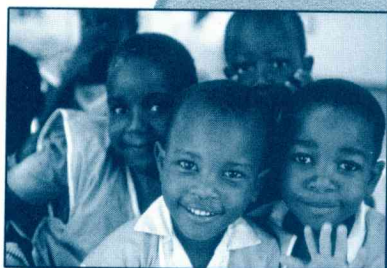


Sugar Fortification to End Vitamin A Deficiency in Southern and Eastern Africa

REPORT OF A PUBLIC-PRIVATE DIALOGUE

Ezulwini, Swaziland
June 29 – July 1, 1999



ORGANIZED BY

The Micronutrient Initiative
United Nations Children's Fund
International Sugar Organization
United States Agency for International Development

HOSTED BY

Swaziland Sugar Association
Government of Swaziland

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This workshop in the Ezulwini Valley of Swaziland is the most recent in a number of activities designed to ensure that sugar fortification can realize its potential for reducing the tragic prevalence of vitamin A deficiency amongst populations across the globe. In 1995, as the success of sugar fortification in Central America was being recognized, the International Sugar Organization and UNICEF signed a joint declaration in support of sugar fortification with vitamin A. An international meeting was convened in Guatemala City in 1996 to explore the possibilities for replicating the success of sugar fortification in Guatemala to other countries around the globe. A year later, The Micronutrient Initiative and International Sugar Organization collaborated on a global survey of sugar producers to identify their knowledge, attitudes and perceptions about vitamin A fortification. In 1998 sugar fortification began in Zambia with the support of USAID and UNICEF.

As we enter the new millennium, the question is: are the conditions right for further expansion of sugar fortification from Zambia to other countries in the Southern and Eastern African Region? *Sugar Fortification to End Vitamin A Deficiency in Southern Africa* was convened to begin answering that question.

This meeting grew out of a partnership of The Micronutrient Initiative, International Sugar Organization, USAID, UNICEF, and Swaziland Sugar Association. The meeting was planned and coordinated by Peter Baron and Lindsay Jolly of the International Sugar Organization and Venkatesh Mannar and Jack Bagriansky of the Micronutrient Initiative. Logistical support and good counsel were provided by Olivia Yambi of UNICEF, Roy Miller and Eve Tamela of USAID's MOST, Mike Matsebula and Rose Maphanga of the Swaziland Sugar Association, and Dominic Scofield of IDRC/ROSA. This report was compiled and edited by Jack Bagriansky. The organizers extend their deepest gratitude to:

- The Swaziland Minister for Foreign Affairs and Trade as well as the Swaziland Sugar Association for their warm welcome and gracious hospitality
- Presenters from governments, the sugar industry, research institutions and international agencies for contributing their efforts, knowledge and experience
- And most of all to participants from 15 countries for their keen insights, opinions and ideas, and for making this meeting an interactive and positive experience for all.

VITAMIN A DEFICIENCY

There are 250 million children who do not get enough vitamin A and they are at greater risk of dying. In areas where vitamin A deficiency (VAD) is widespread, 1 out of 4 child deaths can be prevented simply by supplying vitamin A. The World Health Organization has classified vitamin A deficiency as severe in nearly every country in Southern Africa. In 1996 over 1 million children less than 5 years of age died in the nations of the South African Development Community. Over the past decade, more than a million children have been blinded. Recent studies in Asia and Africa are linking vitamin A deficiency to maternal mortality, anemia and the transmission of HIV.

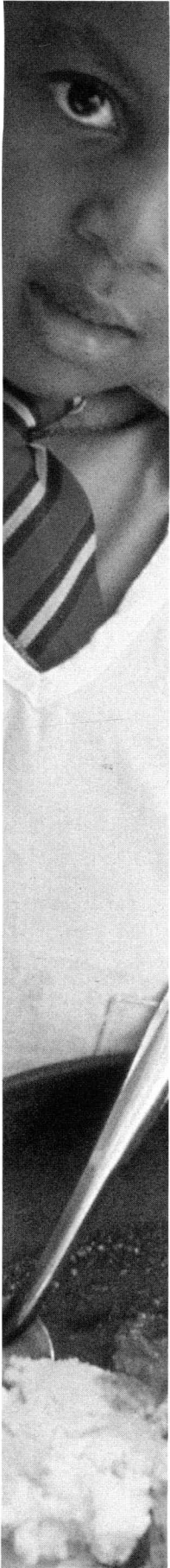
COMMITMENTS AND SOLUTIONS

More than 150 governments have pledged to eliminate vitamin A deficiency. For some countries, sugar fortification offers a proven, effective and inexpensive way to deliver vitamin A to populations who need it. In most countries of Southern and Eastern Africa, sugar consumption is high enough for safe, low levels of fortification to deliver a significant amount of vitamin A to people who need it. Producing fortified sugar is technically feasible and relatively inexpensive. The public health impact as well as the economic and technical feasibility of sugar fortification, has been proven in several countries of Central America and has been initiated in Zambia. If it can be implemented and sustained, fortified sugar can save lives and improve the quality of life throughout the region. Fortification of sugar is sustainable because the increased cost is passed on, invisibly, to consumers.

Sugar fortification requires commitment, investment and expertise from health and regulatory officials as well as sugar producers and consumers. With the aim of opening communications among these sectors, 75 delegates from 10 nations of Southern and Eastern Africa and representing both public and private sectors convened in Swaziland's Ezulwini Valley in June of 1999.

CHALLENGES TO SUGAR FORTIFICATION

Sugar fortification requires specific inputs, investments and technical expertise from health officials, regulatory agencies, private producers, research institutions and consumer organizations. These groups are not normally in consistent communication. Therefore the option of sugar fortification to reduce VAD has not been fully developed. Public health officials are usually not expert in the technical and marketing functions needed for successful sugar fortification programs. Producers are often not aware of the low cost or the immeasurable benefits of fortifying their sugar production.



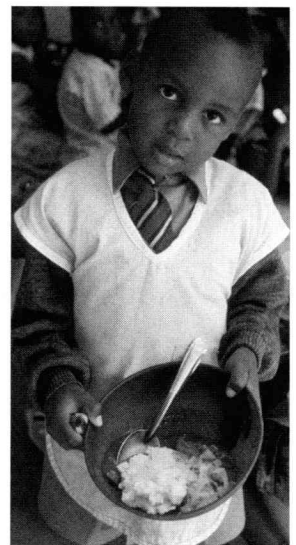
OBJECTIVES OF THE REGIONAL WORKSHOP

The workshop aimed to open communication channels among key partners and encourage both public and private sectors to undertake collaborative assessments of sugar fortification on a national and regional basis. Participants worked to define co-operative roles for all sectors in ending the tragedy of vitamin A deficiency. Specific objectives included:

- Present Business and Public Health Models
- Review Technical Specifications and Cost Factors
- Define Market and Regulatory Barriers
- Establish Channels for National Dialogue & Regional Cooperation
- Identify National and Regional *Centers of Excellence*
- Define Opportunities for Technical Assistance from Donor Agencies
- Define Collaborative Strategies, Roles and Responsibilities

Two days of open and frank discussion at *Sugar Fortification to End Vitamin A Deficiency in Southern Africa* identified a variety of issues fundamental to the successful and sustainable reduction of vitamin A deficiency through sugar fortification. *The Ezulwini Declaration* represents the workshop's consensus view of how to achieve a comprehensive and systematic sugar fortification for Southern and Eastern Africa. We think of it simply as the opportunity of a lifetime.

The path is not straightforward. The communication started in Ezulwini and the actions recommended in the declaration represent a great step toward establishing a landmark collaboration of public and private stakeholders. It is our hope that this document will not only be a record of the workshop but also provide guidance for future action to reduce the tragically high incidence of vitamin A deficiency in Southern and Eastern Africa.



THE EZULWINI DECLARATION

Declaration of Participants

Sugar Fortification to End Vitamin A Deficiency in Southern Africa

Ezulwini, Swaziland June 29 - June 30, 1999

RECOGNIZING THAT a lack of vitamin A in the diet presents a tragic but avoidable public health problem in Southern and Eastern Africa threatening the lives and well-being of millions of children through the region.

RECOGNIZING THAT providing adequate vitamin A could save the lives of at least 250,000 children annually in Eastern and Southern Africa.

RECOGNIZING THAT fortification of sugar with vitamin A has been shown to be technically feasible, safe and efficacious in lowering the prevalence of vitamin A deficiency as part of a comprehensive public health strategy.

RECOGNIZING THAT fortification of sugar offers a unique opportunity to deliver vitamin A to at-risk populations in the region.

AND RECOGNIZING THAT fortification of sugar requires the resolution of a number of complex issues.

The workshop participants recommend that countries in the Southern and Eastern African region should move forward to address these issues on the following basis:

- ✦ Expand participation and commitment of both the private and public sectors
- ✦ Establish a regional approach to fortification utilizing appropriate mechanisms representing both the public health and industry sectors.
- ✦ Recommend mandatory fortification on a national basis to include, at a minimum, all sugar produced for direct household consumption.
- ✦ Harmonize standards, product specifications and guidelines after appropriate consultations at both regional and national levels.
- ✦ Establish a regional mechanism to facilitate information exchange on technical, financial, trade, regulatory, communications and public health issues associated with sugar fortification.
- ✦ Initiate efforts to make sugar fortification technology more efficient and cost-effective under conditions found in the region.
- ✦ Utilize the technical assistance and resources of international agencies including The Micronutrient Initiative, International Sugar Organization, UNICEF and USAID to facilitate progress towards sugar fortification.

WORKGROUP RECOMMENDATIONS

- Mandatory legislated approach to sugar fortification is recommended. Only mandating fortification of sugar for direct consumption and not for food processing should be explored.
- Standards are recommended at the point of manufacture. However, due to the large amounts of sugar that is repacked, there is a need for testing at the packing and retail level.
- A regional fortification standard is recommended. The level of 15 mg/kg as currently practiced in Central America should be considered.
- A harmonized regional approach to duties and taxes on sugar and materials relevant to fortification should be explored.
- Approaches and techniques to measure vitamin A levels should be standardized on a regional basis.
- The private sector should be included in the process of setting standards and enforcement procedures. Independent wholesalers and distributors need to be involved in the dialogue.
- Financing issues should be resolved in a spirit of compromise and through a process involving all parties.
- National Task Forces on Sugar Fortification in the countries of the region should be encouraged
- A regional node for advocacy, research, communications and training should be established

MOVE FORWARD ON A REGIONAL BASIS TO:**Communicate with Regional Organizations:**

- Advocate for a Regional Communiqué by SADC on Sugar Fortification
- Integrate Sugar Fortification into Health Minister's VAD Control Agenda
- Introduce Sugar Fortification into the Regional Agenda of Ministers of Finance, Industry and Trade

Consider Regional Policies, Guidelines and Strategies:

- Develop Regional Fortification Guidelines, Standards and Analysis
- Explore Cooperative Purchasing and Premix Production
- Identify Regional Centers of Excellence for Training and Quality Assurance

Collaborate on Cost-Effective Technology Development:

- Research Improved Accuracy for Dosing/Feeding Systems
- Define Opportunities for Efficiencies in Premix Production
- Develop Storage, Packaging Improvements
- Establish Public Private Cooperation on Quality Assurance

MOVE FORWARD ON A NATIONAL BASIS TO:**Develop Fortification Policy and Strategies:**

- Integrate Vitamin A Fortification into National VAD Control Strategy
- Communicate to Ministers of Finance, Industry and Trade
- Continue to Raise Awareness Among the Industry Partners
- Produce Estimates of Economic Benefit and Cost-Effectiveness
- Undertake Industrial Feasibility Studies

Establish Public-Private Dialogues on Financing Mechanisms:

- Explore Tax and Tariff Relief
- Consider Loans and Revolving Funds
- Develop Public Purchase or Guarantee Agreements
- Provide Incentives to Improve Delivery Performance

MIKE MATSEBULA

**Executive Director
Swaziland Sugar Association**

The concept of smart partnership lies at the heart of good progress on virtually all projects. With delegates coming to this workshop from both public and private sectors we can therefore say with a reasonably high degree of confidence that the outcome of our deliberations here in Ezulwini are biased in favor of success.

Because of its wide consumption, sugar is a potential solution to the tragic problem of vitamin deficiencies in less developed countries. However, potential does not necessarily mean feasible. The economic and technical feasibility of sugar fortification with vitamin A need to be addressed. This workshop is our opportunity to beginning that assessment process.

In deliberating on this question, it should be recognized that, as is the case for Swaziland, there is a diverse customer base, both domestically and internationally. Furthermore, some of the customers have their own quality specifications, which may exclude externally introduced nutrients, including vitamins. At the same time there are some countries in the developed world who may eventually specify sugar imports be fortified. In deliberating on this question, it has to be explicitly recognized that in the case of the Swaziland Sugar Association there is a diverse customer base. Some of the customers are in Swaziland, others are outside. Furthermore, some of the customers have their own quality specifications, which exclude externally introduced nutrients, including vitamins. At the same time there are some foreign countries in the developing world that would want their sugar imports to be fortified because of the problems they are facing within. In addition, they may actually wish to use fortification as a means of controlling sugar imports.

All of these considerations make the issue of sugar fortification quite complex. Many of these challenges will not be easy to solve. However, we welcome these challenges because the elimination of vitamin A deficiency is the opportunity of a lifetime. It is in this vein that the Swaziland Sugar Association feels honored that Swaziland was chosen to deliberate on these issues. Welcome to Swaziland and welcome to the Ezulwini Valley.

