibility for the welfare of the “poorest of the poor,” in contrast to the private sector’s freedom to carve out niche markets of oppor-

tunity. Might a dialogue work to align these contrasting points of view? It is possible that public-private collaboration in market research has the potential to define new products, new pricing, and new distribution mechanisms that could create new niches of opportunity for food products among low-income consumers. Public-private collaboration can focus on the development of what we might call a *public health market*. It may simply be a matter of beginning our collaborative efforts early on in the market research process as well as a focus on developing solutions rather than on the production and promotion of pre-existing products.

Finally, there are areas in which public and private goals and cultures diverge in some very basic ways. Ranking of contrasting public- and private-sector priorities for discussion brings into relief varying views on legislation and regulation. The issue of *legal reform* is a lower priority for the private than for the public sector, and the issue of *enforcement of regulations and quality assurance* does not appear on our list of private-sector priorities. It is a reflection of differing organizational goals, cultures, and operational values. For example, in answering the question "What factors prompted your organization to implement food-related regulations, standards, or other codes of conduct," public health-sector respondents pointed out issues of health, safety, quality assurance, and social responsibility. The private consensus seems to be that public policy should provide an environment in which private companies can compete, innovate, and develop a growing market for fortified food products. It is interesting that not one of the public-sector respondents suggested that a reason to regulate was to provide a business environment for food companies conducive to the development and marketing of fortified food products. On the other hand, *benefits to the national health* are only listed as a public-sector priority for discussion.

Our survey indicated that one of the private sector's top priorities for discussion is *public bureaucracy*—a lack of orientation to results, clarity of goals, decisiveness, and follow-up. These negative comments by the public-sector respondents were an undercurrent throughout the survey. Much of it had to do with the perception that the public sector wanted to place limitations on which foods are appropriate to fortify and which consumer groups are appropriate to target. However, about two-thirds of our public-sector respondents felt the field was wide open with respect to foods, and almost 80% felt that all consumers should have access to these products. Furthermore, the survey responses indicated that the public sector seems to be aware of its own limitations. When responding to a question on barriers to fortification, one-third of our public-sector respondents commented on politics, bureaucracy, and legal issues as barriers. Likewise, many private-sector respondents expressed an awareness of their own limi-

tations, commenting that the rigours of profit-making enterprises and the stress on short-term return often restrict involvement in what they consider to be some worthwhile social enterprises. Our surveys seem to show that both public and private sectors are aware of their own professional limitations when it comes to a collaboration on addressing the issue of micronutrient malnutrition. Through dialogue, perhaps we can come to an understanding and awareness of each other's limitations.

Both the public and private sectors have a role to play in the global elimination of micronutrient malnutrition. A dialogue between the sectors needs to translate the needs of more than 2,000 million people who do not get enough vitamin A, iron, or iodine in their diets into professional opportunities for action and collaboration. As we jointly take the risks involved in collaboration, we can all look forward to the promise of sharing in a truly great reward.

Opportunities arising from an international dialogue

The Micronutrient Initiative, the Program Against Micronutrient Malnutrition, and the Keystone Centre, with the additional assistance of the US Agency for International Development, the International Life Sciences Institute, and the World Bank, invited a diverse group of interested persons to Ottawa on 6-8 December 1995 [10]. The Ottawa Forum on Food Fortification was convened recognizing that although micronutrient malnutrition is a global problem, it will be eliminated one country at a time. We started with the realization that governments and the food industry had already been working together in a number of countries, providing a rich experience from which to learn. The published proceedings of this unique and energizing meeting have already provided a springboard for collaborative action to enhance micronutrient malnutrition in a number of countries [10]. A smaller global follow-up meeting, "Partnerships to End Hidden Hunger: Meeting to Get Concrete," was held in Atlanta on 15 November 1996. Some of the following key ideas emerged from these meetings.

