Micronutrients
and
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Nutriview 2006/1

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Editorial:

The best things in life are (almost) free!

One of the ways advocated by the Millennium Project Hunger Task Force for improving the nutrition status of vulnerable groups is food fortification [Sanchez P. SCN News 28. July 2004]. Nevertheless, governments are often reluctant to support a fortification program because of the cost. If you calculate only the price of the extra nutrients, the additional manufacturing steps, the officials needed to ensure that everything is done correctly and the size of the target group, you are almost certain to come to the conclusion that food fortification is a luxury your country cannot afford.

What is widely ignored in these calculations, however, are the benefits that can be achieved from such a measure. With that, I mean not only the improvements that occur in a population's health and quality of life. Reducing the prevalence of micronutrient deficiencies also results in higher productivity, providing a potential for economic payback that is many times the cost of the intervention. Two years ago, UNICEF and the Micronutrient Initiative published a global damage assessment report ("Vitamin and Mineral Deficiency: A Global Assessment") that showed the estimated magnitude of iron, iodine and vitamin A deficiencies in 80 developing countries, and calculated the loss in GDP associated with such deficiencies. It also showed which countries had introduced flour fortification, salt iodization and/or vitamin A supplementation for children. The table was reviewed in Nutriview 2004/1 and can be found at <http://micronutrient.org/reports/default.asp>.

While some progress has been made since then, there is still a tendency for countries considering food fortification as a possible measure to seek the "cheapest" solution, for example by limiting the number of nutrients used in the program, or by making fortification voluntary to save on the costs of monitoring and enforcement. It cannot be stressed enough that such an approach runs a high risk of failure. Correcting individual deficiencies identified as a major threat to the nation's health, while ignoring other possible deficiencies that might also prevail, can be counterproductive, and cannot be justified economically.

To give you an idea of the real cost of food fortification, Héctor Cori has expanded the original tables published by UNICEF and MI to show the 2003 GDP for each nation in US dollars. Based on this calculation, the actual value of income lost in these countries as a result of micronutrient deficiencies is about US$21'000 million. Assuming an annual cost of US$0.32 to fortify a staple food with 50% of a person's daily requirement of the vitamins A, B1, B2, niacin, B12 and iodine, and 100% of iron and folate, the whole population of the 80 countries could be reached for less than US$1'500 million, or about 7% of the potential benefit to be gained through elimination of micronutrient malnutrition. The table can be found on the Nutrivit web site at: <http://www.nutrivit.co.za/staple/index.htm>.

It is clear from this that a national food fortification program done properly is a sound investment that pays an excellent dividend, both in terms of improved health and higher incomes. Do you know of anything that offers better value? – *A. Bowley*

Changes in Nutriview

Following organizational changes at DSM Nutritional Products, Nutriview has also undergone some small, but significant modifications, and is now linked to the new Nutrition Improvement Program (*see Nutriview 2005/4*).

Héctor Cori, Scientific and Technical Director of the Nutrition Improvement Program at DSM Nutritional Products Ltd, replaces Dr Max Bum as Scientific Coordinator. He has taken over this post in addition to that of Editor for the Nutriview Spanish edition. Héctor is well known and highly respected in nutrition circles and the food industry around the world.

To fulfill a long-standing wish of our African readers, we have recruited a new member to the team from Africa: Jane Badham. Jane is from Johannesburg, South Africa. She has a BSc dietetics degree from the University of Natal in Pietermaritzburg and a postgraduate diploma in hospital dietetics from the University of Pretoria. She also has a diploma in marketing management from the University of Johannesburg and a MSc in nutrition from the North-West University.

Since 1991, Jane has her own health communication and strategy company, JB Consultancy. As a registered dietician, Jane deals with nutrition from the practical side, and knows first-hand the problems associated with applying the results of scientific research to day-to-day routines. She is actively involved in an exciting project to develop and network young leaders in the field of nutrition in Africa (the African Nutrition Leaders Programme).

