



The Micronutrient Initiative

*Activity Highlights***VITAMIN A****Moving Towards the Goal of VAD Elimination:****Creating a demand pull...**

MI in partnership with UNICEF, CIDA and USAID will organize a series of regional and global advocacy events during 1998 to highlight awareness regarding the problem and mobilize action for elimination of VAD.

....and the supply push

As one element in this direction, during 1997-98 MI with CIDA assistance, provided nearly 400 million capsules (in varying strengths) for distribution through UNICEF, NGO and Government networks facilitated by PAHO to reach a significant proportion of under-5 children at risk and women postpartum. Over 1999-2000, an additional 455 million capsules will be distributed.

Measuring Progress

The MI, in collaboration with UNICEF and Tulane University, has assessed the current situation of global vitamin A deficiency with respect to trends in prevalence of vitamin A deficiency (VAD), and the status of control programs. An early summary of the results obtained was presented at the SCN Annual meeting in Kathmandu, Nepal, in March 1997. Subsequent work and addition of new information obtained through a questionnaire sent by UNICEF to their field offices, confirmed the earlier conclusions reached. The results of these analyses were summarised in "Progress in Controlling Vitamin A Deficiency"

The MN-NET database on the prevalence of vitamin

A deficiency and status of control programs are currently being updated in the light of new information obtained particularly on the capsule coverage data collected by the UNICEF. An integrated report is planned to be published by UNICEF/MI/Tulane covering all three micronutrients, i.e., iron and iodine in addition to vitamin A.

Expanding and Strengthening Programs: The Global Vitamin A Initiative (GVAI)

This program of support aims to contribute to the elimination of vitamin A deficiency through increasing and maintaining political commitment to eliminate VAD, increasing coverage of existing vitamin A programs using multiple channels of program delivery, adding-on vitamin A components to existing development initiatives, improved service delivery and monitoring of interventions, strengthening technical capacity, and developing and testing innovative approaches.

Support to national programs

To date, under the GVAI, the MI has provided support through UNICEF field offices for vitamin A programs in 14 countries (Bangladesh, Bolivia, Brazil, Burkina Faso, Cambodia, Cameroon, Ecuador, Ethiopia, Ghana, Haiti, Indonesia, Malawi, Nepal, Niger, Nigeria, Somalia, South Africa, Tanzania, Uganda, Vietnam and Zambia). Through these programs, national capacity to plan, implement, and monitor a diversity of vitamin A activities has been enhanced. Delivery systems have been strengthened, coverage with vitamin A capsules

increased, advocacy efforts intensified, and experience gained in involving community-based organizations in vitamin A interventions.

NGO initiatives

The GVAI programme has, since March 1997, supported 14 NGOs to design and implement projects to contribute to the virtual elimination of vitamin A deficiency.

The 14 award recipients from 11 countries (Bangladesh, Indonesia, Kenya, Malawi, Nepal, Niger, Philippines, Solomon Islands, Uganda, Vietnam, and Yemen) were selected out of over 150 submissions from NGOs around the world following a global call for proposals. On average, the projects selected were for activities over a 2 year period. Throughout these projects, PATH Canada, was contracted by the MI to provide capacity building and technical support to the 14 NGOs, and they continue to facilitate information sharing and the exchange of "lessons learned" in the field through a GVAI Network.

The GVAI Network is maintained through regular electronic communications, the production and distribution of the "GVAI Bulletin", and the organization of workshops where the Network members have met face-to-face on three occasions to enable interactive exchanges on practical experiences in the field, technical issues, as well as to facilitate networking within and beyond the GVAI Network.

Many of the projects have reached completion, and the results have shown evidence of the capacity of NGOs to bridge the gap between research findings and implementation, through pilot trials and operations research, and by strengthening health systems to reach the outlying population groups not reached by the government delivery mechanisms.

A second award programme is currently being offered to the 14 NGOs, to continue their vitamin A intervention programs for up to an additional 24 months, beginning in spring 1999.

...focus on West Africa

In three countries of West Africa--Burkina Faso, Mali and Niger--the MI, through Helen Keller International (HKI) is providing training and technical assistance to both governments and other NGOs to design, implement, monitor, and evaluate vitamin A interventions. Communications and education activities will be emphasized, and while the focus is on supplementation programs, efforts will be made to explore the feasibility of food fortification to help alleviate micronutrient malnutrition.

Expanding supplement coverage through EPI

The MI is providing support to WHO and PAHO to implement a multi country initiative to strengthen vitamin A supplementation linked to immunization programs.

In 1999 MI will be used to provide program support to at least 12 countries in sub-Saharan Africa to coordinate the administration of vitamin A capsules with national immunization days (NIDs) for polio. The following countries are to receive such support: Angola, Burundi, Chad, CAR, D.R.Congo, Ethiopia, Guinea, Malawi, Mozambique, Nigeria, Rwanda, and Zambia.

The integration of vitamin A into routine immunization services will be promoted, especially the administration of VA with the measles vaccine and maternal supplementation within 6 weeks of childbirth at the time of the first EPI contact for the infant.

Communication and training materials will be developed, and it is expected that the following will be ready for widespread distribution in 1999: a Vitamin A addendum to the Polio Field Guide, a Guide for mid-level managers on Vitamin A and EPI, Guidelines for including vitamin A in EPI surveillance system, and a digital communication and training package on CDROM on linking vitamin A to EPI. Together with UNICEF, MI is developing and field testing a new dropper to administer vitamin A.

For the Latin American region, the Pan American Health Organization - PAHO (joint effort of the Food and Nutrition Program and the Special Program for Vaccines and Immunization) is coordinating the implementation of this initiative in six countries: Brazil, Dominican Republic, El Salvador, Haiti, Nicaragua, and Peru. Training and communication materials for health workers were produced by PAHO for adaptation by the countries, as well as guidelines for supervisors and program managers. A regional meeting was held in October 1998 at PAHO Headquarters in Washington to discuss various aspects of the project and to obtain feedback from the countries on any obstacles and progress in the program. A Regional Meeting Report is now available. Five of the six countries have provided vitamin A supplements during their national immunization campaign against measles.

Program Guidelines

Vitamin A dosing during pregnancy and postpartum

The MI supported an expert consultation meeting which was convened by WHO in Geneva, 19-21

June, 1996, to review the available information and reach consensus on the dosage and contact points during pregnancy and the first six months postpartum when vitamin A supplements can be safely administered, and to consider the relevant policy and program implications. The meeting generated recommendations for public health application for the safe use of vitamin A supplements. The joint WHO/MI report "Safe vitamin A dosage during pregnancy and lactation" is now available (French/English).

