Improving nutrition of women and children: the **MICAH** program

A MICRONUTRIENT AND HEALTH PROGRAM FOR AFRICA

Final Program Report: 2006

A collaborative effort of:

Canadian International Development Agency | Agence canadienne de développement international

Canada

World Vision

Acknowledgement

Many different people and organizations have added value to the Micronutrient and Health (MICAH) program. Its success is a direct result of sharing experiences and true teamwork. The nutrition and health team at World Vision (WV) Canada was privileged to work with so many gifted and hard-working people. The collaboration of many different actors, WV and partner staff, government ministry staff, local leaders, and volunteers contributed to reduce the "hidden hunger" of micronutrient deficiencies. The cooperation of the Canadian International Development Agency (CIDA), WV Canada, Ethiopia, Ghana, Malawi, Sénégal, Tanzania, program managers, partners, MICAH staff, extension agents, and volunteers in the implementation of the many MICAH interventions is the real reason we have so much success to share.

Especially important to mention are the community members who generously gave of their precious time; without their interaction and support, MICAH would not have observed these impressive results.

We thank you all very much.

– WVC Nutrition and Health Team, December 2006

Note to the reader:
This report describes the MICAH program and the impact observed over the two phases. Summary information is provided as well as detailed country-specific results. Figures are included to help visualize the information. Where statistical difference ($p<0.05$) between two groups (either over time or with the non-MICAH (NM) 'control' population) was observed, this is indicated by these following symbols:

* difference between MICAH 1996/7 & 2004

^ difference between MICAH 2000 & 2004

\+ difference between MICAH 2004 & Non-MICAH 2004

"MICAH's success and impact is better than any of our other extension activities. MICAH's activities have brought about a lot of sustainable changes, at least in the agricultural sector."

– Ambachew Bantideru, extension team leader, Ethiopia

Contents

Executive Summary

The MICronutrient and Health (MICAH) Program contributed to improved quality of life of women and children in five African nations over a 10-year period between 1996 and 2005. The program was conducted in two phases, funded by the Canadian International Development Agency (CIDA), managed by World Vision Canada (WVC) and implemented by World Vision offices in Ethiopia, Ghana, Malawi, Sénégal and Tanzania. The problem of micronutrient deficiencies (vitamin A, iron and iodine) was addressed through integrated strategies and direct interventions that resulted in measurable positive effects. Quantitative and qualitative program results affirm the contribution of MICAH's achievements towards the Millennium Development Goals, and global nutrition and health targets. As Phase 1 results (1995-2001) have been reported previously, this report will focus on the results of Phase 2 (2002-2005), with some reference to overall program impact.

Working in close cooperation with government, non-government organizations (NGOs), and communities, MICAH built on existing delivery systems within ministries of health, education and agriculture, equipping them to strengthen the coverage and quality of their mandated activities. The foundation for a self-sustaining nutrition and health infrastructure was laid, by empowering communities to take ownership for program activities within their grasp: exclusive breastfeeding, capacity building of community health workers in nutrition and health, establishment of household gardens and revolving funds, and latrine construction.

MICAH also provided education to local populations about the importance of health and nutrition. Thousands of community health workers and volunteers were trained while program staff were equipped with skills to monitor and evaluate the program, gathering valuable information to assess its impact.

The following report highlights program achievements and the benchmarks achieved by MICAH's various interventions. It outlines how the MICAH project coordinating offices worked in concert with their partners on the ground to deliver program activities. Results from three surveys – baseline (1996/7), follow-up (2000) and final (2004/6) – show the program's progress and impact of interventions. Finally, the report summarizes the lessons learned and recommendations to improve the impact of similar programs in the future.

"We can mobilize our community for self-sufficiency. We cannot rely on external aid indefinitely."

– Markos Chomba, Ethiopia

Global Nutrition/Health Targets

Millennium Development Goals

By 2015 Eradicate extreme poverty and hunger – Halve the proportion of people living on less than a dollar a day and those who suffer from hunger.

By 2015 Achieve universal primary education – Ensure that all boys and girls complete primary school.

By 2015 Promote gender equality and empower women – Eliminate gender disparities in primary and secondary education.

By 2015 Reduce child mortality – Reduce by two-thirds the mortality rate among children under five.

By 2015 Improve maternal health – Reduce by three-quarters the ratio of women dying in childbirth.

By 2015 Combat HIV/AIDS, malaria and other diseases.

By 2015 Ensure environmental sustainability.

By 2015 Develop a global partnership for development.

World Summit for Children Goals

By 2020 Eliminate hunger and reduce all forms of malnutrition.

By 2020 Percentage of children under five years of age who are stunted will be less than 20%.

By 2020 Iron-deficiency anemia in women and children will be reduced by one-third of 1990 levels.

By 2020 Iodine deficiency disorders will be virtually eliminated.

By 2020 Vitamin A deficiency and its consequences, including blindness, will be virtually eliminated.

By 2020 All women will be empowered to exclusively breastfeed their children for six months.

By 2020 Incidence of diarrhea will be reduced by 50%.

By 2020 Clean water and sanitation facilities will be available to all.

By 2020 Malaria diseases will be reduced by 50%.

By 2020 Knowledge and supporting services to increase food production will be disseminated to ensure household food security.

By 2020 Growth promotion and its regular monitoring will be institutionalized in all countries.

> *Community health workers in Ghana prepare to distribute iron supplements.*

"It is no longer a question of treating severe deficiency in individuals. It is a question of reaching out to whole populations to protect them against the devastating consequences of even moderate forms of vitamin and mineral deficiency."

– Carol Bellamy, Executive Director, UNICEF

MICAH's Impact: Achieving Global Nutrition & Health Targets

The MICAH program's accomplishments from 1996-2005 demonstrate a significant contribution to achieving global nutrition and health targets[1], re-affirmed in May 2002 by the General Assembly of the United Nations. They also represent measured progress toward achieving the broader international Millennium Development Goals, such as decreasing hunger, malaria and child and maternal mortality.

Target: Vitamin A deficiency (VAD) and its consequences, including blindness, will be virtually eliminated (by 2020)

- In Ethiopian preschoolers, the prevalence of Bitot's spots decreased from 6.4% to 0%, while vitamin A coverage (VAC) increased from 9% to 70%
- In Ghana, mothers with low levels of vitamin A in their breast milk decreased from 24% to 9%, while VAC coverage increased from 13% to 65%

Target: Iron-deficiency anemia (IDA) in women and children will be reduced by one-third of 1990 levels (by 2020)

- In Ghana, the prevalence of anemia was reduced by over half of 1997 levels among women (43% to 18%) and children under five (75% to 31%)
- In Sénégal, anemia decreased in pregnant women from 81% to 65% and among preschoolers from 85% to 69%, while iron tablet supplementation coverage increased from almost 5% to 72% for pregnant women and from 0% to 16% among preschoolers
- In Tanzania, the prevalence of anemia was reduced by 29% among women (72% to 51%)
- Small-scale fortification of maize flour with iron and other micronutrients expanded to 45 community mills in Tanzania, 19 in Malawi and 2 in Sénégal

Target: Iodine deficiency disorders (IDD) will be virtually eliminated (by 2020)

- In Malawi, the prevalence of goiter decreased from 19% to 4%, and IDD based on urinary iodine levels decreased from 16% to <1%
- In Ghana, use of iodized salt increased from 38% to 63%
- The proportion of Sénégalese children 6-12 years old with low urinary iodine was reduced from 41% to 32% while the consumption of iodized salt among households increased from 30% to 79%

Target: Percentage of children under five years of age who are stunted will be less than 20% (by 2020)

- In Tanzania, the prevalence of stunting among children under five decreased from 43% to 28%
- In Malawi, stunting among children under five decreased from 56% to 40%
- In Ghana, stunting among children under five decreased from 25% to 21%
- In Sénégal, the prevalence of stunting among children under five decreased from 36% to 25%

[1] World Summit for Children and Health for All in the 21st Century

Target: Incidence of diarrhea will be reduced by 50% (by 2020)
- In Ethiopia, the prevalence of intestinal parasite infections such as ascariasis decreased from 19% to 1%
- More than 840,000 children received de-worming medication across all countries
- 29,325 children U5 received deworming medication

Target: Malaria diseases will be reduced by 50% (by 2020)
- Malaria in children under five was reduced by 60% (33% to 13%) in Malawi and by 55% in Ghana (18% to 8%)
- More than 130,000 insecticide-treated bed nets (ITNs) were distributed across all countries
- In Sénégalese preschoolers, the malaria rate was reduced 54% (11% to 5%) while the level of utilization of bednets nearly tripled (from 10% to 28%). A total of 19,596 ITNs were distributed.

Target: All women will be empowered to exclusively breastfeed their children for six months (by 2020)
- Women exclusively breastfeeding for six months increased from 15% to 70% in Malawi and from 17% to 49% in Ghana
- Women exclusively breastfeeding for 6 months tripled from 7% to 22% in Sénégal

Target: Knowledge and supporting services to increase food production will be disseminated to ensure household food security (by 2020)
- Over 60,000 new backyard gardens increased household nutrition security
- Over 1.1 million fruit trees planted
- In Malawi, over 30% more households have small livestock – MICAH distributed over 36,000 animals
- In Sénégal, 5,524 fruit trees were planted, and 754 animals distributed

Target: Clean water and sanitation facilities will be available to all (by 2020)
- In Tanzania, access to protected water improved from 39% to 47% and in Malawi, access to sanitary facilities (latrines) improved from 49% to 94%

Target: Building global and national commitment and capacity to invest in nutrition (by 2015)
- Malawi's National Micronutrient Plan of Action development and implementation utilized MICAH best practices. MICAH experiences have also influenced the development of the School Health and Nutrition Program to provide de-worming for school children, vitamin A supplementation, water and sanitation at all schools.
- In Ghana, MICAH staff served on the National Task Force to develop an anemia control strategy. Results from MICAH influenced the incorporation of iron supplementation to preschool and school-age children in the strategy.
- In Sénégal, the success of the Hearth Positive Deviance project, which rehabilitates undernourished children at the community level, has influenced the national level planning. Future plans of action of the Ministère de la Santé et de la Prévention Médicale will include Hearth.

World Vision Canada – along with our partners in Ethiopia, Ghana, Malawi, Sénégal and Tanzania – is proud to present the Final Report of the MICAH (Micronutrient and Health) Program for Africa. This summary report sets out the key results, findings, successes and challenges of the initiative. We hope its lessons will contribute to the success of future programs.

Background

In 1994, a World Bank study concluded that millions of lives could be saved in developing countries by eliminating vitamin and mineral malnutrition. Dialogue among WVC, WV Africa partners and CIDA took place in late 1995 regarding the opportunity for a large-scale, multi-country nutrition program in Africa, and in 1996, the Micronutrient and Health (MICAH) program was born. Its mission was straightforward: Use integrated health and nutrition interventions to reduce micronutrient deficiencies among society's most vulnerable members – children under five, and women of child-bearing age. With funding from CIDA, five African nations were targeted – Ethiopia, Ghana, Malawi, Sénégal, and Tanzania.

In the last decade, MICAH helped combat iron, vitamin A and iodine deficiencies in thousands of people through a combination of integrated strategies and by working in close cooperation with other NGOs, educational institutions, line ministries and local populations. Of all initiatives for developing countries, a 2006 World Bank report determined that "direct investments in nutrition have the potential to improve nutrition outcomes much faster than economic growth alone can… and because nutrition programs are fairly inexpensive and increase productivity and growth, their benefit-cost ratios can be as high as 200:1." At the end of the program, MICAH communities, in many cases using their own resources, have the foundation to build a brighter, healthier and self-sustainable future. Given the encouraging impact shown by the MICAH program, it is hoped that there will be continued investment in nutrition programming.

Note: Sénégal's MICAH program was implemented in a new site in Phase 2 and received an extension for an additional year. Its results show changes from baseline in 2003 to final in 2006.

"The control of vitamin and mineral deficiencies is one of the most extraordinary development-related scientific advances of recent years. Probably no other technology available today offers as large an opportunity to improve lives and accelerate development at such low cost and in such a short time."

– The World Bank

> Child receives an oral dose of vitamin A.

Why Micronutrients?

- A staggering one-third of people on earth are affected by micronutrient malnutrition.
- The impact of micronutrient deficiencies on a country's productivity is huge, costing some countries more than 5% of their GNP in lost lives, disability and productivity.
- Women and children are the most vulnerable to micronutrient deficiencies because of their increased nutrient needs.
- Other health and food security interventions are less effective in reducing illness and death when micronutrient deficiencies prevail.

Consequences of Micronutrient Malnutrition

Vitamin A deficiency

- Increased deaths of children under five years
- Increased susceptibility to disease
- Night blindness and eventual total blindness

Iron-deficiency anemia

- Poor health
- Impaired intellectual capacity
- Low work capacity
- Premature death (especially for adolescent girls and women)

Iodine deficiency

- Low learning capacity and mental retardation
- Impaired growth
- Goiter

"The case for the elimination of vitamin and mineral deficiency is compelling beyond description. The return on investment is without equal."

– Rolf Carriere, Global Alliance for Improved Nutrition

Essential Components of MICAH's Achievements

Partnerships

MICAH's goal to raise the standards of nutrition and health for women and children could not have been accomplished without our partners. The cooperation and commitment of the international agencies, national governments, line ministries, hospitals and research institutes, the private sector, and the communities and volunteers who took part in MICAH made its achievements possible.

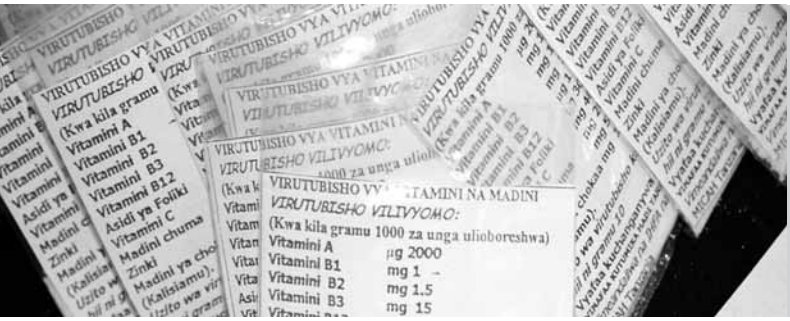
MICAH PARTNERS

CIDA – The Canadian International Development Agency provided $16.5 million in funding support from the Health and Nutrition Division for Phase 2 of MICAH. CIDA staff at Canadian and field offices visited MICAH projects and participated in capacity-building events, as well as evaluation activities.

World Vision (World Vision National Offices in Ethiopia, Ghana, Malawi, Sénégal and Tanzania) – The MICAH management team in each of these offices monitored program activities at the field level, and field staff ensured activities were implemented and tracked appropriately. Finance and nutrition program managers at World Vision Canada provided overall program management, and acted as a liaison between CIDA and implementing field partners.

Other NGOs – WV-Malawi and WV-Ethiopia acted as umbrella grant managers for some 16 local partners.[1] As such, the financial and geographic scope of these two country programs was the largest among the MICAH countries. They experienced both the rewards and challenges of working with multiple partner agencies.

[1] *Malawi:* Domasi Community Nutrition Project, Ekwendeni Mission Hospital, St. Gabriel's Mission Hospital, Agricultural District Development (4), Community Health Services Unit (2), WV-ADPs (4)
Ethiopia: CARE-Ethiopia, Canadian Physicians for Aid and Relief (CPAR), Feed the Children International, Food for the Hungry International, Kale Hiwot Church Development Program, WV-ADPs (11)



"With MICAH we are all working together – World Vision, different NGOs, the Ministry of Health, the Ministry of Agriculture."

– Bertha Chunda, World Vision Malawi

Government Ministries – MICAH closely collaborated with, and in some cases funded, Ministry of Health, Ministry of Education and Ministry of Agriculture activities. Line ministry staff were invited by World Vision to participate in MICAH activities from planning and implementation through to evaluation. This investment in partnership contributes program sustainability.

Communities – Community representatives at various levels from more than 40 project sites participated in MICAH as equal partners in program planning and design, implementation, monitoring and evaluation.

Universities and National Nutrition Institutions – Support from this sector, both in Canada and the various MICAH countries, included survey coordination, analysis of biochemical and other survey data, conducting evaluations, data analysis workshops, and other capacity-building activities of MICAH staff.

- MICAH Malawi partnered with Bunda College of Agriculture and the Malawi Bureau of Standards.
- MICAH Tanzania partnered with the Tanzania Food and Nutrition Centre and Sokoine University of Agriculture.
- MICAH Ghana partnered with University of Ghana (Noguchi Memorial Institute for Medical Research and Nutrition and Food Science Department).
- MICAH Ethiopia partnered with the Ethiopia Health and Nutrition Research Institute and Ethiopian Science and Technology Commission.
- MICAH Sénégal partnered with the National Food Technology Institute and the Université Cheikh Anta Diop.
- World Vision Canada partnered with the University of Guelph, McGill University and the University of Montreal.

"MICAH's emphasis on building the capacity of its partners has a cross-cutting effect on all partners' programs. When MICAH came into the picture, they (NGOs) started to come together and work jointly – just working hand-in-hand implementing the different activities as one NGO."

– Dr. Zewdie Wolde-Gebriel, MICAH Technical Advisor

Integrated Strategies

Goal: To improve the nutritional and health status of women and children through the most cost-effective and sustainable interventions.

OBJECTIVE	ACTIVITIES	OUTPUTS[1]
1 Increase intake and bioavailability of micronutrients (iron, iodine and vitamin A)	• Supplementation • Fortification • Exclusive breastfeeding • Dietary modification	**Vitamin A supplementation** • 2,034,671 vitamin A capsules distributed to children under 5 years • 2,042,105 vitamin A capsules distributed to school-age children • 93,497 vitamin A capsules distributed to postpartum women **Increased iron supplementation** • 91,619 preschool children supplemented with iron • 133,594 pregnant women supplemented with iron • 62,034 lactating women supplemented with iron • 67,175 women of child-bearing age supplemented with iron • 21,779 school-age children supplemented with iron **Increased dietary intake** • 64 community mills fortifying staple food (maize) • 60,837 new gardens created • 1,171,009 fruit trees planted • 45,058 small animals received
2 Reduce the prevalence of diseases that affect micronutrient status (diarrheal, parasitic and vaccine-preventable)	• Water and sanitation • Malaria control • Treatment for worms and parasites • Immunization	• 473 protected water points established • 35,437 latrines constructed • 152,935 insecticide-treated bed nets distributed • 855,668 children de-wormed • 90,828 children treated for schistosomiasis
3 Build local capacity for delivery systems to improve micronutrient status	• Equip labs • Distribute MICAH Guide • Train staff • Influence national policy or compliance to policy	• 36,104 staff and volunteers trained • 501 media messages disseminated • Over 18,860 education sessions provided • MICAH results shared at international fora • 7 micro-enterprise initiatives supported

[1] Achieved by MICAH in collaboration with government ministries and communities.

Cross-cutting strategies

The following cross-cutting themes were woven through each of the key strategic interventions to strengthen effectiveness and contribute to program sustainability.

Advocacy
Partners worked together to create awareness of, promote compliance with, or improve national nutrition strategies and policies.

Information, Education and Communication (IEC)
Each country reflected its individual cultural approach to disseminate messages on health and nutrition. Collectively, the approaches ranged from village-level drama and song to billboards, radio and television broadcasts.

Gender and Development
Training workshops on gender comprised an integral part of the program, fostering greater participation of women in community decision-making and increasing their control over household food security. Men were also encouraged to participate in program activities, with noteworthy increased involvement.

Environment
All partners conducted environmental assessments to ensure program inputs had no detrimental environmental impact. This enhanced their sensitivity toward the environmental issues affected by program interventions.

> *Household latrine, Ethiopia.*

> *Community billboard highlights vitamin A-rich foods.*

"The cross-cutting strategy of IEC that has been incorporated into the other strategies of MICAH has been very successful in bringing behavioural changes and increased awareness to the extent of developing skill and confidence of beneficiaries... where awareness has increased and skills developed, sustainability is sure."