Jane Badham

Héctor Cori

■ Feature:

Stable isotopes as tools for program development and evaluation

Improving nutrition can help to reach the Millennium Development Goals (Nutrition for improved development outcomes: 5th Report on the world nutrition situation. Standing Committee on Nutrition, 2004). The International Atomic Energy Agency (IAEA) is assisting Member States in their efforts to achieve these goals by providing technical support for strategies to combat undernutrition.

In particular, the IAEA contributes technical expertise in the use of stable isotope techniques for the development and evaluation of nutrition interventions. Stable isotopes have been used as research tools in nutrition for many years. However, the application of these techniques in program development and evaluation is a relatively new approach, where the IAEA has a unique opportunity to contribute. As only stable (non-radioactive) isotopes are used, the techniques can be applied in the most vulnerable population groups, such as infants and children. The use of stable isotope techniques adds value by increasing the sensitivity and specificity of measurements as compared to conventional techniques.

This brief overview highlights selected IAEA activities in infant nutrition where stable isotope techniques have been used. They include projects to measure human milk intake in breast-fed infants, lean body mass (muscle mass) in lactating mothers, and bioavailability of iron in complementary foods.

Breastfeeding

Exclusive breastfeeding for six months, followed by the introduction of appropriate complementary foods and continued breastfeeding, as recommended by the WHO, are cornerstones in infant nutrition. However, only limited information is available on how much human milk infants consume and when other foods are introduced into the diet, in particular in developing countries. This lack of information is, at least partly, due to the difficulties involved in measuring intake of human milk.

With the conventional technique, infants are weighed before and after each feeding (test weighing). This is time consuming and far from accurate. It also disturbs the normal feeding pattern. In addition, in many settings, infants are nursed "on demand", including during the night. This makes this approach unpractical. By using a stable isotope technique, namely the deuterium-oxide turnover method, these practical problems can be overcome. The normal feeding pattern is not influenced, and the total volume of human milk consumed by the baby over a period of 14 days can be accurately measured. Furthermore, the method is non-invasive. The mother consumes the dose of deuterium-oxide in a glass of water and samples of the baby's urine or saliva are collected for analysis.

Milk intake is calculated by measuring the appearance of deuterium in the baby's urine or saliva. At the same time, the method shows whether the infant has consumed water from other sources. The mother's body water content can also be measured. From this, the mother's lean body mass (muscle mass) can be estimated. This provides important information about her nutritional status.

This method, elegant in its simplicity, has been developed and validated by independent researchers and is currently used in Member States with technical assistance from the IAEA. Important steps in making this technique more widely available, and to build up national capacities, include regional training courses, fellowships and expert visits as well as the procurement of laboratory equipment. The deuterium-oxide turnover technique to measure human milk intake has been used in IAEA technical cooperation projects in Ethiopia, Senegal, Ghana, Chile and Brazil to develop and evaluate nutrition interventions based on local conditions.

Some of these national projects also collected information about lactating mothers' body composition. In Senegal, for example, it was shown that mothers who participated in a supplementary feeding program during pregnancy for more than 60 days had a significant increase in muscle mass, although their infants did not consume more human milk. When conventional techniques were used to evaluate nutritional status, based on body weight and height, no differences were detected. These results clearly highlight the added value of using the deuterium-oxide turnover method when evaluating the impact of nutrition interventions during pregnancy and/or lactation in mothers and babies.

Complementary foods

Although the benefits of exclusive breastfeeding during the first six months of life are widely known, many mothers give their infants water, tea or honey during this period, exposing them to disease–causing bacteria and viruses.

Accurate information about the amounts of foods and/or fluids consumed by breastfed infants is practically impossible to obtain by conventional techniques. It is thus important to note that the deuterium-oxide turnover technique can show whether an infant is exclusively breastfed or not. Projects in Senegal, Ghana and Brazil have explored this methodological advantage of the technique. They show that, by educating lactating mothers about the benefits of exclusive breastfeeding, the introduction of other foods and fluids into infants' diets can be delayed and/or the amounts given before six months of age can be minimized.

