



Nestlé Foundation

for the study of problems of nutrition in the world



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FOCUSED AND GLOBAL – THE FOUNDATION FOR THE STUDY OF THE PROBLEMS OF NUTRITION IN THE WORLD

HIGH-IMPACT – RESEARCH PROJECTS TO REDUCE MALNUTRITION

INNOVATIVE – FOR SUCCESS

CAPACITY BUILDING – AS A BASIS FOR IMPROVEMENT

SUSTAINABILITY – A KEY MISSION

ENDURABLE NUTRITION – THE PRESCRIPTION FOR SUCCESS

PUBLIC HEALTH – ORIENTATED

EVIDENCE-BASED – PROACTIVITY

THE FOUNDATION AT A GLANCE

PARTNERSHIP – FOR LONG-TERM SUCCESS

SOLUTION – ORIENTED ACTION RESEARCH

enLINK-ing FOR A BETTER WORLD



CAPACITY BUILDING



enLINK-ing FOR A BETTER WORLD



PUBLIC HEALTH ORIENTATED



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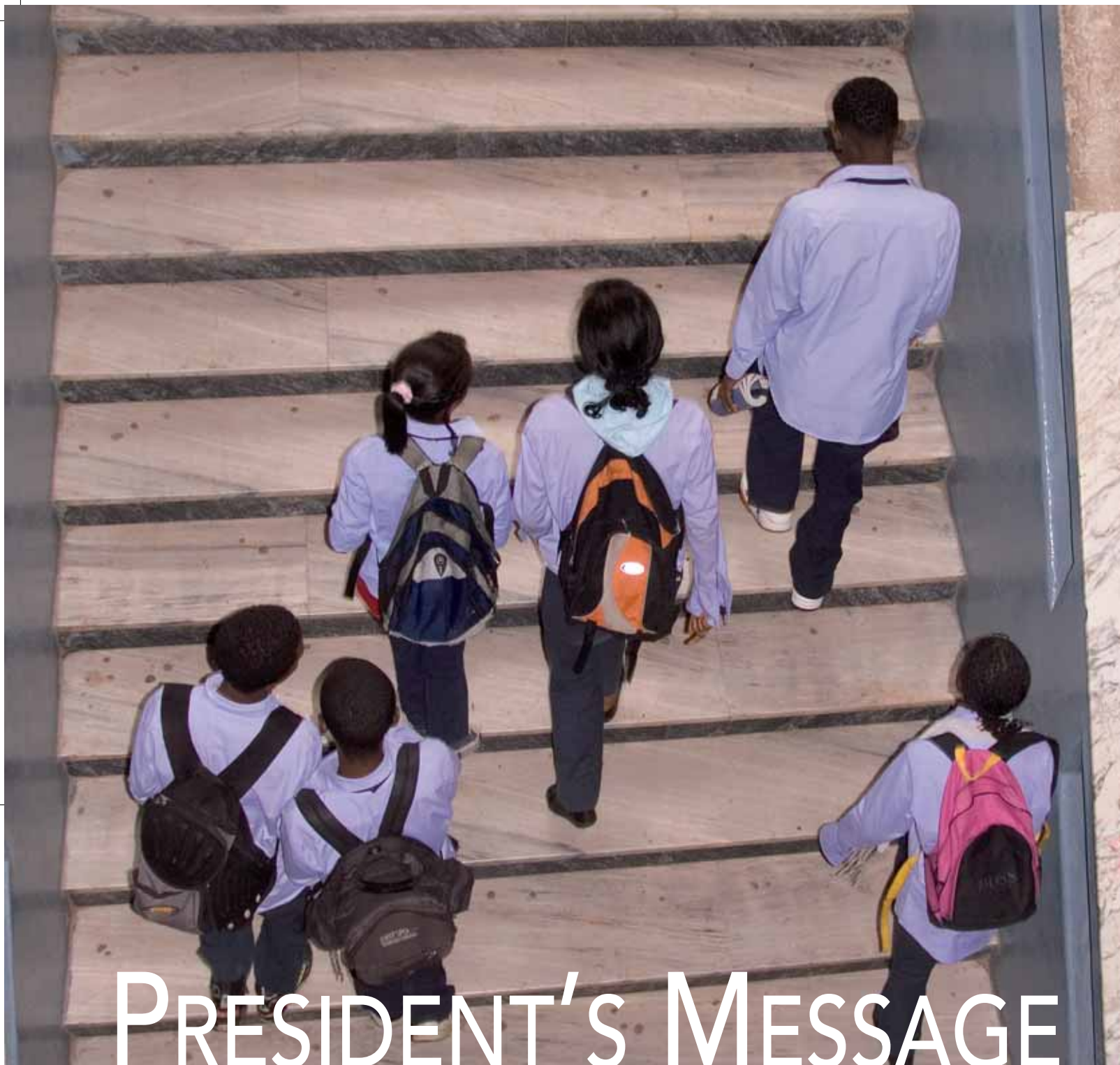
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PRESIDENT'S MESSAGE