– Qualitative survey, Ethiopia

Program Monitoring

Monitoring of program activities provided MICAH staff with opportunities to reinforce training, ensure quality implementation by partners and collect information on progress achieved. Using a Results-Based Management framework, staff worked with community volunteers and line ministry staff to gather information on a monthly and quarterly basis. This data was used to assess whether activities were achieving the desired results and to provide program managers with valuable input for refining strategies.

ETHIOPIA

Supervision/monitoring visits were routinely made at all levels of Ethiopia's MICAH projects. The program coordinating office and program partners conducted 86 visits to assess the implementation and progress of various initiatives. Throughout the year, activity reports and evaluation documents were reviewed, site visits made, and ongoing discussions held between MICAH staff and stakeholders. After every visit, copies of feedback reports were sent to the relevant ADPs and NGOs.

At the project level, MICAH facilitators conducted joint field visits and reviews with frontline personnel such as government health workers, community health workers, volunteers and school teachers to ensure implementation of activities was proceeding according to plan.

GHANA

Monitoring of MICAH Ghana improved in several ways in Phase 2 as the program team worked closely with Ghana Health Service and community health volunteers. Increased effectiveness was best illustrated by the heightened accuracy of data for iodized salt consumption after changing the method from school-based to house-to-house surveys. The team reinforced this effort by testing the quality of salt in markets as well.

To improve monitoring of compliance with iron supplementation, MICAH facilitators worked closely with community health volunteers to assess whether women and children were taking the supplements as prescribed. Throughout the program, monitoring information was shared with all stakeholders at quarterly district and sub-district meetings in an effort to improve implementation and build ownership.

Community members of all ages cooperated fully and were excited to participate in the MICAH program.

TANZANIA

At the district level, MICAH collaborated with government health facility staff to support outreach activities. Regular meetings provided a venue to discuss ways to further collaborate and share information. This ongoing dialogue with line ministries aimed to improve quality control, as discrepancies were observed with both under- and over-reporting. Monitoring included interviews with volunteer health workers and community members.

Regular visits to implementation sites were designed to motivate community volunteers and health staff. Support was provided to assist community-based organizations to self-manage. MICAH helped by training and following up with local committees; this capacity building and continued support enhances sustainability.

MALAWI

Regular meetings were conducted with government ministry and partner staff to share feedback and resolve issues. Training was provided and follow-up maintained to improve the capacity of field agents and staff. Regular community visits, including meetings with women and local leaders, provided management staff an opportunity to ensure quality implementation. Specific issues were dealt with using results-based management. For example, to obtain a more accurate estimate of de-worming coverage in Phase 2, the household listing register was introduced and utilized, to supplement data regarding the de-wormed child. As a result of this new system, household monitoring revealed the extent of infection and enabled appropriate follow-up.

To monitor the quality of the flour fortification project, the Malawi Bureau of Standards (MBS) and Chancellor College labs analyzed premix produced at the Domasi Fortification Unit. Each test found the Domasi premix to meet all MBS requirements; recommended levels of iron were found in the flour, and flour samples were free from contaminants.

SÉNÉGAL

Program monitoring was conducted regularly at all levels. Ministry of Health (MOH) staff visited the outreach sites on a monthly basis along with MICAH staff. Throughout these visits, support and motivation was provided to the health volunteers.

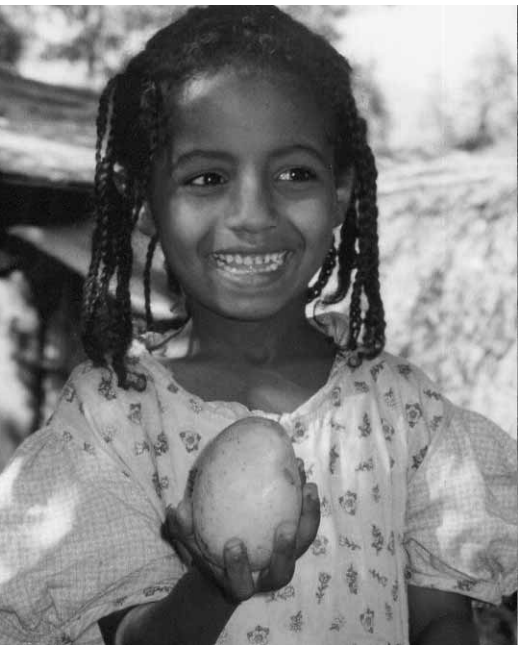
Monthly meetings between the MOH and non-governmental organizations (NGOs) were organized at the district level to coordinate activities and to maximize available resources. Action plans, results achieved and challenges encountered were shared and discussed.

The Food Technology Institute visited the communities where fortification was implemented, and flour was analyzed to verify fortification was carried out properly.

At the onset of the program, data collection forms were revised. On a quarterly basis, plans of action and budgets were reviewed to ensure appropriate implementation of activities. Reports relating the program progress, follow-up and consultant documents were shared with local stakeholders.

"We should think of preventive measures, as most of them are within our reach, rather than thinking of curative measures. A good example of this – instead of looking for outside support for de-worming drugs, it is better to teach our communities to construct latrines, to use clean water or boil water, keep our environment clean and practice personal hygiene… Instead of waiting for external assistance for vitamin A capsules, let us teach parents to feed themselves and their children vitamin-rich fruits and vegetables."

– School director, Ethiopia



Strengthening Health Systems

Building local capacity for delivery systems to improve micronutrient and health status ensures that progress will continue long after MICAH ends. Advocating for improved national policies, training line ministry staff and equipping facilities were core MICAH strategies to strengthen local and national health systems.

TANZANIA

MICAH conducted refresher training courses and workshops for frontline health-care workers in Tanzania throughout Phase 2. In all, the program supported the training of 48 health officials and public health committee members. Health workers at all levels received instruction on nutrition and growth monitoring, treatment of minor illnesses and control of diarrhea and malaria, and how to identify and prevent diseases that affect micronutrient status.

ETHIOPIA

In 2005, MICAH participated in the development of the Ethiopia National Nutrition Strategy. Under this initiative, Ethiopia established the priorities to be addressed in order to overcome the impending nutritional problems of the country. MICAH provided financial support for the first nationwide nutrition survey conducted by the Ethiopian Health and Nutrition Research Institute, as well as training for survey clinicians and transport for the survey teams. MICAH also gave logistical support to immunization campaigns (transportation, refrigerators, fuel, syringes, and immunization cards).

MALAWI

Malawi's future physicians from the University of Malawi's College of Medicine were involved in the MICAH program during the national mass treatment campaign for schistosomiasis. MICAH's influence helped change previous protocols to ensure this intervention included children from ages two and up (previous target group was six years and above). The project gave the medical students an opportunity to see first-hand the strong impact of these community health initiatives, as well as a greater understanding of the challenges they will face in their careers. Further, the presence of these doctors-in-training was a positive motivator for program staff as they disseminated their nutrition message.

As the primary suppliers of the household water supply, women benefited from MICAH's initiatives to improve access to protected water sources.

GHANA

The National Nutrition Unit of the Ghana Health Service incorporated learnings from MICAH Ghana into the development of policies to guide nutrition programming across the country. Of special note in Phase 2 was the launch of two government initiatives – the National Anemia Control Strategy and the Universal Iodized Salt Consumption Strategy – both of which had a positive impact on program areas. At the district level, MICAH provided equipment to the district hospital to monitor blood, urine and stool samples, as well as four fridges to enhance cold chain management in the sub-districts.

SÉNÉGAL

MICAH provided support to the MOH with interventions such as mass-campaigns, and inputs such as medicines and supplies. Initial stocks of drugs (fansidar, amodiaquine), iron/folic acid tablets, oral rehydration solution, growth curve charts and bed nets were provided to community health committees who distributed these through a revolving system to ensure continual supply.

The program trained staff on positive deviance, a sustainable community based intervention to rehabilitate undernourished children. Future plans of action of the MOH will implement positive deviance to rehabilitate malnourished children. On a regular basis, health volunteers received education on growth monitoring and treatment and prevention of major illnesses that could affect the nutritional status of women and children.

MICAH Sénégal influenced the Area Development Program (ADP) plans of action by providing support and funds for the implementation of health activities. It also influenced the district level MOH plans, which included positive deviance as one of the activities to implement.

> *In Ethiopia, MICAH staff were involved in supporting Ministry of Health priorities, such as growth monitoring of children. Here, a young child is being weighed to assess recent changes in growth.*

All countries emphasized the priority of improved household hygiene through education and simple environmental improvements, such as this latrine in Ghana.

Engaging Communities

To enhance both individual and community well-being, MICAH continued to engage communities and develop local capacity in Phase 2. MICAH focused on building critical skills, knowledge and resources to effectively address nutrition and health concerns in rural communities faced with a complex range of economic, social and environmental challenges.

ETHIOPIA

MICAH engaged communities in Ethiopia through music, dance and drama that spread the message of good nutrition and health. MICAH Days were held annually in most projects during Phase 2 to raise awareness and commitment of both communities and line ministries to strengthen and sustain program activities. Performances included role-playing, songs and poems to communicate the cause and effect of each of the three micronutrient deficiencies, as well as methods of prevention and control.

Another key community focus was the engagement of students in school nutrition clubs. During Phase 2, a total of 51,354 students participated in activities such as school gardens and disseminating nutrition information within the community. Drama groups also evolved out of these clubs and proved highly effective as they travelled to local communities, sharing the messages of good nutrition and micronutrient deficiencies. A high level of community enthusiasm and support was gathered for MICAH, particularly for activities that could easily be continued, such as school and home garden projects and maintaining the supply of iodized salt through revolving funds.

GHANA

Community volunteers were trained to lead the way in health, environmental and agricultural activities. MICAH worked with community health workers, trained in Phase 2, to deliver regular education sessions and active follow-up of children and women who would benefit from program activities.

A workshop on latrine construction gave MICAH villages much-needed expertise on environmental sanitation from among their own ranks. Volunteers from 19 communities were shown the theoretical and practical aspects of a new model of latrine construction, resulting in eight new latrines constructed during the training week. Residents of participating villages are now qualified to build these latrines.

TANZANIA

Tanzanian youth continued to be eager supporters of MICAH's objectives in Phase 2. Twenty-five school health clubs were formed, with members trained on the basics of good nutrition and environmental sanitation. Community groups were created to use entertainment to spread the word about the program and its key messages. Both bodies were mobilized by other World Vision Tanzania projects and NGOs to create awareness about HIV/AIDS and disease prevention. These MICAH-trained youth embody great potential for future community education.

MICAH Tanzania also worked with existing women's support groups to promote exclusive breastfeeding and appropriate child care practices. Active engagement resulted in a significant increase in the rate of exclusive breastfeeding for the first six months of a child's life.

"The approach of MICAH has been very good and successful… Training has changed cultural behaviours and eating practices. The MICAH villages will be taken as model villages."

– Villager, qualitative survey, Malawi

MALAWI

A stronger sense of local ownership emerged among residents of MICAH Malawi communities in Phase 2. Community revolving funds were established to re-supply the stock of medicine and insecticide-treated nets to fight malaria, and of small animals to increase women's and children's access to a regular food-based iron source. The establishment of these funds created an effective method of distribution, ensured accessibility and enhanced community commitment and confidence, thereby strengthening the project's sustainability.

The media was recruited in the campaign for better health. Radio messages on micronutrients, funded by the Ministry of Agriculture and Food Security, aired once a week on the Malawi National Radio. MICAH staff and agents were regular contributors to these broadcasts.

SÉNÉGAL

Through the functional health committees in charge of ensuring access to health services, the communities were engaged in the maintenance of their health and nutritional status.

The implementation of positive deviance was unique in terms of community involvement to rehabilitate the undernourished children using local knowledge and foods. Mothers and grandmothers actively participated in this activity.

Seven health volunteer groups created micro-enterprises, dedicated to improve the access to micronutrient rich foods such as iodized salt and red palm oil (rich in vitamin A) in their villages.

Small-scale fortification continues in three local mills as millers are now equipped to fortify flour. The high acceptance of fortification and the cost-recovery system will contribute to sustainability of small-scale fortification.

A high level of community enthusiasm and support was generated for MICAH, particularly for activities that could easily be continued, such as school and home garden projects and maintaining the supply of iodized salt through revolving funds.

> *Community members gather for a meeting held by MICAH.*

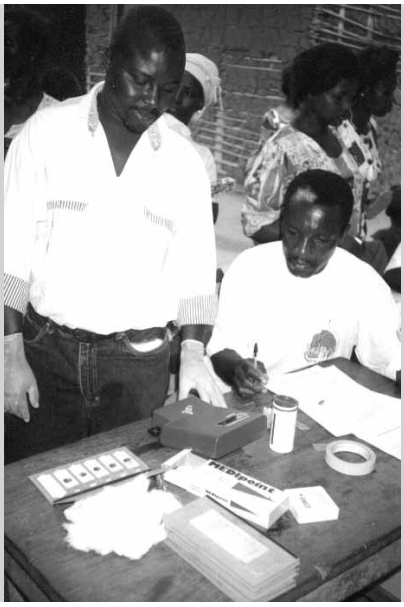
Measured Impact – Quantitative

Comprehensive Baseline, Follow-Up and Final Surveys
From start to finish, MICAH's positive impact on target communities and populations was well documented. Progress was recorded through a baseline survey (1996/97) of 10,250 households. A similar follow-up survey was repeated in 2000/01 among another 15,500 households to determine the impact of Phase 1, and to provide a basis to evaluate Phase 2. Final program surveys took place in 2004/05 among over 11,000 households to determine overall program impact since inception and measure changes in key indicators between follow-up (2000) and final (2004) surveys. In Sénégal, at baseline in 2003, 800 households were involved in the survey while at the final in 2006, 650 participated. In addition, a comparison was made between the baseline and final surveys. In order to strengthen the attribution of positive change to MICAH interventions, a sample of communities outside the MICAH catchment areas (non-MICAH or control) was included as a means of comparative study. The exception is Malawi where some non-MICAH areas actually had MICAH interventions in Phase 1. Key information was gathered through semi-structured interviews with communities and program partners. Survey teams also collected biochemical, clinical and anthropometric data.

Biochemical Tests
Changes in micronutrient status appear first in biochemical tests. By collecting and analyzing blood, breast milk and urine samples, staff can assess the program impact within target populations over a short period of time. The following tests were used to track program progress:

- Vitamin A – retinol levels in breast milk
- Iron – hemoglobin levels in blood
- Iodine – iodine levels in urine
- Parasites – in urine, stool and blood

> *Health staff assess hemoglobin levels with hemocue.*



"I never had data on the micronutrient situation in the district where I work. But from the baseline survey, the results we aggregated at the district level showed a real problem that needed immediate attention. I was fortunate to have MICAH in my district."

– Charles Kofi-Bah, Ministry of Health, Ghana

Clinical Assessments
Clinical examinations reveal the later stages of micronutrient deficiencies. Changes in statistics using this method are more noticeable over time – thus even small changes within a few years are significant. The following clinical examinations were made in the MICAH program:

- Vitamin A – examine eyes for Bitot's spots
- Iodine – examine throat for palpable or visible goiter
- Anthropometry – measure height and weight related to age

Functional Tests
Certain micronutrient deficiencies can also be detected through functional tests. Night blindness among young children was an important functional test used in the surveys to assess vitamin A deficiency in this target group. Mothers were asked whether or not their child was able to walk and see in the dark.

Household Questionnaire
To gather first-person data on the target populations, MICAH utilized the standard questionnaire developed at the inception of the program. This questionnaire was intended for use by health workers and community volunteers in house-to-house interviews. To enhance the accuracy of the data, the questionnaires were tested, translated, modified where necessary. Caregivers were queried on their knowledge, attitude and practice on topics such as feeding, causes of disease, micronutrient deficiencies and health care in general.

Benefits of Measuring Impact
While surveys constitute a critical tool for assessing baseline values for key indicators and the impact of interventions, MICAH partners identified other benefits of including this component in the program life-cycle.

- Improved national capacity
  In many cases, MICAH's provision of lab equipment and field-testing kits enabled national Ministry of Health staff to undertake more rapid assessments of micronutrient status. The repeated surveys provided an opportunity for health staff to put into practice new knowledge and refine skills of data collection and analysis.
- Prompted national research and policy
  The success of some key interventions within MICAH have been included in national policy – for example, iron supplementation to pre-school children in Malawi.
- Improved program design and implementation
  The 2000 survey indicated that while improvements in health and nutrition knowledge were apparent, continued education was required in Phase 2 to ensure sustained behaviour change.

  Baseline data indicated anemia was a severe public health problem in Malawi, Tanzania, Ghana and Sénégal. In Ethiopia, the issues were vitamin A and iodine deficiencies. Programs were targeted to address the micronutrient deficiencies specific to each country.

  The 2000 survey in Ethiopia indicated a significant decline in use of iodized salt (reflecting decreased availability of this commodity that was historically imported from Eritrea), corresponding with a significant rise in the prevalence of goiter. In Phase 2, the program emphasized IEC regarding Iodine Deficiency Disease, and distributed 10,500 quintals of iodized salt among program communities through cooperatives with the intent to continue the supply of iodized salt through revolving funds.

"The introduction of yellow-fleshed sweet potato in the villages has been very well accepted and is believed to be the reason for the reduction of vitamin A deficiency in our villages. Green pepper was the only vegetable we used to grow and consume in our villages, and it was seasonal and not appropriate to feed small children."

– Head of Rural Development Authority, Ethiopia

Measured Impact – Qualitative

To assess a project's impact, assessment of relevant data is needed, both quantitative and qualitative. The MICAH Guide provided the framework to monitor the program's impact quantitatively among the target communities and populations. Adhering to international standards, the guide also considered social, religious and cultural norms. With the support of various partners, including government, line ministries, NGOs, community program staff, and volunteers, this vital quantitative information was collected.

Qualitative information provides a different lens through which to view the success of the program. It offers the perspective of the community: beneficiaries, volunteers, health workers and others who were closely involved and tied to the program. Through focus groups and key informant interviews, their candid input was obtained. Feedback from these sources assisted program managers to adjust or revise plans as needed.

At the program's end, one of the qualitative indicators of interest is the degree to which MICAH has been integrated into World Vision programs, NGO partner programs, and line ministry planning. The country qualitative surveys provide insight regarding the degree to which this has taken place.

Integration of MICAH into WV programs, NGOs, government ministry planning

Close integration among MICAH's partners helped advance the program's long-term objectives and improve sustainability. The multi-sectoral approach also broadened the base of support for these programs to continue. Because of the success of the positive deviance, this intervention was considered in the national priorities in Sénégal. Close collaboration with community groups and leaders also enhanced continued positive behavioural changes initiated during the program.

WV programs and partner NGOs aim to sustain these key MICAH interventions:

- Revolving funds for insecticide-treated bed nets (ITNs), small animals, seeds, basic medications for malaria treatment
- Nutrition education and backyard gardens
- Fortification of foods; support from national fortification alliances, where WV is a partner
- Iron, vitamin A supplementation and de-worming to specific target groups (pregnant women in association with the Ministry of Health, and preschoolers in association with Unicef and WV, school children in association with the Ministry of Education and the World Bank)
- Water and sanitation
- Immunization
- Training on family planning and HIV/AIDS

The Ministries of Health and Agriculture plan to support (to varying degrees):

- Iron supplementation for pregnant women, with some countries providing this for lactating women as well
- Routine parasite treatment
- Irrigation
- Training on micronutrients
- Support for immunization
- Distribution of insecticide treated bed nets and provision of anti-malarial drugs
- Re-treatment of bed nets
- Growth monitoring and promotion
- Treatment of childhood illnesses (diarrhea, malaria, acute respiratory infection)
- Latrine construction
- Supportive supervision and community review meetings
- Educating community members on exclusive breastfeeding and proper feeding practices

The integration of multiple sectors within MICAH has facilitated dialogue and collaboration among government ministries (education, health, agriculture) within communities. The positive results of MICAH and the higher knowledge base of community members will enhance the continuation of this partnership. The training of many leaders and government staff provided through MICAH provides a good base from which these staff can continue to fulfill their duties and respond to the needs of the people they serve.