Monitoring vitamin A programs

Monitoring of vitamin A activities is important for tracking and ensuring project effectiveness, improving implementation, and minimizing the risk of overdosing with supplements. The MI and PAMM have jointly prepared a manual to guide monitoring of various interventions to improve vitamin A status. Copies of this manual entitled "Monitoring Vitamin A Programs" are now available from the MI.

The Global Thrust for Food Fortification

The MI is working with sugar processors, flour millers and oil processors at the global, regional and national levels to facilitate the enrichment of these widely consumed commodities.

Selection of food vehicles

Unrefined Palm Oil for Vitamin A in Burkina Faso

The MI plans to support a pilot project to assess the acceptability and impact of red (crude) palm oil (RPO) among vulnerable groups in a region of Burkina Faso where RPO is neither currently produced nor widely consumed, and where vitamin A deficiency is a problem. This collaborative study between the University of Montréal, Canada and the Home Economics Association of Burkina Faso will use a social marketing strategy to promote the use of RPO as a vitamin A food supplement for women and preschool-age children. The local RPO production system will be documented in order to appraise its growth potential. After 2 years, it is expected that at least 50% of the target group will be using RPO regularly, and that vitamin A intakes and status of the participants will have improved. It is also expected that the traditional RPO market will be able to respond to the increased demand in non RPO-producing areas. Finally, if the project is successful, it will provide the basis for potential expansion to other provinces of the country.

Vitamins stability in fortified vegetable oils

Edible oils have been identified as suitable food carriers for micronutrients, but we have limited knowledge of the stability of micronutrients added under local conditions of temperature, humidity and packaging. Such information is essential if edible oils are to be fortified for human consumption. To obtain such information in a systematic manner, the MI, through funding from CIDA, has supported the University of Guelph in Canada to perform an extensive research study to look at a range of factors affecting stability of vitamin A and beta-carotene in at least six vegetable oils at varying storage conditions (temperature, light, oxygen), packaging and antioxidant levels. The selected vegetable oils for this study are deodorized soybean, sunflower and palm olein, filtered mustard and groundnut oils and vegetable vanaspati ghee. In addition, the effect of deep frying, and repeated use of fortified soybean oil and vanaspati ghee on the vitamin A content will be investigated. The research will determine the level of vitamin A in cooked foods prepared with these fortified oils by using selected oils and traditional dishes from 11 countries (including Bangladesh, East & West Africa, India, Indonesia, Nepal, Pakistan, Philippines, South America and Thailand. The results of this study will be available by August 1999.

Progress in development of UltraRice technology

Rice is a staple commodity in many micronutrient deficient populations in developing countries, but because it is often prepared for consumption in a different way (e.g. soaking, rinsing and cooking in excess water), most micronutrients added would be lost if traditional fortification technologies are used. A recently developed and tested technology produced UltraRice which has overcome many of the technical limitations of other techniques used to effectively fortify rice. The MI, working with Program for Appropriate Technology in Health (PATH) in Seattle, has successfully tested the marketability and consumer acceptance of this fortified rice product in Kupang, Indonesia. MI and PATH have now entered a second phase of work to undertake vitamin A stability tests using various cooking procedures as well as shelf life studies under different environmental conditions of temperature and humidity. Furthermore, the second phase of this activity included funding PATH Canada through PATH Seattle to determine the optimum dose of vitamin A content of UltraRice and safety/toxicity conditions for the product, as well as preparation of a protocol for testing efficacy and effectiveness of UltraRice in controlling vitamin A deficiency. The final report for phase 2 will be available by September 1999.

Next steps involve the possibility of adding other micronutrients such as iron and zinc to the rice, and field testing the product in a number of countries with vitamin A and other micronutrient deficiencies.

The MI sponsored and co-organized with the University of Arkansas an international workshop on "Micronutrient Enhancement of Rice for Developing Countries", in Arkansas, September 2-3, 1998. Other collaborating organizations included ILSI, SUSTAIN, UNICEF and USAID. The meeting attended by over 50 participants, aimed to address various aspects of a national rice fortification program, current status of rice fortification technology, processing, distribution, marketing and regulatory considerations. The proceedings of this workshop with recommendations for future actions will become available shortly.

Global directory of supplement and premix suppliers

The MI has prepared a catalogue of major manufacturers of micronutrient premixes used in the fortification of foods, supplements and in large, medium and small scale processing facilities. To compile this list, a questionnaire was prepared and widely distributed to over 700 companies and posted on the MI web-site. Copies of the directory are now available. The directory is also accessible through MI's Internet site.

Procurement of supplements and premixes

The MI has been assisting agencies such as World Food Program in the procurement of vitamin A and iron supplements, and fortification premixes. In this process the MI has gathered information on product specifications used by various agencies, potential suppliers and their products lines, standards which these classes of products must meet, and product price information.

...where there is no food vehicle

The MI recognizes that there are several countries where it is difficult to find appropriate food vehicles. Here the approach could be to 'create' a vehicle such as a beverage drink mix or biscuit or produce and market a premix condiment that can be directly added to foods.

Fortified beverage drink mixes

The MI supported a study in Tanzania to test the efficacy and acceptability of a multiple micronutrient fortified beverage drink among school children in one district. The Procter & Gamble Company which developed the drink, provided it for the study. The results overseen by the Tanzania Food & Nutrition Centre (TFNC) and Cornell University have shown significant improvement in micronutrient status and growth among the school children.

Given the positive results, MI decided to support another Cornell/TFNC study to test the efficacy of a similar beverage on nutritional parameters in Tanzanian women during pregnancy and post-partum. The project is scheduled to begin early 1999.

Food Aid Fortification

Nutritional quality of relief foods

A workshop on "Enhancing the nutritional quality of relief foods" will be held in Washington DC on April 28-30, 1999. The workshop objectives are to exchange information on current practices, and to compare operational approaches, in enhancing the nutritional quality (especially micronutrient) of relief foods, and; to expose participants to the technical options and the related needs for fortifying relief foods, and to other methods that can increase the quality of diets and reduce nutrient losses in relief situations. The workshop is being organized by Food Aid Management, the Congressional Hunger Center, the American Red Cross, the MI and USAID.