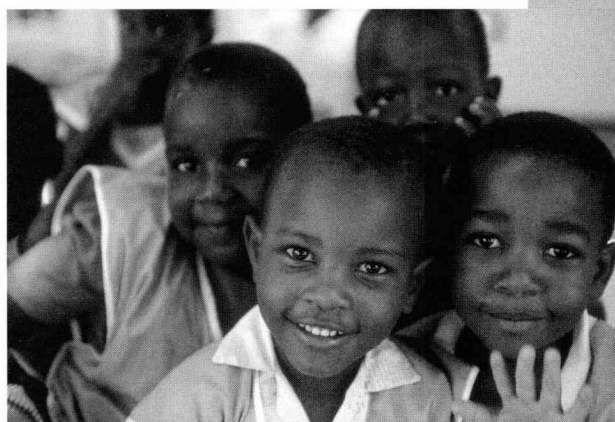
DR. PHETSILE K. DLAMINI**Minister of Health and Social Welfare
Swaziland**

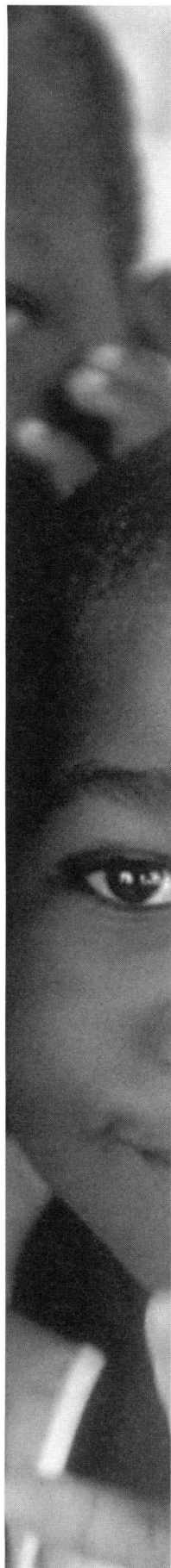
The body is like a house. Its strength depends on the building blocks and the cement that puts them together. The food we eat and the micronutrients in them are very much like the blocks. If the building blocks of a house are weak, when the wind comes, it will fall. Only those with solid building blocks will survive.

In Swaziland and other Southern African countries, vitamin A, iodine and iron are deficient in the diet. The effects of such deficiencies are more critical in the period of fastest growth – in our children and pregnant women. Most of these micronutrients exist naturally in foods but if inadequate quantities are consumed then effects result in mental retardation, blindness, growth stunting and even death.

Children under the age of five are extremely vulnerable to the consequences of vitamin A deficiency. It has been found that vitamin A can decrease child mortality by one-quarter. Lack of vitamin A can result in blindness and a range of other illnesses. Recognizing the profound impact of vitamin A, during our recent immunization campaign in 1998 we gave vitamin A capsules to children. It works very well. It is labor intensive and expensive because ultimately people have to make a conscious effort to take the vitamin A. Because of this, it is not practical. A better alternative is to use a food vehicle so that people consume vitamin A unconsciously.

We, in the health sector, welcome the work of the International Sugar Organization, our local Swaziland Sugar Association and the Micronutrient Initiative to seriously discuss sugar fortification. Vitamin A is essential for good health. If it could be added to a commodity consumed by more than 95% of the population, then we will achieve better health at reduced cost. Many lives will be saved.



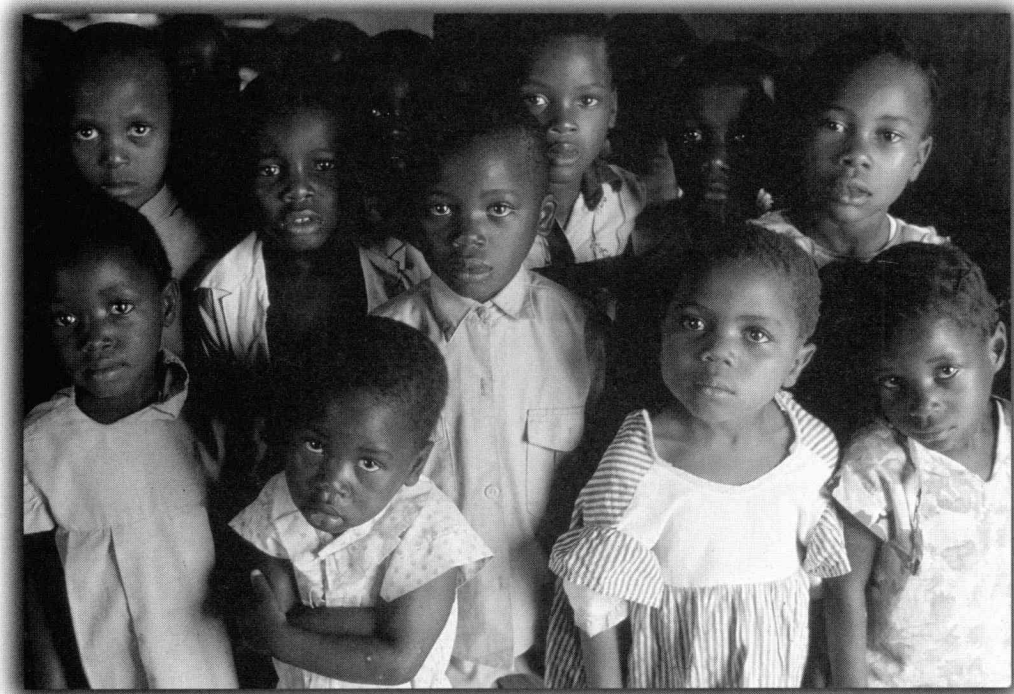


One sees fortification of sugar as a milestone with the private sector taking the initiative in providing an important public health measure. If this collaboration of the sugar industry and public sector succeeds, as I am sure it will, we will be rewarded by the good health of our population, especially the young. Mutual benefit will also enhance the exercise. As value added sugar is sold, the benefits will create a snowball effect, especially in developing countries.

It is critical that all stakeholders take an active role in seeing this process through. One thinks here of scientific researchers, health personnel as well as marketing specialists. The role of donors is not only to provide funding but also their technical expertise is most welcome. The Ministry of Health and Social Welfare and indeed the whole of His Majesty's Government is optimistic that this exercise between the public and private sectors will gain momentum. Government will give all the necessary support within her means, including enabling and protecting legislation and regulation.

The regional scientific and private sectors are hereby challenged to come out with a program that will make a major health impact. We thank the international specialists and advocates on this issue. I also thank our local sugar association for its enthusiasm in involving the health sector. My colleague Minister for Foreign Affairs and Trade, Albert Shabangu, is applauded for having invited this Regional Workshop to be held in Swaziland. Let us agree to make our sugar not just sweet, but "A-Sweet."

A DEVASTATING PROBLEM & A COST-EFFECTIVE SOLUTION



OLIVIA YAMBI

**Regional Nutrition Advisor
UNICEF, ESARO**

A THREAT TO CHILDREN'S HEALTH AND LIFE

The Convention on the Rights of the Child (CRC), ratified in 1989, stipulates the right of children to the highest attainable standard of health. In 1990 more than 100 world leaders made a pledge. These are obligations, solemnly made to progressively improve the conditions of children of this world. Progress has been made but the job is far from complete and the right to health has in many cases not been realized. That is why this gathering is important. It is an opportunity to revisit the promises made and specifically to explore a partnership, which can accelerate the achievement of a region free of VAD.

Vitamin A deficiency threatens the life of 100 million young children worldwide. In the countries of the Eastern and Southern Africa, one in three to one in seven children suffer from vitamin A deficiency. That means approximately 75 million children face a higher risk of dying before their fifth birthday. About 10 million children in the region show clinical signs of vitamin A deficiency.

THE DEVASTATING CONSEQUENCES OF VAD

The effects of vitamin A deficiency are far reaching and will affect the child even before clear signs are observed in the household. Even mild vitamin A deficiency impairs the immune system, reducing the child's resistance to diseases like diarrhea, which kills over 2 million children every year. The consequences of vitamin A deficiency are devastating. In 1996, more than 4 million children died in this region. And we know that vitamin A deficiency does contribute to significantly increased risk of death in children.

There is needless human waste and tragedy. Various studies have shown that good vitamin A status would reduce mortality due to measles by up to 50%. Measles remains prevalent in the countries of our region and as measles immunization coverage in a number of countries slides, protection declines. Adequate vitamin A status could reduce mortality due to diarrhea by about 40%. The overall estimate of child mortality reduction due to good vitamin A status is between 25% and 35%.

There are other consequences and other populations at risk. Globally, 600,000 women die annually through childbirth. Approximately 104,000 of these are from Eastern and Southern Africa. That's about 1 in 5. It is known from various studies that good vitamin A status before and during pregnancy has some protective effect. Studies are now showing an association of VAD and anemia. In our region about 50% of pregnant women and up to 60% of pre-school children are anemic. We also know from available information that there is an association between vitamin A status and HIV/AIDS. All of you would be aware that the HIV/AIDS pandemic has hit this region hardest and in some countries already 1 in 4 of the adult population is infected. No doubt multiple interventions are required to improve the nutrition status of the population of the region with special attention to the needs of women and children.

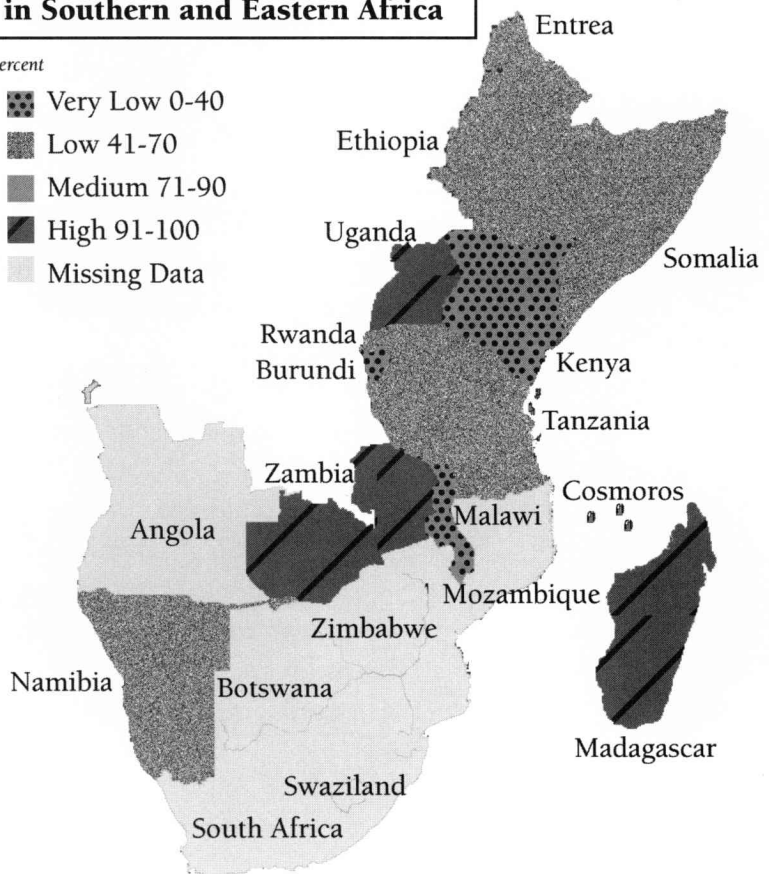
FINDING SOLUTIONS AND TAKING ACTION

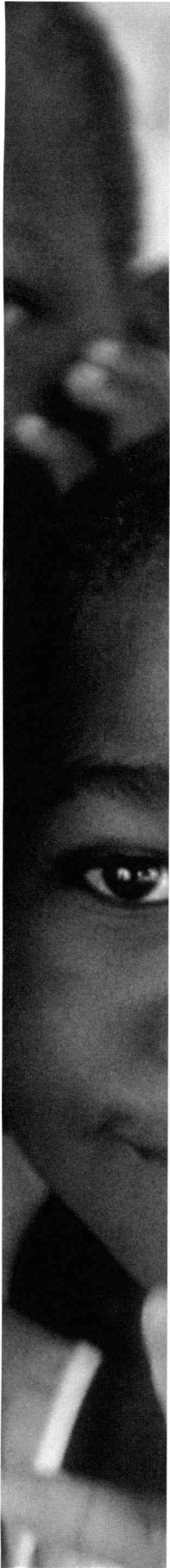
VAD prevalence is most often measured biochemically by serum retinol or clinically by signs of eye disease and other indicators like history of nightblindness during pregnancy. More recently, underlining the grave threat, experts at an informal technical consultation agreed that a child mortality rate of more than 70 per 1000 indicates deficiency and should trigger action. This means that countries in this category do not have to wait until they have a representative survey of vitamin A deficiency before putting control measures in place. Every country in this region is affected by vitamin A deficiency to a lesser or greater degree. Even in countries like South Africa and Botswana that have a lower child mortality rate, there are large and populous regions, such as the Northern Province in South Africa, where the prevalence of vitamin A deficiency is high and well beyond the cut off points for triggering public health intervention.

Vitamin A Supplementation Rate in Southern and Eastern Africa

percent

- Very Low 0-40
- Low 41-70
- Medium 71-90
- High 91-100
- Missing Data





Action is underway to control vitamin A deficiency in most countries but it is not commensurate with the size of the problem. Over the last two years, 25 countries in Sub Saharan Africa have included vitamin A in national immunization days and the coverage has been doubled from about 24% in 1996 up to 48% in 1998. However, although 2 doses over a 12-month period are needed for protection, only 60% of young children received at least one dose of vitamin A during 1998. Coverage with an appropriate amount of supplements is inadequate and despite efforts to distribute inexpensive vitamin A capsules, 7.6 million children remained unprotected in 1998.

WORKING TO MAKE A DIFFERENCE

There is need to explore additional strategies and actions. The elimination of vitamin A deficiency requires multiple strategies, including food fortification, promoting intake of foods rich in vitamin A and other public health interventions. While there are some examples of fortification in countries like Zambia, Namibia, Botswana and Malawi, compared to other parts of the world, fortification is lagging behind in this region. Among other barriers, there is a widespread notion that fortified foods are mainly accessible to the urban few. However, we have a growing proportion of urban poor in the region and to the extent that these people can access fortified foods, we will be able to improve their nutrition status.

The situation is not unlike the story of a man standing on the beach at low tide struggling to save the starfish that were stranded on the dry sand at low tide. One by one he threw them into the sea. A passerby stopped and said that throwing starfish back one at a time was hopeless. There were simply too many to save. But the man continued and replied, "There are so many starfish. You might think my efforts are small. But it will make a difference for this one." And with that he picked up another starfish and threw it back into the sea.