"As a result of the MICAH program… our children are healthy, alert and active; they look attractive and beautiful; children are not falling sick with malaria as frequently as they did in the past; the frequency of diarrhea and intestinal worms has decreased; eye diseases have decreased because of improved hygiene; the harmful health practices have now been dropped because of the intensive education given by health workers; and severe malnutrition, blindness, measles and polio have decreased."

– Focus group discussion, qualitative survey, Ethiopia

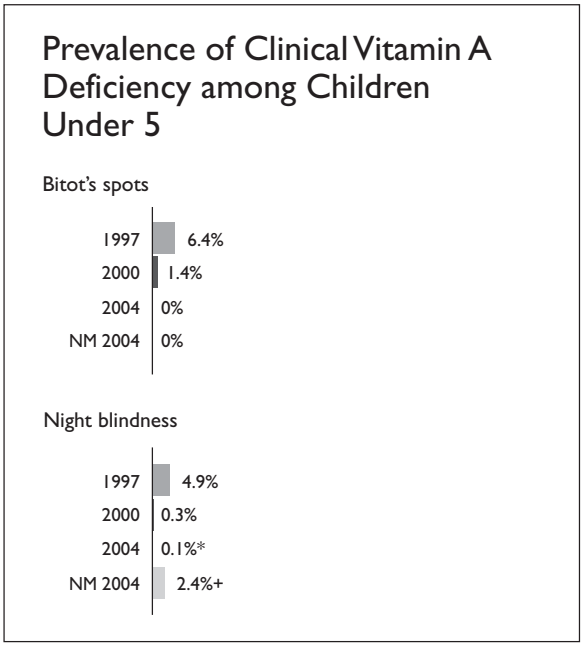
Results by Country

Ethiopia

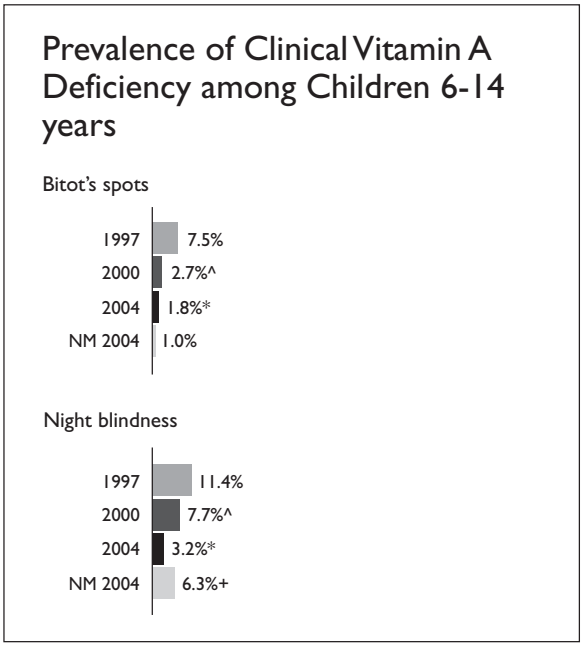
- 1.8 million beneficiaries
- $4.4 million budget (USD, 2002-2005)
- 5 partner agencies
- 18 project sites

KEY RESULTS

Increased Micronutrient Intake
The vision of young children in the MICAH Ethiopia projects showed a noteworthy improvement, attributed largely to vitamin A capsule supplementation. For children under five, the prevalence of Bitot's spots decreased from 6.4% (1997) to 0% by 2004. Likewise, night blindness among under-fives fell from the baseline of 4.9% to 0.1% by 2004.



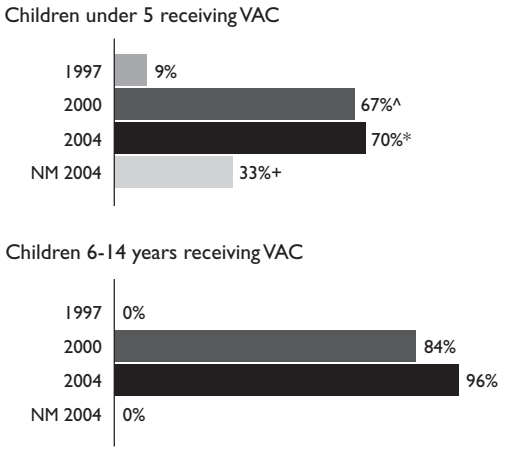
Among school-age children, similar results were observed as the incidence of Bitot's spots fell from 7.5% to 1.8% and night blindness from 11.4% to 3.2%. Prior to MICAH, school-age children and lactating women were not included in the MOH protocol for VAC distribution. However advocacy efforts resulted in permission to provide VAC to these target groups in MICAH program areas.



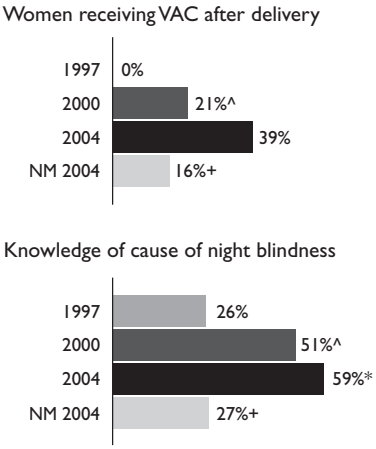
These impressive results coincide with increased VAC coverage during Phase 2. Through two rounds of VAC distribution each year, 70% of children under five received supplementation by 2004, an eight-fold increase from the 9% covered at the program's start, and improved from the 67% coverage in 2000.

Vitamin A supplementation for post-partum women, conducted by community health workers on a house-by-house basis, reached 39% of eligible mothers in 2004, an increase from 21% in 2000. Educational activities also proved effective, as 59% of mothers could identify that night blindness is caused by food factors, an increase from 51% in 2000.

Coverage of Vitamin A Capsules among Children



Knowledge and Prevention of Vitamin A Deficiency among Women



With the strong support of MOH health facilities, iron supplementation for pregnant women increased from 20% in 2000 to 43% by 2004. Compliance was measured at 92%. A key factor in this intervention's success was the community-based distribution system supported by local government, health staff and traditional birth attendants. The proportion of women who exclusively breastfed their infants for six months increased from 38% (2000) to 49% (2004).

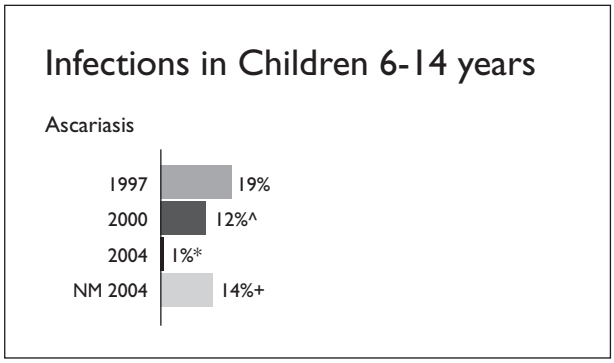
Despite two dry years and a modest budget, 13,459 new gardens and 59,401 fruit tree seedlings were established in Phase 2 to give households a local source of micronutrient-rich vegetables and fruits. School garden/nutrition clubs became more firmly established, with a total of 56,777 student members.

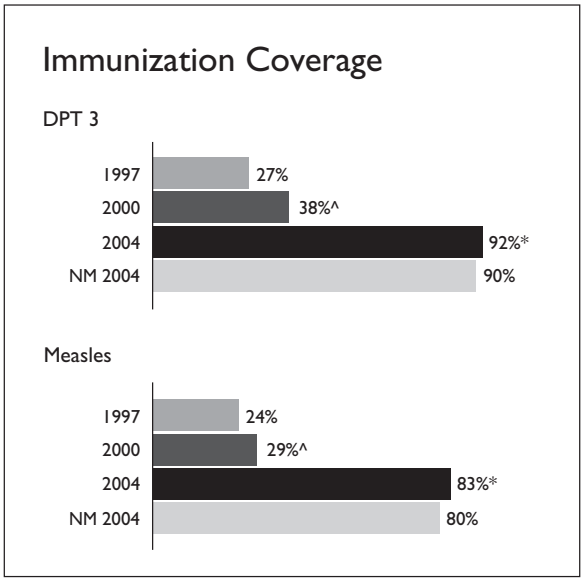
Reduced Prevalence of Disease

Malaria control was a stronger focus in Phase 2, and as a result of the 21,559 insecticide-treated bed nets distributed, 22% of children under five were protected from the effects of malaria. In addition, 57,208 U5s and pregnant women were treated for malaria.

The biannual de-worming campaign – made possible with strong community support – reached 273,270 children under five and 488,132 school-age children.

Ethiopia, continued





In a country where more than 86% of the rural population has no access to potable water, supply of clean and safe water improved through 37 sites constructed to benefit some 4,780 households. New pit latrines in Phase 2 provided improved sanitation to 18,542 households. The result of these activities, in addition to treatment of parasitic infections, is seen in the dramatic drop in the prevalence of ascariasis among schoolchildren – from 12% in 2000 to only 1% by 2004.

Children under two years are also benefiting from protection against disease as a result of improved immunization coverage, shown in the accompanying graph.

Build Capacity

In Phase 2, steering committees were formed by all 18 projects, as well as at the program coordinating office, to coordinate nutrition-related activities of various sectors at the community, regional and central levels, to involve community and sectoral offices at various levels of planning and implementation of MICAH activities, and to encourage ownership of MICAH by communities and sectoral ministries, thereby enhancing sustainability.

During Phase 2, 195 project staff, 8,905 line ministry staff and 25,681 community members were trained on micronutrients, appropriate feeding practices, water and sanitation, and the control of common parasites and diseases. Within the communities, educational initiatives continued to expand during Phase 2 as 24,453 sessions, with 3,492,815 people in attendance, were conducted on the above-mentioned topics.

Success Stories

- MICAH purchased 10,500 quintals of iodized salt and distributed it to all projects in the last year of Phase 2. The demand for iodized salt has been high due to MICAH's effective IEC on this topic; however, it was virtually unavailable in program areas. The salt was supplied to local cooperatives that are responsible for distributing it on a revolving basis, with the plan to continue the supply of this important commodity in the community.
- After identifying a severe public health problem of vitamin A deficiency among school-age children in the baseline survey, MICAH successfully engaged in advocacy with the Ministry of Health to provide VAC to this target group in MICAH program areas. The success of this initiative is evident in the impact shown on both VAC coverage and VAD among this target group. (See graphs on pp 24-25.)
- A long-standing problem of erratic supply of vitamin A capsules was addressed when MICAH gave

officials from the MOH, UNICEF and CIDA an on-the-ground tour of its projects and field activities. A first-hand look at the operations was instrumental in bringing about an increased commitment to ensure adequate vitamin A supply for the remainder of the program.

Difficulties/Challenges

- The border conflict with Eritrea that broke out in 1998 sparked a shortage of iodized salt in Ethiopia. As a result, the proportion of households consuming iodized salt fell from 30% after Phase 1 to only 2% at the end of Phase 2. Not surprisingly, the clinical signs of iodine deficiencies disorders and goiter increased to 31% in 2004, up slightly from 29% in 2000.
- High staff turnover resulted in some loss of experienced program officers and delays in finding replacements limited the office's ability to provide adequate monitoring and overall support for projects.
- The national election of 2005 put several MICAH activities on hold as government officials, line ministry staff and community leaders were busy with the extended campaign period.

Distinctive Program Features

- The Hearth program commenced in eight MICAH projects during the final year of the program, and an assessment of this positive-deviance-based initiative indicated enhanced awareness of nutrition and health among mothers, improved feeding practices of infants and young children, and improved nutritional status of some participating children. As a result of the positive momentum and results, WV Area Development Programs have shown an interest in continuing this initiative.
- MICAH program staff presented WV Ethiopia senior management with a proposal showing how essential components of the MICAH program can be implemented with modest resources and initiatives tailored according to the needs and resources of each community. This initiative is being piloted in three Area Development Programs of World Vision Ethiopia.

> Women and children participate in a Hearth feedback meeting.

"The experience with Hearth has generated much enthusiasm... there is quantitative evidence of considerable nutrition recuperation, and self-reported learning and behaviour change among caregivers. The intensive, hands-on, small group learning provided through the Hearth program seems to have afforded additional learning."

– Qualitative survey, Ethiopia

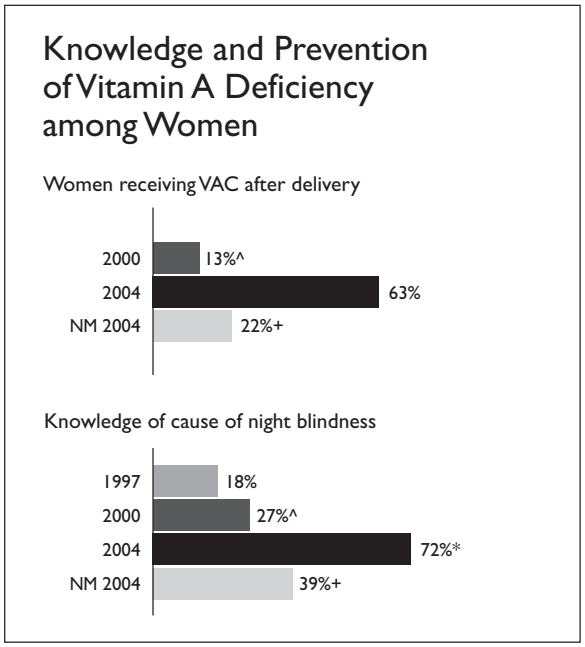
Ghana

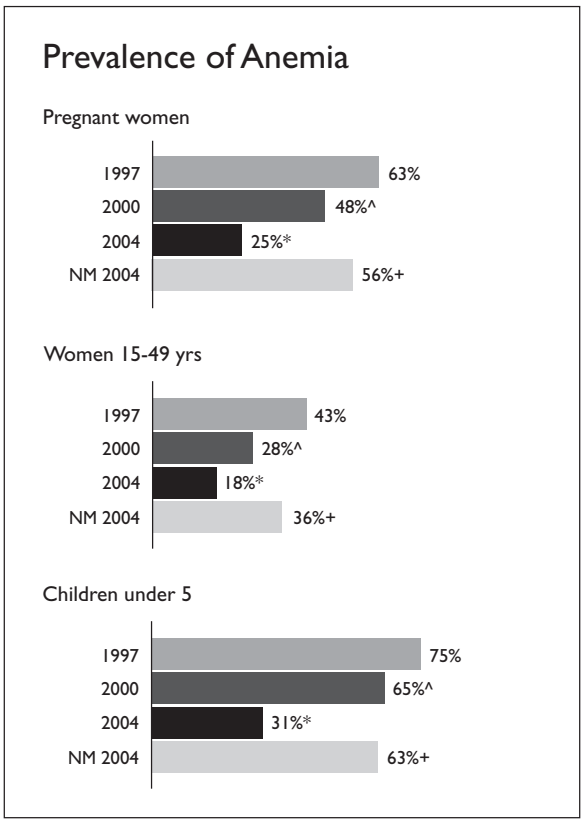
- 150,000 beneficiaries
- $745,000 budget (USD, 2002-2005)
- 1 Area Development Program
- 1 District

KEY RESULTS

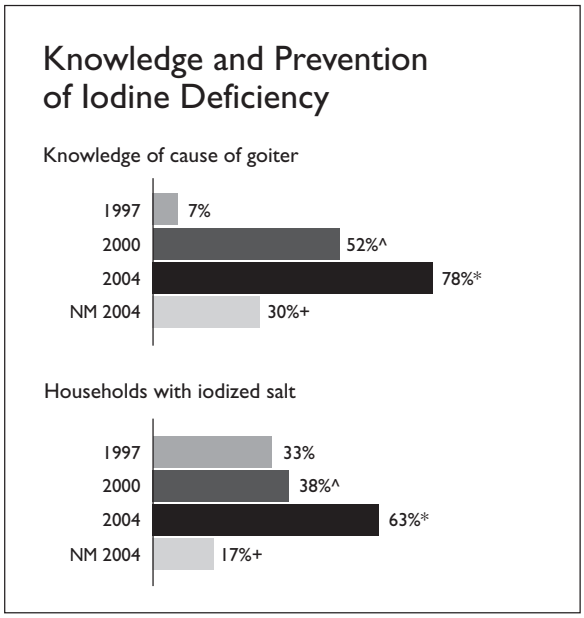
Increased Micronutrient Intake

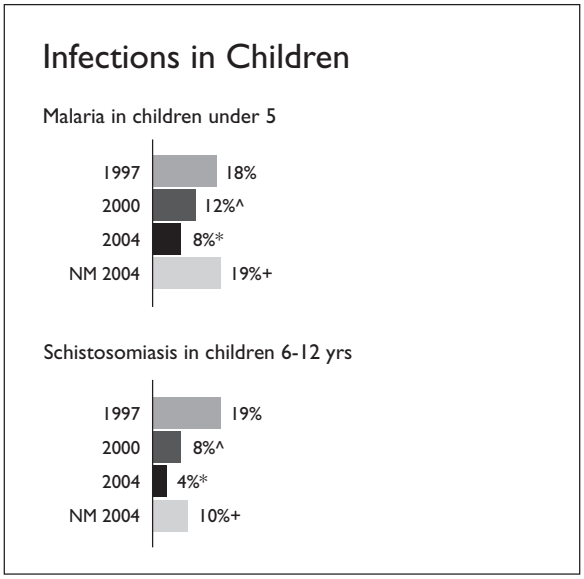
Vitamin A supplementation for women following delivery achieved a high rate of coverage thanks to the inclusion of traditional birth attendants in communities in this initiative, along with the cooperation of sub-district health teams. Coverage improved from 13% in 2000 to 63% in 2004. This resulted in improved vitamin A status among breastfeeding mothers, benefiting both mother and child.





The problem of high rates of anemia among women and children has improved dramatically in program communities, with more than a 58% reduction. Increased awareness, along with a national policy of free antenatal services, are the factors credited for the increase in pregnant women who received iron supplementation – 98% in 2004, compared to 41% in 1997. Consistent supply and community involvement in supplementation for women of child-bearing age and children resulted in an amazing turnaround from the baseline survey, when few benefited. Over 90% of women and 85% of children under five received iron and folate supplements in 2004.





Iodine deficiency disorders are lower in MICAH communities than in reference areas, in large part due to the high demand for iodized salt. According to a Ghana Health Services survey in 2005, 73% of households monitored in MICAH communities consume iodized salt, versus only 42% in non-MICAH communities. Retailers are increasingly catering to this new market. Of the 277 salt dealers in 110 communities in the MICAH area, 82% sold iodized salt in 2005. MICAH's intensive education efforts and creation of district depots for iodized salt complemented government efforts to enforce national policy and achieve 90% coverage by the end of 2005.

Reduced Prevalence of Disease

MICAH communities located near water that infects people with schistosomaisis have seen a major change in the health of their children as the program provided regular treatment for this disease. Infection rates dropped from 19% in 1997 to 4% in 2004. MICAH also provided education for families on how to prevent diseases like schistosomiasis and malaria. Young children benefit the most as their body is able to use nutrients for growth and development rather than fighting infections.

Build Capacity

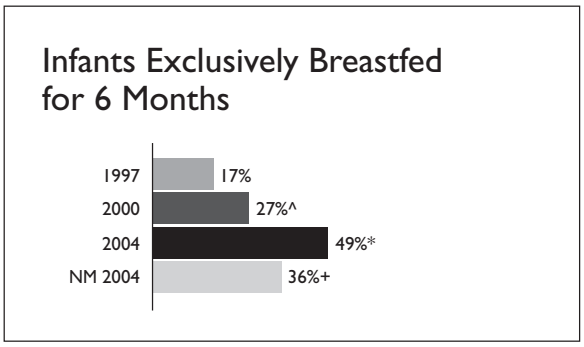
Collaboration with district government partners was a trademark of MICAH in Ghana and shaped all program interventions. Community nurses, agriculture extension workers, environmental health staff, teachers and health volunteers benefited from ongoing training and supportive monitoring by MICAH staff. Joint planning assisted district partners in incorporating nutrition and health interventions into their annual plans and many are expected to continue beyond the program.