Operational Research

Developing a rapid vitamin A field test

Up to now, a good test to measure serum vitamin A in the field has not been available. Such a test, if available, would be invaluable to survey populations and monitor the effectiveness of vitamin A intervention programs. Fluorescence is both a selective and sensitive mode of measuring vitamin A. Through MI support to Craft Technologies in the USA, a fluorometer has been identified and optimized for VA analysis in the field. The unit and battery weigh less than 7 kg and will fit into a backpack. The method compares favorably with measuring serum VA by HPLC, and promises to be a portable, sensitive, selective field test to measure serum VA from a capillary of blood. Efforts are underway to use whole blood, and to field test the method.

Vitamin A and AIDS

An intervention trial on "vitamin A supplementation at delivery to breast-feeding women and their neonates: impact on mother-to-child HIV transmission during lactation, HIV infection among women, and infant mortality" is being conducted in Zimbabwe, with CIDA support. MI had provided additional support to accelerate preparations for this study: project development workshops were funded, preliminary field activities conducted, and the University of Zimbabwe equipped to perform serum retinol analyses and HIV assays.

Sharing the Knowledge

Micronutrient learning materials

Work is ongoing to produce computer-assisted interactive learning materials on micronutrient malnutrition aimed at students in undergraduate-level programs in the medical, health and nutrition sciences. The MI has contracted McMaster University in Canada to produce modules on iodine deficiency disorders, iron deficiency, and vitamin A deficiency. Working with partners in developing countries (Mahidol University, St. John's medical College in Bangalore, and the All-India institute of medical Sciences in New Delhi) the vitamin A module will soon be ready for field-testing. The modules will be available on CDROM and is expected to be ready for distribution to academic institutions in late-1999.

Primary school kit

The MI, PAMM and the Ministry of Health in Malawi have adapted an education kit developed by PAMM for use in educating primary school students about micronutrient malnutrition. The kit is available from the MI to interested groups.

About the Micronutrient Initiative

The Micronutrient Initiative has recently expanded! Regional offices in South Asia now include Bangladesh, India, Nepal and Pakistan. Our Head Office in Ottawa, Canada is now structured into 3 main program units - Programs; Technology and Research; and Information and Communications - as well as a Finance and Administration unit. Now in its 8th year of operation, the MI continues to respond to a very positive demand for new initiatives and the development of existing technologies to achieve sustainable control of micronutrient malnutrition by and beyond the year 2000, in keeping with the goals of the World Summit for Children: The mission of the Micronutrient Initiative (MI) is to facilitate the sustainable control of micronutrient malnutrition by the year 2000 in keeping with the goals of the World Summit for Children:

- "virtual elimination of iodine deficiency disorders";
- "virtual elimination of vitamin A deficiency and its consequences, including blindness";
- "reduction of iron deficiency anemia in women by one-third of the 1990 levels".

The MI was established in 1992 as an international secretariat, by its principal sponsors: the International Development Research Centre (IDRC), Canadian International Development Agency (CIDA), United Nations Children's Fund (UNICEF), U.S. Agency for International Development (USAID), World Bank, and the United Nations Development Program (UNDP).

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The Micronutrient Initiative

Activity Highlights

SOUTH ASIA MICRONUTRIENTS PROJECT

The South Asia region accounts for almost 50% of the world's micronutrient problem. The MI, with funding from CIDA, is now involved in an ambitious effort - "The South Asia Micronutrients Project"- to help governments in four countries (Bangladesh, India, Nepal, and Pakistan) plan and implement micronutrient programs using an integrated combination of supplementation, food fortification and other dietary approaches in order to eliminate iodine and vitamin A deficiencies and reduce iron deficiency anemia in women by the turn of the century. Special attention is being given to monitoring, capacity building and management of the programs. MI is also providing large quantities of vitamin A and iron supplements to catalyze rapid expansion of programs. MI has a full time Director in Delhi and full time program officers/advisers stationed in Bangladesh, Nepal and Pakistan. The role of the MI is to assist in the planning and implementation of micronutrient programs, provide technical inputs, facilitate action and leverage donor support for the countries. There is already evidence that MI's efforts are beginning to make a difference.

Bangladesh

MI is providing technical support to the Government of Bangladesh to implement the micronutrient component of the Bangladesh Integrated Nutrition Project (BINP) which is a \$60 Million World Bank-funded project. Through Tufts University, MI supports BINP supplementation, fortification and diet-based interventions. The goal is to utilize this experience at the community level to expand interventions to the national level. On the basis of a systematic MI analysis of delivery systems, BINP has begun provision of iron/folate tablets to pregnant and lactating women directly through its community nutrition centres (in addition to government clinics). With assistance from MI,

BINP field staff provide high-dose vitamin A capsules to women post-partum within two weeks of delivery, ensuring improved Vitamin A status both for the women and the infants they are breast-feeding.

MI has been assisting the Government of Bangladesh for its food fortification goals in the National Plan of Action on Nutrition (NPAN). The Government of Bangladesh's Institute of Public Health Nutrition (IPHN), UNICEF and the MI conducted the first in a series of national fortification workshops for policy planners, academics and nutritionists in Nov 98. The MI provided two international experts to participate in the panel of experts presenting the case for fortification. MI consultants have examined the possibilities of micronutrient fortification of wheat flour and edible oil. Work is also in progress on fortification of a food supplement and the use of a micronutrient fortified beverage drink for adolescent girls.

MI has been engaged in a pilot project to establish internal, factory-level monitoring of salt iodization. The project will determine and rectify the constraints to quality control, after which the participating salt factories will implement new monitoring procedures under MI supervision. MI is also participating in other IDD control activities viz. helping to redesign the universal salt iodization survey for a post 1998 study and preparation of a plan to revamp the iodized salt industry to ensure effective iodization with quality assurance.

In the planned National Nutrition Program (NNP) of the Government of Bangladesh, high priority has been given to national level activities, many of which are related to micronutrients. The MI is closely associated with the development process of the NNP and is assisting in many aspects of different NNP preparation including advising on field-based micronutrient interventions

MI appointed a full-time National Programme Officer in September 1998. MI/IDRC has also secured office accommodation with the Program Support Unit of CIDA in Dhaka. A new Memorandum of Understanding is being finalized between MI/IDRC and the GOB covering all MI's activities in the country (funding of micronutrient programs, collaboration with Ministries and national institutions, technical assistance to BINP and the stationing of full time professional staff).