Child by child, our individual effort will make a difference. But our collective efforts will make even a bigger difference. A collaboration of governments and industry to fortify the sugar of this region will work toward reaching our children. However, to provide everybody with additional vitamin A all strategies must be brought to bear.

I hope that at this meeting we can start a movement to revitalize ongoing efforts and work towards a world where all children, women and the whole population enjoy their right to the highest attainable standard of health.

ROY MILLER

Project Director

USAID's MOST Project

The original research showing large reductions in child mortality through provision of vitamin A were done in Indonesia and published in the mid 1980's. At the time, few people believed that a deficiency in a single nutrient could have such a devastating impact. That study had to be repeated six times in a number of countries before people were ready to take action based on those results. Today, we understand that providing vitamin A can reduce the rate of child deaths by about 30%.

It has taken quite some time for these facts to filter into program efforts to reduce vitamin A deficiency, but over the last few years the astonishing facts about vitamin A are changing the landscape of nutrition programming. About 2 years ago, the United States Agency for International Development elevated the priority of vitamin A within its range of public health programs by establishing what we call the VITA Alliance. This is a global effort to make VAD a thing of the past.

The VITA Alliance focuses on three general classes of interventions. We support distribution of vitamin A capsules or syrup to children twice a year in high dose quantities. However, while the impact is rapid, the effort and resource expenditure is high and it is generally thought that this is not a sustainable approach. If we rely only on this approach, we might have short term success but five years down the road we will all be wondering why we continue to have such a high levels of vitamin A deficiency.

The second class of intervention, which has traditionally been part of nutrition programming, is improving vitamin A status by changing people's diet. This involves getting people to produce, distribute and consume more vitamin A rich food. These interventions require care and resources and are extremely difficult to implement on a population-wide scale. Recently, there have been a number of examples of genetic research that might produce crops containing more vitamin A. These dietary approaches are also probably long term solutions, which will not bring results for decades.

Food fortification represents the third major intervention. When the conditions are right, fortification of commonly consumed foods with vitamin A offers existing production and distribution channels to deliver vitamin A to at risk populations. It involves little or no change in the way the food is used or consumed. And, the small cost increment can ultimately be spread invisibly across millions of consumers.

Fortification has been the solution to micronutrient deficiency in the more developed countries in the world. It's happening without public sector involvement. However, for most developing countries a national fortification program will involve a partnership among public and private sectors. Generally, Ministries of Health or health and development agencies aren't experienced in working with the private sector. It's something we have to learn. But at USAID we are convinced that building partnerships with the private sector is key to the achievement of a world free of vitamin A deficiency.



VENKATESH MANNAR, Executive Director
JACK BAGRIANSKY, Consultant
 The Micronutrient Initiative

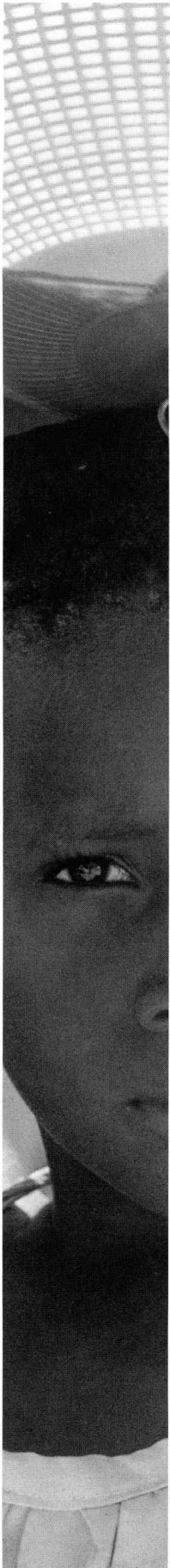
INTRODUCTION

Vitamin A deficiency is one of the most widespread and life-threatening health issues in Southern and Eastern Africa. Fortification of sugar with vitamin A can play an integral role in eliminating this needless tragedy. Capsule supplementation and dietary education will also play a vital role. Other vehicles such as maize meal and cooking oil should also be considered. But for wide populations throughout the region, sugar is the only centrally processed food vehicle that is consistently purchased and consumed by people at risk. In this paper we will present a series of projections indicating that for average consumers in Africa, fortified sugar can provide a significant percentage of daily requirements for this crucial nutrient.

PROJECTIONS OF IMPACT ON CHILD MORTALITY

From a widely accepted meta-analysis of vitamin A interventions in a number countries, we can conservatively project that, among populations where vitamin A deficiency is widespread, providing sufficient vitamin A will result in a 23% reduction in child mortality. In 1997, UNICEF's "State of the World's Children" reported that 1.2 million under five years of age died in 13 countries of Southern and Eastern Africa. If we assume that 90% of these children lived in areas where vitamin A deficiency was widespread and health care rudimentary, we might extrapolate that more than a quarter of a million children could be saved every year if they could consume sufficient vitamin A.

	90% of Under 5 Deaths ('000) UNICEF 1997	Estimated Mortality Reduction @23% ('000)
Angola	143.1	32.913
Botswana	0.9	0.207
Congo	397.8	91.494
Kenya	82.8	19.044
Malawi	9	2.07
Mozambique	146.7	33.741
Namibia	3.6	0.828
South Africa	75.6	17.388
Swaziland	2.7	0.621
Tanzania	12.6	2.898
Uganda	132.3	30.429
Zambia	64.8	14.904
Zimbabwe	28.8	6.624
TOTAL	1100.7	253.161



NATIONAL AND REGIONAL SUGAR CONSUMPTION

Sugar offers a channel to reduce the prevalence of VAD because it is, in many cases, the only centrally processed food that reaches throughout the population, including less advantaged sectors that are most at risk. Definitive consumption studies in at risk areas are not available. However, figures are available to roughly project average consumption among lower income groups. Based on ISO estimates for sugar consumption in a range of nations, rough calculations indicate that for lower income groups, sugar consumption is high enough for low levels of vitamin A fortification to deliver from about 8-81% of daily requirements. This conclusion is based on a series of three assumptions.

- First, a recent report by South Africa's Bureau of Market Research revealed that, in both rural and urban areas, the poorest 20% of the population purchased 88% of the population-wide average for sugar. The next higher income quintile spent 96% of the average on sugar. If we assume that those at risk of VAD are predominantly drawn from this lowest 40% income group then we might make a general assumption that the at-risk population consumes about 92% of the average.
- Second, the calculations assume that only sugar destined for direct retail consumption is fortified. Sugar in more expensive value-added foods such as soft drinks, ice-creams, candy and sweets does not reach lower socio-economic groups on a consistent basis. The amount of sugar used by industrial food and beverage processors as opposed to purchased by consumers on a retail level varies from country to country. However, we will assume that 20% of all sugar consumption is in the form of value added-products. Therefore sugar intake is calculated at 80% of the level indicated by the ISO.
- The final assumption is for the level and stability of vitamin A as it is subjected to the stress of heat and humidity during processing and distribution. Based on results from monitoring of sugar fortification programs in three Central American countries, we project that an average of 50% of added vitamin A will actually be delivered to the consumer. Calculations are based on adding 50 IU/gr (as is being done in Central America and Zambia) and delivering 25 IU/gr at the consumer level.

		Consumption White Sugar Kg/yr (ISO)	Adjustments: Industry Use: 20% Low Income: 92%	% WHO RDI Add: 50 IU/gr Deliver: 50%
Low Consumption	Mozambique	3.0	2.2	7.7%
	Tanzania	4.6	3.4	11.6%
	Uganda	4.8	3.5	12.1%
	Angola	8.8	6.5	22.3%
Mid Consumption	Zambia	14.9	11.0	37.6%
	Malawi	15.0	11.0	37.8%
	Kenya	15.9	11.7	40.1%
	Zimbabwe	22.9	16.9	57.7%
High Consumption	Botswana	24.7	18.1	62.1%
	Namibia	29.2	21.5	73.5%
	South Africa	29.3	21.6	74.0%
	Swaziland	32.2	23.7	81.2%

PROJECTING IMPACT ON DAILY REQUIREMENTS

When ISO figures for per capita consumption are adjusted for these three factors, sugar that is fortified at 50 IU/gr will deliver from 8-81% of the WHO defined safe level for minimal intake of 2000 IU/dy*. If we assume 40-50% of vitamin A requirements from other sources, sugar clearly can make the difference between sufficiency and deficiency for millions of children. Clearly, sugar fortification can play an integral role in the virtual elimination of VAD.

* RDI's for some countries in the region are more than 50% higher. However, these are for optimum nutrition and health not simply the prevention of mortality

	Total Direct Consumption (MT)	Total Cost @ \$13.10*	Cost Per Person Per Year (USD)
Angola	103,036	\$1,349,771	\$0.093
Botswana	22,079	\$289,237	\$0.258
Kenya	386,385	\$5,061,640	\$0.166
Malawi	130,770	\$1,713,092	\$0.157
Mozambique	36,798	\$482,059	\$0.031
South Africa	1,218,830	\$15,966,678	\$0.308
Swaziland	137,566	\$1,802,119	\$0.338
Tanzania	121,435	\$1,590,801	\$0.048
Uganda	110,395	\$1,446,177	\$0.050
Zambia	54,402	\$712,671	\$0.156
Zimbabwe	246,584	\$3,230,250	\$0.240

* Includes a tariff of 17.5% on fortificant imported to Zambia

COST PROJECTIONS

Based on incremental costs of fortification reported by Zambia Sugar PLC of \$13.10 per MT, national costs for adding vitamin A at a rate of 50 IU/gr can be calculated for all production to supply direct retail consumption. More than 90% of these costs are for purchase of vitamin A. For average consumption, the incremental cost per person ranges from USD \$0.03 to \$0.05 for the lower consumption countries and from \$0.24 up to \$0.33 for higher consumption nations. Costs for a scenario that does not include a tariff on imported fortificant are lower – about USD \$.18 to \$.26 for average consumer. These calculations indicate a 1-3% higher retail cost.

Vitamin A Intake at High Consumption				
	Sugar Consumption In Gms/day	Added IU/dy @ average consumption	Added IU/dy @ 4 x average consumption	% WHO Safe Level: 4 x average consumption
Zimbabwe	46.2	1155	4619.2	46.2%
Botswana	49.7	1243	4971.6	49.7%
Namibia	58.8	1470	5880.4	58.8%
South Africa	59.2	1479	5917.6	59.2%
Swaziland	64.9	1623	6492.8	64.9%

SAFETY CONSIDERATIONS

These calculations indicate little or no threat of toxicity from fortified sugar. For most population groups, safe intake for vitamin A is above 30,000 IU/day. However, because of risks to the unborn fetus, WHO/ UNICEF indicate a safety threshold of 10,000 IU/day for women of child bearing age (except for a period of 8 weeks postpartum, when conception

is unlikely, the higher threshold applies to women as well). Based on our assumption of adding 50 IU/gr and delivering 25 IU/gr to the consumer, in countries with high sugar consumption, average additional intake of vitamin A totals 11.5%-16.2% of this safety threshold. When calculations are made for high consumption of four times the average, additional intake reaches only 46%-65% of the safe level.

CONCLUSION

These scenarios and analyses, indicate that a modest investment in sugar fortification offers the potential for significant impact on vitamin A deficiency and child mortality. We might refine the calculations and projections included in this presentation. But no one can argue about the magnitude of the impact.

If the market system responded perfectly to the nutritional needs of the human body, the cost of fortification, usually less than over-all inflation for food products, could be easily absorbed. However, VAD is a *hidden hunger*. If the diet is insufficient in this nutrient, there is no craving or hunger for foods that contain vitamin A. Or when a child dies after a bout of measles or diarrhea, the cause is not listed as an immune system so impaired by vitamin A deficiency that a young body could not defend itself against a common childhood disease. Transforming this invisible hidden need into visible and viable market demand will entail a close collaboration of public and private sectors to “prime the pump,” prepare the market and justify the small investment in sugar fortification. The rewards are immeasurable.



PETER BARON, Executive Director
LINDSAY JOLLY, Economist
 International Sugar Organization

A Meaningful Role in Public Health

Combating vitamin A deficiency is unquestionably an urgent need in the developing world - especially here in Southern Africa. We're all aware that fortifying sugar with vitamin A is a technically feasible and realistic tool for attacking the tragedy of vitamin A deficiency in this region. Sugar has the potential to play a meaningful role in boosting public health in Southern Africa. Even so, we must recognize that the path towards implementing sugar fortification is not straightforward.

"Carbohydrates in Human Nutrition" FAO/WHO 1997

- ◆ No evidence that sugar promotes obesity other than the contribution to total energy intake.
- ◆ No evidence that sugar is directly involved in the etiology of non-insulin dependent diabetes.
- ◆ No evidence that sugars are directly involved in the etiology of non-insulin dependent diabetes.
- ◆ No evidence that sucrose plays a causal role in the etiology of coronary heart disease.
- ◆ No evidence that sugar automatically replaces foods rich in micronutrients, adversely altering micronutrient intake
- ◆ No evidence that refined sugar intake has any significant influence on either behavior or cognitive performance in children.
- ◆ The impact of sugars on caries depends on the type of food, frequency of consumption, degree of oral hygiene, availability of fluoride, salivary function and genetic factors. Programs to control dental caries should focus on fluoridation and oral hygiene, rather than sucrose intake.