Ghana, continued

Success Stories

- All five major health facilities in the district are now designated "Baby Friendly," in large part due to MICAH's work with Ghana Health Service to promote, protect and support breastfeeding. Community health workers trained by MICAH gave 436 breastfeeding education sessions. The success of these efforts is evident in the steady increase in the number of women who exclusively breastfed their infants for the first six months.
- Schoolchildren grew to be agents of change in MICAH communities. In competition with rival school groups, elementary school children created "jingles" that communicated nutrition messages through drama, music and dance. The final competition took place annually at a district-wide Micronutrient Day, providing an opportunity to share these messages with leaders and family members alike.

> *Jingles competition gives school children a voice for change in their communities.*

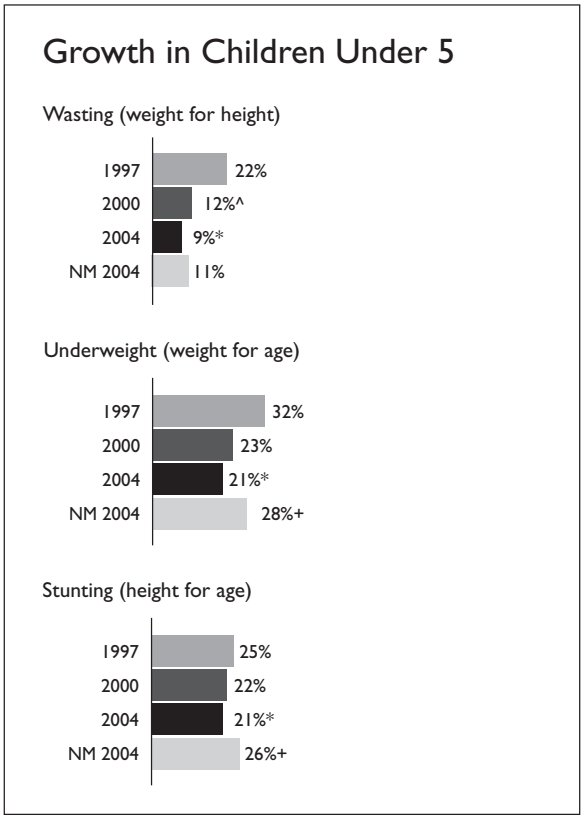


Difficulties/Challenges

- Vitamin A capsule supplementation for children under five was hampered by poor communication between national and district health teams during the second year of the program. Although the Ghana Health Service had hoped to integrate this activity into routine health services, the initial attempt covered only a few communities in the program areas. A return to campaign distribution improved coverage the following year.
- Water and sanitation activities suffered when an important partner was unexpectedly redeployed to another area of the country. Benchmarks to achieve coverage were thrown off schedule, and an attempt was made to liaise with an NGO in the district to try and carry out these activities. These eventually took place within the last year of the program.

Distinctive Program Features

- MICAH activities were regularly reviewed by the key players in the program area. Chiefs, opinion leaders, community health workers, teachers, and agricultural extension workers routinely held meetings in the eight project sub-districts to review program activities. At these well-attended conferences, issues raised included difficulties in latrine construction and the need for community health workers to conduct more education sessions. Participants also made plans for carrying on with projects after MICAH's eventual departure.
- In collaboration with the Ghana Health Service, MICAH introduced Community-Based Growth Promotion with 39 volunteers from 10 pilot communities. The objective was to find ways to build the capacity of communities to take greater ownership of the health needs of children under two. Monitoring the growth of young children provides communities with an indicator of their nutritional status. Improvements were noted in nutritional levels throughout the MICAH program. Wasting and underweight decreased, especially as compared to the non-MICAH populations. Stunting or shortness for age, an indication of chronic malnutrition, has become less of a problem in MICAH communities.



"The positive impact of MICAH on the health of children is a motivation to continue. With improved knowledge, good health and nutrition practices will be sustained with support from chiefs and elders."

– Qualitative survey, Ghana

Malawi

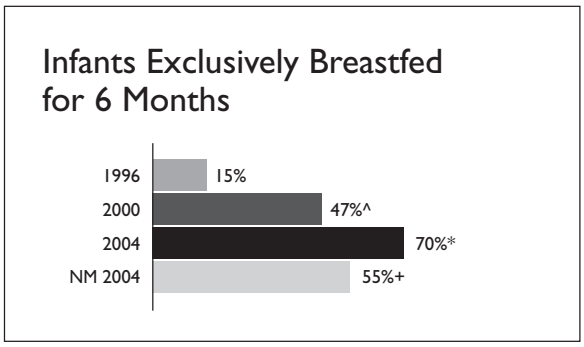
- 272,391 direct beneficiaries, with indirect benefit extending to 4.7 million people
- $3.8 million budget (USD, 2002-2005)
- 11 partner agencies
- 16 project sites

KEY RESULTS

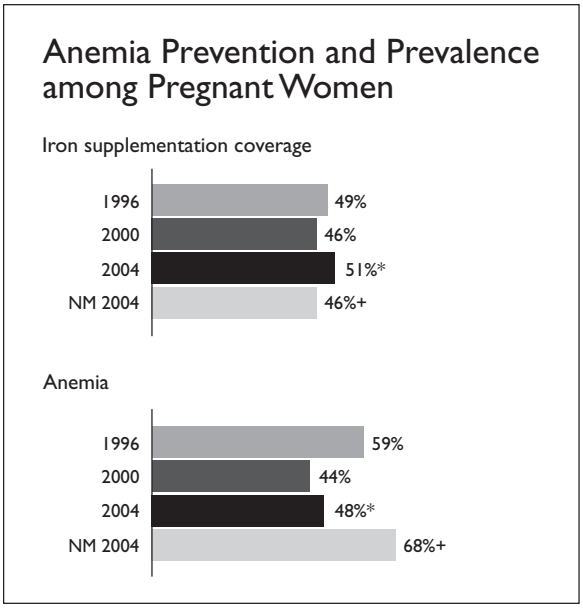
Non-MICAH results represent some areas that received MICAH interventions in Phase 1. The Malawi Demographic and Health surveys (DHS) from 2000 and 2004 provide additional comparison.

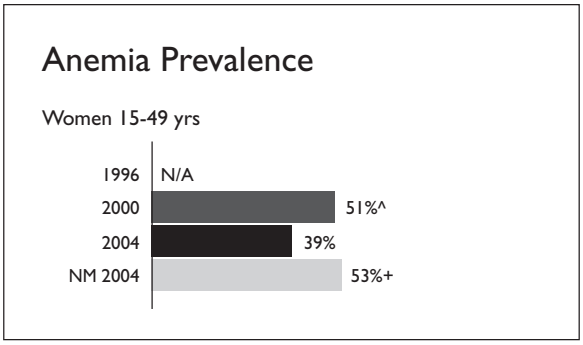
Increased Micronutrient Intake

Efforts to encourage exclusive breastfeeding for infants up to six months were evident by the final survey, as 70% of mothers reported they breastfed exclusively for six months, compared to 15% at baseline; this was significantly higher than the non-MICAH population and rural Malawi (44%, DHS 2004). The initiative received a boost from the baby-friendly hospitals in the project areas, along with strong support from community support groups.



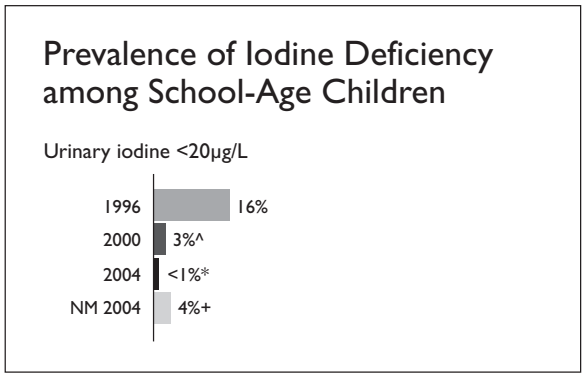
Iron supplementation met and surpassed objectives in Phase 2. An effective information and education program and regular supervision contributed to nearly 100% compliance in all target groups. Iron supplements were received by 51% of pregnant women, 72% of women of child-bearing age, and 68% of children under five based on 2004 data, compared with coverage of 46% of pregnant women and 68% of women of child-bearing age in 2000. Anemia among all target groups

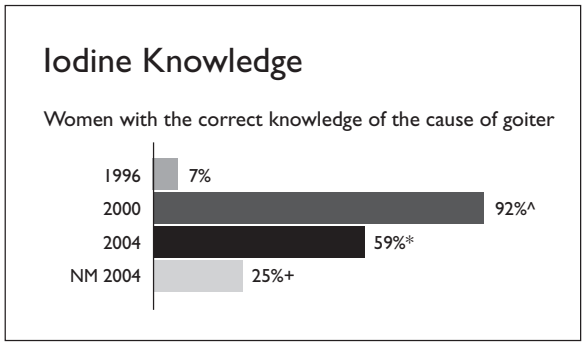




decreased since the 2000 follow-up survey: among children under five, from 86% in 1996 to 60% in 2004.

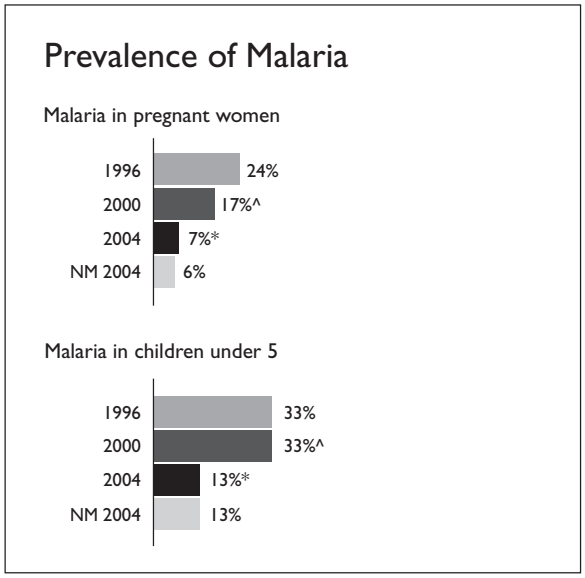
The increased availability of animal source foods is reflected in reduced anemia: Anemia among pregnant women declined from 59% in 1996 to 48% in 2004. This compares favourably to the non-MICAH rate of 68% and rural prevalence of 47% (DHS 2004). For women of





child-bearing age, anemia decreased from 51% (2000) to 39% (2004), which is significantly lower than the non-MICAH rate of 53% and rural rate of 45%.

Iodized salt use increased from 59% (1996) to 88% (2004). A campaign informed the community on the importance of iodine and proper salt storage. IEC created demand which encouraged shops and sellers to supply iodized salt. In MICAH areas, iodine deficiency (UI<50 µg/L) decreased significantly from 12% in 2000 to 5% in 2004, lower than the control population (14%)



in 2004. Severe IDD (UI<20 µg/L) decreased from 16% to <1% in 2004, which may reflect in part the significant increase in knowledge about this disease since 1996.

Reduced Prevalence of Disease

- 846 HIV/AIDS prevention messages reached 57,272 community members
- 420 new sources of water were created/protected
- 12,514 latrines were constructed
- 6,721 households built rubbish pits

An impact on malaria was seen as infection rates decreased in all target groups; among women of child-bearing age, from 22% in 2000 to 5% in 2004; among pregnant women, from 24% in 1996 to 7% in 2004; and among children under five, from 33% in 2000 to 13% in 2004.

"The MICAH approach is a good and successful model for the Ministry of Agriculture. Given right training people are ready to follow new habits and change traditional attitudes – for example, by eating rabbits and drinking goat milk. MICAH has provided a learning area for agriculture to reduce hunger."

– Mr. Bbvumbwe, Malawi

Malawi, continued

Household purchase of insecticide-treated nets (ITNs) reached 76% in program areas compared to 69% in the control population. Through MICAH, 96,926 ITNs were distributed, protecting at least 39,155 children under five and 12,555 pregnant women.

Mass treatment of intestinal worms and schistosomiasis reached 80% of school-age children and 30% of children under five.

Build Capacity

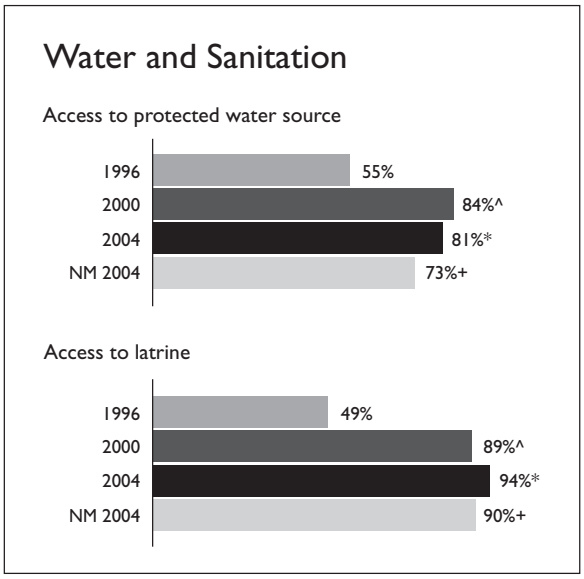
The program coordinating office continued to build the level of expertise among volunteers and MICAH partners during Phase 2. Overall, 268 village health volunteers, 69 health surveillance assistants, and 34 health workers received training and then conducted over 3,900 community education sessions.

Partners conducted initial and refresher training sessions for village health volunteers on topics ranging from iron supplementation, malaria control and the use of ITN record-keeping, to exclusive breastfeeding, diarrhea management, and nutrition and health education for communities. In addition, 623 volunteers received training in water-point maintenance and building latrines.

Management staff and 42 program partners attended three training meetings on financial and operational management to build their knowledge of activity-based costing and equip them to complete financial and operational reports.

Success Stories

- Cholera and other waterborne diseases were eliminated through the provision of potable water and health education and disease prevention skills. Access to protected water sources increased significantly with 420 water points created and/or protected. Access to clean water was maintained throughout Phase 2 at 81%; this was significantly increased from 55% in 1996. In addition, access to latrines increased from 49% in 1997 to 94% in 2004 as shown in the accompanying graph.

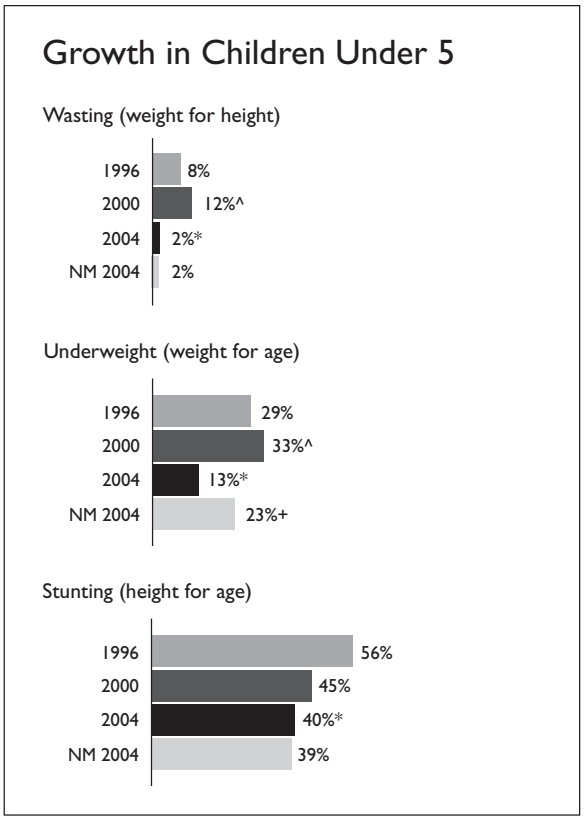


Difficulties/Challenges

- Nature delivered the greatest challenges during Phase 2. Severe droughts at the beginning and end of Phase 2 resulted in drastic decreases in crop yield and doubled maize prices. These famines not only undermined household food security but also community education initiatives, as people were preoccupied with finding food.
- Further, the economy performed dismally during Phase 2 – inflation rose 9% and 15% in 2004 and 2005 respectively. The continual devaluation of the local currency resulted in frequent hikes in the cost of living, especially felt in the soaring price of fuel.
- HIV/AIDS continued to affect the population's most productive age group, leaving an increasing number of orphaned children in the care of their grandparents or other extended family members.

Distinctive Program Features

- Nutrition education transformed eating and food preparation habits. The community milling fortification initiative flourished, despite challenges of mill breakages and routine power failures. Six implementing partners aided 19 mills to provide



fortified flour to 8,000 households; household coverage for fortified flour in MICAH areas at 12% was significantly ahead of the 1.5% found in control areas in 2004.

- The number of households with small livestock increased from 54% to 72%. The small animal revolving fund distributed 40,000 animals – primarily rabbits, chickens and guinea fowl. The program's success is credited to a cost-recovery scheme where in-kind payment is required of all beneficiaries to increase coverage. To date, 15,000 of these animals have been distributed through this revolving fund. More than one million trees/seedlings were distributed in an attempt to sustain access to micronutrient-rich foods.
- Significant improvements in growth of children under five were observed as the proportion of children wasted, underweight and stunted was significantly less at the final evaluation in 2004 compared with the baseline. Significant differences in growth are also observed with rates in rural Malawi: wasting was 5%, underweight 23% and stunting 49% (DHS 2004).
- Target villages established 177 new revolving funds to buy pharmaceuticals according to the specific needs of communities where health facilities are too remote. Under the funds, communities control the bank accounts used to regularly replace these essential medicines. The objective is to foster a sense of ownership among beneficiaries, while ensuring prompt treatment to prevent serious illness.

"Fortifying foods with basic vitamins and minerals is both essential and affordable."

– Bill Gates, co-founder, Bill and Melinda Gates Foundation

"Child mortality rate has been reduced in the communities. Absenteeism by the school children has been reduced, school children are active in class. Diarrhea diseases have been reduced because of good sanitation and provision of safe drinking water."

– Villager, Bethu, Malawi

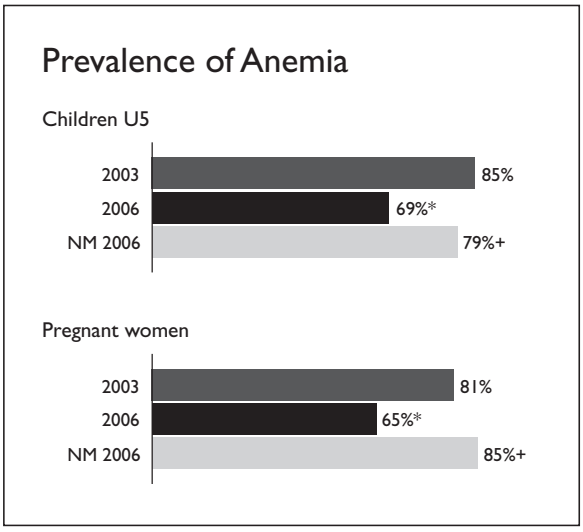
Sénégal

- 204,000 beneficiaries
- 758,690 budget (USD, 2002-2006)
- 3 Area Development Programs

KEY RESULTS

Increased Micronutrient Intake

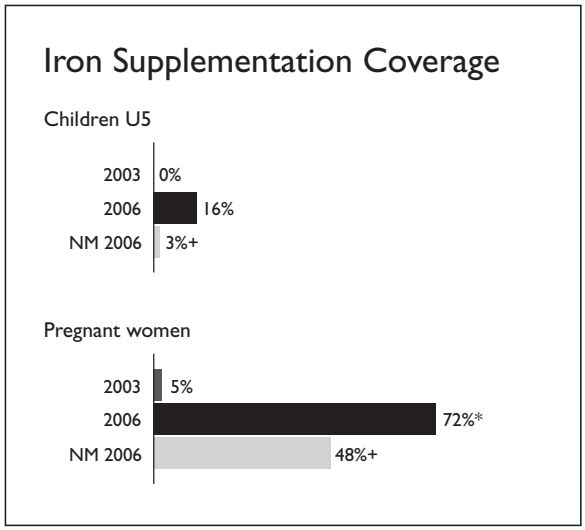
Vitamin A coverage remained stable for children under five years of age (U5) between 2003 and 2006. Night blindness affected virtually no children U5 in Phase 2.