India

MI has assisted two states (Gujarat and West Bengal) to undertake preparatory studies and use the information to prepare integrated micronutrient plans. The plans have been submitted to the Government of India for approval and funding support from donors and the World Bank. It is expected that these plans alone could have an outlay of US \$80 - 100 Million and form part of a larger national micronutrient project. Meanwhile, the MI (with CIDA support) has placed at the disposal of each state, seed funding to establish a core management team, develop an IEC strategy and workplan, prepare and test training modules and introduce a set of new interventions beginning July 1999. The basic emphasis during this phase has been laid on improving field worker performance through the design, refinement and implementation of micronutrient training modules and behavioural change activities. Other promising approaches to fortification of ready to eat foods, supplementary nutrition foods and wheat flour supplied through the public distribution systems are also being explored. The coverage and outreach of iron and vitamin A supplementation programs is also being expanded through better counselling of beneficiaries, adoption of modified delivery protocols and provision of supplements to previously neglected high risk groups. The partners involved in developing the Training Modules are renowned NGO's such as the Child in Need Institute (CINI) and CHETNA. Thus, MI's technical inputs and seed funding are helping leverage large resources to implement programs.

Food based strategies to control micronutrient malnutrition in the country (e.g. dietary diversification and fortification) are being emphasized. New strategies for food fortification down to the rural levels are being explored by conducting studies on the feasibility and effectiveness of fortification of common staples such as wheat flour, sugar and edible oils with micronutrients such as vitamin A and iron through collaborative research with leading institutes in the

country. The MI has assisted in the formation of high-level committees/working groups by the Government of India to examine the feasibility, methodology and efficacy of different modes of food fortification (dealing with staple food fortification strategy, sugar and oil fortification). The MI is supporting several pilot studies in India to address key operational issues and facilitate reviews by the committees:

1. Pilot fortification of sugar with Vitamin A (Vasantdada Sugar Research Institute, Pune)
2. Relative absorption of different forms of iron in whole wheat flour (National Institute of Nutrition, Hyderabad/Central Food Technology Research Institute, Mysore)
3. Industrial scale fortification of wheat flour with iron and community effectiveness (Roller Flour Millers Federation with Post Graduate Institute for Medical Research, Chandigarh)
4. Stability of Vitamin A in edible oils/fats

MI sponsored a national meeting of food fortification with the Ministry of Food Processing and ILSI in Jaipur in February 1999. The meeting was attended by over 100 representatives from Government, private industry, scientific institutions and international agencies and came up with the Jaipur Declaration that contains specific recommendations to move forward on the strengthening and expansion of food fortification in the country.

Nepal

The MI is working closely with the National Planning Commission, the Ministry of Health and UNICEF to develop long-term plans for sustained elimination of micronutrient deficiencies in the country. MI has funded and provided technical assistance for a national micronutrient survey to assess both the prevalence of the deficiencies and status of current control interventions. Data collection is complete and the final report of survey results is expected to be available in April 1999. The survey has for the first time validated and standardized new rapid assessment tools such as blood spot assessment of serum retinol, urinary iodine assessment by the Hitachi method and palpation for IDD using ultrasonography.

The MI has helped develop a comprehensive salt monitoring system in the country in collaboration with the Ministry of Health and the Salt Trading Corporation. This system combines entry level testing along the Indian border with a school-based monitoring that focuses on the consumption of refined/crushed salt in the place of lumpy crystal salt that does not retain iodine. The feasibility of iodizing salt imported from Tibet is also being studied.

A food fortification assessment showed that cooking oil, sugar and noodles are three potential vehicles for vitamin A and iron. More detailed feasibility and acceptability studies are planned.

The MI is providing ongoing support to the Ministry of Health in intensifying antenatal supplementation activities to improve delivery systems and identify appropriate community-based support activities to create greater awareness and generate demand. The project focuses on training and orientation of female community health volunteers and traditional birth attendants. Alternative intervention regimens will also test for coverage and compliance.

Pakistan

The focus of MI support for the micronutrient fortification program has been:

- to revitalize Vitamin A fortification of vanaspati ghee (fat) and oils which has been legislated in 1965 but not closely monitored
- to initiate iron fortification of wheat flour on an experimental basis.

The project commenced with a situation analysis of the relevant industry sectors and key government agencies responsible for food production, regulation, quality control and health. The findings have been crucial in identifying constraints, issues and opportunities to expand the program.

MI co-sponsored a national consultative meeting on Vitamin A fortification of Vanaspati ghee and edible oil in December 1998. The meeting was attended by representatives of the manufactures, federal and provincial governments, NGOs and international agencies. It reviewed current practices, internal and external quality assurance and led to a number of recommendations including a plan of action for improving the current program.

A second meeting on iron fortification of wheat flour was organized in January with the Pakistan Flour Mills Association, federal and provincial government representatives. The meeting discussed opportunities for flour fortification, constraints and barriers. It led to the formulation of a plan of action for an experimental phase of flour fortification. A National Task Force on Food Fortification was launched with technical groups for specific fortification programs.

MI will continue to provide assistance for:

- upgrading quality assurance capacity of ghee and oil processors through training and education, regulation and promotion.
- implementation of the trial project for production and commercialization of fortified wheat flour
- Strengthening the micronutrient component of the National Nutrition Survey in collaboration with the National Institute of Health.

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*Activity Highlights***I**RON**Addressing Iron Deficiency Anemia: the global communications challenge****The demand pull.....**

MI in partnership with UNICEF, World Bank, ILSI and USAID is developing a communications strategy to promote effective interventions for iron. As one element in this exercise, a video is being prepared to highlight the adverse consequences of the deficiency, availability of cost effective solutions and successful experiences. The video is aimed at policy makers in government and private industry to focus and intensify control activities.

....and the supply push

As one element for moving in this direction, during 1999-2000 MI with CIDA assistance is providing 1 billion iron-folate tablets for pregnant women to be distributed through UNICEF.

Integrated report on micronutrient status

UNICEF, MI and Tulane University are in the process of bringing out an integrated report on current status of the three micronutrients, vitamin A, iron and iodine in developing countries. The report is based on new information made available by key organizations i.e. WHO, UNICEF, ICCIDD and other available sources. The integrated report is expected to be published by May 1999.