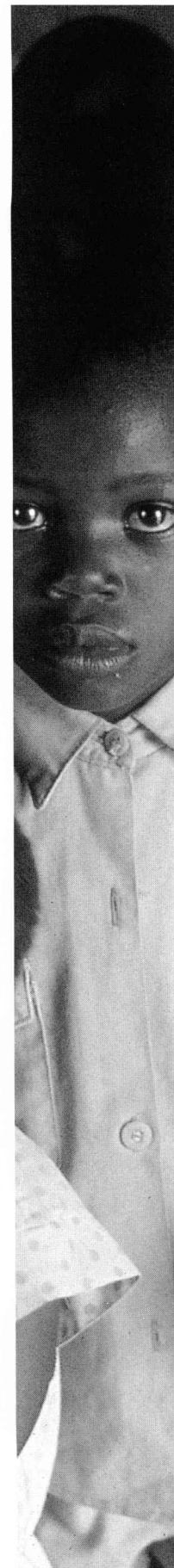
First, one crucial point must be emphasized: sugar is not bad for you. This is a fact established beyond refute by the most recent objective scientific considerations. In 1997, a joint FAO/WHO expert group was set up to investigate the role of carbohydrates in nutrition. Its interim report "Carbohydrates in Human Nutrition" represents an authoritative and comprehensive

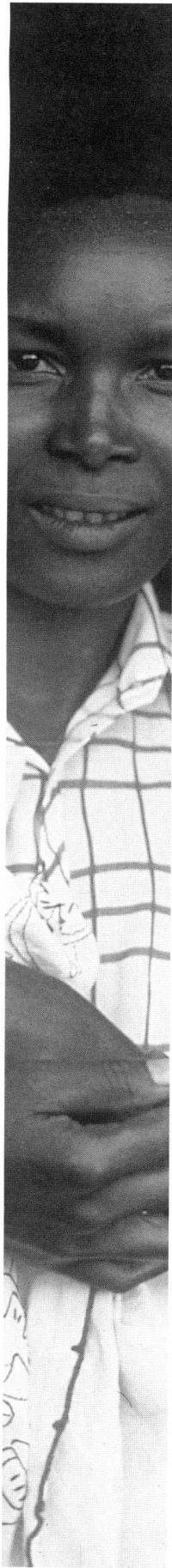
review of the role of sugar in health and nutrition. The report fully recognizes sugar's role in providing energy and palatability, especially in developing countries. The report concluded that eating sugar is not harmful in a balanced diet. Sugar has its legitimate place as an energy provider among other carbohydrates. But fortification with vitamin A presents an opportunity for our industry to take another step, to the moral high ground, as a saver of lives.

UNDERSTANDING FORTIFICATION OPPORTUNITIES

Nevertheless the 'moral high-ground' alone cannot be expected to drive any industry toward fortification. If such an effort is to be sustained there must be sufficient opportunity and incentives for sugar millers to adopt fortification on business as well as moral criteria. The heart of this workshop is directed toward better understanding the opportunities presented by fortification. And we're here to forge the required partnerships between the public and private sector to define and overcome the barriers. In this spirit of identifying opportunities I will offer some suggestions outlining some potential benefits for the industry. These are 'food for thought' - not statements representing the collective wisdom of the ISO.

- **Product Identity:** Create a healthy image for sugar as a nutritious product. Fortification offers new ways to attain an enhanced product identity and to achieve product differentiation.
- **Marketing Strategies:** Develop a range of new marketing partnerships and channels with government, public health, medical and other organizations.
- **Public Relations:** Public image of the entire sugar industry can be enhanced. Private interests acting for public benefit stand to gain greater credibility in the market place, perhaps leading to greater commercial success in the marketplace.
- **Fair Trade:** Since fortification will require regulation and enforcement, it may be useful in controlling 'informal' or black market sugar flows between countries.
- **Social Returns:** These include decreased mortality as well as reductions in the national cost of health care. Improved parenting and education performance are also the beginnings of large economic dividends available from improved human capital.

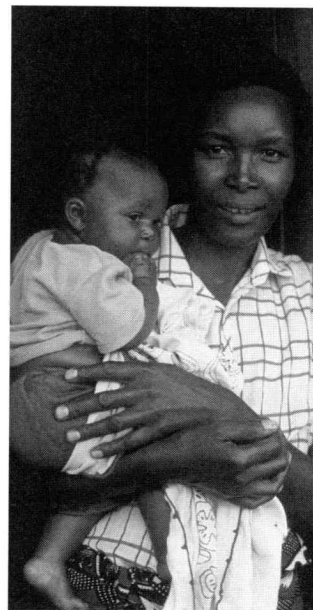




BUILDING COLLABORATION

In 1997 the ISO and the Micronutrient Initiative conducted a first ever survey on the knowledge and attitudes of public officials and private executives on sugar fortification. The results highlighted the fact that the sugar industry is very concerned with the financial implications of sugar fortification, such as increased production costs and lower consumer demand for sugar. Many respondents expressed a need for incentives to offset the extra costs. On the other hand, the concerns of the public sector were with technical barriers to efficient sugar fortification, quality assurance and legislation. It's clear that there are differences of approaches, interest, and perception. However, all agreed that the sugar fortification is feasible and offers potential benefits from both industry and government perspectives.

Let's not forget that the consequences of no action are far more serious than the constraints. Let's take this opportunity to build a collaboration of governments and sugar producers to move forward for our mutual benefit. Let's explore marketing partnerships and joint communication campaigns to raise public awareness and consumer demand. Let's discuss government seals of approval to assist consumers in identifying sugar that's good for their health. Let's find ways government and industry can work together in quality assurance and monitoring schemes. Let us focus on ways to share the costs of fortification as well as the rewards of a healthier population. Vitamin A is such a crucial nutrient and sugar is such an effective vehicle to deliver that vitamin A that we simply must find ways to cooperate in order to achieve the promise of fortification.



DR. OMAR DARY

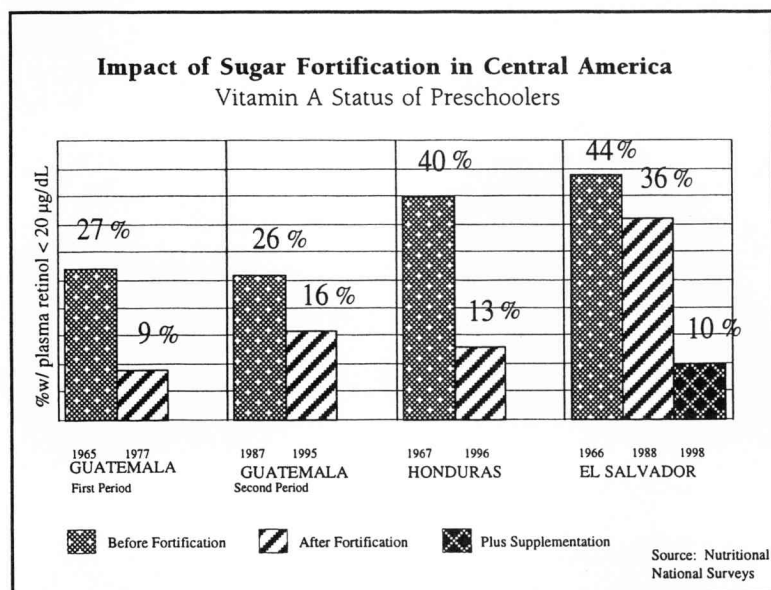
Head, Food Analysis & Safety

Institute of Nutrition of Central America and Panama

SUGAR FORTIFICATION:

A STRATEGY FOR CENTRAL AMERICA

The diet in most countries in Central America is low in vitamin A, containing on average approximately 50% of the Recommended Daily Allowance (RDA). Sugar fortification with vitamin A was chosen as the main strategy to overcome this deficiency, because sugar is centrally produced, is affordable for all people, and is distributed and consumed almost everywhere. Today in Guatemala, Honduras and El Salvador, sugar is fortified at a level of 15 mg/kg in order to assure a minimum of 5 mg/kg at the consumer level all year around.



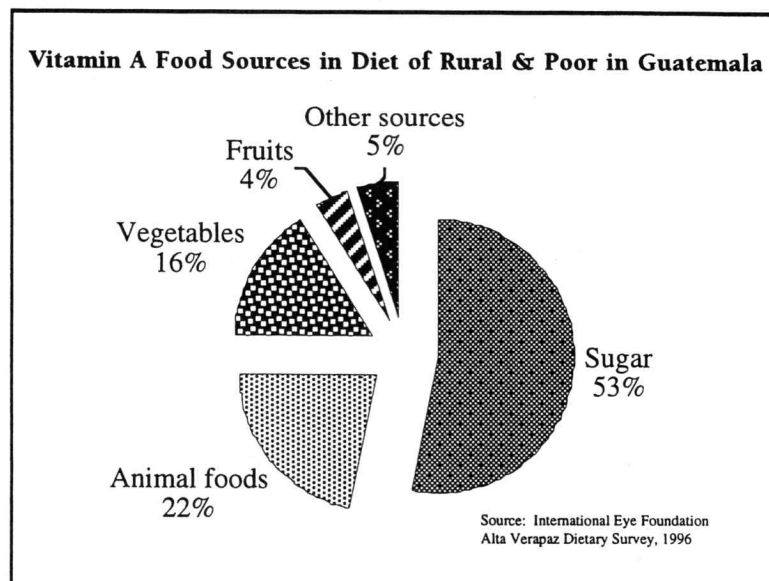
THE IMPACT OF SUGAR FORTIFICATION

A national survey of Guatemala in 1965 found 27% of children deficient in vitamin A. Sugar fortification was launched in 1974. In 1977, only 9% of children suffered low levels of vitamin A in their blood. Unfortunately, due to a number of reasons, fortification stopped. VAD reappeared and by 1987, a general study found a situation similar to that of 1965. Sugar fortification was reactivated in 1987 and by 1995, a national survey determined that the vitamin A deficiency was no longer a public health problem with less than 16% of children indicating low levels of serum retinol. Recently, more dramatic results of sugar fortification were demonstrated in two other Central American countries. In Honduras, children



with low levels of vitamin A fell from 40% in 1967 to 13% in 1996. In El Salvador, 44% rate of VAD in 1966 dropped to less than 10% in 1998. However, in the latter case, the success could also be attributable to the combined effect of supplementation.

In Central America, sugar supplies at least 50% of the RDA values for all people older than 2 years of age. The diet provides the other 50%. The importance of fortified sugar within the overall diet was confirmed in a study carried out by the International Eye Foundation in a rural community of Northern Guatemala. Fifty-three percent of the vitamin A content of the diet of that community came from fortified sugar, 22% from animal food sources, 16% and 4% from vegetables and fruits, respectively, and 5% from other sources.



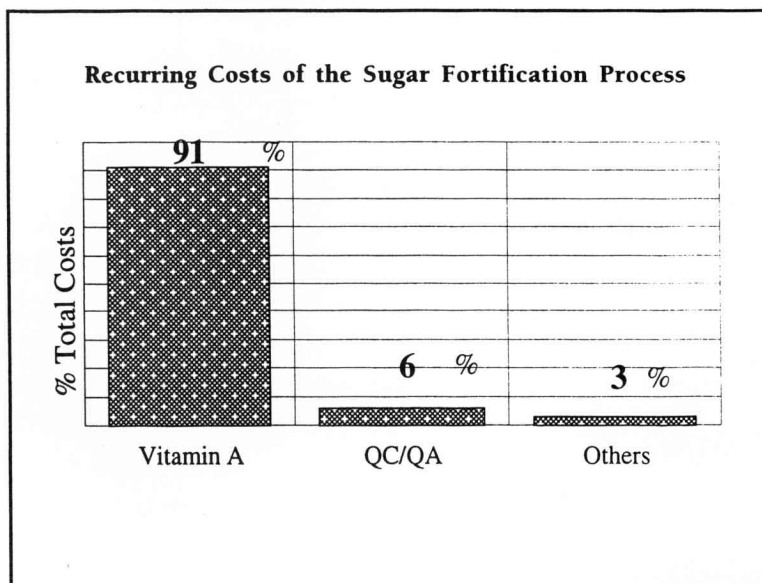
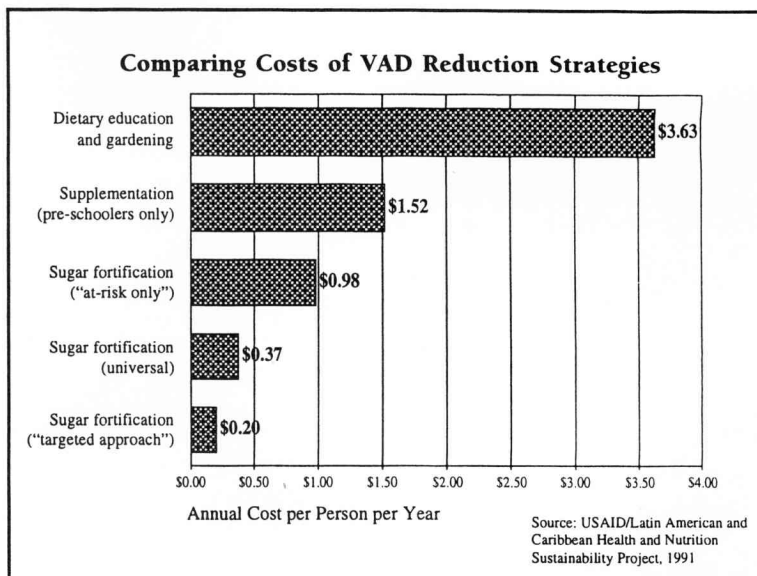
Nevertheless, children younger than 24 months of age remain at risk. The main reason is that their sugar intake is not high enough to deliver their full vitamin A requirement. Hence, these children need to receive periodic high dose supplements. However, the sugar fortification has reduced the cost and raised the effectiveness of the supplementation program, because it is much more feasible and less expensive to cover children from 6 to 24 months of age than all preschoolers and lactating women. Even though fortified sugar does not completely fulfill the requirements of small infants, this food is still an excellent source of vitamin A, representing from 30% to 40% of RDA values for this age group. No other food in the diet supplies as much vitamin A. Moreover, our experience and data demonstrates that consumption of fortified sugar is safe for everyone. No case of vitamin A toxicity has been reported from fortified sugar.

COST OF THE SUGAR FORTIFICATION PROGRAM

In 1991, the Latin American & Caribbean Health and Nutrition Sustainability Project, carried out a study in Guatemala to determine the cost-effectiveness of several health interventions to control vitamin A deficiency. The study indicated that under the Central American conditions, sugar fortification is the most cost-effective. Dietary education and gardening projects cost USD \$3.63 annually per person at risk. Supplementation cost was US\$1.52 for preschool children only. Sugar fortification cost was US\$0.98 per "at-risk person" and US\$0.37 per capita for the entire population.