According to WHO recommendations, infants should be introduced to complementary foods when they are six months old. At this age, they are very vulnerable to nutritional deficiencies. The gradual increase in energy and nutrients provided by semi-solid/solid foods requires access to appropriate complementary foods with high energy and nutrient density, as well as high nutrient bioavailability. In many resource poor areas, homemade, semi-solid foods based on cereals are representative of the monotonous diets consumed by infants and young children. The introduction to complementary foods is of public health concern, because it increases the risk of diarrheal disease from contaminated foods and the risk of growth faltering from foods of poor nutritional quality.

The hidden hunger

In addition, micronutrient deficiencies (also called "the hidden hunger") are very common in developing countries, especially among young children. The consequences are often severe (impaired psychomotor and mental development due to iron deficiency, increased morbidity and mortality due to vitamin A

deficiency, poor growth and increased morbidity due to zinc deficiency, etc). One of the priority areas for IAEA projects in human nutrition is therefore to combat micronutrient deficiencies, in particular during early life.

Full-term breastfed infants generally have an adequate iron status during the first six months of life. But afterwards, body stores become depleted and iron requirements are high due to rapid growth and development, and iron has to be provided by the diet. Therefore, the amount of iron in complementary foods and its bioavailability are of special concern.

Complementary foods in developing countries are often made with cereals and pulses, which contain considerable amounts of phytic acid. Because of this, only a small fraction of iron is absorbed and utilized by the body. However, iron absorption can be improved by adding vitamin C. The value of adding vitamin C to a traditional, homemade complementary food to enhance iron absorption was recently demonstrated in Pakistani infants within an IAEA coordinated research project. Iron absorption was measured by a stable isotope technique based on the incorporation of stable iron isotopes into red blood cells in healthy infants consuming a traditional complementary food based on rice and lentils. Addition of vitamin C resulted in a two-to-threefold increase in iron absorption. This shows how a simple dietary modification can improve the nutritional value of homemade complementary foods.

Centrally produced complementary foods are often fortified with vitamin C and iron to increase their nutritional value. However, as bioavailability varies widely between different iron compounds, measurement of iron absorption is an important step in the development of an effective food fortification strategy. For example, by using a stable isotope technique to measure iron bioavailability from three different iron compounds added to a milk-based complementary food in a nutrition program targeted at young children in Mexico, guidance on how to optimize the nutritional impact of the intervention was provided.

The child cannot wait

The urgent need for effective interventions to combat undernutrition during early life cannot be summarized more elegantly or more forcefully than Nobel Prize laureate Gabriela Mistral has done: "Many things we need can wait, the child cannot. Now is the time his bones are being formed, his blood is being made, his mind is being developed. To him we cannot say tomorrow. His name is today."

Following the recent decision to use the Nobel Peace Prize fund for fellowships and training in cancer management and childhood nutrition, IAEA will further strengthen technical support to Member States working toward the achievement of the Millenium Development Goals by improved nutrition. – *Lena Davidsson, Head of the IAEA Section of Nutritional and Health Related Environmental Studies, Division of Human Health. E-mail: l.davidsson@iaea.org*

Feature:

Changing concepts in international nutrition science

The EV McCollum International Lectureship in Nutrition provides a means to encourage sound advancements in nutrition science and their application for improving the health and wellbeing of people worldwide. It is awarded biannually by the American Society for Nutritional Sciences. The 19th lectureship, in 2005, was awarded to Mark L. Wahlqvist, Past-President, International Union of Nutritional Sciences, and Director, Asia Pacific Health and Nutrition Centre, Monash Asia Institute, Monash University, Australia, for his work on the concept of "econutrition", which puts nutritional science in a context that goes beyond diet, food, metabolism and nutrition status, and embraces human behavior, lifestyle, physical activity and work, along with the burden on the physical environment for the provision of food and the consequences of ecological degradation for the task of feeding humankind. The following article summarizes the main points from the lecture held by Dr Wahlqvist at the ICN in Durban last September. The full text has been published by the Journal of Nutrition Online under the title: "Towards a New Generation of International Nutrition Science and Nutrition Scientist, 2005 E. V. McCollum Lecture". It can be found on the web site www.nutrition.org. A related article ("Towards A New Generation of International Nutritional Science and Scientist: The Importance of Africa and Its Capacity") is scheduled for publication in the April 2006 issue of The Journal of Nutrition – A. Bowley.