Developing Expert Consensus**Major issues in the control of iron deficiency**

An overview paper has been prepared by the MI jointly with UNICEF to describe the outstanding major issues in developing effective approaches for prevention and control of iron deficiency. The aim is to highlight

major common constraints to developing effective programs, and to suggest how these can be eliminated or minimized. Particular attention is paid to examining the current state of knowledge with respect to the significance of iron overload for iron deficiency control programs. The document concludes that there will be virtually no public health risks associated with the increased iron intake from a fortification program. The report has been externally reviewed by over 20 experts and finalized in light of the comments received. This publication is now available for distribution.

Anemia determinants

An expert consultation on determinants of anemia, hosted by the MI, was held in Ottawa in September 1997. 14 experts specializing in iron nutrition, epidemiology and parasitology attended. The objectives were to analyze evidence on the etiology of anemia including deficiencies of iron, folate, other micronutrients, malaria, intestinal parasites, schistosomiasis, etc., to determine the relative contribution of each to anemia in different regions and different age groups; to identify efficacious and effective interventions; to identify gaps in knowledge; and to identify the implications of the above for policies and programs relating particularly to the issue of integration. The importance of each determinant of anemia in each age/physiologic group should conceivably influence the mix of interventions appropriate for the target group. A matrix was developed to look at each determinant in each age/physiologic group with SubSaharan Africa used as an example. The participants also assessed the relative importance of each determinant for each age group. The report entitled "Expert Consultation on Anemia Determinants and Interventions" is now available.

Iron supplementation cross-project analysis

The MI contracted Drs. Beaton and McCabe to conduct a cross-project analysis of the absolute and relative efficacy of daily and intermittent (weekly or bi-weekly) iron supplementation for the control of iron deficiency anemia in developing countries. Data from 14 separate efficacy trials completed between 1994 and 1999 were used for the secondary analysis, representing three age/physiologic categories: childhood (5 studies), adolescence (5), and pregnancy (4). The draft report is currently under review and the final version should be available by mid-1999.

The Global Thrust for Food Fortification

The MI is working with cereal and food processors at the global, regional and national levels to facilitate the enrichment of widely consumed staple foods.

Selection of food vehicles

In developing a fortification program, one of the most common constraints encountered is the selection of appropriate food vehicles. MI and PATH Canada have developed Fortification Rapid Assessment Tool (FRAT) to help programmers make an informed and responsible decision regarding the development of a fortification intervention, and to design a fortification programme that will be both effective and safe as a public health intervention. FRAT has been designed to collect a minimum amount of data on food consumption of one or more foods under consideration as carriers for fortification among populations at risk of vitamin A deficiency. FRAT will now be implemented and field-tested with a local partner in up to four countries where there is interest in fortification, and where key information is lacking to select the most appropriate vehicles. As part of the fortification assessment, a market analysis will also be conducted to provide an overall perspective on production and distribution aspects of the potential food vehicles. The results of the fortification assessment will allow for the selection of the most appropriate food vehicles for fortification with vitamin A. It is expected that field-testing will result in advancement of fortification in the field-test sites, as well as recommendations to improve the guidelines and methodology. The Guidelines have now been field tested in 3 countries and will soon be published in English and Spanish.

Global directory of supplement and premix suppliers

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fortification of foods, supplements and in large, medium and small scale processing facilities. To compile this list, a questionnaire was prepared and widely distributed to over 700 companies and posted on the MI web-site. Copies of the directory are now available. The directory is also accessible through MI's Internet site.

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Double fortification of salt

The fortification of salt with iron as well as iodine is a strategy for overcoming both iron and iodine deficiencies that has been under development for the past few years, as a potentially efficacious and cost effective intervention. With support from the MI, a technology has been developed at the University of Toronto for the preparation of a salt fortified with iron and iodine in which dextrin encapsulates the iodine and prevents it from interacting with moisture and the iron.

A study of the acceptability of the salt in Ghanaian, Bangladesh and Guatemalan foods has been completed. The foods prepared with the salt have been as acceptable as those made with local and iodated salts, except for certain vegetable dishes such as plantain which darken when cooked with the salt. Encapsulation of the ferrous fumarate as well as the iodide or iodate is being tested to overcome the colour change. The study of the efficacy of the salt in improving iron and iodine status in mildly anemic women and their families at risk of both deficiencies in Ghana found the salt to be efficacious. It is expected that the technology will soon be applied on a commercial scale.

...where there is no food vehicle

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Given the positive results, MI decided to support another Cornell/TFNC study to test the efficacy of a similar beverage on nutritional parameters in Tanzanian women during pregnancy and post-partum. The project is scheduled to begin early 1999.

Focus on Flour Fortification

Latin America

MI is working with Association of Latin American Millers (ALIM) to expand flour fortification in the region. Spanish and English versions of the MI brochure "Be a Leader: fortify the nation" have been well received.

Middle East and North Africa

A second regional workshop on Fortification of Flour in the North African and Middle Eastern region cosponsored by WHO, UNICEF and MI was held in Beirut, Lebanon in July 1998. The Workshop attended by government representatives and millers from 15 countries was a follow-up activity to an earlier meeting held in Muscat Oman in October 1996. The workshop concluded that flour fortification with iron and other micronutrients represented a major opportunity to alleviate micronutrient deficiencies in the region. The workshop made specific recommendations on standards for fortified flour, quality control, regulation and program implementation. MI has offered a sum of \$ 1 million to create a regional fund to be administered jointly by WHO, UNICEF and MI and provide technical and financial support for countries interested to move forward on flour fortification.

China

The MI and the International Life Sciences Institute (ILSI) co-sponsored a workshop on micronutrient fortification at the Chinese Academy of Preventive Medicine in Beijing. Soy sauce has been identified as an appropriate vehicle for iron fortification. Market studies and technology development are in progress.

Africa (maize flour)

MI is working to assist with the fortification of maize flour in small mills. Appropriate technology involving hand operated mixers for use at the mills have been developed and are being tested for application in Zambia. The National Food and Nutrition Commission

and the National Council for Scientific research in Zambia, the MI, and UNICEF are working together to design a pilot project to design and test a scheme for the fortification with micronutrients of maize milled using hammer mills. This will include the selection of an appropriate premix and packaging, a blending method, and the design and implementation of an education/promotion campaign. In March 1998, in Ottawa, Canada MI tested three inexpensive hand-operated blenders. The blending technology was successfully demonstrated and other premix-related issues (such as colour, taste, texture, affordability, and distribution of the fortified product) will need to be addressed in specific country situations.