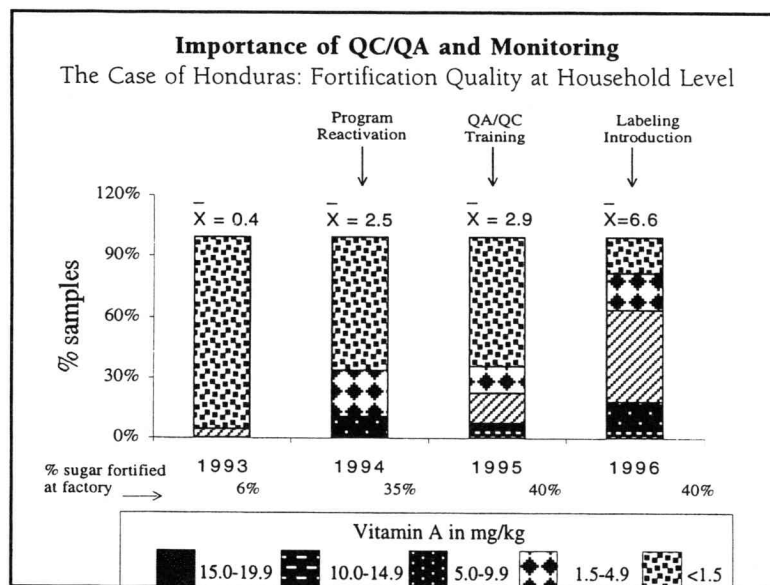
These figures reflect the decision in Guatemala to fortify all sugar whether it is destined for industrial processing or direct retail consumption. If only sugar for retail consumption is fortified and sugar for industrial use is not, the cost could be reduced to about US\$0.20 per person a year. This is the scheme currently followed in Honduras.

Most of the recurring costs of fortification, about 90%, are from the purchase of vitamin A. Industry covers these costs, which have been transferred to consumers in the form of higher retail costs of about 2%. In Central America, the governments provide exemptions for import duties of vitamin A and other fortification equipment in order to keep the program affordable. The government sector invests about \$40,000 per year in maintaining inspection, monitoring and evaluation systems. This represents about 5% of the total cost of the program.



QUALITY ASSURANCE AND QUALITY CONTROL

Although it accounts for only about 6% of the total, adequate quality control and quality assurance is essential to assuring a beneficial impact. Moreover, since vitamin A is the most expensive component, reducing vitamin A loss from producer to consumer represents a cost effective investment. After adding 15 mg/kg, national averages of vitamin A surviving in sugar at household level in 1998 were 9.3 mg/kg in El Salvador, 8.3 mg/kg in Honduras and 6.9 mg/kg in Guatemala. Between 45%-62% of the vitamin A is lost during storage and marketing of sugar – a period of about 9 months. This means that a major part of the investment is lost. Therefore, developing technologies that reduce vitamin loss or increase homogeneity (allowing for more precise dosage levels) may provide major savings.



Honduras enacted mandatory sugar fortification legislation in 1976. In 1984, the producers obtained government authorization to exclude sugar destined for industrial use. However, there was no related implementation of QC/QA. A few years later, government sampling in homes indicated a drop in vitamin A content and there was evidence that industrial sugar was leaking into the market. In 1996, a special type of labeling was introduced to the bags and training was provided to warehouse personnel. Furthermore, governmental inspectors visited each factory every two weeks, and they monitored warehouses and retail stores. Within a year, household samples returned to satisfactory levels.

SUPPORTING LOGICAL LEGISLATION

Often, enthusiasm for the potential benefits of fortification results in the promulgation of overly theoretical laws and regulations that do not take into consideration the real-world feasibility, performance and efficiency of the fortification process. In developing countries, regulations sometimes prescribe conditions that are impossible to fulfill. In our experience, legal instruments are needed, but they must be wisely and realistically conceived and enforced. Key factors to be considered include the following:

↔ **All producers and traders must be governed by the same rule:**

For public health programs in the developing world, all brands of the food vehicle, either internally produced or imported should satisfy the required specifications.

↔ **Minimum fortificant content should be established for the retail level:**

This simplifies control activities and furthermore producers are motivated to find ways to reduce the amount of fortificant added at the factory while fulfilling the required content at the retail level.

↔ **Minimum fortificant content and guarantee date should be declared in the label:**

These claims are needed to raise the awareness of the consumers as well as to protect the producers.

↔ **Regulations should provide incentives to adopt the fortification process:**

One of the most important issues to consider is the exemption of importation duties for the equipment and ingredients that are needed for fortification.

↔ **Regulations should be harmonized between adjacent countries:**

Some officials incorrectly interpret food fortification as a technical barrier to trade. In order to avoid this barrier, food legislation among neighboring countries should be harmonized.

↔ **A reliable and feasible enforcement mechanism must be implemented:**

Government enforcement must ensure that all national and imported sugars fulfill the specifications. When unfortified sugar is available, it creates uneven competition.



PETER MCKERCHAR

DEREK WILKES

Tongaat-Hulett Sugar Ltd

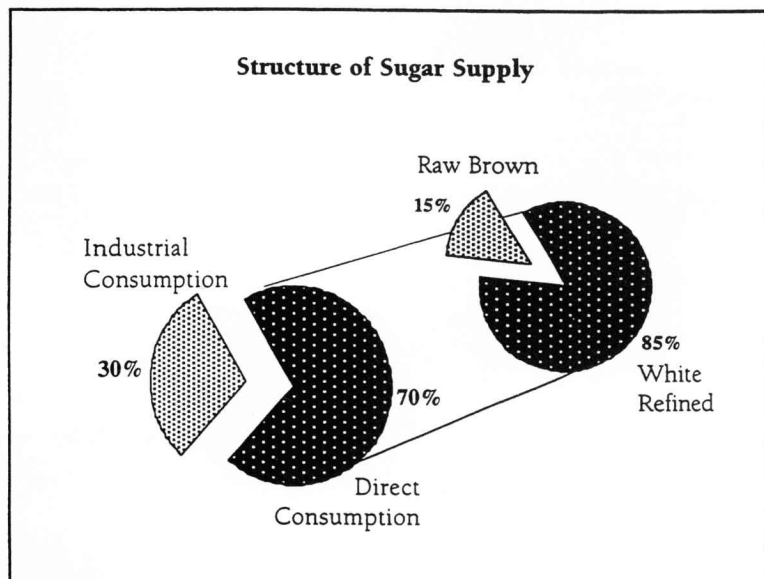
SUPPLY AND DEMAND

The total sugar demand for the South African Customs Union, including Namibia, Botswana, Lesotho, Swaziland and the Republic of South Africa, amounts to 1.6 million tons per year. About 1.2 million tons comes from South Africa. Another quarter million tons comes from Swaziland and less than 100,000 tons from Zimbabwe. Sugar for direct consumption is produced at ten sugar mills within those three countries, six in the Republic of South Africa, two in Zimbabwe, and two in Swaziland.

SA Customs Union Demand & Supply

Tons x 1000		SUPPLY			
		South Africa	Swaziland	Zimbabwe	Total
D	Botswana	31		27	58
E	Lesotho	21			21
M	Namibia	38		52	90
A	South Africa	1,154	231		1,384
N	Swaziland		32		32
D	Total	1,244	263	79	1,586

70% of all sugar produced is prepackaged and consumed directly. 85% of this direct consumption is white and refined sugar. The remaining 15%, a raw brown sugar, is priced lower than white sugar. Only about 30% goes to industrial food processing.



The distribution system for the 70% of production that goes to direct consumption is complex. About 70% of direct consumption sugar goes to the wholesale trade. Once delivered to the trader or broker, this is the last point where sugar manufacturers have control over their product. About one quarter of the direct consumption volume is delivered to major retail chains. This retail sector believes that availability of inexpensive sugar is a key to getting customers into their stores. Therefore they sell it at a low margin. They often sell at no mark-up at all, just to get the people to come into their stores and purchase other products on which they make a comfortable margin. Consequently, the wholesale sector is affected by these low retail margins. This in turn affects the whole industry.

PRICE SENSITIVITY OF SUGAR

Sugar is one of the most price sensitive of consumer products. We have measured consumer sensitivity down to 5 South African (SA) cents. In other words, if sugar is 5 cents per kilogram cheaper in another store, the consumer will seek it out. With tight profit margins and a price sensitive consumer, the lowest price sugar will have an unbeatable advantage.

One factor causing price differentials is transport costs. In South Africa, sugar is priced as though it was manufactured in Durban, with the customer paying the transport from Durban to his point of sale. The variations in transport costs contribute to price differences of up to 15% from region to region. Any price differential is exploited by legions of sugar traders over whom the manufacturers have no control.

We can see this process at work in the Northern Province of South Africa. The official per capita sugar consumption in South Africa is about 35 kg per annum. However, these official industry figures do not necessarily reflect actual consumption. These figures are only based on industry data recording where and to which distributors the manufacturer ships. For the Northern Province this official figure drops to 3.5 kg per annum. Is consumption in the Northern Province really one tenth of the national average? I would venture to suggest that sugar is available from other sources at a cheaper price from traders outside the province. Coincidentally, the Northern province borders on Swaziland and Zimbabwe and sugar is cheaper on the other side of the border. It would seem that price differential within and between borders is a crucial issue

Projected Costs of Fortification		
	Rand	USD (@ 6 Rand/\$)
Increased Cost of Production/MT		
Capital Cost	14	2.33
Operating Cost	67	12.67
Total Costs	81	13.5
Increased Retail Price/Kg		
Consumer Price Sensitivity	0.05	0.0083
Projected Rise in Retail Price	0.1	0.0167

If some, but not all sugar is fortified with vitamin A, this will create another price differential. Even the smallest cost of fortification, will put the fortified sugar at a major disadvantage in

this price sensitive market place. If the fortified product cannot compete, the program will not be sustainable. If the price of unfortified sugar is a bit lower, the people who need vitamin A most, will choose the unfortified brand.

COST OF FORTIFICATION

Based on costs from millers in Guatemala, we estimate a capital cost of 3 million Rand to fortify 150 thousand tons of sugar. Based on standard procedure in our industry this equates to a return on capital of about 14 Rand per ton. This includes an after-tax return of 25% for the investment and a 10% residual value of 3 million Rand. Adding levels of vitamin A used in Central America, we estimate recurring operating costs of 67 Rand per ton. With a capital cost of 14 Rand and operating costs of 67 Rand we can project a incremental cost of 81 Rand per ton. That's a total of 91 million Rand annually multiplied across the South African market. How can these costs be recovered?

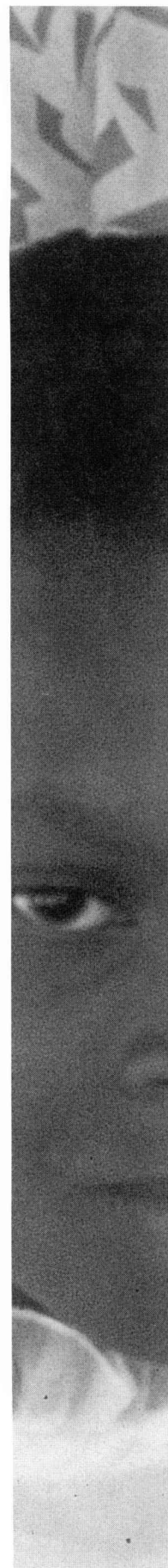
If the incremental cost were to be covered via the retail price, the on-shelf price would rise between 10 and 11 SA cents per kg (which includes the traders margin and VAT). As discussed previously, we have measured consumer sensitivity to fluctuations of as little as 5 SA cents. 10-11 SA cents per kilogram, is outside of that margin. Vitamin A fortified sugar cannot compete against a non-fortified sugar selling at 10-11 cents less. You can bet your bottom dollar that if you've got a 5 SA cent differential between vitamin A enriched sugar and non-enriched sugar, the fortified product will not sell. If it doesn't sell, not only are costs not recovered, but the beneficial health impacts will not be achieved.

From a producer's point of view we all welcome fortification. We understand how important it is to rid our region of this deficiency. But unless that playing field is level, pricing a product 10 SA cents higher than the competition on the store shelf will be counter-productive – from a business point of view and from a public health point of view. The playing field has to be levelled. Either the cost has to be borne by someone other than the consumer. Or all sugar must be fortified.

CONSUMER ACCEPTANCE

The consumer acceptance of fortified sugar is still unknown. While we understand that the population is positive about fortified sugar in Central America, there has been no definitive research undertaken in the Southern African market. When considering the addition of a new ingredient to sugar we need to bear in mind that in Southern Africa the industry has been advertising sugar as "nature's energy food." It has always been classified as being a pure product. How will we explain to the consumer that we are adding a synthetic chemical to a product that we have always said has been pure?

The sugar industry has been working very hard to dispel two myths that remain prevalent among consumers. The first is that sugar gives you diabetes and the second is that sugar gives you hypertension. If we start adding vitamins to the sugar we may destroy all that education. Consumers need education on VAD and on vitamin A fortified sugar. It is crucial that this education and consumer preference for fortification work right down to grass roots levels, because the lion's share of our consumers are those people that can least afford to pay the premium.





LEGISLATION AND REGULATION

Legislation is a key to creating an environment where cheaper unfortified sugar does not compete unfairly with fortified sugar. Legislative support mandating fortification is needed to create a level playing field and to ensure that those companies who choose not to fortify will not have an unfair advantage in the market place - particularly among the lower income consumers who are most in need of vitamin A. Fortification must be mandated and enforced. A "level playing field" goes beyond mandating that all sugar companies fortify.

Government regulations must set clear and transparent standards for the level of vitamin as well as how and where this level will be measured. This is a crucial matter, because while the sugar industry can guarantee the level of vitamin A when the sugar leaves the mill, there can be no guarantee from the manufacturer regarding the level at the point of sale. Speaking for the South African sugar industry, I can guarantee that if the standard for fortification is set at the point of manufacture there would be no need for an inspector because manufacturers would ensure that they comply to the letter of the law. But if levels are monitored at the store level, with the vitamin A suffering varying levels of degradation in storage or transport, there will be a problem with varying levels at the point of sale.