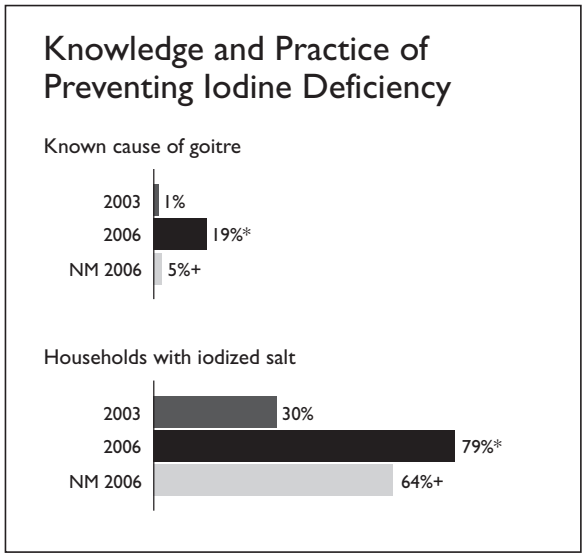


In all groups, anemia dropped by 15% as shown above. Iron coverage increased from 0% to 16% in children U5 and from 5% to 72% in pregnant women. Compliance to iron tablets was high (over 94%) in both groups.

The proportion of children 6-12 years with high urinary iodine levels dropped significantly from 40% to 32%. Knowledge of the cause of goiter was significantly higher in MICAH villages (19%) compared to the non-MICAH communities (5%), and consumption of iodized salt increased from 30% to 79% among households. Also, the use of iodized salt in the Velingara district is much higher than the national rate (16%)[1].

Over the program period, 802 retailers were visited and 734 were selling iodized salt (92%).





[1] UNICEF, The State of the World's Children, 2005. New-York, USA.

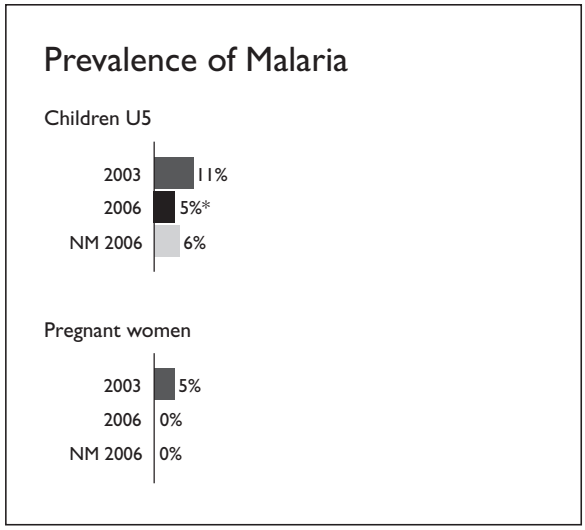
The consumption of fortified flour increased from 0% to 10%. In each mill, the fortification process followed protocol and registers recorded the number of users and the quantities of flour fortified by each household. During community interviews, the consumption of fortified flour was well received with health benefits noted.

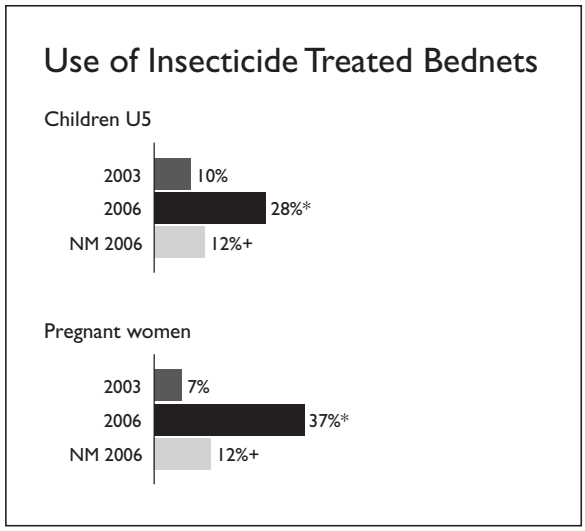
The proportion of children exclusively breastfed for 6 months increased from 7% to 22%. Positive deviance (Hearth) was implemented in 47 sites, surpassing the target of 40 sites. A total of 64% of the undernourished children that attended the positive deviance sessions were rehabilitated through the adoption of appropriate feeding practices.

Animals and fruit trees were provided to undernourished U5 children identified during the growth monitoring sessions. In total, 754 small animals and 5,524 fruit trees were distributed.

Reduced Prevalence of Diseases

The proportion of children U5 with malaria decreased significantly from 11% to 5%. No pregnant women were affected by malaria at the end of the program, as compared to 5% at baseline. The majority of malaria cases were treated according to the Sénégalese national protocol. When field staff checked use of insecticide treated bednets after distribution, almost all sampled children (99%, MICAH reports) and pregnant women (100%, MICAH reports) were sleeping under a bednet.





The benefits of small scale fortification have been clearly observed by beneficiaries, as summarized by one perspective on the impact of this new activity… "Since fortification has been implemented in our community, we sleep better but also, we have more energy to accomplish our daily tasks"

– community member, Kounkané, Sénégal.

Sénégal, continued

In children U5, the prevalence of measles (3.0% vs. 1.3%) and intestinal parasites (14% vs. 6%) was reduced by half from baseline to final survey. Also, half of the children U5 were dewormed twice a year. According to data from the district health service, immunization coverage reached 98% at the end of the project. Almost all outreach sites (66 of 72) performed immunization. No vaccine shortage was reported at the health post level.

Build Capacity

At the end of the project, all health structures in the MICAH area had integrated micronutrient activities in their plans of action. All sites offering health services (72) conducted monthly growth monitoring sessions. More than 80% of the village committees (59 of 72) overseeing distribution of drugs and ITNs had operational revolving funds. Seven micro-enterprises were created by community health agents.

MICAH has actively supported the MOH with mass campaigns which integrated immunization, deworming and vitamin A supplementation.

Twelve planning workshops were organized with health post personnel, village chiefs and community leaders. Support for local community agents to provide quality health services was a key focus. Progress and challenges were shared with stakeholders including the chief and three vice-chiefs (Assistant-Prefect), 10 health personnel and 90 community leaders. Monthly meetings were held with the MICAH staff and each team of seven health posts.

At the onset of Phase 2, results-based management training was conducted with MICAH and ADP staff, to enhance responsive programming. During the project, 4 MICAH field agents and 16 MOH agents were trained on appropriate treatment of child diseases and on participatory communication. During supervision visits, training was provided to the community health agents. Throughout the positive deviance sessions, the mothers learned how to identify the precursor signs of diseases, how to improve the quality of complementary foods and how to improve their children's cognitive ability through the use of local toys. Fifty individuals were trained on survey methodology. Training on integrated management of children illness was also provided to 216 community health workers, 14 MOH representatives and 4 MICAH agents.

Success Stories

- The community-based Hearth program, focusing on rehabilitating undernourished children through the identification of positive deviant behaviours of well-nourished children in the community, has been a strong feature of the MICAH program. Grandmothers have been shown to play a key role, through their influential relationship with the young mothers in the community. MICAH has focused on including grandmothers in nutrition education, and they in turn have been able to influence the young mothers in the community to improve infant and young child feeding habits.

- MICAH Senegal's fortification initiative has been well received by the program community, after overcoming various barriers early on.

- Significant reductions in anemia were observed among children (85% to 69%) and pregnant women (81% to 65%).

- The prevalence of exclusive breastfeeding infants for six months significantly increased from 7% to 22%.

- Collaboration with partners and other organisations (UNICEF, Food Technology Institute) enhanced achievement of program targets as well as sustainability. The inclusion of influential community members. Collaboration with other World Vision Senegal colleagues has enhanced adoption of MICAH-type activities in other area development programs.

Difficulties/Challenges

- The success of the MICAH program created demand for the initiation of similar nutrition program activities in other World Vision Senegal program areas. In order to facilitate this, MICAH staff were invited to provide support and contribute to building capacity in these new program areas. Without reinforcement from additional personnel, the existing MICAH staff were stretched, as they were constantly challenged with balancing their responsibilities with implementation and their desire to share positive experiences with colleagues. Challenges in meeting program targets were met with the larger goal of sustainability being focal.

- Consumption of fortified flour increased from 0% to 10%, following proper procedure. To enhance sustainability, the project partnered with the Food Technology Institute (ITA) in Dakar, who provided personnel for the investigation, implementation and evaluation of the fortification component. When access to micronutrient fortificants was difficult for the communities, MICAH assisted with the start-up of a community-based revolving scheme with provision of the initial fortificant. Despite delays, the partnership with ITA and MICAH did result in success, with 10% of targeted households now fortifying their foods.

Distinctive Program Features

- Implementation and success of the Hearth program/positive deviance within MICAH Senegal has grown through the life of the program, and shown many positive results including improved hygiene and food preparation habits, empowerment of women, sharing of nutrition and health knowledge throughout the community and improved understanding, and ultimately happier, healthy and more active children. By the end of MICAH, 64% of malnourished children involved in the program were rehabilitated, as they gained between 400 and 700 grams after two months. In view of this impact, the positive deviance approach to address malnutrition is being scaled up at the national level. In addition, fathers were integrated into the program and more involved with caring for their children. Also, the participation of grandmothers in the Hearth sessions was a critical component for program success.

- In order to improve the supply of essential drugs to treat common illnesses, MICAH facilitated the implementation of functional drug-revolving funds at the community level. These are considered a sustainable, community based approach, and are expected to contribute to continued improved access to health care.

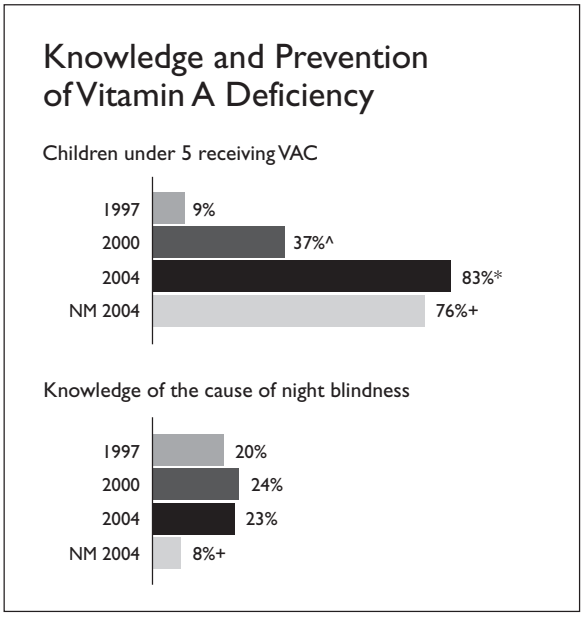
Tanzania

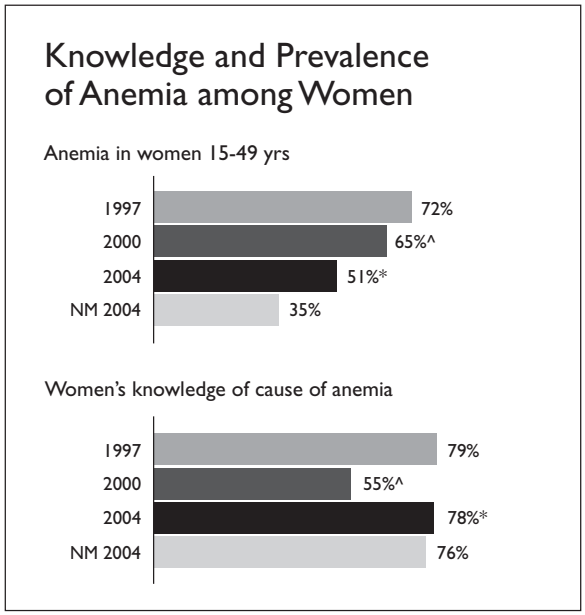
- 255,420 beneficiaries
- $789,000 budget (USD, 2002-2005)
- 4 Area Development Programs

KEY RESULTS

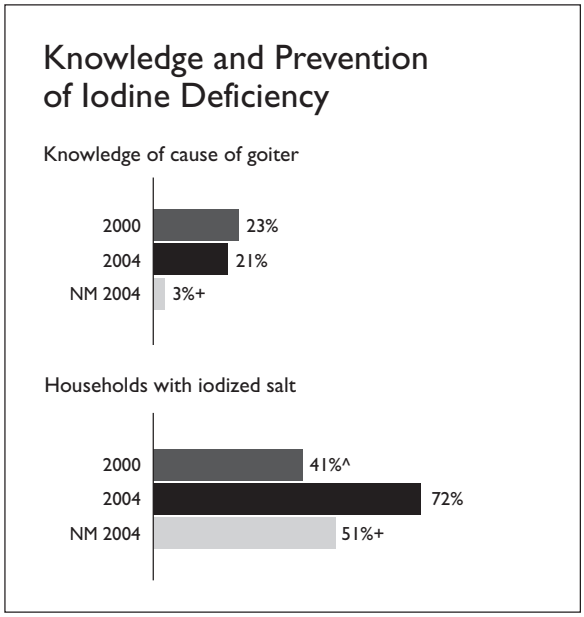
Increased Micronutrient Intake

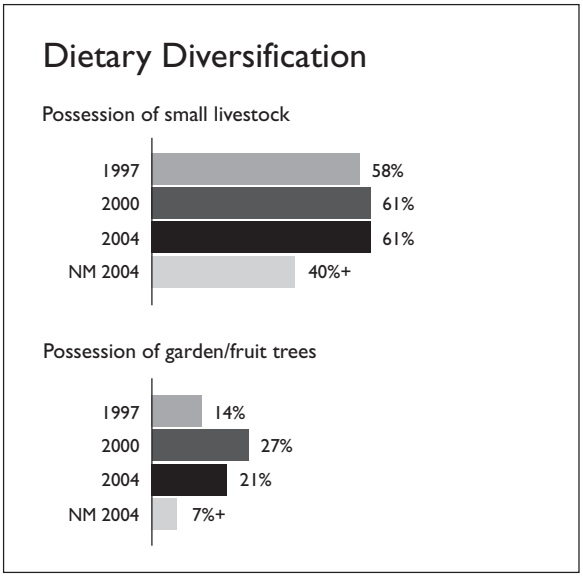
MICAH Tanzania achieved an appreciable increase in micronutrient intake during Phase 2. Vitamin A supplementation for lactating women rose from 26% to 83% during Phase 2. Education efforts resulted in significantly more women in 2004 knowing the cause of night blindness in MICAH areas (23%) as compared with the non-intervention areas (8%). Among children under 5, VAC coverage increased from 37% to 83% in Phase 2. Vitamin A deficiency, based on low breast milk retinol, was eliminated by 2004, decreasing from 53% to 0% during Phase 2.





With the support of government and community health workers, iron supplementation of pregnant women increased from 78% in 2000 to 89% (2004). This contributed to the decreased anemia rate for women of child-bearing age: from 65% in 2000 to 51% in 2004. Among pregnant women, anemia decreased significantly from the baseline of 87%, but remained static in Phase 2 at 73%. For children under five, anemia rates fell significantly from 86% to 75% (2004). Anemia was clearly was impacted among all target groups. Intensified education during Phase 2 reversed the negative trend with knowledge of anemia observed in 2000; in 2004 significantly more women in MICAH areas (78%) knew causes of anemia than in 2000 (55%).





Consumption of iodized salt increased significantly from 41% in 2000 to 72% in 2004; this was also significantly higher than the control population (51%) in 2004. Iodine deficiency decreased in the MICAH villages. Knowledge of cause of goiter was significantly greater in MICAH areas (21%) as compared with the control areas (3%) in 2004.

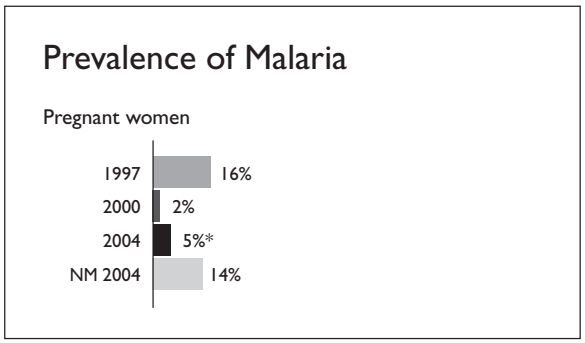
The proportion of women exclusively breastfeeding in MICAH areas increased significantly from 15% in 2000 to 21% in 2004. Possession of small livestock at the household level, enabling increased iron intake, increased from 58% in 1997 to 61% in 2000. This increase was maintained in 2004, and is significantly higher than the non-MICAH areas, where the rate was limited to 40%. In addition, significantly more households in MICAH areas (21%) had gardens/fruit trees than in the control areas (7%) by the end of Phase 2.

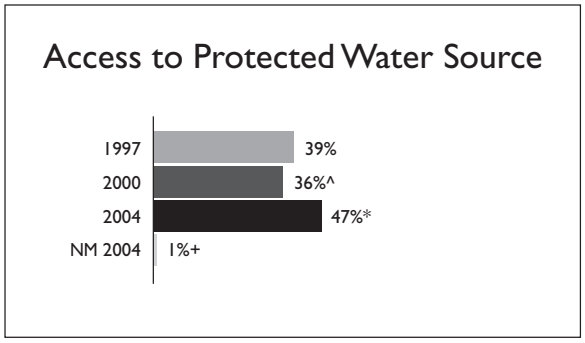
"For many of us eggs and milk were for business; now some are spared for our children. Before, we used to boil our vegetables for a very long time but after being educated by MICAH we no longer overcook our vegetables. These days people do not eat just to fill their stomachs, but they try to eat a balanced diet."

– Mother, qualitative survey, Tanzania

Tanzania, continued

Reduced Prevalence of Disease
Malaria continued to be a challenge to bring under control. Possession of insecticide-treated bed nets increased from 37% in 2000 to 51% in 2004, significantly higher than the 30% rate observed with the non-MICAH population. This intervention may have influenced the reduced malaria load observed: for pregnant women, the infection rate fell from 16% in 1997 to the static level of 5% during Phase 2. For children under five, the prevalence of malaria fell from 35% at baseline to 6% by 2004. Full immunization of children 12 to 23 months of age increased from 72% in 2000 to 78% in 2004. The de-worming program for children under five reached 56% in the MICAH area, a significantly higher coverage rate than the 36% reached among the control population.





Access to sanitary facilities dropped from 77% in 2000 to 69% in 2004, but was significantly greater than the 51% access within the non-MICAH areas. Access to a protected water source increased from 36% in 2000 to 47% in 2004, significantly higher than the control population at only 0.5%.

Build Capacity
The education of health workers at all levels continued in Phase 2. MICAH Tanzania supported the training of 48 district health officials and 592 public health committee members. Overall, 2,717 education sessions were conducted during this phase. Training and refresher courses were provided for 286 volunteer health workers, 105 community health workers, four health workers, nine supervisors, and 17 agriculture workers.

> *Small scale fortification of maize at local hammer mill.*

In addition, 25 school health clubs were established, and proved highly effective in promoting good micronutrient practices among the population. These lessons were further promoted through MICAH Days, which were held in target communities every three months throughout Phase 2.

Success Stories

- Small-scale fortification – the use of premix to fortify food – was implemented by 45 mills, covering 11,000 households. The distribution of premix sachets to individual families was an innovative way to ensure the supply of fortified maize despite mill-related issues.
- Collaboration with MOH district medical officers took place to improve maternal and child health services, as well as continuous information-sharing and technical support.