Need for market-based solutions

Whereas capsules, injections, and nutrition education to improve micronutrient status are primarily delivered to vulnerable populations through a network of public health, welfare, and education services, fortified food products are primarily delivered to consumers through private production and distribution. Market-based and consumer-driven solutions, historically developed by the private sector, should be explored. However, in most countries, channels of communication

and mechanisms for collaboration between public and private sectors have not been developed. Addressing micronutrient malnutrition through a market-based food-fortification strategy entails developing a new paradigm of public-private collaboration and communication. Following an appropriate situational analysis, a first step in this process may include a national dialogue between the public and private sectors and establishment of national and sub-national partnership round tables.

A call for leadership: Communications and marketing

Low consumer awareness of micronutrient malnutrition and lack of demand for fortified food products are major barriers to investment in the elimination of vitamin A and iron deficiencies. A major obstacle to overcoming insufficient awareness and demand is a lack of communication and coordination among the various professional sectors that have the resources and the credibility to serve as public advocates and educators. The public health community works to define the extent and impact of micronutrient malnutrition. Pharmaceutical companies research the production of micronutrients. Food companies develop the technology of fortification. Nutritionists and market researchers study local consumption patterns. The media publish and broadcast on health and development issues. Input from these and other sectors is needed to develop effective marketing strategies and messages. Unfortunately, there is little communication among them.

Each professional community has its own distinct language, goals, and audiences. Consequently, the range of messages is specialized and fragmented, and tends to confuse the consumer. In some cases, the message is wrong. For example, scientifically framed information, like the often-heard call for a reduction in infant mortality, does not resonate with a mother shopping for milk or flour. In other cases, the messenger is inappropriate. A message from government public health "authorities" does not have the credibility of a personal endorsement by a family physician. Unfortunately, family doctors are often uninformed about micronutrient issues. Some participants felt that getting the right message delivered by the right messenger to the right audience entails a new kind of leadership to pull together the efforts of the various professional communities.

There was some discussion of an international communications strategy. Some questioned the appropriateness of this approach, since action to eliminate micronutrient malnutrition unfolds on a national stage. Most participants agreed that national communications approaches need to integrate professional and technical constituencies in advocacy to governments and marketing to consumers. However, many felt that communication to professionals and policy makers in government, medicine, business, and research is increas-

ingly via global media, international trade, and professional associations. Both national and international channels need to be cultivated. There was some suggestion that messages to the consumer could wait on marketing to a range of professional public- and private-sector organizations. These, in turn, can serve as effective and credible messengers to the general public.

Several participants expressed interest in developing these concepts to the next stage. The implementation of "umbrella" public relations and marketing activities may parallel efforts of professional and trade associations in which a range of diverse interests jointly invest in "growing the market."

Collaborating to create an enabling environment

In most industrialized nations, micronutrient deficiencies have been eliminated through a joint public and private effort that created an enabling environment for the development of a range of fortified foods. However, in many countries where micronutrient malnutrition remains a public health scourge, a range of constraints frustrates such an environment: bias against food additives, low professional awareness, limited consumer demand and purchasing power, arbitrarily enforced regulations, and other government economic policies and programmes. Even though the need for micronutrients is clear and potential markets for fortified products are large, these negative market factors inhibit investment, and private capital is drawn to a range of competing opportunities. A public-private collaboration can more attractively position fortified food products in relation to competing investment options. A partnership of governments, development agencies, national and multinational companies, and a range of scientific, professional, trade, civic, and volunteer organizations can reduce the perceived risk and increase the potential return of investments in fortified foods by collaborating to raise awareness, create demand, transfer technology, and engage in a variety of joint ventures in product development, production, distribution, and marketing.

A stake for multinational companies in a national collaboration

In many nations where micronutrient malnutrition remains a significant public health concern, rapid urbanization, changing consumer preferences, and rising incomes offer opportunities for investment by multinational companies. Collaboration to expand the consumption of fortified foods in these nations offers a vehicle to forge alliances with national governments which define the investment climate, identify strategic alignments with national companies, and create a positive image among consumers. Moreover, the elimination of micronutrient malnutrition in developing coun-

tries will have a significant effect on the productivity of workers and the purchasing power of consumers. Many multinational food companies are based in North American and European nations, which are signatories to the World Summit for Children and the governments of which are investing in the elimination of micronutrient malnutrition. Participation in collaborations to eliminate micronutrient malnutrition abroad can have a positive impact on corporate relationships with these governments as well as with consumers in industrialized nations.