Nutrition Science is poised for a generational shift. Nutrition-related physiology and pathophysiology are being reconceptualized both from a broad socioenvironmental perspective and from molecular and cellular perspectives. The concept of socioenvironmental injury and the nutritional modulation of inflammatory responses is emerging. Innovation in nutrition science will increasingly derive from other disciplines, notably from the geographical and neurobehavioural sciences, and from related technologies. This will allow human and community development to be addressed in more ambitious and optimistic ways. This new generation of nutrition science will be unsupportable, however, unless it contributes to sustainability, security and prosperity.

Mechanisms of nutrition-related disease

The rapid change in the profile of nutrition-related disease is chiefly due to urbanization, labour-saving environments and technologies, ecosystem degradation, compromised family and social networks, changes in literacy and access to information, and the variable nature of health care systems and food security. Whether we are able to live a long and healthy life or not depends increasingly on where we live and how wealthy we are.

To resolve this situation, the first thing

we need to do is create partnerships that address complex environment-related and nutrition-related health problems. Then we must identify the basic causes of food-related problems and nutrition-related diseases, and seek solutions. The growing epidemic of obesity, for example, is being recognized as a more fundamental problem than just the net effect of energy imbalance. New unifying concepts of the mechanisms of nutrition-related disease are emerging, which will extend the horizons of how and when aberrant food intake affects health and wellbeing. One, already raised, is the notion that our biological systems cannot be seen in isolation from the environment.

As we understand more about the human genome, we realize that the modest portion of DNA that produces RNA (referred to earlier as junk DNA) may, in fact, have a prime role in surveillance and organization of the entire genome. This integrative genomics or epigenetic understanding will extend our present recognition of the nutritional determinants of gene expression, where the way we eat influences how our genes work.

We are also beginning to recognize the much more extensive role of inflammatory processes in health outcomes. Foods with inflammation modulating properties may be relevant in musculoskeletal disease, neurodegenerative disease, cognitive function, Parkinson's disease, glomerulonephritis, inflammatory bowel disease, upper GI disease, certain cancers, asthma and allergies, as well as macrovascular disease (leading to stroke and ischemic heart disease). Because of the close connection between pychosocial and environmental challenges to our sense of wellbeing and the neuroendocrine system, it is not surprising that inflammatory factors might be mediators of tissue damage. Together with changes in insulin resistance, energy metabolism and fat distribution, these factors have the potential for nutritional modulation and altered expression of so-called chronic disease and its complications.

Sensory nutrition is a field destined for a more concerted effort. Not only is this because our senses (taste, smell, hearing, sight, touch) are so crucial for food choices. It is also because these sensory inputs are vital for the more general functions of the central nervous system such as memory; specific food memory in the amygdala and memory in general depend on olfaction. It is also likely that the myriad of molecules with taste and olfactory receptors have functions beyond the sensory, so that the understanding of multifunction food components will grow.

Wellness is often used interchangeably with wellbeing, but there may be several states of wellbeing (physical, intellectual, emotional, spiritual, social and occupational). Wellness is a state of mind that might have little relationship to physical wellbeing. Contemporary health science acknowledges the essentiality of wellness in health indices; it is reflected in the Definitions and Strategies for Health of the World Health Organization. The international science community has also embraced its responsibility to contribute to health and wellbeing. This means it will have to pay more attention to the relevance of food intake in future. At the very least, we can say that eating, at its most fulfilling, is a social phenomenon. Few social activities occur without eating or drinking, and social activity is a powerful determinant of longevity. A growing amount of evidence suggests that cognition and mood are to some extent dependent on food factors such as iron, folate, vitamin B12, n-3 fatty acids and anthocyanins.