Technical manual on food fortification

The MI in collaboration with OMNI/USAID is developing a 3-volume technical manual on flour fortification. The document will outline milling practices, fortification procedures, selection of fortificants, equipment requirements, quality control procedures and program development. The manual is expected to be available by mid-1999.

Food Aid Fortification

Nutritional quality of relief foods

A workshop on "Enhancing the nutritional quality of relief foods" will be held in Washington DC on April 28-30, 1999. The workshop objectives are to exchange information on current practices, and to compare operational approaches, in enhancing the nutritional quality (especially micronutrient) of relief foods, and; to expose participants to the technical options and the related needs for fortifying relief foods, and to other methods that can increase the quality of diets and reduce nutrient losses in relief situations. The workshop is being organized by Food Aid Management, the Congressional Hunger Center, the American Red Cross, the MI and USAID.

Reaching consensus on key technical issues to prevent iron deficiency:

In October 1998 a technical workshop to reach consensus on issues that can accelerate and expand national programs for the prevention of iron deficiency was held at UNICEF headquarters in New York. The workshop, organized by UNICEF, UNU, MI and WHO, was a collaborative effort designed to bring together experienced international health workers and eminent scientists to address the major issues constraining stronger advocacy and accelerated planning and implementation of programs to prevent iron deficiency. Strategies for prevention and control including dietary behaviour, food fortification, oral supplementation, and control of infections that contribute to anemia were all discussed. A series of

consensus statements on these issues and strategies were developed and endorsed by the participants, and the workshop document "Preventing iron deficiency in women and children: Consensus on key technical issues" is expected to be ready for widespread distribution in April 1999. (To be available from UNU and MI.)

Operational Research

Alternative interventions for the control of anemia-Zanzibar

The MI is funding this collaborative project along with WHO, Ministry of Health, Zanzibar, and Johns Hopkins University to compare the efficacy and side effects of weekly and daily school-based iron supplementation regimes in conjunction with anthelmintics, to assess the impact of weekly and daily iron supplementation on growth, cognition and school performance, and to compare coverage with anthelmintic chemotherapy through school-based delivery versus a school-based extended program. The two year project began in January 1998.

Economic consequences of iron deficiency

The MI has commissioned the preparation of a paper examining the evidence for a causal relationship between iron deficiency and a variety of functional consequences with economic implications (motor and mental impairment in children, low work productivity in adults, poor pregnancy outcome, and health effects in children). In the paper, now completed, the effect has been quantified in economic terms. Several country examples have been used to illustrate the economic impact, and to argue for interventions based on potential benefits, and the monetary cost of prevention. The report entitled "Economic Consequences of Iron Deficiency" is now available from the MI.

Sharing the Knowledge

Micronutrient learning materials

Work is ongoing to produce computer-assisted interactive learning materials on micronutrient malnutrition aimed at students in undergraduate-level programs in the medical, health and nutrition sciences. The MI has contracted McMaster University in Canada to produce modules on iodine deficiency disorders, iron deficiency, and vitamin A deficiency. Working with partners in developing countries (Mahidol University, St. John's medical College in Bangalore, and the All-India institute of medical Sciences in New Delhi) the vitamin A module will soon be ready for field-testing. The modules will be available on CDROM and is expected to be ready for distribution to academic institutions in late-1999.

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*Activity Highlights***I**ODINE**The Salt 2000 Symposium**

Salt: Life Depends on it. That is the message of the international meeting of salt producers in the Hague, The Netherlands in May 2000 -- officially known as Salt 2000 -- that will bring together leading salt industry representatives from around the world. The symposium will discuss a wide range of scientific, operational and health-related issues in salt production.

The MI, UNICEF, PAMM and ICCIDD, along with the Salt 2000 organizing committee, have agreed to take the lead in highlighting the global success of salt iodization and the important role that the salt industry has played in this effort. To this effect, three main activities will occur:

Technical support and abstracts: MI and PAMM will coordinate the collection and presentation of abstracts on key issues, trends and experiences in salt iodization worldwide -- including salt production, processing, packaging, distribution and consumption.

Run-up meetings in the regions: Currently planned or upcoming meetings on salt or IDD will be used as run-up meetings to provide input and experiences from Asia, Africa, Latin America and Europe to the final Salt 2000 meeting.

Advocacy and communications: MI and UNICEF will produce educational materials and help in the development of key IDD-related messages. Specific materials to be produced over the next year are: a multi-media "State of the World's IDD" report, a video featuring global leaders speaking on IDD elimination, and media and educational kits. Carol Bellamy, Executive Director of UNICEF, will deliver the opening remarks at Salt 2000.

Expanding and Strengthening Programs**Stability of iodine in salt**

Under contract with the MI, the University of Toronto conducted studies to determine the stability of iodine in salt under various environmental, packaging and storage conditions. The results have formed the basis for recent WHO/UNICEF/ICCIDD recommendations on iodine levels in salt. The study has also recommended appropriate packaging to ensure iodine retention under adverse environmental conditions. The findings and recommendations of the stability study are now published in two separate papers in the Food and Nutrition Bulletin (1998).

Quality assurance, monitoring and enforcement for salt iodization programs

MI provided support to PAMM to organize a Regional Workshop on Quality Assurance, Monitoring and Enforcement of Iodization Programs in Malawi for 15 Sub-Saharan African countries in March 1998. Participants included representatives from a wide range of sectors including the salt industry, government ministries, standards bureaus and medical experts. The workshop reaffirmed the importance of multi-sectoral cooperation to ensure successful quality assurance for IDD programs and the need for communications, legislation, and regulation to ensure compliance. It stressed the importance of assistance to countries and especially salt producers to produce iodized salt to agreed upon standards and ensure that only salt meeting these standards are consumed by the entire population of African countries. Other critical needs identified were in building human capacity, information sharing among countries and establishment of reference laboratories.

Rapid test kits for iodized salt

MI in collaboration with PATH Canada, and the University of Toronto has developed new rapid test kits for the field detection of iodine in salt. The work involved the optimization of chemical test systems that are appropriate for testing iodized salt in the field. Separate kits have been developed for iodide and iodate. Furthermore, countries will be supplied with the instructions to make them locally. The developed kits have been validated in India and Ecuador and the kits will be modified based on the suggestions received. The next steps are to package the kits in a form ready for field use and disseminate information for in-country production of the kits.