Difficulties/Challenges

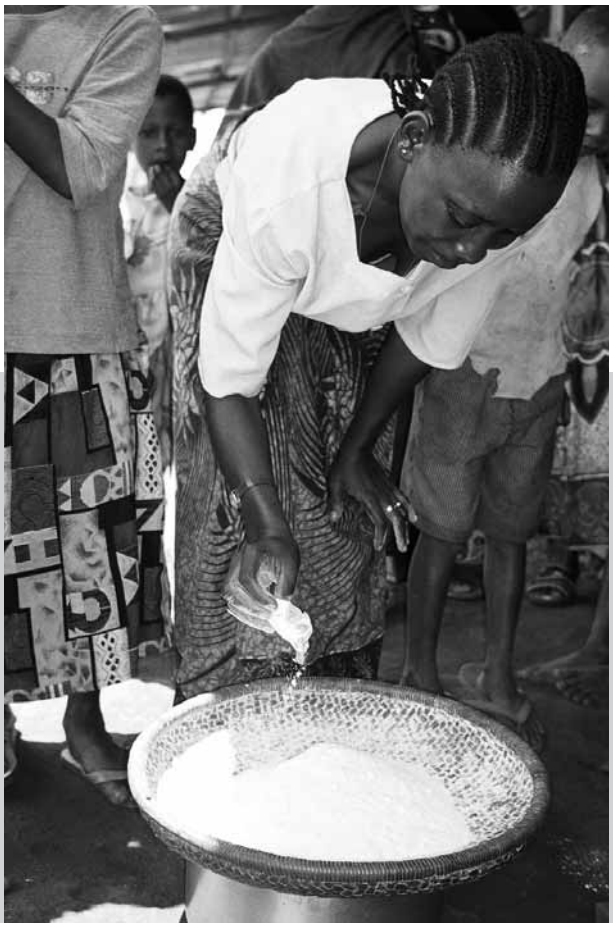
- Lack of adequate and competent staff hindered MICAH Tanzania's efforts at all levels. Competition from other NGOs contributed to high turnover, especially at the management level.
- Vegetables remain in short supply after three years of inadequate rainfall, coupled with a lack of pesticides in villages without stores or retail shops.
- Malaria proved difficult to battle. Despite malarial medicine, education and the promotion of ITNs for protection, more pregnant women tested positive for malaria in the 2004 survey than during the follow-up survey.

Distinctive Program Features

- MICAH Tanzania is a founding member of the Tanzania National Food Fortification Alliance (TNFFA), which since 2003 has helped coordinate food fortification initiatives in the country along with government, the private sector, consumer groups, research and academic institutes, and UN agencies.
- School health clubs and community cultural groups trained through the program were used by other World Vision Tanzania projects and NGOs to mobilize and create awareness about HIV/AIDS.

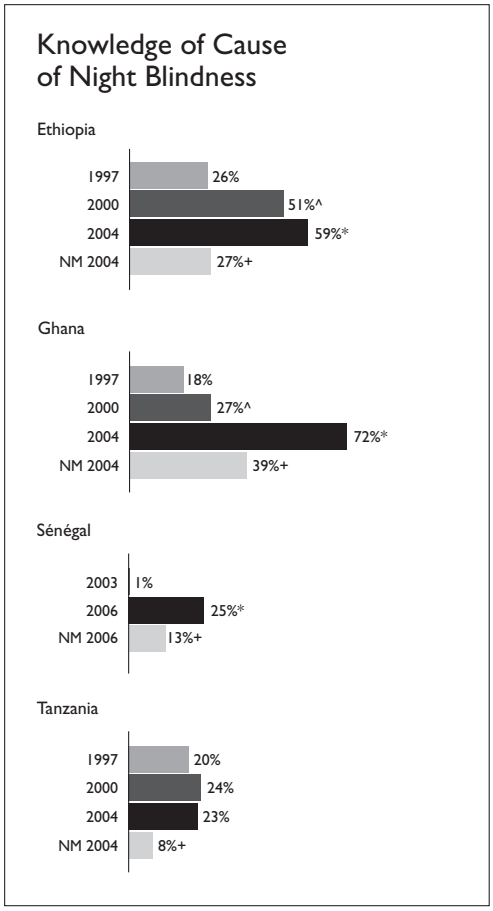
"For nearly 40 years, food fortification has protected the populations of the United States, Canada, and many other countries. It is long past the time when the same protection was available to the peoples of the developing world."

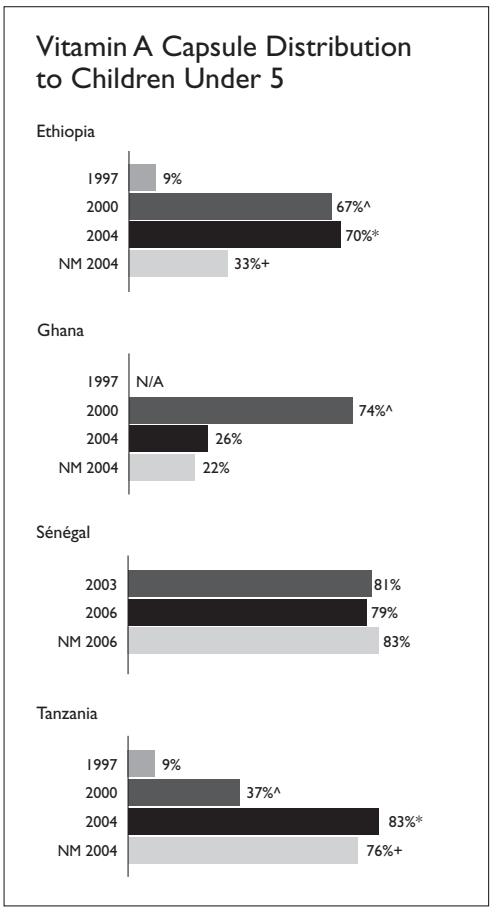
– Nevin Scrimshaw, President, International Nutrition Foundation



> Home-based fortification: woman adds vitamins and minerals to maize flour at home.

Results by Micronutrient





Vitamin A

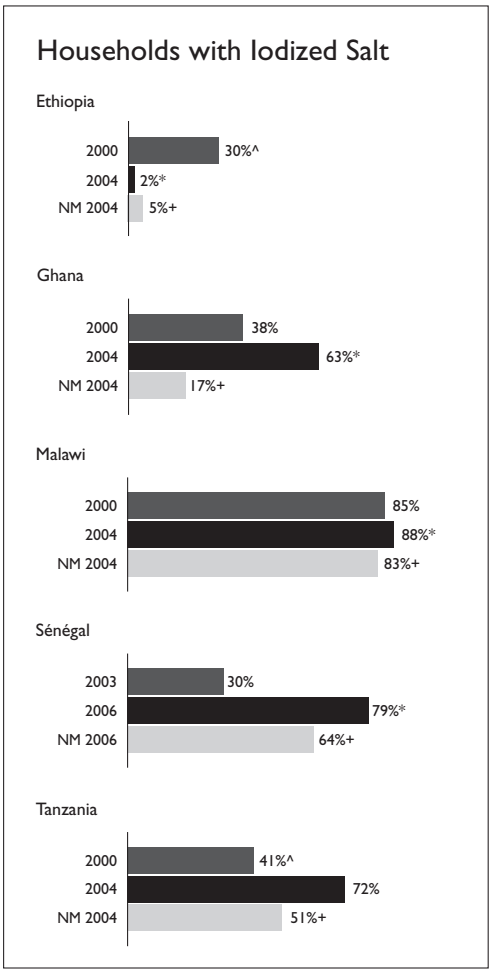
Night blindness, an early indication of vitamin A deficiency, was reduced among children under five in Ethiopia, Ghana and Tanzania. Vitamin A deficiency decreased among lactating women in Ghana and Tanzania, and children under five in Ethiopia. These positive results may reflect women's improved knowledge of vitamin A deficiency.

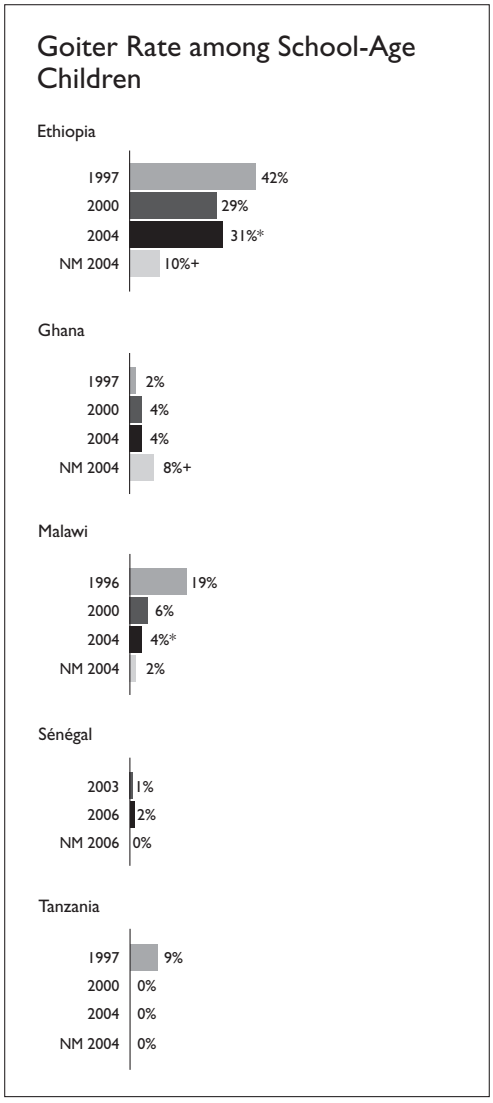
Coverage for vitamin A supplementation, a cost-effective way to directly address vitamin A deficiency, improved among children in Ethiopia and Tanzania, and among lactating women in Ethiopia, Ghana and Tanzania. The high coverage of vitamin A supplementation among lactating women reflected MICAH's efforts with education and mobilization, as well as improved capacity of local health systems. In Sénégal, night blindness has been eliminated in children U5 while VAC coverage remained high.

Although Malawi did not assess vitamin A deficiency nor include it in its goals, selected program activities, such as fortification and dietary strategies, likely improved vitamin A status. In Phase 2, almost all targeted households consumed fortified foods. In addition, more households in MICAH villages (relative to control) possessed small livestock and household gardens over the life of the program, thus increasing access to vitamin A-rich foods.

Iodine

Increasing use of iodized salt is the best way to prevent iodine deficiency disorders such as goiter. MICAH programs educated community members on the

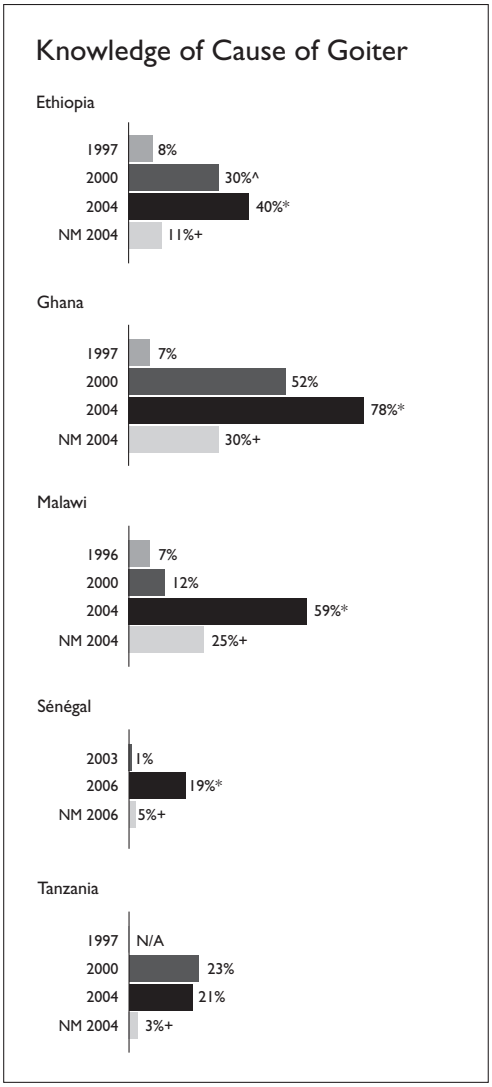


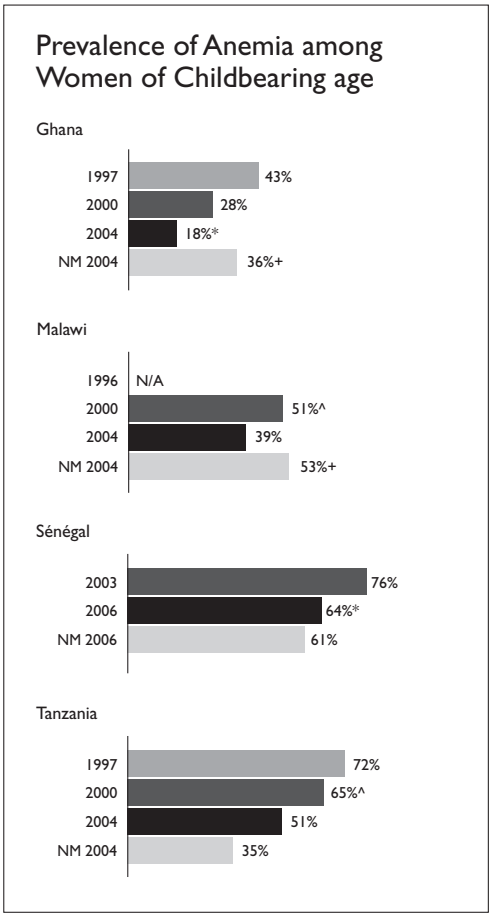


importance of using iodized salt, provided test kits to monitor whether salt was adequately fortified with iodine and advocated for governments to enforce existing legislation.

Intensive community sensitization and education resulted in impressive results for Tanzania, as significantly more households used iodized salt by the final survey compared to earlier surveys and control villages. A significant reduction in goiter was observed in both MICAH and control areas, despite the higher proportion of households with iodized salt.

In Ethiopia, a rising goiter rate in Phase 2 reflects the decreased availability of iodized salt. A border dispute with Eritrea (the primary supplier of iodized salt to Ethiopia) hindered Ethiopia's attempts to increase the use of iodized salt in both Phase 1 and 2. In fact, the use of iodized salt fell from 48% in 1997 to 2% by 2004, while the prevalence of goiter increased slightly from 29% (2000) to 31% (2004). In Sénégal, the use of iodized salt increased significantly and IDD (based on low level of urinary iodine) decreased in school-age children. Regular support to the district government service who controlled the availability of iodized salt likely helped improve access and consumption. See the graph (above) for a comparison of the change in goiter rate over time among the other MICAH countries.



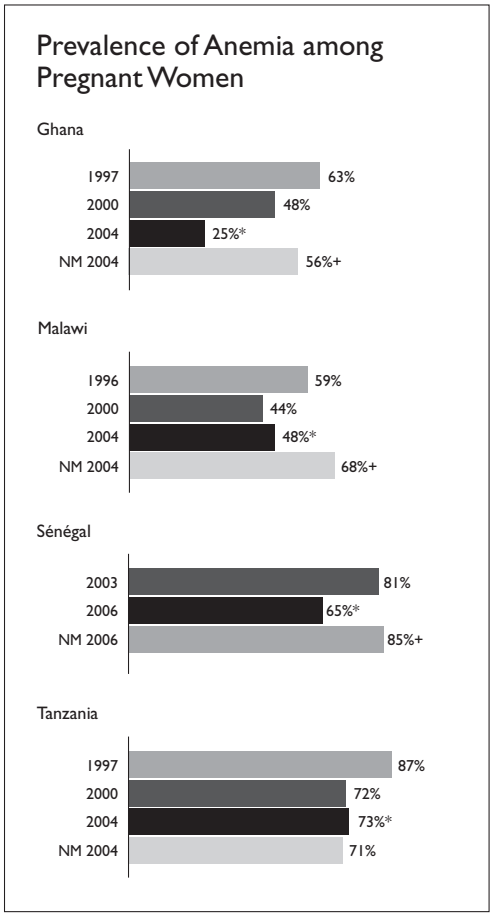


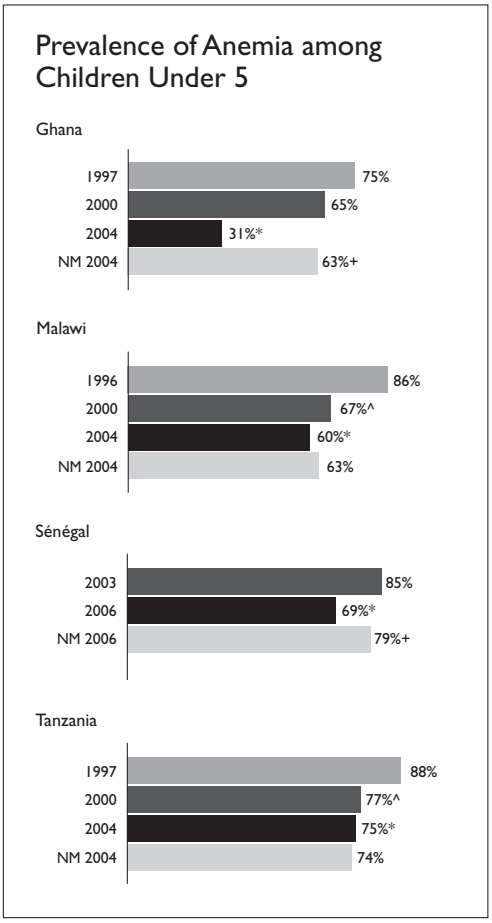
In Ghana, the high use of iodized salt (63%) in 2004 was confirmed by the Ghana Health Service 2005 survey. In MICAH-monitored communities, 73% of households had iodized salt. Although the goiter rate increased, it was significantly lower than the control. In Malawi, the use of iodized salt increased during Phase 1. Intensified IEC and monitoring resulted in maintaining the rate in Phase 2. MICAH's advocacy efforts throughout the program likely influenced the high proportion of control households that had iodized salt. In addition, MICAH influenced suppliers and shopkeepers to ensure the availability of iodized salt within program communities. Finally, community education efforts have likely contributed to increased demand for iodized salt and improved knowledge of IDD in all countries.

Iron

Iron deficiency and anemia remained public health problems in all MICAH countries, although results from the Phase 2 evaluation show a greater impact on anemia than was evident in Phase 1. This may reflect the long-term benefit of an integrated approach that addresses both intake of iron and reduction in infections that affect iron absorption.

Prevalence of anemia among women was reduced in all countries. In Ghana, Malawi and Sénégal, the improvement was also significantly different from control areas, suggesting that MICAH's interventions were a contributing factor. Although anemia rates





dropped for women aged 15-49 years in Tanzania, rates among pregnant women remained static in Phase 2. MICAH contributed to reduced anemia rates among children under five in Ghana, Malawi, Sénégal and Tanzania.

Strategies to address iron deficiency in Phase 2 included the promotion of increased iron intake through supplementation, with a specific focus on improving compliance. Iron coverage improved in all countries among all target groups, and was significantly higher than control areas. The relationship between increased supplementation and reduced anemia levels is consistent in Ghana for all target groups and for women in Malawi, suggesting that iron deficiency contributed considerably to anemia in these groups. However, in Malawi and Tanzania, it appears factors such as malaria may contribute to the problem of anemia beyond the positive effect of supplementation among children. In Sénégal, the improved access to iron tablets at the community health huts helped achieve positive results.

Each country program promoted iron-rich foods, particularly animal sources such as rabbits, poultry and goats, to increase the frequency of meat consumption. In Malawi, over 72% of households in MICAH communities now own animals as compared to 55% in non-MICAH areas.

Fortification of staple foods with iron as well as other micronutrients continued in Malawi and Tanzania in selected communities in Phase 2. Some reduction in the prevalence of anemia was noted among women in these countries, but not among children. This suggests

the need for higher levels of iron in foods targeted to young children, who consume a smaller amount each day, as well as diversified strategies that include control of infections.