Malaria, schistosomiasis, hookworm and ascariasis are so endemic that parasitosis must account for the greatest burden of disease globally. Yet, probably because of limited data, and linkage to the health, wellbeing and longevity of poor people, this impact on global health is underestimated. Likewise, even though the coexistence of parasitosis and malnutrition is well recognized, it is one of the least active areas of nutrition research. The field of nutrition and host-parasite dysbiosis (as opposed to symbiosis) needs urgent attention.

A basis for human and community development

Human security depends on good governance, with robust and credible legal systems, property rights, and financial systems in place and functional, along with the availability of shelter, food and clothing as basic human rights. But, in turn, this depends on an adequate infrastructure to provide drinking water (and water for agriculture and sanitation), energy, transport, telecommunication, healthcare and education, without any form of discrimination. In this scheme of things, the way food is produced, transported, processed, stored and sold is paramount. Because of the work involved, the food system can be a source of income for those involved. Successful food systems will also relate well to education and health care by being more responsive to need, as well as more contributory to health maintenance.

Increasingly, policy decisions about the application of food and nutrition knowledge take into account the level of evidence. What happened with evidence-based medicine is now happening with evidence-based nutrition. The IUNS Task Force on evidence-based nutrition, together with the Food and Agriculture Organisation and the World Cancer Research Fund, has recommended a portfolio approach with no hierarchical superiority accorded to intervention studies. The German Ministry of Science's objective-oriented project planning approach (Ziel Orientierte Projekt Planung; ZOPP) also acknowledges that evidence must be adduced in concert with implementation, monitoring and surveillance.

Drawing on its history of social engagement, nutrition science has made the promise that it will fulfill its growing obligation to provide a sustainable food supply, so people can feel relatively secure, and either be employed or entrepreneurial in roles that are remunerative, both financially and personally. We must therefore pay more attention as to how sustainable our nutrition recommendations are. For example, we cannot simply encourage people to eat more fish if fish stocks are precarious or if there is gross inequity in the distribution of limited stocks. For the outcomes we seek, we may need to identify alternatives.

Environmental change, with changes in infectious agents, physical activity and what we eat, will lead to changes in health patterns. This challenge for nutrition science will be great. Planetary health, and not simply human health, must now be the outcome.

A new generation of nutrition scientist

The new generation of nutrition scientist will seek an even more purposeful career, where an impact on human and community development is likely; will want greater respect both inside and outside the institutions in which scientists work; will expect to be well paid, and provided

with a flexible working arrangement between the core and related disciplines. The capacity building this requires will always depend on the creation of sound scientific knowledge, leadership development and support for entrepreneurship. The training will be interdisciplinary and crosscultural. Many more role models that embrace the required new direction for nutrition science will be needed. National and international nutrition science organizations will need to be influential and supportive of this new generation.

The IUNS, other related unions like the International Union of Food Science and Technology (IUFoST), the United Nations System Standing Committee on Nutrition, NGOs and the private sector have put great emphasis on capacity building. The IUNS has had a particularly productive relationship with the United Nations University Food and Nutrition Programme and the Ellison Foundation. In Africa, there has been much effort to build training and leadership with information technology. The IUNS has worked with IUFoST in this endeavour. The Swedish International Development Agency has supported Uppsala University and a growing cohort of its graduates in the composite fields of nutrition science and information technology as ITANA (Information Technology in the Advancement of Nutrition in Africa). These are important beginnings for a new generation of nutrition science programs and leadership throughout the developing world. They are no less important in Europe, North America and Australasia where succession in nutrition science is faltering.

Nutrition science and the arts

Nutrition science has much to gain through cooperation with the arts. The most developed expression of this is in cuisine, where the presentation, palatability and ambience of eating assume a special importance. Regard for local food production with its peculiarities has relevance for both health and wealth. Food systems can be both economically successful and sustainable when regard is given to palatability and health-related properties.