Iodized Salt Program Assessment Tool (ISPAT)

The MI, PAMM and ICCIDD in collaboration with USAID, UNICEF and WHO have produced this manual to assist government and national program managers to undertake a systematic assessment of their iodization salt programs to ensure program effectiveness and sustainability. The manual will be available shortly.

Global directory of supplement and premix suppliers

The MI has prepared a catalogue of major manufacturers of micronutrient premixes used in the fortification of foods, supplements and in large, medium and small scale processing facilities. To compile this list, a questionnaire was prepared and widely distributed to over 700 companies and posted on the MI web-site. Copies of the directory are now available. The directory is also accessible through MI's Internet site.

Double fortification of salt

The fortification of salt with iron as well as iodine is a strategy for overcoming both iron and iodine deficiencies that has been under development for the past few years, as a potentially efficacious and cost effective intervention. With support from the MI, a technology has been developed at the University of Toronto for the preparation of a salt fortified with iron and iodine in which dextrin encapsulates the iodine and prevents it from interacting with moisture and the iron. (A separate Activity Highlight has been prepared to describe the success of this project.)

Procurement of Supplements and Premixes

The MI has been assisting agencies such as World Food Program in the procurement of vitamin A and iron supplements and fortification premixes. In this process the MI has gathered information on product

specification used by various agencies, potential suppliers and their products lines, standards which these classes of products must meet and product price information.

Water iodination

A review of the effectiveness and application of water iodination in different country settings was carried out by ICCIDD in collaboration with WHO, and funding from the MI. Water iodination as a means to overcome iodine deficiency disorders may be an important technology for those areas unreachable by way of universal salt iodization. However, there is some question as to cost and sustainability. The review focuses on issues related to program operations and implementation. A report is now available.

Simplified method for monitoring urinary iodine

Technology developments to enhance efforts toward the virtual elimination of micronutrient deficiencies including iodine deficiency disorders (IDD) is one of the key focus areas of work in the MI. Although major progress has been made toward universal salt iodization in many countries, the tools for monitoring the impact of salt iodization remain a weak point in most country programs. Urinary iodine is well accepted as the indicator of choice for monitoring the iodine status of populations, yet the current method is somewhat noxious, requires importation of certain reagents and a spectrophotometer. A faster method would be time and cost effective. The MI has supported ICCIDD to develop a simplified method for assessing urinary iodine at the field level. The semi-quantitative method is based on the standard reduction technique but uses a color indicator rather than a spectrophotometer, and is performed in batches with comparison to standards rather than by assay and recording of individual samples. These and other modifications will lead to a safer, cheaper, faster and more field-applicable assessment of a populations iodine status. The results of this study will be available by mid-September 1999.

Communicating the Message and Sharing the Knowledge**Russian and French translation**

The MI supported the translation of the Monitoring of Universal Salt Iodization Programmes (1995) and Salt Iodization for the Elimination of Iodine Deficiency (1995) manuals into Russian. Copies are available through the ICCIDD Office for East Europe and

Central Asia. The French versions of the manuals as well as the Spanish version of "Monitoring Universal Salt Iodization Programs" are being translated and printed with the support of the Dutch government by the International Agricultural Centre (IAC) and will be available shortly.

Micronutrient learning materials

Work is ongoing to produce computer-assisted interactive learning materials on micronutrient malnutrition aimed at students in undergraduate-level programs in the medical, health and nutrition sciences. The MI has contracted McMaster University in Canada to produce modules on iodine deficiency disorders, iron deficiency, and vitamin A deficiency. Working with partners in developing countries (Mahidol University, St. John's medical College in Bangalore, and the All-India institute of medical Sciences in New Delhi) the vitamin A module will soon be ready for field-testing. The modules will be available on CDROM and is expected to be ready for distribution to academic institutions in late-1999.

Ending Iodine Deficiency, Now and Forever: A Communication Guide (1997).

The MI has supported publication of this communication guide which describes the process of forming alliances with various elements of society having a role in eliminating IDD. The guide also recommends the social mobilization approach to manage the communication aspects of programs that aim to establish and sustain the use of iodized salt. Copies of this document written by Jack C.S. Ling and Cynthia Reader-Wilstein of ICCIDD are now available in English. MI has recently agreed to fund translation of the guide into Arabic, Chinese, French, Portuguese Russian and Spanish. It is expected that these language versions will be ready mid- 1999.

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The Micronutrient Initiative

 *Activity Highlight***D**OUBLE FORTIFICATION OF SALT*Announcing A Major Breakthrough...*

After five years of research and testing at the University of Toronto and field studies in Ghana, Bangladesh and Guatemala, the Micronutrient Initiative is pleased to announce the successful development of a stable iron and iodine fortified salt that is acceptable to consumers and shown to be efficacious in maintaining iron status in women and children among populations with high prevalence of iron deficiency anemia. Field studies indicate that foods prepared with double fortified salt are as accepted as those made with local salt.

Why double fortified salt?

One of the preventable tragedies in the world today is micronutrient malnutrition. Affecting more than one third of the world's population, micronutrient malnutrition results from the deficiency of minute quantities of vitamins and minerals in diet. Two key micronutrients: iron and iodine are present in inadequate quantities in the diet of more than a billion people in developing countries. In the bid to reach micronutrients to large undernourished and impoverished populations around the world, the availability of a suitable food vehicle has always posed a challenge. In most countries there are only a handful of staple foods: cereals, oils, sugar and salt that are widely consumed and available for central processing to be fortified with nutrients. For this very reason the only true example of a food that is globally fortified is salt. Within a span of a decade a major proportion of the world's salt has been iodized. In many remote parts of the world salt is the only food that comes in from outside. All other foods are locally grown and consumed. Salt was therefore chosen as a suitable vehicle for double fortification with both iodine and iron considering the global success achieved with salt iodization.

The idea of adding both iron and iodine to salt is not a new one. The challenge has been to prevent the loss of nutrients when these two micronutrients are combined and added to

salt. Moreover, the varying qualities of salt consumed and packaging and storage conditions enhance the challenge.

How was double fortified salt produced?

Double fortified salt (DFS) is high-purity, dry table salt fortified with ferrous fumarate and encapsulated potassium iodate. The iodate is encapsulated with dextrin using a spray-drying technique. Encapsulated fumarate is commercially available. The coating prevents the iodine and iron from interacting with one another or coming into contact with moisture in the salt. The premix containing iron and iodine is then mixed into salt in dry condition at a specified rate. Water resistant packaging is critical to ensure the stability of the nutrients. MI is working with the University of Toronto to simplify the technology and make it more robust to work with inferior quality salts and packaging. The salt has passed tests on at least four counts:

Stability: Over one year of storage under different temperature and humidity conditions, the salt has been shown to be stable with a very mild coloration that has not been found objectionable in consumer acceptability tests.