OVERCOMING TECHNICAL BARRIERS

To achieve a minimum standard for vitamin A in sugar, we will have to define factors which cause variation in levels delivered to the consumer and compensate for those factors. Many of these are beyond the control of the manufacturer since it is the trader, who controls the time and the conditions under which the sugar is stored. However, we can anticipate some basic issues.

The industry utilizes a *first-in-last-out* inventory management. This means that current sales come directly out of current production. Excess production goes into storage for up to 5 months. This has implications for the stability of vitamin A. In the first three months of hot and humid conditions, vitamin A levels decrease about 20%. In six months it drops 38% and 9 months later it decreases by 60% of the original dosage. Needless to say, the addition rate cannot vary depending on whether the sugar is destined for immediate sale or storage. To get a consistent level we will have to make an assumption for storage. If we assume a three month storage period for all sugar, we then need to add 20% more vitamin A, at the point of manufacture. However, 40%-60% of this sugar might not go into storage but directly to the consumer. Consequently, at any given time, the sugar being purchased will have at least a 20% variation levels of vitamin A.

There will also be a differential in vitamin A stability depending on the length of transport. 80% of South Africa's sugar is transported by road. Under a truck tarpaulin with humidity rising above 100% and temperature over 40 degrees C, the vitamin A will suffer significant losses. Depending on the location of the customer, these times for transport – and therefore the time of maximum stress for the vitamin A – will vary from 4-5 hours to more than 36 hours. This will result in a variation in the level of vitamin A delivered to the consumer.

Sugar is often in the marketplace for more than a year with no detrimental effect. Currently, all packs are exempt from the “sell by date” requirement. Vitamin A will degrade over the course of time so there will be a temptation to require the addition of a “sell by date” to the sugar pack – in the effort to ensure that the sugar at the consumer level has adequate amounts of vitamin A. This “sell by date” requirement would increase costs of production, storage and handling – not to mention an increase the number of returned packets. Again, this would put fortified sugar at a disadvantage in the market place.

Legislation simply mandating fortification of sugar with vitamin A at the time of manufacture will not ensure that all direct consumption sugar in the region is fortified because a large proportion of direct consumption sugar is not packed at the point of manufacture. For example, about two thirds of the more than 300 odd thousand tons of sugar coming into SACU from Swaziland and Zimbabwe in 1 ton bags is repacked. Unless those producers or packers have had to pay for the vitamin A, this unfortified sugar is going to have a big advantage in the market place. In any legislation, sugar repacking must be defined specifically as an activity falling under the law. In other words, repacking must be deemed as a manufacturing activity.

Finally, sugar is a commodity widely traded throughout the region. Effective legislation would have to be applicable to imported sugar. This may cause a potential conflict with the World Trade Organization in terms of a non-tariff barrier. Therefore, international and regional as well as national politics become a factor.

We firmly believe that with commitment and with partnership all these issues can be addressed. From an industry point of view, we would love to get in and help solve this tragic problem. All that we ask is that the playing fields be level so that we all play by the same rules. And with competition for the best vitamin A fortified sugar, may the best company win.

REBECCA KATOWA

**Marketing Manager
Zambia Sugar PLC**

Zambia is the first country in Sub-Saharan Africa to fortify all sugar for domestic consumption with vitamin A. The initial impetus was in response to a public health problem. Empirical studies revealed that 66% of our children and 22% of women have sub-clinical signs of vitamin A deficiency. Night blindness rates are about 12% in women and 6% in children. Fortification was therefore part of a comprehensive approach to VAD reduction, which includes supplementation of children and lactating women as well as promotion of breast-feeding and dietary diversification.

For a number of reasons sugar fortification was identified as one of the most cost-effective intervention strategies to combat VAD. First, consumption was widespread among all populations, including those at-risk. Second, sugar in Zambia is centrally produced and marketed, mainly by Zambia Sugar PLC. Finally, the fortification process was found to be operationally compatible with the existing technology. Zambia Sugar had the required technical and commercial expertise to implement, coordinate and control sugar fortification.

A National Sugar Fortification Committee was formed representing nine government sectors, NGOs and the private sector. Zambia Sugar started to meet with a National Fortification Task Force in January 1996. We went through a number of meetings and interchanges before finally launching fortification of sugar in Zambia in May 1998.

ZAMBIA SUGAR PLC'S CONDITIONALITIES

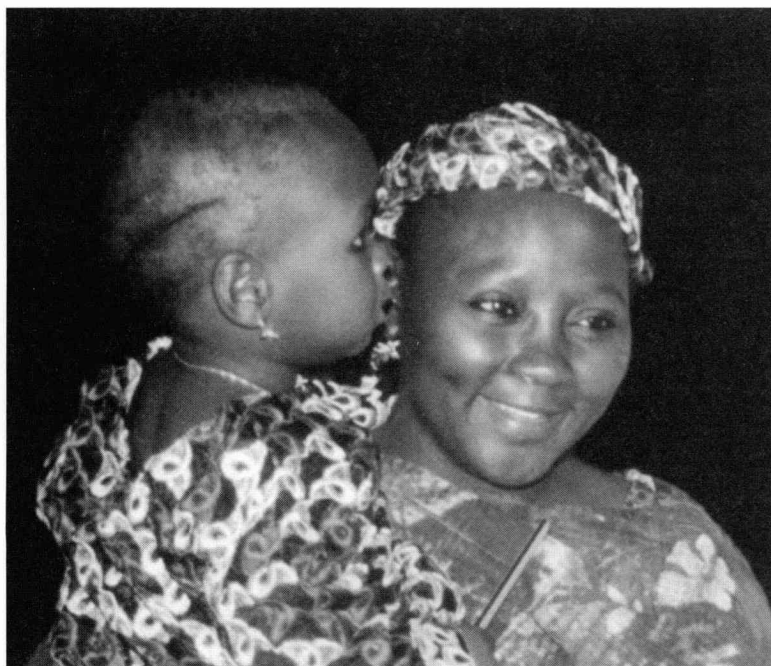
From Zambia Sugar's perspective, if fortification were to succeed, certain conditions had to be satisfied. First, we needed confirmation, through research, of consumer acceptance of vitamin A fortified sugar. Second, Zambia Sugar required some financial assistance in acquiring fortification technology as well as for initial training of the relevant employees. Third, we felt it appropriate that imported fortificant receive a "zero-rating" so it could be brought into the country duty free. Fourth, we asked for a government commitment to implement a major educational campaign. Finally, we asked for guarantees that the appropriate legislation be put in place.

After getting the required data and guarantees from various stakeholders, Zambia Sugar felt fortification was a commercially viable proposition. We received financial assistance in procuring mixers and dosifiers. Our technical people received training and several operatives were sent to Guatemala to get a “hands-on” view of sugar fortification. We carried out research to confirm product acceptability. Technically we did not get the zero rating of the fortificant import, but we found a way around it through a donor agency (USAID). After some delay we did get legislation banning unfortified sugar sales. The public education campaign has been launched although not to our expectations.

In our view, this was an opportunity for Zambia sugar to play a role as a good corporate citizen and to address a public health problem in a way that would add value to our product. So given those reasons Zambia Sugar did embrace sugar fortification.

THE COST OF FORTIFICANT

Fortification has raised a number of concerns from Zambia Sugar’s perspective. Cost is a major issue. Our company fortified about 100,000 metric tons of sugar last year. The cost of fortification was \$13.1 per metric ton or more than \$1.3 million. 85% of that cost, (more than \$1 million dollars) is the cost of the fortificant. The fortificant is priced in U.S. dollars and therefore with the continuing devaluation of Zambian currency against the U.S. dollar the cost of the fortificant has had an increasing trend. Although we “shopped” for the best supplier, we got more or less the same price from the two fortificant suppliers.



THE ZAMBIAN CONSUMER

The Zambian consumer is hard pressed. GDP is \$295 per capita and declining daily. Consequently, the Zambian consumer is very sensitive to any increase in the cost of living. In these hard economic times, many consumers are not willing to pay more even for what they perceive as real benefits. Moreover, the average person on the street does not know the benefits of vitamin A. As long as consumers do not personally experience the impacts of VAD and relate those impacts to a deficiency of vitamin A they will not perceive a benefit in fortified sugar. As a result they will not be willing to pay for it.

While the low-income consumer cannot afford other sources of vitamin A, there are market segments that can afford a variety of food sources. Even in this higher end of the market there has been some resistance from consumers who may be well-informed regarding VAD but feel they already have a choice of vitamin A sources. These consumers are concerned that they are being forced to purchase vitamin A fortified sugar even though they are not at risk.

SALES AND VALUE

In our experience there is no evidence that fortification increases sales or adds perceived value. In Zambia, fortification is a consumption neutral issue. People will not consume more sugar simply because of fortification and therefore increasing sales is not a realistic reason for any industry to fortify. Sugar companies should fortify because they want to contribute to the elimination of a severe public health problem.



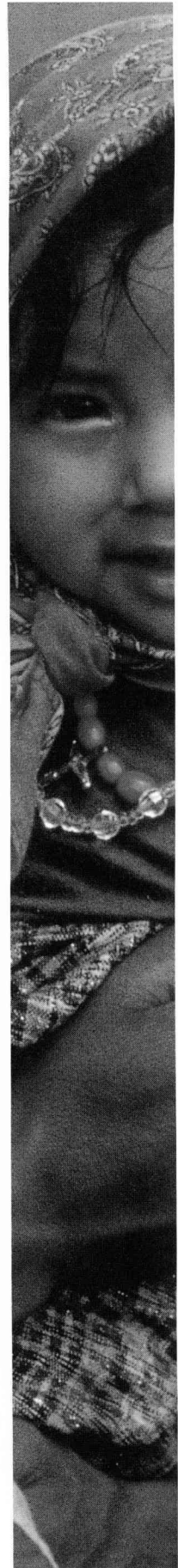
In our current situation, sugar fortification does not yet justify a price increase. There are two common consumer responses to a price increase due to fortification. First, those who don't understand the consequences of VAD will respond that they don't want it fortified. Second, you will hear that if this is a public health problem, it is the government who should pay for the solution – not the individual consumer. Particularly since vitamin A supplements at the clinics are free, consumers do not understand why they should pay for sugar fortification. These are the perceptions of the majority of the consumers. In the context of the current Zambian economy as well as these consumer perceptions, it has not been possible to transfer the total cost of fortification to the retail market.

EDUCATION AND MARKETING

Public awareness and demand are key to raising the added value of fortified sugar sufficient to justify the higher costs. Because of these negative consumer perceptions, a vitamin A educational campaign must be aggressive. In Zambia we have had some support from various stakeholders. There have been "Vitamin A Weeks," a special calendar funded by UNICEF, and bits and pieces here and there. However, there has been no aggressive and systematic campaign to change consumer perceptions to appreciate sugar fortification and understand why they need to pay that extra money for sugar that would have otherwise not been fortified.

Zambia Sugar has done a lot to advertise the fact that our sugar is fortified. Every packet of sugar has a vitamin A logo and nutritional information to confirm that it is in fact fortified. But if you take a random sample in the street, 7 out of 10 people will not know sugar was fortified. So consumers are naturally resistant to paying for something that they don't know or value.

In Zambia, with a per capita income and a very low general literacy level, successful educational efforts are both difficult and expensive. People have to know about the importance of vitamin A and how a deficiency in vitamin A impacts vulnerable groups. There needs to be a huge investment in education. This marketing and communication expenditure is too high for an individual company like Zambia Sugar. From a private sector perspective, we feel that if you are addressing a public health problem this should not be the sole responsibility of the company. All stakeholders should take it on. It will take a partnership of public and private sectors to successfully add value to fortified sugar and rise to the challenge of creating more positive consumer perceptions.





LEGISLATION

In asking for legislation, Zambia Sugar was not asking for protection. We are only asking for a level playing field. Zambia Sugar is investing more than one million dollars per annum to fortify our domestic sugar supply. This cost and investment needs to be protected. In the case of Zambia, illegal importation of sugar into the country is creating an uneven playing field because this illegal sugar sells at a discount to Zambian sugar primarily because of our domestic fortification costs.

Zambia now has legislation banning the sale of non-fortified sugar. But this needs to be enforced. Enforcement costs money. That is the real world. Any government, especially in developing countries, has other urgent priorities. With competing issues, like AIDS and cholera, sugar fortification is often at the bottom of the list. Our experience indicates that as long as the fortification is implemented in one nation without a coordinated effort among its sugar-producing neighbors, you will never be able to control cross border trade or informal trade. There must be a regional solution.

NEED FOR MORE ACTIVE COMMITMENT AND PARTNERSHIP

Government goodwill does not equal government commitment. That is our experience. Certainly, the government of Zambia has been supportive of our role in addressing a national public health problem. But when it comes to investment and action, sugar fortification has not always been a government priority. For example, we hope the government will take a wider role in educating consumers that sugar fortification is good for them and good for the country. In the past, Zambia Sugar, the government and fortificant suppliers worked together finding the solution to technical problems like preventing segregation of vitamin A from the sugar. That process of co-operation needs to be expanded.

Sugar fortification in Zambia has been achieved through a private-public partnership. It is a significant achievement. For Zambia Sugar, it was a business decision and a calculated risk. The way forward to make this a successful project is through broader partnership and joint investment.

STABILITY OF VITAMIN A IN SUGAR

ISSUE: Vitamin A in sugar will be degraded by light, heat and humidity. Will protecting the vitamin A entail changing the packaging and storage which could add to the cost?

It is always better to continue with the system of production and distribution already in place. There need be no change in the way sugar is stored, handled or used during marketing, distribution or food preparation. In Central America, about 50% of the original 15 mg/kg is lost over the course of one year. Although reducing these losses means considerable savings, changes in packaging are expensive and would probably not be worth the investment. In Southern Africa conditions of temperature, humidity and storage are different. It will be necessary to embark on a series of stability tests real settings to measure losses under local conditions.

ISSUE: In the home, sugar is used in a variety of preparations – sometimes subjecting the fortificant to heat and humidity. How stable is the vitamin A under these conditions?