Whilst at first an odd proposition, music and dance must be one of nutrition science's most powerful allies. Like food, they speak a universal language and fulfill basic human needs; they are inspirational, and allow for the pursuit of excellence. The role of music in the programming of cerebral function (including food choice) and movement through dance and in achievement of energy balance and preferred body composition, are worthy of investigative attention. Food appreciation is often most exquisite when accompanied by music. Literature, too, has an important place in the realm of nutrition science, and many nutrition writings are becoming literary classics.

The arts also allow for passion, and this is what is required by food and nutrition scientists to change the world for the better. ■.

■ Conference report:

Uganda meeting advances regional fortification efforts

In East, Central and Southern Africa, more than 100 million women and children suffer micronutrient deficiencies. Every year, more than 400'000 of them die. Economic losses due to malnutrition in the region total almost three quarters of a billion US$ annually. Fortifying commonly consumed foods with vitamins and minerals is a proven, cost-effective and sustainable, market-driven strategy to reduce micronutrient deficiencies and lift this enormous human and economic burden.

The regional environment for implementing food fortification is positive:

- Many countries have achieved successful iodization of more than 90% of salt for human consumption.
- In all the countries (according to a survey by MI) there are large food industries with capacity to fortify, and more than 750 million potential consumers.
- Some of these industries already fortify wheat flour, maize meal, vegetable oil and/or sugar on a mandatory or voluntary basis.

Food fortification programs require a sequence of epidemiological, policy, food technology, food control, and financial decisions to create a sound framework for government oversight, industrial implementation and consumer financing.

In November 2002, the Ministers of Health of ECSA (the East, Central and Southern African Health Community, an intergovernmental organization established in 1974 to assist member countries identify and address the region's health and nutrition needs) instructed the ECSA Secretariat to strengthen food fortification initiatives. In response, the Secretariat initiated a regional process, the ECSA Fortification Initiative (EFI), to assist member countries in capitalizing on opportunities to develop and accelerate food fortification programs. It established four EFI Technical Workgroups to develop a series of practical, implementation-focused guidelines that help governments facilitate and harmonize:

- realistic national fortification regulations and standards;
- cost-efficient methods and investments to assure quality and safety;
- industrial implementation including regional training and purchasing schemes;
- strategies to signal public commitment and stimulate investment.

Safe and affordable for the region

From August 28 to September 2, 2005 the ECSA Secretariat convened its 3rd Regional Meeting on Food Fortification (Creating Good Partnerships to Accelerate Progress) in Kampala, Uganda *(for reports of the earlier meetings, see Nutriview 2004/2 and 2004/4*). Its aims were:

- To present the provisional regional guidelines for fortification standards, regulatory approaches and analytical methodologies developed by the EFI Technical Workgroups.
- To communicate benefits of food fortification as well as demonstrate feasible and affordable technologies and quality assurance processes.
- To encourage formation of partnerships among public and private sector institutions to accelerate implementation of food fortification.

As a starting point for national discussions, the EFI Technical Workgroups presented the provisional guidelines they had developed. These show that fortification can deliver effective, safe and affordable micronutrient nutrition to typical consumers of industrially produced vegetable oil, sugar, maize meal and wheat flour:

- One teaspoon of vegetable oil with added vitamin A (35 mg/kg) provides 25–35% of the daily vitamin A requirement at an annual cost of $0.02 per person.
- Ten grams of sugar fortified with vitamin A (25mg/kg) provides 25–30% of the daily vitamin A requirement at an annual cost of about $0.05 per person.
- A mix of nine recommended vitamins and minerals added to a bowl of maize porridge can provide 15–46% of an individual's daily requirements for about $0.05 per year.
- Two slices of bread fortified to proposed levels can provide one third of an individual's daily need for nine vitamins and minerals at an added cost of about $0.05 per year.

The regional process opens opportunities for efficient investments in capacity building for inspection and enforcement along with the required food analysis. EFI Technical Workgroups presented a review of available laboratory capacities in the region and recommended robust and appropriate methodologies using fast, inexpensive approaches for quality control at the industrial level and inspection at the regulatory level.