Consumer Acceptability: A study designed to test the acceptability of the salt in Bangladeshi, Ghanaian and Guatemalan foods concluded that foods prepared with the salt were as acceptable as those made with local and iodized salts. The only exceptions were certain vegetable dishes such as those made with plantain which darkened when cooked with the double fortified salt. Encapsulation of the ferrous fumarate is expected to overcome this problem.

Efficacy: A double-blind placebo-controlled study was conducted in Ghana to test the efficacy of the double fortified salt in preventing anemia and IDD in mildly anemic women and their families. The use of DFS proved to be as efficacious as a weekly iron supplement in preventing anemia in women. DFS also prevented and alleviated anemia in children and iodine deficiency in both women and children.

Production feasibility: Premix production tests in Guelph, Canada have shown that centralized premix production can be organized in most countries and then distributed to individual salt producers. The success of this test has prompted efforts to simplify technology, to allow for its transfer and use in developing countries. The goal is to simplify the technology so as to enable centralized facilities in developing countries to manufacture a premix which could then be distributed to local salt suppliers to be mixed with local salt. This phase is currently in progress and once complete, the technology will be applied on a commercial scale.

Next steps: MI is prepared to offer to governments and salt industries around the world the following assistance in a phased manner.

- An assessment of salt production and packaging to determine the feasibility of double fortification and recommend additional processing and investment to enable fortification
- Provision of limited quantities of premix from the Guelph Food Technology Centre facility to enable pilot production testing and stability studies.
- Technical information to enable local production of premix
- Production and quality assurance guidelines

***Double fortified salt...
One intervention
controlling
two problems***

What Would Double Fortified Salt Cost?

The cost of adding iron and encapsulants would be approximately 2-3 cents per kg of salt. When this is applied to a well-packaged refined salt that retails at anywhere between 20-50 cents/kg, the additional cost would be marginal. Applied to unrefined salt in low-quality packaging that retails at 5-7 cents/kg, the minimum additional processing and packaging cost would be 10-15 cents/kg over and above fortification cost. However this would still imply anywhere in the range of 15-75 cents per person per year (depending upon the extent of additional processing and packaging required) - a bargain that delivers iron and iodine to large populations on a continuous, self-sustaining basis.

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*Activity Highlight***S** MALL SCALE MILL FORTIFICATION**BACKGROUND**

In recent years, attention has increasingly turned to finding ways to fortify staple foods consumed by populations who are not only very poor, but also most vulnerable to micronutrient deficiency disorders. People in this target group usually live in rural areas often consume mainly the foods that they grow, e.g., in several sub-Saharan countries, people grow maize, which they get ground to a flour-like meal in local hammer mills. The maize meal is typically consumed as a lightly cooked porridge, often without vegetables or meat meaning the diet is lacking most of the basic micronutrients.

In response to a request from UNICEF Zambia in 1995, the MI studied hammer mill conditions and operating practices in Zambia to suggest ways to fortify maize meal with a premix consisting of one or more micronutrients.

The study concluded that fortification is feasible within the poor infrastructure of small maize mills in Zambia. The process consists of adding a micronutrient premix powder to maize meal (both materials to have similar consistency) at a hammer mill using inexpensive hand-operated blending equipment.

BLENDING TECHNIQUES

The development and testing of technologies for fortifying maize meal was performed in Ottawa, Canada, using maize meal milled in a hammer mill and a premix powder containing reduced iron, vitamin A and other minerals. The premix was added at the rate of 25 g per 100 kg of maize meal. Samples of blended maize meal were taken at intervals of 1, 3, 5 and 10 minutes and the concentration was analyzed for reduced iron. The analysis results were assessed using statistical and

other methods to determine the mixing efficacy of each method.

Among the blending methods tested, the following showed the most promise:

- (1) Hand-Operated stainless steel blender, with 20 kg capacity. This equipment is being used to blend common salt and potassium iodate in many developing countries.
- (2) An 'ODJOB' mixing pail (a commercial product designed for mixing up to 60 kg of cement in a 25 litre plastic pail, having integral wall baffles designed to assist mixing). The premix is blended into the maize meal inside the pail once the lid is fastened and the sealed pail is rolled within arm's reach, back and forth on the floor.

The blenders range in cost and sophistication from the US\$ 950 stainless steel ribbon blender (HOB), originally developed for iodizing common salt, to the ODJOB costing US\$10-12 each. Preliminary assays of the premix-maize meal blends suggest that satisfactory mixing can be achieved in 3 to 5 minutes using the Hand-Operated Blender or the ODJOB.

CURRENT STATUS

Details of the mixing technologies and lab results have been conveyed to Zambia's National Food & Nutrition Commission (ZNFNC), and many interested parties (CARE, Oxfam, World Vision, WFP).

The MI is now supporting field tests by ZNFNC in Lusaka using both blenders at six hammer mills, to gauge consumer acceptance of the blenders, premix and the concept of fortification.

The premix, manufactured in Canada, has already been introduced to Zambia by the World Food Program.

Independently, CARE Zimbabwe is also hoping to soon start testing the ODJOB to fortify maize meal at up to 60 hammer mills being purchased and installed for the benefit of rural women's co-operatives.

NEXT STEPS

Now that the blending technology has been successfully demonstrated, other premix related issues of colour, taste, texture, affordability, distribution, packaging, consumer acceptance, and education of consumers and mill operators need to be addressed. Similar trials may occur in other countries through NGOs such as World Vision and the Aga Khan Foundation.

A common issue to all of these trials will be the social marketing methods employed and tested to encourage local consumers to accept this type of fortification on a sustainable basis, given that the benefits of the micronutrients may not be readily visible. Premix sourcing, pricing, dilution, packaging and distribution also represents a major challenge for fortification which is conducted on this scale and targetted at consumers with very little disposable income. Where possible, the MI is encouraging complementary introduction of regulations permitting fortification, proper quality assurance practices, and fortification by large mills.

If you or your agency are interested in these efforts to explore the feasibility of fortifying maize milled at a small scale, the MI would be pleased to hear from you and to share pertinent details.

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