At the present time, value-added products produced and marketed by many multinational food companies are not always consumed by those most at risk of micronutrient malnutrition. However, there is evidence that fortified value-added products stimulate interest among professionals and consumers alike, thereby achieving the critical mass of political support and consumer awareness necessary for broad-based fortification of staple foods. Although currently beyond their reach, these value-added products speak to the aspirations of consumers. As producers of value-added products, multinationals are major customers of commodity products and, therefore, have influence on producers of staple foods. Moreover, many national companies look to multinationals for expertise in fortification technology and in marketing fortified products. Thus, the presence of multinationals can create opportunities for technology transfer through licensing and other partnership arrangements. In this unique position of influence with both producers and consumers, multinational companies are poised to catalyse national dialogues to eliminate micronutrient malnutrition. To date, there has been no concerted effort to define a special role for or to enlist the support of multinational food companies in national programmes to eliminate micronutrient malnutrition.

Good corporate citizens

It is clear that corporations thrive by solving consumer needs with consumer products and not necessarily by directly addressing social concerns. In some cases, a company will find an opportunity to profit from a product that also happens to provide health benefits. In other cases, contributing to social goals improves their image with the consumers who buy the product and their access to policy makers who play a large role in determining the business environment. Public-private collaboration to eliminate micronutrient malnutrition involves both of these scenarios.

Most participants agreed that multinational corporations and some national companies could provide access to fortification and other food-processing technology. It is acknowledged that public domain technology can be shared through publication in peer-reviewed professional journals and trade journals.

Information about proprietary technology can be disseminated through newsletters, CD-ROMs, and the Internet. Although some have questioned the impact of value-added products and sophisticated technology on poor populations in developing nations, others have suggested that currently available products and technologies could have a significant impact on micronutrient malnutrition. In some cases, fortified "sachet" products have been developed and are waiting for market opportunities. In other cases, "the nutritional guts" of more expensive products can be adapted to fortifying staple foods.

There was general agreement that corporate technologists could make a major contribution to training both public- and private-sector personnel. Public-sector participants noted that national governments and food companies need assistance in a range of areas, including process technology, packaging, and market research. Private-sector participants responded that under the right circumstances, this kind of service could be forthcoming.

The group recognized that several factors constrain these kinds of contributions. A lack of workable international standards and inconsistent national standards inhibit the ability and motivation of companies to transfer their knowledge, expertise, and experience. Corporate participants suggested that costs are driven up and investment opportunities are passed over because corporations face ambiguous legislation, unclear regulation, and arbitrary enforcement. Although corporate participants indicated a willingness to assist in tackling issues involved in fortifying foods for less advantaged populations, in many countries vague and conflicting public policy makes fortifying foods a risky venture, even for the more affluent markets. A tested method of arriving at consensus standards may be through an international dialogue involving both public and private parties.

Participants expressed interest in advocating to the Codex Alimentarius the development of clear guidelines, particularly on fortification of foods with iron. All agreed that Codex guidelines would work to motivate and ease the way for national governments to adopt clear and consistent policies to enhance the investment environment for food fortification. It was noted that working with the Codex is a slow process, but that a Codex Working Group on Fortification was recently established. With international goals to eliminate micronutrient malnutrition by the year 2000 ratified by 123 heads of state, there is a window of opportunity for an alliance of public agencies, academic and research institutions, and private companies to advocate a sense of urgency to the Codex Commission.

Undeveloped channels of communication are another factor inhibiting greater participation by companies in programmes to eliminate micronutrient malnutrition. Communicating information about public domain

patents or favourable terms for licensing proprietary technology requires a neutral and secure third party to serve as a broker. Bringing corporate expertise to bear on national market research entails a third party that understands the needs of country programmes and the strategic interests of multinationals, and can help make a match.

Participants reported that there is no clearinghouse supplying information necessary to connect companies, expertise, and resources to private companies and public agencies that might benefit. It was noted that on a regional basis, UNICEF Central America is about to undertake an inventory of fortification activities. On an industry basis, the International Sugar Organization is developing a role as an information clearinghouse for fortification of sugar with vitamin A. These models might be replicated by other industry trade groups, such as the International Life Sciences Institute, International Grain Council, and Association of Oil Chemists, or on a regional basis by organizations such as MERCOSUR, the Asian Pacific Economic Council (APEC), or regional UNICEF offices.