The right thing to do

Participants confirmed that, once aware of the tremendous difference it can make through fortification, the food industry accepts it as the "right thing to do". They agreed that fortification is commercially and technically feasible. However, a number of barriers remain, including tariffs on food fortificants and when industry faces a competitive environment. Without intensive marketing, most consumers, particularly those at the lowest income level, will opt in favor of nonfortified products at slightly lower prices. In this environment, government food control and enforcement are critical to create a "level playing field" where companies producing fortified products are not at a commercial disadvantage. A competitive environment magnifies the need for transparency, good governance and public education.

Establishing an open platform for public-private sector communications, such as a national fortification alliance, opens opportunities to address these barriers by building trust, defusing tensions and developing mutually acceptable solutions. While public and private sectors may have distinct objectives and vocabularies, open multisectoral dialogue can set the stage for identifying joint interests and commonalities. For both the public and private sectors, working across sectors is not easy, because it is a new way of doing business. However, the longer-term benefits are worth the time spent in the partnership-building process.

The participants reached a consensus on the activities and next steps necessary to capitalize on the promise of food fortification to reduce micronutrient deficiencies and contribute to the achievement of the Millennium Development Goals. The proposed work program over the next two years includes:

- Apply the proposed fortification guidelines at country level to generate national standards and regulations while opening channels for regional harmonization.
- Complete the ongoing regional capacity-building program based on consensus on laboratory methodologies.
- Develop systems to facilitate industrial start-up activities including equipment selection, human resource development and premix procurement.

The ECSA Secretariat will intensify activities to secure resources and to empower national participants to complete EFI activities. By the end of the two-year period, the Secretariat proposes to synthesize final technical guidelines and consensus recommendations along with proposals for regional harmonized standards, enforcement protocols and capacity-building activities into a comprehensive strategic ECSA plan of action to be launched at a region-wide advocacy meeting in 2007. – *Jack Bagriansky, 30033 Decatur, GA. USA; email: bagriansky@comcast.net, and Omar Dary, Academy for Educational Development, Washington DC, USA; email: odary@aed.org.* ■

■ Conference report:

Tanzania plans implementation of food fortification

On November 16, 2005, the Tanzania Food and Nutrition Centre (TFNC) hosted an advocacy workshop on food fortification in Dar Es Salaam. The meeting was sponsored by DSM Nutritional Products, the Micronutrient Initiative (MI) and TFNC, and attended by representatives of the Tanzanian Government, the food industry, NGOs active in the fight against micronutrient malnutrition, and the media. The objectives of the workshop were:

- to obtain Government support for food fortification in Tanzania,
- to solicit partnerships from public and private sectors,
- to develop an action plan for implementing such a program.

In his welcome address, Dr Godwin Ndossi, Managing Director of TFNC, told the participants that their role at the workshop was to draw the road map showing the way forward on food fortification in Tanzania. The workshop was officially opened by Linus Gedi, Chairperson of the National Food Fortification Alliance (NFFA). The participants introduced themselves individually, and stated their expectations from the meeting. These ranged from how the different stakeholders can contribute to strengthen the fortification alliance, to how the financing, marketing and safety of the fortification process would be managed.

An urgent problem

Dr Sabas Kimboka (TFNC) reminded participants that micronutrient malnutrition is a serious public health problem in the country, and needs to be dealt with urgently. Deficiencies of iron, iodine and vitamin A alone are having devastating

Dr Generose Mulokozi, Tanzania Food and Nutrition Centre (on the left), Ms Sakina Lweno, Ministry of Agriculture and Food Security and Mr Leo Mpwata, Kilombero Sugar Company, listen carefully to the presentations

effects on health, education and the economy. Surveys (2004/2005) showed that 65% of children and 42% of women of childbearing age are anemic. In 2003, 84% of households were consuming iodized salt, and goiter prevalence had fallen to 7% (from 25% in the 1980s). In 1997, vitamin A deficiency was found in 24% of Tanzanian children and 69% of lactating women.