Vitamin A is very stable in domestic use. It can be mixed in lemonade, coffee, milk, or sweets and retain potency for 24 to 48 hours. When sugar is crystallized or melted to make hard candy, there is only about 5% loss of vitamin A. Once the candy is made, the vitamin A is much more stable than in sugar.

ISSUE: In Central America and Africa the soft drink industry is a major customer for sugar. Are there any negative interactions with the vitamin in soft drink production ?

The soft drink industry is a key sugar customer all over the world. Generally, there are two types of soft drinks. The dark colored products, like colas, use active charcoal to clarify the syrup. This destroys the vitamin A but has no impact on the soda. With cola drinks there is also no interaction of the micro-beads encapsulating the vitamin A causing acid beverage flock. The lighter soft drinks don't need to be clarified and add their sugar straight into the syrup. In this case there have been no reports of negative effects. Moreover, in the case of lighter soft drinks, tests have established that after one year more than 30% of the vitamin A remains active in the soft drink.

SAFETY AND EFFICACY

ISSUE: If there is a loss of 50% of vitamin A from point of production to the point of consumption, are the surviving levels of vitamin A in sugar sufficient to have a health impact on the consumer?

With an additional 15 micrograms per gram at the point of manufacture, sugar under Central American conditions delivers an average of 7 micrograms/gr. Guatemala has established a minimum acceptable level of 5 micrograms/gr at the point of consumption. Given the average intake in the region, even at 5 micrograms/gr, the sugar will provide from 50 to 100% of the RDA values

ISSUE: Have there been any studies of the interaction between vitamin A interventions? For example, what kinds of monitoring has been done in areas where the same children receive both supplements as well as fortified sugar?



In 1997 UNICEF held a technical consultation with an accompanying consensus statement affirming that consumption of vitamin A from fortified sources in the range of 1000 IU per day presents an insignificant risk. The risk from fortified foods is not as high as other accepted public health interventions. Data from Central America indicate that with sugar fortification, only children from 6 to 24 months will be in need of

supplementation. Some are concerned with the risks of supplementing women of childbearing age. However, if sugar can provide 50% or more of vitamin A requirements, there may be little need to supplement women. With the bulk of the population covered with fortified sugar, governments can focus supplementation resources on the most at-risk groups.

ISSUE: Is there a difference in the metabolism of synthetic as opposed to natural sources of vitamin A? Does the body store it? Is it completely excreted? Have there been any tests concerning its carcinogenicity?

The natural and synthetic vitamin A molecule is identical. Commercial vitamin A mimics the biochemical synthesis of plants in nature, otherwise it would not have the same function as vitamin A. Vitamin A is not excreted like water soluble vitamins but stored in the liver. Vitamin A may actually protect against some cancers because it regulates cell function and the expression of genes. Because fortification levels are so low, the risk of overdose is extremely remote. In summary, industrially produced vitamin A and fortified foods have been in use for 50 years. Numerous tests in a number of countries have proven their safety and efficacy.

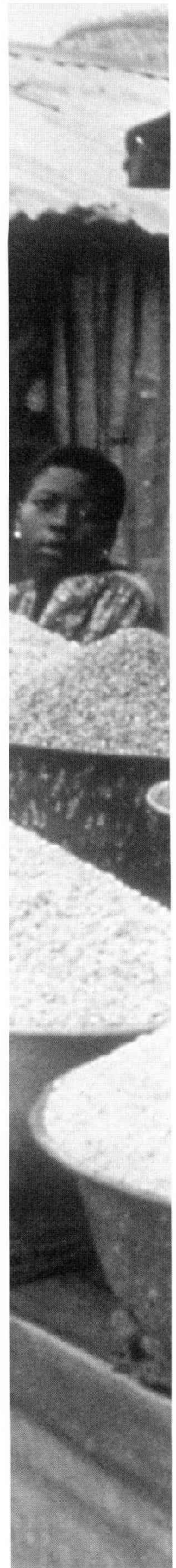
QUALITY CONTROL AND ASSURANCE

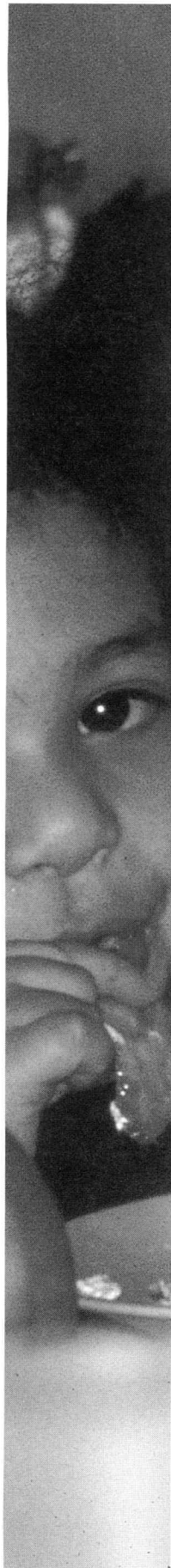
ISSUE: Private food companies should have strict quality control procedures. It is particularly important when adding an additional synthetic compound. However, in this region this is not always the case.

Adequate quality control at production is the key. In the African region there were some problems with salt iodination. Most of these are being overcome. However, the sugar industry in this region is technically more sophisticated, with a limited number of large producers practicing good quality control.

ISSUE: Enforcing fortification standards can become expensive on a national level – especially for countries that are still grappling to provide basic necessities.

Regular and transparent government monitoring is always necessary. In many cases, the sugar industry should be able to monitor itself and make testing records available to the government. It would probably not be necessary for authorities to run tests more often than once or twice a year, based on the standards that are being used at the manufacturing or packaging level. Department of Health testing at the consumer outlet level should be undertaken with independent laboratories and equipment in order to preserve its integrity.





ISSUE: Currently, evaluating levels of vitamin A in sugar involves expensive equipment like HPLC. It's not unfeasible to set up the required laboratories on a national basis. But it is very difficult given the economic realities of many countries in Southern and Eastern Africa.

Just as a simple and inexpensive spot test for iodine in salt was developed in order to reduce enforcement costs for salt iodination programs, an inexpensive spot test for vitamin A in sugar should be the next challenge for the research community. With more nations adopting food fortification and rising demand, it is technical experts, including those with the vitamin companies, who should focus on producing a simple and inexpensive test. Consideration might also be given to a regional pooling of resources for more sophisticated labs using HPLC. The use of regional facilities such as the national narcotics laboratory in Zimbabwe has been suggested. It should be noted that spectrophotometry, a much less expensive method than HPLC, can be used to accurately measure the levels of vitamin A in sugar.

ISSUE: Since vitamin A degrades over time, a clearly labeled date is crucial to effective quality assurance. Currently, in this region there is no shelf life for sugar. By requiring a shelf life, we introduce a factor that actually makes it more difficult to trade in sugar. For example, if sugar remains on the shelf for more than a year would you be required to take it off?

The practice in Central America, provides for a guarantee date on the package that does not refer to the sugar itself but rather to the level of vitamin A. The label refers to a minimum level of vitamin A. The current system in Central America requires a minimum of 5 mg/kg after one year and leaves producers with the responsibility of adding sufficient vitamin A at the point of production. When sugar does not meet that standard it does not mean it is no longer fit for consumption.

LEGISLATION & REGULATION

ISSUE: What is the basic rationale for legislating mandatory fortification as opposed to simply allowing fortification by private producers?

If both fortified and unfortified sugar compete in the market, fortified sugar is likely to be sold at a slightly higher cost. For a price-sensitive commodity like sugar there is little room for consumers to pay more or for suppliers to charge less. If there are two products in the marketplace, consumers who are in most need of fortified sugar may choose to purchase the cheaper, unfortified product. Mandatory fortification theoretically creates a level playing field, requiring all companies to play by the same rules and to make investments to fortify their product at certain standards. Producers compete on quality and price in the market place with the costs of fortification the same for everyone.

From the producers' point of view, when consumer demand is a strong force in the marketplace, they may perceive an advantage in voluntarily taking the lead in fortification. However, with no consumer demand driving the market, there is little business advantage to shouldering the start-up expenses and risk of developing the market for a new product.

ISSUE: It is easy to recommend mandatory legislation and regulation. But governments may not have sufficient resources, capacity or laboratories to be able to enforce the fortification standards.

Collaboration between public and private sectors can extend the regulatory resources of the government and create a more level playing field for the producers. This is the case in Central America where there is a large degree of self-enforcement by the producers and their associations. This minimizes the need for actual government inspection, testing and enforcement.

ISSUE: What are criteria need to be considered when evaluating the alternative approaches of “Targeted” versus “Universal” fortification of sugar.

This is not an easy question and needs to be considered carefully with input from both public and private sectors. A targeted approach can be cheaper and equally effective. For example, current costs in Guatemala are USD \$0.37 per person with universal fortification. In a targeted scheme where non-fortified sugar supplied to industrial processors is not fortified, a drop to USD \$0.20 can be projected. However, the targeted approach makes a number of demands on government enforcement and monitoring. If two grades of sugar are available and have different costs, the temptation arises to pass the one off as the other. If it is possible to efficiently prevent “leakage” from the non-fortified to fortified supplies, targeting offers considerable savings. However, if a government does not have resources to control two types of sugar in the market, a universal scheme is more effective. In this case, from both a safety and efficacy perspective, it will be easier to fortify all sugar - even though some resources are “wasted” and the finished product is a bit more expensive. The added cost is preferable to putting the entire program at risk. For producers, targeted fortification has additional cost implications in terms of running two inventories. In a targeted system, manufacturers need to keep track of fortified sugar for the consumer market and non-fortified sugar for the individual market.

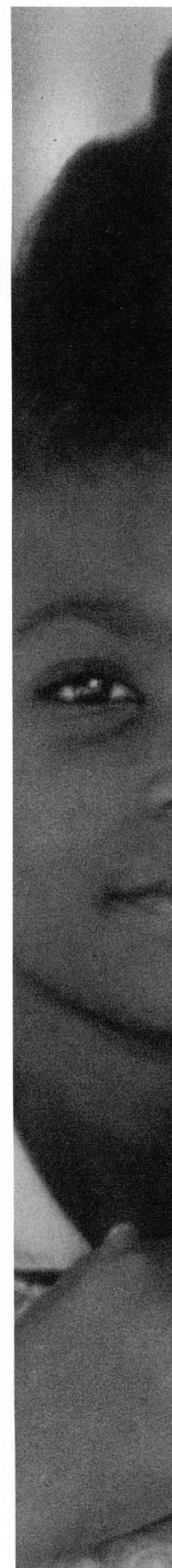
ISSUE: Even with clear labeling, counterfeiting or passing of non-fortified sugar as fortified, will inevitably arise. Non-fortified sugar will be mislabeled as fortified. How can this problem be minimized, especially in countries with no counterfeiting law.

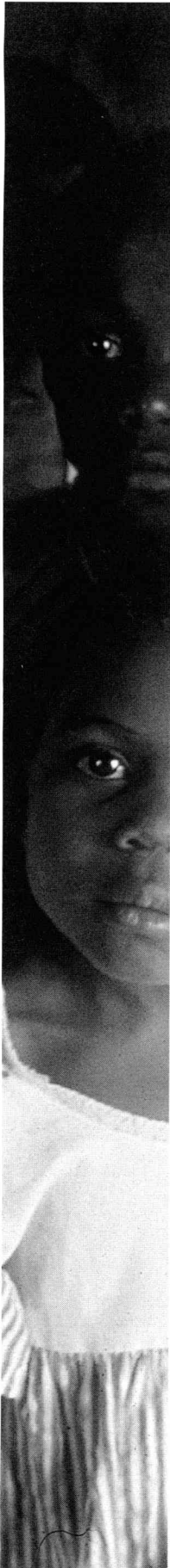
This is a process of education, legislation and enforcement. In countries like Guatemala counterfeiting is more difficult because only about 10-20% of sugar is packed in retail packs while most is packed into 100 pounds. As the consumer purchases the sugar it is ladled into small poly bags. Therefore counterfeiting is not possible. However, when the bulk of direct consumption is in retail packs, counterfeiting becomes an option. In this case, there is a need for standards and strict enforcement. For Southern Africa this would require standardized analytical methodology for monitoring vitamin A content in sugar throughout the region.

ISSUE: Implementing legislation is a process which starts long before any laws or regulations go into effect. There needs to be a chronological sequence. Sometimes things get out of sequence. For example, in Zambia sugar fortification was launched prior to the promulgation of legislation.

It is clear that in the Zambia, the sugar company was ready and able to move more quickly than was the government. If legislation is needed, it should be in place prior to any product launch. There should be the legal framework in place and simultaneously there also needs to be the physical resources in place for enforcement. The inspectorate needs to have people, they need to be trained and to have the equipment to be able to go in and do the necessary investigations and testing. An aggressive and comprehensive advocacy and public education campaign should probably precede the introduction of legislation. A case in point comes from Guatemala. In 1998 producers increased sugar prices 10%. In order to force a roll-back of the increase, the government moved to abolish the law requiring all imported sugar to be fortified, thus threatening the success of the fortification program. There was an immediate reaction among consumers, the media, and a number of institutions. Within two months the government was forced to change its position. It is a lesson that fortification programs need to have widespread public support lest these kinds of problems undermine even a successful program.

ISSUE: In Southern Africa national boundaries are very poorly sealed. If one country decides to fortify and another does not, you will have leakage and smuggling problems. Sugar crossing borders will be a threat to the viability of fortification programs. There must be a level playing field not only within each country but among countries of the region.





Regional cooperation is crucial not only to deal with smuggling, but also to address the perfectly legal sugar that moves from one country to the next as a result of bilateral protocols. If there is no uniform approach, it is likely that problems will arise. There is also the issue of unfortified sugar coming into the Southern African Development Community (SADC) region from an outside nation. Whether legal or illegal, the public sector needs to address this issue clearly and forcefully. We should learn from the salt iodination programs the importance of regional harmonization. In Africa there was a meeting of ministers in Tanzania where a consensus was built to fortify all salt in the region. That's why very early in the process we should come to a consensus on regional guidelines or even standards for sugar fortification. That will avoid the problems we had with salt iodination. In Central America, specifications and regulations vary from country to country. However, the basic technical requirements are similar. Communication among sugar producers from different countries is organized into an effective association. This is also the case in Southern Africa.