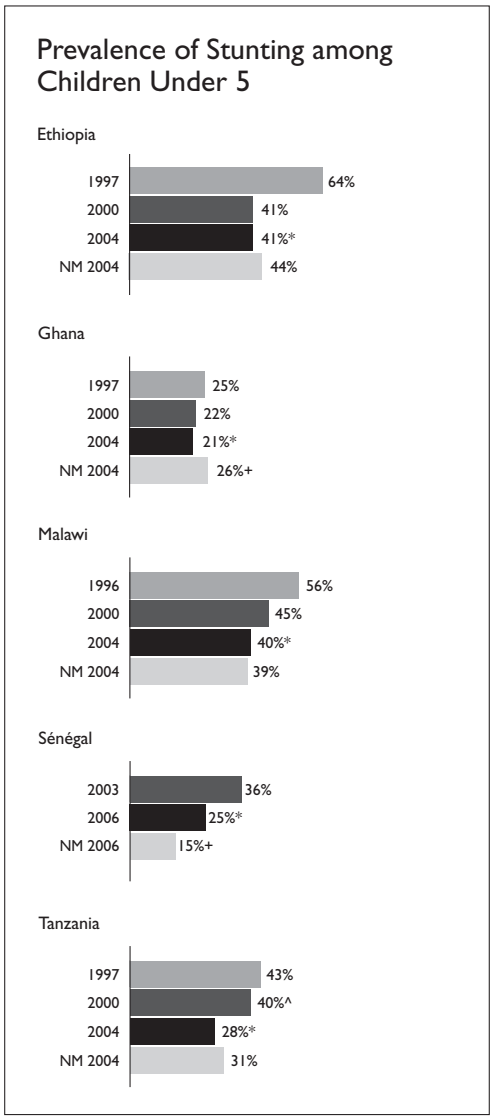
It is critical to address malaria and intestinal parasites to reduce levels of anemia, as these infections also reduce hemoglobin levels. MICAH purchased and distributed insecticide-treated bed nets to prevent malaria among children under five and pregnant women. Appropriate treatment of malaria cases was also encouraged through education and provision of medicine. Results showed a modest positive impact on malaria in most target groups, but malaria likely remains a major contributor to levels of anemia. Continued partnership with national strategies to "roll back" malaria is essential in these communities.

General Nutrition

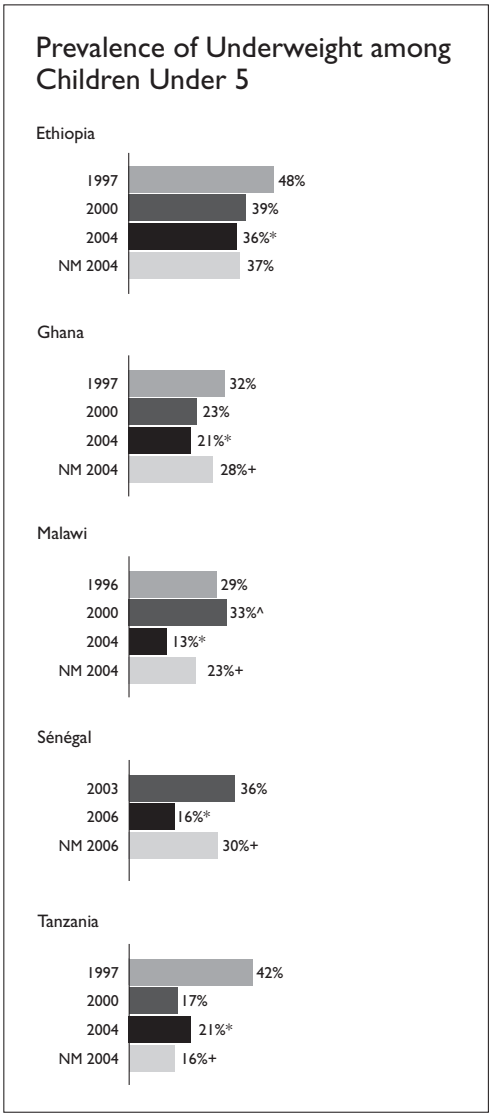
MICAH monitored the growth of children under five as an indicator of overall nutrition and health. The final survey results for anthropometric indicators of nutritional status – stunting, wasting, and underweight – showed improvement in all countries. This suggests that MICAH's multi-sectoral approach, which incorporated reducing the burden of disease while increasing knowledge and access to nutritious foods, has contributed to the improvement in the nutritional status of these children. For a comparative look at the impact on stunting and underweight in all countries, please see the accompanying graphs.

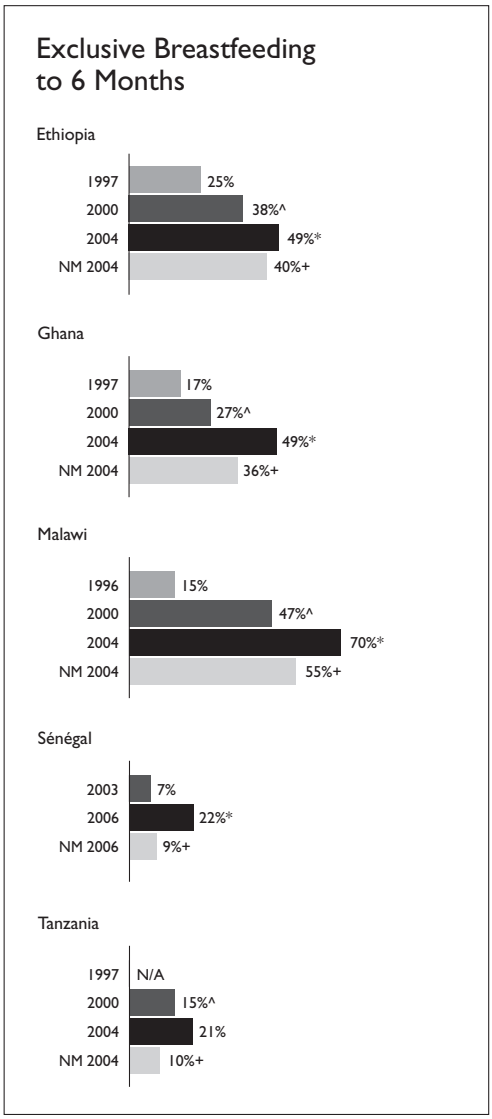
Chronic malnutrition, as measured by stunting, improved significantly compared to the control populations in Ghana. In Ethiopia, the prevalence of stunting decreased from baseline in the MICAH and non-MICAH areas but remained static during Phase 2. MICAH Malawi's rate of stunting decreased during Phase 2, inspite of the famine of 2001/2002.

The prevalence of underweight children (6-59 months), reflecting both past and/or present undernutrition, was significantly lower in MICAH areas than in control areas in Ghana, Malawi and Tanzania. In Ethiopia, underweight decreased significantly in MICAH villages from the baseline to final survey, yet was the same as the non-MICAH areas. In Malawi, a dramatic decline was observed in contrast to the control population, where underweight prevalence was nearly double.



Wasting, an indicator of children suffering from current or acute undernutrition, was relatively constant in most countries, both over time and between MICAH and control areas. In MICAH Ghana, the prevalence of wasting decreased significantly from baseline, although it was similar in control areas.





Exclusive Breastfeeding

Exclusive breastfeeding of infants up to six months gained strong acceptance and adoption during MICAH, with significant changes observed in all countries. See the accompanying graph for country-specific information.

In Ethiopia, exclusive breastfeeding increased significantly throughout the program, was significantly higher (49%) to rates in the non-MICAH areas (40%). Extensive education efforts resulted in significant improvements in Ghana, in contrast to the non-MICAH rate of only 36%.

In Malawi, exclusive breastfeeding increased significantly throughout the program to 70% by 2004, compared with 55% in non-MICAH areas. In Tanzania, significant improvements were observed during Phase 2, as one-fifth of the target now exclusively breastfeeds, compared to only 10% in the control. In Sénégal, significant improvements in exclusive breastfeeding were observed in just three years, from 7% to 22%

Contribution of Results to Millennium Development Goals

Goal 1: Eradicate extreme poverty and hunger
Through dietary diversification and modification, hidden hunger was reduced in all target populations. Women and children now have access to a variety of micronutrient-rich foods. Increased availability and use of micronutrient-rich foods from household gardens and small animals fostered the long-term sustainability of this intervention.

Goal 2: Achieve universal primary education
Improved nutrition had a visible impact on school attendance, as a more nutritious diet made children more alert, easier to teach and more eager to learn. The popularity of school health clubs within students' home communities acted as added motivation for them to continue with their education. "…Absenteeism has noticeably decreased after the initiation of MICAH activities in our school." (MICAH qualitative survey results)

Goal 3: Promote gender equality and empower women
Community training sessions emphasized the value of education for both boys and girls, while school health clubs promoted the concept of equal opportunity for both sexes. School teachers and community members received instruction in gender-related issues.

"(Women) feel that they are more involved in decision making through their sessions. They are building confidence in giving their opinion, even in meetings with men." (MICAH program manager, World Vision Tanzania)

Goal 4: Reduce child mortality
The prevalence of illness among children declined, as communities improved their ability to quickly treat childhood ailments. The promotion of exclusive breastfeeding ensured that infants and children under two received vital nutrients from birth, and for a longer period than they had in the past. "After the modern education by health workers on infant and young child feeding, we now advise to breastfeed without adding any other food, including water, and continue breastfeeding for as long as possible." (Qualitative survey results)

"(Women) feel that they are more involved in decision-making… They are building confidence in giving their opinion, even in meetings with men."
– MICAH program manager, Tanzania

Goal 5: Improve maternal health
Maternal health improved through the introduction and expansion of antenatal care, post-natal care, supplementation, dietary improvement, sanitation, and the alleviation of micronutrient deficiencies linked to mortality among pregnant women and women of child-bearing age.

Goal 6: Combat HIV/AIDS, malaria and other diseases
The frequency of malaria infection declined, due in part to the expanded use of insecticide-treated nets, which were effectively distributed through revolving funds within communities.

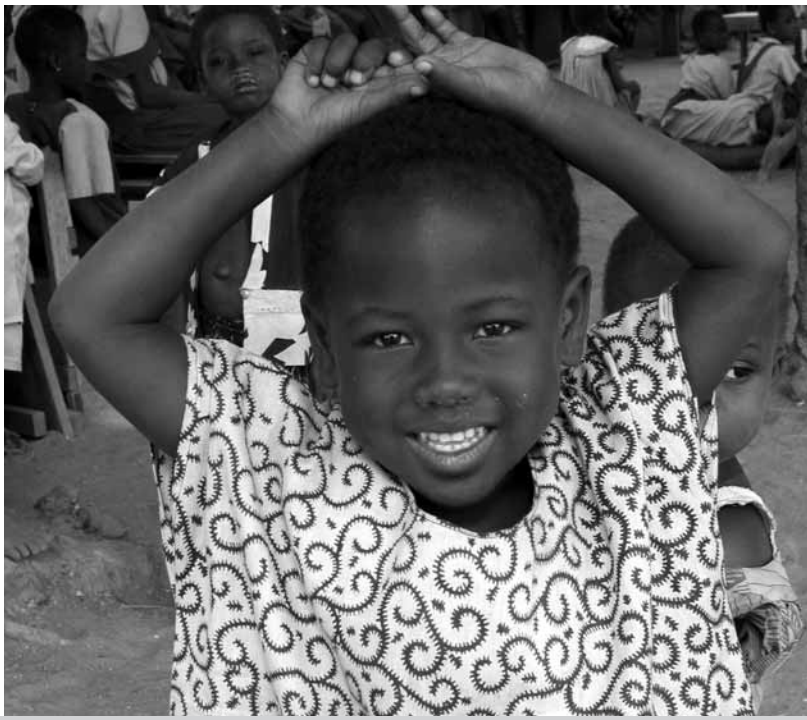
"…children are not falling sick with malaria as frequently as they used to; the frequency of diarrhea and intestinal worms has decreased; eye diseases have decreased because of better hygiene." (Qualitative survey results)

Goal 7: Ensure environmental sustainability
Environmental sustainability within communities improved with the construction of latrines to prevent water contamination, the establishment of safe water points within communities, and the increased proper disposal of household waste and water.

"Improved health status of children was attributed to keeping the homes and surroundings clean and looking after the children's hygiene; the construction of latrines and their use; and better access to clean water." (Qualitative survey results)

Goal 8: Develop a global partnership for development
MICAH was built on a foundation of partnership. The programs worked in close cooperation with all levels of government and community leadership down to the volunteer level in the villages and districts.

"…the collaboration with MICAH has been excellent, which has helped us in attaining our common goals. The district health office is ready to work with the ADP even after MICAH has phased out… After all, most of the MICAH health activities are our mandates." (Qualitative survey results)



"Children are not falling sick with malaria as frequently as they used to, the frequency of diarrhea and intestinal worms has decreased, (and) eye diseases have decreased because of better hygiene."

– MICAH qualitative survey results

Lessons Learned and Recommendations

LESSON LEARNED	RECOMMENDATION
The success of program interventions requires strong multi-sector collaboration between MICAH and national governments and departments, line ministries and field staff, NGOs, international agencies, research and academic institutions, communities and volunteers.	Adopt an integrated approach to ensure key partners and sectors are involved in the planning and execution of health and nutrition programs.
National policy can be influenced when the positive results of programs are shared with decision-makers.	Incorporate advocacy into program planning. Ensure key decision-makers at national and local government levels are aware of good practices and successes of the program.
Continual monitoring of the program at various levels (technical and management support) encourages staff and provides a vehicle to incorporate results-based management.	Ensure program monitoring includes regular site visits to improve implementation.
Networking with other agencies within the country can help to expand inputs (e.g. low-cost ITNs from a local agency in Malawi exceeded coverage targets).	Ensure representation at national-level sectoral meetings as well as regional district meetings to share information and establish links.
Communication and experience-sharing between colleagues (within and between countries) can expand positive practices as well as highlight gaps.	Plan for exchange visits with other similar projects, and encourage visits to model villages.

> Participants gather at a MICAH Workshop in Malawi in July 2005.

LESSON LEARNED	RECOMMENDATION
Community-based support for initiatives built on a strong sense of local ownership will enhance sustainability of project activities.	Work with local leaders and officers (agriculture, health) at the start of the program, to assess community problems and design the implementation plan. To implement interventions that have more opportunities to be sustained by the communities.
Sustained behavioural change cannot be guaranteed after a program of less than five years.	Programs require a five-year time period and secured resources to attain the goal of sustained behaviour change.
Regular monitoring of outputs requires full cooperation of local officers (e.g., agriculture, health). Poor data collection from a lack of clear survey standards can inhibit the effective evaluation of interventions needed to gauge program success and correct deficiencies.	Create reporting forms together with local government officers to enhance data quality; participate in local management meetings to help facilitate information flow, including feedback.
High attrition rate of staff and volunteers may bring initiatives to a halt and create a ripple effect of delays throughout the program.	Plan for ongoing training sessions and consider other incentives to build staff commitment and loyalty and enhance overall program progress.
Consideration should be given when establishing program plans, to ensure adequate time to launch the program. The start-up of both MICAH Phase 1 and 2 required considerably more time than projected in the original design. Many unexpected and surprising events emerged, beyond the control of program staff, which delayed start-up of key program activities and stalled their progress.	Adequate time for program start-up must be anticipated and incorporated into the overall time frame and life of the program, to allow for unforeseen challenges and delays.

Ethiopia MICAH Program Survey Results for Key Indicators

KEY INDICATORS	BASELINE MICAH 1997		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Vitamin A								
Night blindness in children 6-59 months	1246	**4.9**	1981	**0.3**	879	**0.1***	209	**2.4+**
Bitot's spots in children 6-59 months	1246	**6.4**	1979	**1.4**	956	**0**	241	**0**
Vitamin A capsule (VAC) coverage in children 6-59 months	5217	**8.9**	4061	**66.8^**	1817	**70.2***	427	**33.0+**
Night blindness in school-age children	3003	**11.4**	3201	**7.7^**	2397	**3.2***	601	**6.3+**
Bitot's spots in school-age children	3003	**7.5**	3201	**2.7^**	2397	**1.8***	601	**1.0**
VAC coverage in post-partum women	NA	**NA**	2985	**20.6^**	1484	**39.3**	389	**16.2+**
Knowledge of cause of night blindness	2221	**25.8**	3702	**50.8^**	3197	**59.4***	140	**27.1+**
Iodine								
Total goiter rate	3003	**42.4**	2707	**28.6**	2396	**30.9***	601	**10.2+**
Households with iodized salt	106	**48.1**	80	**30.0^**	3409	**1.8***	689	**5.2+**
Knowledge of cause of goiter	4115	**7.9**	4871	**30.3^**	4465	**39.8***	492	**11.4+**
Iron								
Women receiving iron supplements during most recent pregnancy	5067	**9.8**	4635	**20.1^**	4048	**42.6***	953	**9.2+**
Anemia in women 15-49 yrs (Hb <12g/dL)[1]	1150	**15.7**	989	**14.3^**	822	**39.5***	202	**32.2**
Anemia in pregnant women (Hb <11g/dL)[1]	NA	**NA**	NA	**NA**	278	**36.0**	84	**23+**
Knowledge of cause of anemia	9078	**85.4**	7279	**91.2**	7020	**91.4***	996	**89.2+**

[1] Using altitude adjusted cut-off

KEY INDICATORS	BASELINE MICAH 1997		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Exclusive Breastfeeding								
Women exclusively breastfeeding for 6 months	3044	**25.0**	3039	**37.6^**	3023	**49.0***	671	**39.5+**
Women breastfeeding for 24 months	1234	**61.9**	919	**66.9**	1004	**69.4***	207	**65.1**
Anthropometry								
Stunting (Children <5 yrs with height-for-age z-score <-2)	20230[2]	**64.2**	1892	**41.3**	953	**40.8***	299	**43.8**
Wasting (Children <5 yrs with weight-for-height z-score <-2)	20151[2]	**8.0**	1892	**10.0**	953	**8.3**	299	**11.0**
Underweight (Children <5 yrs with weight-for-age z-score <-2)	20307[2]	**47.7**	1892	**39.4**	953	**35.8***	299	**37.2**
Immunization								
BCG	1119	**31.1**	983	**42.2^**	2298	**86.6***	532	**86.8**
DPT3	1119	**27.4**	983	**37.7^**	2156	**92.2***	513	**89.9**
OPV3	1119	**26.4**	983	**39.5^**	1303	**56.9***	451	**15.5+**
Measles	1119	**23.5**	983	**29.0^**	2268	**82.5***	533	**79.2**
Morbidity								
Malaria in women 15-49 yrs	NA	**NA**	NA	**NA**	790	**5.3**	203	**0.0**
Malaria in children <5 yrs	NA	**NA**	NA	**NA**	214	**5.6**	48	**0**
Ascariasis in school-age children	493	**18.7**	439	**11.7^**	400	**1.0***	14	**13+**
Water and Sanitation								
Households with access to protected water source	5391	**30.5**	5371	**39.2^**	4798	**50.2***	1198	**5.8+**
Households with access to sanitary facilities	5385	**10.6**	5335	**21.4^**	4709	**33.1***	1192	**42.2+**

* $p<0.05$ for comparison of MICAH 1997 & 2004

^ $p<0.05$ for comparison of MICAH 2000 & 2004

+ $p<0.05$ for comparison of MICAH 2004 & Non-MICAH 2004

Hb = Hemoglobin

N = Size of total population studied

[2] These data were taken from the National Anthropometric survey of 1992 collected by Central Statistical Authority

Ghana MICAH Program Survey Results for Key Indicators

KEY INDICATORS	BASELINE MICAH 1997		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Vitamin A								
Night blindness in children 6-59 months	1786	**0.2**	1102	**0.1**	811	**0.1**	307	**0.0**
Vitamin A capsule (VAC) coverage in children 6-59 months	NA	**NA**	891	**73.9**	648	**26.1^**	228	**21.9**
Low breast milk retinol (<1.05 µmol/L)	106	**23.6**	149	**11.3**	248	**8.9***	83	**22.9+**
VAC coverage in post-partum women	NA	**NA**	839	**13.2**	829	**62.7^**	283	**21.6+**
Knowledge of cause of night blindness	597	**18.1**	679	**26.5^**	542	**71.6***	137	**38.8+**
Iodine								
Total goiter rate	342	**1.7**	466	**3.6**	491	**3.5**	143	**7.7+**
Low urinary iodine (<20µg/dL) in school-age children	344	**6.7**	422	**8.8^**	446	**4.9**	134	**15.7+**
Households with iodized salt	782	**32.7**	996	**38.4^**	897	**62.5***	297	**16.6+**
Knowledge of cause of goiter	981	**7.1**	954	**51.7^**	899	**78.3***	300	**30.4+**
Iron								
Iron supplementation coverage in women 15-49 yrs	966	**6.8**	831	**85.1^**	888	**91.1***	284	**14.4+**
Anemia in women 15-49 yrs (Hb <12g/dL)	160	**43.0**	490	**28.2^**	536	**17.5***	231	**35.9+**
Women receiving iron supplements during most recent pregnancy	974	**40.5**	994	**61.5^**	899	**98.3***	299	**82.6+**
Anemia in pregnant women (Hb <11g/dL)	59	**62.7**	159	**47.8^**	234	**24.8***	86	**55.8+**
Iron supplementation coverage in children <5 yrs	NA	**NA**	932	**79.4^**	789	**85.1^**	281	**4.6+**
Anemia in children <5 yrs (Hb <11g/dL)	301	**75.2**	455	**64.8^**	620	**31.3***	229	**62.9+**
Anemia in school-age children (Hb <12g/dL)	NA	**NA**	435	**37.9^**	467	**29.8^**	129	**58.9+**
Knowledge of cause of anemia	987	**71.0**	861	**100.0**	895	**97.1***	265	**85.3+**