Dr Ndossi reviewed the status of food fortification in Tanzania. Studies conducted over the past ten years show that food fortification can be an effective public health measure to prevent nutritional deficiencies in the whole population or in specific risk groups. While a number of food commodities on the Tanzanian market claim to be fortified with vitamins and minerals, this needs to be confirmed. The Government is already committed and supportive of programs for micronutrient interventions. What is needed now is an appropriate strategy, food industry commitment and action to make food fortification a reality.

Shadrack Orinda, representing the International Health Food Association Tanzania Project, said that his organization is milling and packaging fortified maize flour, finger millet flour cookies and peanut butter, and will start producing fortified bread, cakes and corn coffee soon.

Fortification is cost effective

Heidi-Lee Robertson, DSM Nutritional Products, South Africa, discussed the effects that micronutrient malnutrition is having on national economies and individuals' lives, and pointed out the simplicity and cost-effectiveness of corrective measures. She also stressed the importance of partnerships for sustainable food fortification programs. Each partner has strengths and needs:

- The health sector knows which vitamins and minerals are lacking, and who is deficient, but cannot fortify foods.
- The food industry has the technology to fortify and the channels to reach the consumer, but needs guidance on how to do it, as well as a level playing field.
- Health and development agencies can provide standards, guidelines, technical assistance and possibly start-up funding, to assist in ensuring sustainability.
- The consumer, if well informed, will make the decision to purchase fortified products if they are safe, accessible and affordable, and taste and look the same as the nonfortified food.

A real partnership has shared burdens and shared rewards for both the public and private partners.

Anthony Hehir, DSM Nutritional Products, South Africa, explained the technicalities and costs involved in the fortification of wheat flour, maize meal, sugar and vegetable oil. To minimize weighing errors and simplify quality control and standardization, it is better to use a premix rather than isolated nutrients. He showed how fortification can benefit industry as well as the country, and discussed ways to attract consumers.

Dr Generose Mulokozi, TFNC, described staple food consumption patterns in urban and periurban areas, reminding participants that patterns in rural communities still need to be assessed. She showed that sugar, wheat flour and edible oil have the best potential for a national fortification program, because of the small number of major processing units (4 for sugar, 6 for oil and 7 for wheat flour). Maize meal is less suitable, because most maize is milled in small hammer mills (about 9'000) scattered all over the country.

Getting organized

Dr Mofota Shomari, Coordinator of the Food and Nutrition Program at the ECSA Secretariat, Arusha, first explained the role of the Secretariat, which is to create an enabling environment for member countries to take forward food fortification through involvement of their industries and other stakeholders. Efforts include organizing workshops, and formulating policies and guidelines.

Progress made so far (see pages 6+7) indicates that ending vitamin and mineral deficiency could be a major catalyst for member states to eradicate extreme poverty and hunger, and so improve maternal health and reduce child deaths by two thirds by 2015.

Mr Gedi described the role of the National Food Fortification Alliance, the task force on fortification issues established in 2001 that coordinates and spearheads food fortification activities in the country, provides strategic vision, policy guidance and technical support, and advises the Government as necessary. It currently has 28 members and a secretariat at TFNC. Following this meeting, the TFNC will be mainly involved in implementing the action plan that was agreed on for 2006. This includes:

- Propose the introduction of a school food fortification program to the Ministry of Education and Culture.
- Make a presentation to Government explaining why the fortification of staple foods would benefit the population.
- Update data regarding the health and nutrition status of the population.
- Assess consumption of wheat flour, oil and maize meal in rural Tanzania.
- Devise incentives for food processors and investors to encourage food fortification.
- Formulate strategies for social marketing, advertising, sensitization and mobilization.
- Define the way forward for small-scale fortification.
- Assess laboratory analytical capacity and training needs within the regional context.
- Develop/revise fortification standards.

Dr Julia Moorman, MI South Africa, who acted as meeting facilitator, praised Tanzania for being one of the lead countries in the region, and for deliberating on specific and achievable actions. – *Report based on the workshop proceedings compiled by Dr Godwin Ndossi, Dr Nicholas Mlingi, Dr Elifatio Towo and Celestin Mgoba.*