A complicating factor is that the price structure of sugar may not be equal in neighboring nations. For example, in Zambia, even without fortification, the price of sugar is relatively high compared to its neighbors in Malawi and Zimbabwe. Sometimes the issue is not only the added cost of vitamin A, but also the different costs for producing sugar.

COMMUNICATION & PUBLIC EDUCATION

ISSUE: Given price sensitivity on sugar and low consumer awareness, a successful public education drive to create demand and value for fortified sugar will be a crucial challenge.

The majority of the consumers are not informed about vitamin A. And they don't understand why they should actually pay for it. You need to recondition the consumer. You can't achieve that with a one week campaign. It has to be ongoing and sustained until it reaches that saturation stage where everyone buys into the concept. That was the challenge with iodized salt. The relevant sectors put their heads together and rose to the challenge. Public education campaigns should be a partnership among all stakeholders.

ISSUE: We often hear reference to reduction of vitamin A deficiency leading to shorter stays in hospital, less illness, and decreasing health costs. The magnitude of these benefits need to be quantified and presented to governments. Moreover, these figures might be used to create incentives for companies to invest in fortification.

There is no general universal model for this kind of economic analysis. A number of local conditions will determine the “savings.” For example, in a country where no one goes to the clinic for measles treatment, savings will be minimal. In a country where mothers routinely bring their children for treatment you are going to save a lot of money. There is a program called Profiles, which can assist in quantifying the cost-effectiveness of all these interventions. The program is available and can be accessed via MOST, USAID’s primary micronutrient project. This analysis was developed for Kenya. When the results were presented, people were really shocked. By not taking action, Kenya would be losing about 119 thousand children specifically from vitamin A deficiency over the next 10 years. With some interventions about 62 thousand lives could be saved. However, the bottom line is that the benefits of improved human health and development are part of a very slow process. This is not an infrastructure project.

FINANCING & COST ISSUES

ISSUE: Governments have the primary responsibility for VAD reduction and public health in general. Therefore governments will enjoy the primary benefits of sugar fortification and are likely to enjoy savings as a consequence of it. There should be a link between the benefits and costs of the exercise.

It’s a controversial question. The reality is that at the end of the day, government’s can’t pay for it because they don’t have the resources. It’s that simple. Therefore, issues of public versus industry and consumer financing will really boil down to a question of compromise. But government might contribute things like tax relief on importation of equipment, fortificant or on the manufacturers who are incurring costs in the production. The government also plays a role in levelling the playing field. This is a crucial regulatory and enforcement role. So it is clear that we end up with a compromise solution where the financial burden is carried jointly by government, manufacturers and the consumer.

ISSUE: We have heard estimates that about two-thirds of the operating cost of sugar fortification is the cost of vitamin A. For example, in South Africa the cost has been estimated at about 60 million Rand per annum on fortificant for that nation alone. What are the prospects for lowering the price – so that the essential ingredient is made more widely available?

One must remember that sugar fortification is 0.2% of the global market for vitamin A. If you look at the vitamin A pricing across products, the price of vitamin A for sugar fortification is 22-25% less than the average selling price on the global market. As a general rule, the volume will determine the unit price. As fortification becomes more widespread, the volume will increase and the price will presumably decrease. Even within the relatively small current volume there seems to be some hope that vitamin A will go down in price more quickly. But certainly the greatest cost savings are going to be in improved vitamin stability and technology, which can lower the absolute amount of vitamin A used.

ISSUE: Will the manufacturers of fortificant who benefit from selling vitamin A at least consider sharing costs — especially for equipment and set-up costs?

One has to be realistic. If vitamin suppliers were to assist one nation with say, \$100,000 for start-up costs, then another 30 or 40 nations will expect the same. And in the end, the cost of this assistance will be reflected in the price of vitamin A. However, if the problem is simply cash flow, suppliers could assist by establishing a steady price over a fixed time period or by offering more flexible credit terms.

ISSUE: If we look at drugs, vaccines and even vitamin A capsules, most countries of the region really depend on outside assistance. How much assistance was invested from outside Zambia?

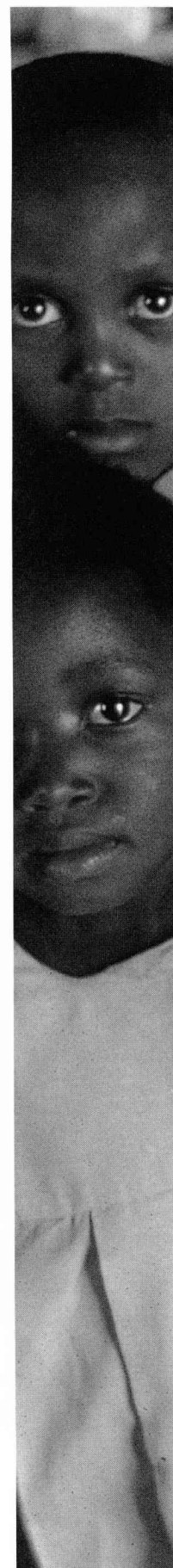
In Zambia, the international assistance from UNICEF and USAID for technical assistance and equipment amounted to more than \$250,000. Over the past two years, the Canadian government, through the Micronutrient Initiative and UNICEF, has been the major global supplier of vitamin A capsules. This year alone this totalled 600 million capsules in over 70 countries. Our minister is pleased with the results. But all countries, including Canada, are cutting back on overseas aid projects for domestic political reasons. Future Canadian support, the minister stressed will really depend on developing sustainable longer term solutions – like fortification.

ISSUE: Acquiring and sustaining new technology and equipment is very difficult in many developing countries. This includes difficulty in obtaining foreign exchange as well as adapting and maintaining the equipment.

In Guatemala, the original premix and dosification equipment were purchased from European companies. These companies provided technical assistance and spare parts. Subsequently, some local companies began to produce these mixers domestically. In Southern Africa industries are certainly capable of producing the technology. Moreover, there is no substitute for local expertise in adapting foreign technology to local conditions. For example, the Zambia company received machines that were not compatible with the electrical system. Within a week the problem was solved and the machines were modified. You have to be pragmatic.

ISSUE: There are only a few suppliers of vitamin A to the global market. If there is a widespread movement to fortify foods with vitamin A will there not be a shortage of supply.

The total amount of vitamin A that is used for sugar fortification is less than 1% of the total production. There is more than one provider so there is definitely no reason to fear that there will not be a continuous supply of vitamin A.



WORK GROUP 1: ISSUES OF COST AND PRODUCTION

Public sector intervention is crucial to ensuring that non-fortified sugar is not a tempting and less expensive option, particularly for lower income consumers. The extent of government intervention in the sugar market should be based on clear definition of the national benefits of improved vitamin A status. National surveys to quantify these savings and benefits are urgently required. For most producers, no technical problems are foreseen in introducing vitamin A fortification into the production processes. Cost and difficulty of introducing fortification technology will vary among various producers. As a general principle, in order to reduce losses, vitamin A should be added as late as possible, just prior to packing. The incremental cost of production, can be minimized in a number of ways

RECOMMENDATIONS

- ✦ It is recommended that sugar companies create purchasing systems and cooperatives to increase the volume of fortificant orders and reduce unit costs. This may well extend beyond national boundaries. Governments might arrange bulk purchasing and duty-free entry of fortificant, thereby allowing them to monitor fortificant purchases related to sugar production.
- ✦ Develop methods to improve stock rotation and reduce storage times. Current stock rotation methods, like the system of *first in first out*, must be improved in order to reduce fortificant loss and to improve homogeneity from batch to batch.
- ✦ Sugar is often repacked and stored by independent wholesalers and distributors at warehousing depots. This sector needs to be involved so that storage methods are reviewed and personnel is trained to minimize the length of time sugar is stored.
- ✦ A collaboration of sugar producers, fortificant manufacturers and public agencies should work to improve vitamin A stability in sugar. This includes developing technologies to improve accuracy of vitamin A dosing to minimize the fortificant needed. Tests to establish the critical points in fortificant loss should begin immediately. These tests might also establish stability of fortificant purchased from different suppliers.

- ✦ Public agencies and private companies should collaborate in advocacy for tax and tariff exemptions for equipment and fortificants.
- ✦ For maximum cost effectiveness, training for both public and private sectors should be centralized on a national or regional basis. Central American and Zambian experiences should be analyzed to identify personnel and training needs.
- ✦ Although this is a complex matter needing additional attention, it is provisionally recommended that only sugar for direct consumption and not sugar for use in food processing be fortified.

WORK GROUP 2: ISSUES OF LEGISLATION & REGULATION

Because sugar is a traded regionally, consumed widely and is a price sensitive commodity, a clear and enforceable legal and regulatory framework should precede implementation of sugar fortification. This legislation should specify time frame for implementation and grace periods. National legislation should be coordinated with region wide approaches. Throughout the region there will be a high risk of counterfeit sugar and abuse of standards.

RECOMMENDATIONS:

- ✦ Financing issues need to be resolved in a spirit of compromise and through a process involving all parties. Governments, industries and consumers may be not in a position to completely finance fortification in the initial stages.
- ✦ Differentiated fortified and non-fortified products will have cost differences. The population at-risk of VAD may select the wrong product. Therefore a mandatory approach for sugar fortification is recommended.
- ✦ Although there are large differences in sugar consumption and packaging throughout the region, a regional standard is recommended. The Guatemalan level of 15 micrograms per gram when packed should be considered.
- ✦ The private sector needs a permanent presence in the process of setting standards and enforcement procedures for sugar fortification.

- The issue of fortifying all sugar or excluding sugar used for industrial purposes needs further consideration. While the universal approach is expensive, the targeted approach may create opportunities for abuse.
- Standards are recommended at the point of manufacture. However, due to the large amounts of sugar that is repacked, there is a need for testing at the packing and retail level.
- While quality control at the manufacturing level can be implemented jointly by industry and government, testing at the consumer level is the responsibility of the public sector. A strategy needs to be developed to identify the most appropriate mix of these opportunities.
- Labeling should contain dosage information which recognizes the degradation after the point of manufacture. A common logo for the region is recommended. Bulk sugar transported across borders should be covered by certificates of analysis.
- Most countries do not have either a legal framework or the physical resources to regulate and inspect fortified sugar. Training and human resources should be a priority. There is a need for cost-effective standards of analysis. It is recommended that independent laboratories and regional government labs be integrated into the system.

WORK GROUP 3: ISSUES OF REGIONAL COOPERATION

There are a number of barriers to regional harmonization. Although production is concentrated in 5 or 6 countries, sugar is widely traded throughout the Eastern and Southern Africa region and about 50% of all sugar is exported out of the region. Various producing nations feature varying mix of domestic, regional and export markets. Moreover, sugar production and trade is handled by different ministries. Finally, there are overlapping and sometimes conflicting interests of regional organizations. Nevertheless, regional economic groupings offer a number of opportunities for efficiency and cost-effectiveness within the environment of free trade and the regional SADC sugar protocol. Therefore, issues of regional harmonization should be considered by regional bodies such as COMESA, SADC, CRHCS are crucial. Sugar fortification should be inserted onto the agendas of the regional Ministers conferences to consider the following recommendations:

RECOMMENDATIONS:

- Define a single regional fortification profile. The level of 15 mg/kg currently used in Central America should be considered.
- Cost structures for producers vary in different nations. Explore a harmonized approach to duties and taxes on sugar and materials relevant to fortification.
- Standardize approaches and techniques to measure vitamin A levels on a regional basis. This may include identifying regional laboratories.
- Facilitate public-private sector communication and consensus building on both a national and regional level.
- Create a node for regional communications to share information and experiences via newsletters, email groups and/or a website. A key initial activity is an in depth analysis, report and dissemination of the Zambian fortification experience.
- Build a stronger regional presence of international agencies to give technical assistance and support.
- Develop approaches integrating sugar fortification with the fortification of other staples including maize, oil and wheat flour.

WORK GROUP 4: ISSUES OF COMMUNICATION & EDUCATION

Public awareness of VAD is low. Therefore, consumer resistance to paying more for fortified sugar may be high. There is a need for communication to raise public awareness of VAD and its consequences and build a platform for creating a consumer demand for fortified sugar. Simultaneously, there is a need for advocacy among leadership groups to initiate the process. Opening channels of communication amongst the relevant public and private institutions is a crucial first step. With the exception of South Africa and Zambia where fortification task forces bring together the necessary stakeholders, communication among prospective partners is limited.

RECOMMENDATIONS:

- ✦ Formation of National Task Forces on Fortification in the countries of the region to facilitate regular and high level communication among all sectors.
- ✦ Communication needs to be research based. The health agencies and sugar companies should pool information and research capabilities to better understand the consumer.
- ✦ A Regional Communiqué on Sugar Fortification should be targeted to health ministries and regional health organizations.
- ✦ A Secretariat should be formed in order to provide a clearinghouse for information and to produce and disseminate technical and promotional material.
- ✦ National and regional figures should be identified for appropriate endorsements of sugar fortification.

SPECIAL TARGET AUDIENCES:

- ✦ Sugar producers should target their employees. They need to be made aware of VAD and their potential role in the solution.
- ✦ The press and media, who need to be educated and involved from the initial planning stages.
- ✦ Health personnel sometimes are not convinced that fortification is a viable approach to reduce the prevalence of VAD.
- ✦ The agriculture sector may perceive fortification as discouraging to dietary diversification. Communications need to be developed to involve this food sector and define their long-term roles.
- ✦ Service organizations such as Rotary and Lion Clubs should be tapped for support of fortification related activities.

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**SUGAR FORTIFICATION
TO END
VITAMIN A DEFICIENCY
IN SOUTHERN AND EASTERN AFRICA**

REPORT OF A PUBLIC-PRIVATE DIALOGUE

Ezulwini, Swaziland
June 29 – July 1, 1999