Measuring the benefit

There is a need for clear and persuasive micronutrient assessment data at all stages of elimination programmes. Clear data are crucial to convincing governments that there is a micronutrient problem and that fortification efforts should be supported. Pilot projects or clinical trials need credible data to assure both regulatory authorities and private investors that a particular fortified product does make a difference to micronutrient status. If smaller fortification efforts are to be replicated or developed on a larger scale, data are needed to confirm that those current efforts are, in fact, effective. Finally, clear assessments are needed to monitor the progress of national-scale programmes.

Participants pointed out that although the private sector has established laboratories to measure the content of nutrients in *food*, public health laboratories, such as those at academic institutions, and government-supported centres of excellence, need to extend to measuring micronutrient levels in *populations*. There was a call for developing cooperative relationships among public and private technical and laboratory capacities to provide this crucial resource for advocacy, product development, and evaluation.

It is clear that current methods for micronutrient status assessment for vitamin A and iron deficiency have significant limitations for application in developing countries. Dietary assessment of vitamin A status provides a description of intake patterns but gives no reliable quantitative indication of the actual level of deficiency. Clinical assessment methods are ineffective in evaluating moderate and mild levels of deficiency. Biochemical measures provide a more quantitative assess-

ment of micronutrient status but are limited by the complexity and cost of sample collection, transport, and analysis. A need exists to develop and field test a core set of indicators of vitamin A status that can provide a reliable, practical, and affordable basis for community assessment, monitoring, and programme evaluation. Similarly, rugged and reliable methods for iron status and folate status indicators need to be developed.

Harnessing the power of the grass roots

Civic organizations, such as the Red Cross in Thailand, the Kiwanis for the elimination of iodine deficiency globally, and Sister Cities International (SCI) with their SCI/Program Against Micronutrient Malnutrition (PAMM) Hidden Hunger Initiative, are important allies in any global or national partnership. They offer lines of communication with civic authorities as well as a range of community leaders and volunteers down to the grass-roots level. These organizations are often in an ideal position to facilitate municipal nutrition assessments to gather data about levels of micronutrient deficiency in specific cities. Or they might work as consumer groups to assist regulatory authorities to ensure that fortified food products meet standards of quality. Working together, local government and business leaders might develop a range of approaches to enhance investment in the production and consumption of micronutrient-rich foods. One participant noted that even though many regulatory and other barriers to fortification of foods exist on a federal level, a grass-roots municipal constituency can be a powerful advocate for policy changes at the national level.

It is clear that fortification efforts are enhanced when government agencies, large corporations, and civic organizations coalesce into a web of opportunity through which employees, customers, and their families can have an impact on programmes and policies.

Barriers to overcome and future action

Although public officials and private executives generally endorse the concept of public-private collaboration to eliminate micronutrient malnutrition, they are unaware of channels of communication or mechanisms that might allow collaboration to move forward. They will meet barriers that will include the following issues. The nutrition community, agencies, governments, and non-governmental organizations sometimes feel a sense of ownership of the micronutrient problem and are reluctant to share roles and responsibilities with others. Some nutrition and public health advocates have an inherent distrust of the private, commercial world, especially large companies. The battle over breastfeeding versus breastmilk substitutes has created passionate groups that perceive either the public health commu-

nity or the private food industry as the enemy. There is concern by the public sector that fortification choices may not cover the most needy populations but may result merely in profit taking with inappropriate foods, which they consider a distortion of diets. The food industry is concerned that when dealing with governments and agencies, they will be caught in a bureaucratic process that will absorb their time and resources.

The elimination of micronutrient malnutrition will

be made possible by broadening the support base for what will certainly be a landmark achievement. By working together, we can play a role in assisting national governments and industries to reduce the incidence of micronutrient malnutrition while reducing the risk of investments in fortified foods. We look forward to a fruitful collaboration with a variety of partners, so that we all may see a twenty-first century free of micronutrient malnutrition.

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