KEY INDICATORS	BASELINE MICAH 1997		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Exclusive Breastfeeding								
Women exclusively breastfeeding for 6 months	631	**17.4**	798	**27.2^**	758	**49.1***	200	**36.0+**
Anthropometry								
Stunting (Children <5 yrs with height-for-age z-score <-2)	1372	**24.6**	1153	**22.1**	1150	**20.9***	409	**25.7+**
Wasting (Children <5 yrs with weight-for-height z-score <-2)	1372	**21.7**	1140	**12.1^**	1147	**8.6***	410	**10.5**
Underweight (Children <5 yrs with weight-for-age z-score <-2)	1372	**32.3**	1166	**22.6**	1155	**21.0***	413	**27.8+**
Immunization								
BCG	1372	**82.1**	1197	**89.5^**	1181	**92.2***	422	**84.6+**
DPT3	1210	**74.4**	1170	**78.1^**	1120	**82.1***	388	**75.8+**
OPV3	1196	**73.4**	1162	**78.9**	1127	**81.7***	390	**75.4+**
Measles	1140	**63.9**	1148	**66.5^**	1074	**72.3***	363	**61.2+**
Morbidity								
Malaria in women 15-49 yrs	318	**6.0**	610	**7.4^**	188	**2.7**	89	**10.5+**
Malaria in children <5 yrs	282	**18.1**	450	**11.6^**	596	**7.7***	223	**18.8+**
Schistosomiasis in school-age children	182	**19.0**	463	**7.8^**	489	**3.5***	142	**9.9+**
Hookworm in school-age children	182	**4.4**	463	**3.2^**	491	**0.8***	143	**0.7**
Water and Sanitation								
Households with access to protected water source	988	**53.8**	1005	**68.1^**	888	**79.3***	299	**79.7**
Households with access to sanitary facilities	892	**92.0**	1003	**88.9**	898	**90.3**	300	**89.7**

* p<0.05 for comparison of MICAH 1997 & 2004

^ p<0.05 for comparison of MICAH 2000 & 2004

+ p<0.05 for comparison of MICAH 2004 & Non-MICAH 2004

Hb = Hemoglobin

N = Size of total population studied

Malawi MICAH Program Survey Results for Key Indicators

KEY INDICATORS	BASELINE MICAH 1996		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Iodine								
Total goiter rate	1087	**18.9**	732	**5.5**	576	**3.5***	269	**2.3**
Low urinary iodine (<20µg/dL) in school-age children	685	**15.9**	960	**3.2^**	1054	**0.5***	526	**3.6+**
Households with iodized salt	1062	**59.4**	1862	**85.4**	1902	**87.7***	962	**83.1+**
Knowledge of cause of goiter	1148	**7.1**	1969	**92.3^**	1224	**59.2***	302	**24.8+**
Iron								
Iron supplementation coverage in women 15-49 yrs	NA	**NA**	1249	**67.5**	299	**72.3**	147	**8.3+**
Anemia in women 15-49 yrs (Hb <12g/dL)	NA	**NA**	1584	**50.8^**	1518	**38.5**	787	**52.5+**
Women receiving iron supplements during most recent pregnancy	168	**49.4**	212	**46.1**	465	**51.3***	238	**46.2+**
Anemia in pregnant women (Hb <11g/dL)	392	**58.9**	157	**43.8**	203	**48.0***	85	**68+**
Iron supplementation coverage for children <5 yrs	NA	**NA**	NA	**NA**	1061	**67.6**	577	**5.7+**
Anemia in children <5 yrs (Hb <11g/dL)	637	**85.7**	1165	**67.3^**	1337	**59.8***	729	**63.3**
Knowledge of cause of anemia	1068	**84.3**	1967	**91.1^**	307	**95.9***	155	**87.5+**
Possession of small livestock	1272	**54.5**	2300	**68.3^**	1930	**72.1***	988	**54.5+**
Exclusive Breastfeeding								
Women exclusively breastfeeding for 6 months	463	**15.1**	1047	**47.1^**	1089	**69.5***	536	**54.9+**
Women breastfeeding for 24 months	211	**72.9**	527	**69.3**	607	**68.5**	243	**53.7+**

KEY INDICATORS	BASELINE MICAH 1996		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Anthropometry								
Stunting (Children <5 yrs with height-for-age z-score <-2)	504	**55.6**	962	**45.1^**	1387	**40.3***	651	**39.1**
Wasting (Children <5 yrs with weight-for-height z-score <-2)	504	**8.3**	983	**11.7^**	1387	**2.0***	651	**1.6**
Underweight (Children <5 yrs with weight-for-age z-score <-2)	504	**29.0**	979	**33.4^**	1387	**13.0***	651	**23.1+**
Immunization								
BCG	203	**86.2**	356	**93.5^**	502	**98.3***	279	**89.4+**
DPT3	203	**82.3**	356	**91.3^**	502	**94.8***	279	**89.9+**
OPV3	203	**82.8**	356	**88.2^**	502	**95.5***	279	**88.1+**
Measles	203	**77.8**	353	**81.6^**	502	**91.3***	279	**77.3+**
Full immunization	187	**73.0**	353	**75.8^**	502	**88.1***	279	**70.1+**
Morbidity								
Malaria in women 15-49 yrs	NA	**NA**	1593	**22.0^**	1497	**5.4**	780	**4.0**
Malaria in pregnant women	392	**24.2**	157	**17.2^**	199	**7.4***	82	**6**
Malaria in children <5 yrs	648	**32.9**	1165	**32.8^**	1284	**13.4***	694	**13.1**
Hookworm in school-age children	690	**17.7**	1094	**3.4**	1019	**0**	506	**0.3**
Schistosomiasis in school-age children	690	**20.2**	1094	**10.6**	1019	**0**	506	**1.5**
Water and Sanitation								
Households with access to protected water source	1269	**54.9**	2301	**83.9^**	1920	**81.4***	980	**72.7+**
Households with access to sanitary facilities	1269	**48.9**	2294	**89.2^**	1922	**94.0***	984	**90.0+**

* p<0.05 for comparison of MICAH 1996 & 2004

^ p<0.05 for comparison of MICAH 2000 & 2004

+ p<0.05 for comparison of MICAH 2004 & Non-MICAH 2004

Hb = Hemoglobin

N = Size of total population studied

Sénégal MICAH Program Survey Results for Key Indicators

KEY INDICATORS	BASELINE MICAH 2003		FINAL MICAH 2006		FINAL NON-MICAH 2006	
	N	%	N	%	N	%
Vitamin A						
Night blindness in children 24-59 months	335	**0.3**	205	**1.0**	242	**1.6**
Vitamin A capsule (VAC) coverage in children <5 yrs	506	**80.6**	385	**78.7**	442	**82.6**
Low breast milk retinol (<1.05 µmol/L)	77	**32**	21	**38**	24	**33**
VAC coverage in post-partum women	480	**9.8**	300	**41.0***	309	**22.3+**
Knowledge of cause of night blindness	480	**0.6**	295	**25.1***	304	**13.2+**
Iodine						
Total goiter rate	878	**1.2**	568	**1.8**	568	**0**
Low urinary iodine (<20µg/dL) in school-age children	84	**40**	32	**32***	36	**31+**
Households with iodized salt	366	**30.3**	310	**78.7***	311	**63.7+**
Knowledge of cause of goiter	433	**1.2**	312	**18.6***	306	**4.9+**
Iron						
Iron supplementation coverage in women 15-49 yrs	NA	**NA**	173	**26.0**	248	**7.0+**
Anemia in women 15-49 yrs (Hb <12g/dL)	267	**76.0**	255	**65.4***	246	**77.2+**
Women receiving iron supplements during most recent pregnancy	283	**5.3**	47	**72***	52	**48+**
Anemia in pregnant women (Hb <11g/dL)	67	**81**	26	**65***	27	**85+**
Iron supplementation coverage for children <5 yrs	593	**0**	383	**15.9**	439	**3.0+**
Anemia in children <5 yrs (Hb <11g/dL)	486	**84.8**	236	**68.6***	262	**79.0+**

KEY INDICATORS	BASELINE MICAH 2003		FINAL MICAH 2006		FINAL NON-MICAH 2006	
	N	%	N	%	N	%
Breastfeeding practices						
Women exclusively breastfeeding for 6 months	460	**7.0**	408	**21.8***	452	**9.3+**
Women breastfeeding for 24 months	109	**73.4**	105	**79.1**	118	**56.8+**
Anthropometry						
Stunting (Children <5 yrs with height-for-age z-score <-2)	887	**36.2**	258	**24.7***	316	**15.2+**
Wasting (Children <5 yrs with weight-for-height z-score <-2)	879	**12.6**	258	**5.8***	314	**19.4+**
Underweight (Children <5 yrs with weight-for-age z-score <-2)	904	**36.0**	264	**15.8***	327	**29.7+**
Immunization						
BCG	198	**91.9**	139	**33.1***	136	**38.2**
DTCP3	198	**77.8**	139	**31.6***	136	**26.5**
Measles	198	**79.3**	139	**23.7**	136	**19.8**
Morbidity						
Malaria in pregnant women	74	**5.4**	26	**0**	26	**0**
Malaria in children <5 yrs	531	**10.9**	331	**5.4***	319	**6.3**
Hookworm in children <5 yrs	NA	**NA**	291	**0.7**	287	**0.3**
Ascariasis in children <5 yrs	369	**2.4**	291	**3.1**	287	**3.0**
Prevalence of measles in children <5 years	565	**3.0**	387	**1.3**	453	**0.4**
Water and Sanitation						
Households with access to protected water source	391	**32.6**	321	**64.2***	323	**74.6+**
Households with access to sanitary facilities	391	**80.3**	321	**62.3**	324	**75.3+**
Prevalence of intestinal parasites in children <5 yrs	369	**14.4**	259	**5.7***	277	**10.1**

* $p<0.05$ for comparison of MICAH 2003 & 2006

+ $p<0.05$ for comparison of MICAH 2006 & non-MICAH 2006

Hb = Hemoglobin

N = Size of total population studied

Tanzania MICAH Program Survey Results for Key Indicators

KEY INDICATORS	BASELINE MICAH 1997		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Vitamin A								
Night blindness in children 5-59 months	NA	**NA**	1971	**4**	1445	**0**	313	**0**
Vitamin A capsule (VAC) coverage in children 5-59 months	1035	**9.0**	1283	**37.1^**	1244	**83.4***	289	**75.9+**
Low breast milk retinol (<1.05 µmol/L)	153	**94.1**	207	**52.6**	173	**0**	42	**0**
VAC coverage in post-partum women	1035	**10.0**	1276	**26.3^**	655	**83.2***	109	**79.8**
Knowledge of cause of night blindness	273	**19.8**	270	**23.7**	458	**23.1**	289	**8+**
Iodine								
Total goiter rate	614	**8.6**	380	**0**	207	**0**	41	**0**
Low urinary iodine (<20µg/dL) in school-age children	NA	**NA**	309	**4.7^**	207	**0.5**	41	**0**
Households with iodized salt	NA	**NA**	1218	**41.1^**	1277	**71.7**	290	**50.7+**
Knowledge of cause of goiter	NA	**NA**	549	**23.1**	740	**21.2**	88	**3+**
Iron								
Anemia in women 15-49 yrs (Hb <12g/dL)	1038	**71.8**	1297	**65.4^**	75	**51***	20	**35**
Women receiving iron supplements during most recent pregnancy	NA	**NA**	1255	**77.8^**	1282	**89.2**	280	**72.9+**
Anemia in pregnant women (Hb <11g/dL)	62	**87**	82	**72**	86	**73***	35	**71**
Iron supplementation coverage for children <5 yrs	NA	**NA**	NA	**NA**	1172	**25.9**	275	**13.8+**
Anemia in children <5 yrs (Hb <11g/dL)	1075	**88.1**	1754	**77.2**	501	**75.2***	160	**74.4**
Knowledge of cause of anemia	1378	**78.9**	1047	**55.4^**	1862	**77.8**	338	**76.0**

KEY INDICATORS	BASELINE MICAH 1997		FOLLOW-UP MICAH 2000		FINAL MICAH 2004		FINAL NON-MICAH 2004	
	N	%	N	%	N	%	N	%
Exclusive Breastfeeding								
Women exclusively breastfeeding for 6 months	NA	**NA**	1180	**15.1^**	1218	**20.7**	274	**9.9+**
Anthropometry								
Stunting (Children <5 yrs with height-for-age z-score <-2)	978	**42.8**	1984	**40.0^**	1263	**27.5***	316	**30.7**
Wasting (Children <5 yrs with weight-for-height z-score <-2)	1040	**18.5**	1983	**6.7**	1263	**7.5***	316	**4.1+**
Underweight (Children <5 yrs with weight-for-age z-score <-2)	1013	**41.8**	1994	**16.8**	1263	**20.7***	316	**15.8+**
Immunization								
BCG	1073	**90.9**	1068	**96.2^**	1239	**97.7***	276	**94.9+**
DPT3	1080	**78.9**	1075	**95.5^**	1213	**92.6***	266	**90.2**
OPV3	1078	**78.8**	1073	**96.2^**	1132	**89.4***	246	**88.2**
Measles	1070	**75.4**	1066	**84.8^**	1110	**81.5***	248	**79.8**
Morbidity								
Malaria in pregnant women	76	**16**	82	**2**	60	**5***	22	**14**
Malaria in children <5 yrs	1641	**35.3**	1984	**9.8^**	502	**6.4***	59	**15.3+**
Schistosomiasis in school-age children	NA	**NA**	NA	**NA**	264	**2.7**	20	**0**
Intestinal parasites in school-age children	NA	**NA**	NA	**NA**	280	**5.7**	46	**11**
Water and Sanitation								
Households with access to protected water source	1031	**38.6**	1255	**35.5^**	1193	**46.9***	278	**0.5+**
Households with access to sanitary facilities	1070	**75.6**	1264	**77.2^**	1274	**68.7***	284	**51.1+**

* p<0.05 for comparison of MICAH 1997 & 2004

^ p<0.05 for comparison of MICAH 2000 & 2004

+ p<0.05 for comparison of MICAH 2004 & Non-MICAH 2004

Hb = Hemoglobin

N = Size of total population studied

Glossary of Terms

Acute Malnutrition – Abrupt reductions in a child's weight are related to immediate changes in food availability and/or disease. The indicator for acute malnutrition is wasting.

Anemia – The condition of reduced hemoglobin levels (<11.0 g/dL for pregnant women and children <5 yrs; <12.0 g/dL for women and school-aged children) in the blood. It can be caused by a variety of factors, including iron deficiency, malaria, and parasitic infections such as hookworm.

Ascariasis – Intestinal worm infection.

BCG – Bacillus Calmette-Guerin: A type of bacteria consisting of attenuated human tubercle bacilli, used to vaccinate against tuberculosis.

Chronic Malnutrition – Poor dietary intake over a long period of time, particularly in early childhood, is reflected in slowed growth in height; the indicator for chronic malnutrition is the prevalence of stunting.

DDM – Dietary Diversification and Modification.

DHS – Demographic and Health Survey: These country-wide surveys are conducted periodically by the national governments.

DPT – Diptheria, Pertussis, Tetanus: A combination vaccine against diphtheria and pertussis (whooping cough) and tetanus. DPT3 refers to the third dose.

DTCP3 – Diptheria, Tetanus, Pertussis, Polio: A combination vaccine against DPT and Polio. DTCP3 refers to the third dose.

Exclusive Breastfeeding – Feeding an infant no food or liquid (including water) other than breast milk. WHO and UNICEF recommend infants be exclusively breastfed for the first six months of life.

Fortification – The process of adding vitamins and minerals to foods.

Goiter – Enlargement of the thyroid gland, caused by iodine deficiency.

HAZ – Height-for-age z-score.

Hb – Hemoglobin – the oxygen carrying protein found in red blood cells, containing iron; an indicator of anemia when below 12 g/dL (women).

IEC – Information, Education and Communication – activities designed to disseminate health information messages.

IDD – Iodine Deficiency Disease

Iodine Deficiency (clinical) – Defined as a public health problem when Total Goiter Rate is >30 (severe); 20-29% (moderate); 5-19% (mild) in school-age children.

Iodine Deficiency (sub-clinical) – Defined as a public health problem when median urinary iodine in school-age children is <20 µg/L (severe); 20-49 (moderate); 50-99 (mild).

MICAH – World Vision Canada's MICronutrient And Health program, funded by CIDA and implemented in five African countries. MICAH took place between 1996 and 2005. It integrates strategies of supplementation, fortification, dietary diversification and modification and primary health care interventions (e.g. clean water and sanitation, prevention and control of parasitic infections, immunizations) to achieve the goal of improving the nutrition and health of women and children through the most cost-effective and sustainable strategies.

MOH – Ministry of Health.

Night Blindness – difficulty seeing in the dim light of evening; a symptom of vitamin A deficiency.

NM – Non-MICAH – referring to a representative sample of households from villages similar to MICAH villages, but which did not receive the benefit of direct implementation of MICAH program activities.

OPV – Oral poliovirus vaccine that is given to provide immunity to poliomyelitis. OPV3 refers to the third dose.

PRSP (Poverty Reduction Strategy Paper) – The economic action plans developed by nations benefiting from the Jubilee 2000 debt cancellation initiative.

Schistosomiasis – A parasitic infection contracted from snails in stagnant water. Also known as bilharzia.

Statistical Significance – Indicated by these symbols:

* refers to $p<0.05$ for comparison of MICAH 1997 & 2004

^ refers to $p<0.05$ for comparison of MICAH 2000 & 2004

+ refers to $p<0.05$ for comparison of MICAH 2004 & Non-MICAH 2004

Stunting – An indicator of chronic malnutrition. Stunting is measured in children 6-59 months and defined as height-for-age less than minus two standard deviations of the international reference median.

Underweight – An indicator of both acute and chronic malnutrition. Underweight is measured in children 6-59 months and defined as weight-for-age less than minus two standard deviations of the international reference median.

Vitamin A Deficiency (clinical) – Defined as a public health problem when prevalence of Bitot's spots is greater than 0.5% in children 6 to 71 months of age.

Vitamin A Deficiency (sub-clinical) – Defined as a public health problem when at least two of the following biological indicators of vitamin A status are below the cut-off:

- Night blindness in children 24 to 71 months of age is greater than 5% (severe), between 1% and 5% (moderate) and <1% (mild).
- Serum retinol in children between 6 and 71 months of age – the prevalence of low serum retinol (<0.70 µmol/L) is greater than 20% (severe), between 10% and 20% (moderate) and between 2% and 10% (mild).
- Breast milk retinol – the prevalence of low breast milk retinol (<1.05 µmol/L) in women is >25% (severe), between 10% and 25% (moderate), and <10% (mild).

Wasting – An indicator for acute malnutrition. Wasting is measured in children 6-59 months and defined as weight-for-height less than minus two standard deviations of the international reference median.

WAZ – Weight-for-age z-score.

WCBA – Women of childbearing age (15-49 years).

WHZ – Weight-for-height z-score.

Z score – The z-score for an individual indicates how far and in what direction, the person's anthropometric measurement deviates from the international reference median. It is expressed in units of standard deviations (SDs).

MICAH Project Areas

Africa: MICAH Countries Highlighted

A MICRONUTRIENT AND HEALTH PROGRAM FOR AFRICA

A collaborative effort of:

Canadian International Development Agency | Agence canadienne de développement international

Canada

World Vision