The Nestlé Foundation has been involved in the fight against malnutrition for 42 years. It is appropriate to recall that the first of the UN Millennium Development Goals is to “eradicate extreme poverty and hunger”. Yet in 2008, more than 2 billion people in the world were still suffering from malnutrition. Up until the 1980s, efforts to combat malnutrition in developing countries were focused on protein-energy malnutrition (PEM). When severe, PEM induces wasting and stunting in children, adverse effects that are easily diagnosed. Today, it is recognized that micronutrients deficiency, a more hidden form of malnutrition, is widespread. The most common forms of micronutrient malnutrition (MNM) are iron, vitamin A and iodine deficiencies. MNM affects more than one third of the world's population,

mainly in developing countries. In addition to the obvious clinical manifestations of specific micronutrient deficiencies, MNM is responsible for non-specific health impairments leading to alterations in psychomotor development in children and to reduced resistance to infections.

The best way of preventing MNM is providing access to a balanced diet, sufficient in quantity and quality, for the different population groups. It is well known that diet diversification and consumer education about the foods that provide a balanced diet is the best strategy to prevent malnutrition. However, this food-based approach is often not achievable in the case of poorer populations, due to a lack of resources for producing and purchasing higher

quality foods. Improving the nutritional quality of food crops with classical plant breeding techniques is a promising and sustainable approach to providing micronutrients. Micronutrient fortification of staple food that is consumed by the population at risk of a nutritional deficiency is widely used for reducing MNM. Fortified foods, however, are not a substitute for a balanced diet and cannot meet the requirements of all micronutrients in low-income population groups with multiple micronutrient deficiencies. Supplementation is the provision of micronutrients in the form of pills, capsules or syrups. The example of a single, high-dose vitamin A supplement that improves vitamin A stores for 4 to 6 months shows that this approach can be effective to prevent one of the world's most significant vitamin deficiencies. Unfortunately, a lack of supplies and poor compliance have often been reported in large-scale supplementation interventions for providing vitamin A.

The Nestlé Foundation has been involved in stimulating and supporting many nutritional studies using the above described approaches to correct micronutrient deficiencies in developing countries. The results of these studies are often encouraging, demonstrating a positive effect of either supplementation of micronutrients or food fortification programmes by reducing PEM and MNM in at-risk population groups. The sustainability of these interventions is, however, highly dependent on the degree of involvement of the governments of the countries in which these studies are carried out. The fastest improvement in the micronutrient status of targeted population groups is provided by supplementation of micronutrients, but this is the least sustainable approach. Food fortification has a wider and more sustained than supplementation. Finally, the ultimate goal is to implement the food-based approach by using locally produced foods. The purpose is to increase dietary diversity and to allow access to micronutrient-rich foods; in addition, the provision of enough energy and protein to cover these fundamental nutritional needs is essential for optimal health.

The Nestlé Foundation understands that the improvement of health in developing countries is not only dependent on adequate nutrition. Implementation of hygiene and simple public health measures for preventing diseases play a complementary role. Supporting the education of health personnel and university students in the field of disease prevention is also an aim of the Foundation. In this Report, several contributions emphasize the importance of education in developing countries for improving health.

Because the adverse effects of malnutrition have devastating and long-lasting consequences on foetal and child growth, cognitive development, resistance

to infections and on many other specific health issues, the first of the Millennium Development Goals, to “eradicate extreme poverty and hunger”, merits the highest priority in development aid worldwide.

I take this opportunity to thank the Council members and advisors for their excellent contributions to our activities. The Director, Professor Paolo Suter, has been particularly successful in his efforts in encouraging new collaborations with scientists of developing countries; I am very grateful to him for these achievements. I also thank Mrs. C. Lieb, the assistant to the Director, for her dedication to the everyday tasks. I also want to express my gratitude to Mr. Peter Brabeck, President and Chief Executive of the founding company, to Mr. Richard Laube, Director, and to Dr. Irène Cortésy for their interest in our activities.

Prof. Dr. E. Jéquier
President Nestlé Foundation



One of the Foundation's main aims is the transfer of scientific and technological knowledge to low-income countries. The Foundation advances nutritional science both by supporting nutrition research projects in established institutes and universities and by giving focused support to existing nutrition schools and educational programs. To further fulfil the mandate of the Council and also encourage sustainable improvement in nutrition, a proactive strategic area of activities was introduced in 2003: The enLINK Initiative.

This year the mobile enLINK nutrition library trunk has been added. In addition several e-books have been added to the digital library.

PROJECTS INITIATED BY THE FOUNDATION

THE enLINK INITIATIVE

- Study of the Vitamin A value of spirulina carotenoids in humans
- The enLINK digital library
- The enLINK hard-copy service
- Mobile enLINK library:
 - The large enLINK library trunk
 - The small enLINK library trunk
- e-Learning

enLINK



THE enLINK INITIATIVE

Sustainability and public health relevance are key issues for all activities of the Foundation. Research projects need to result in a short- and long-term public health implementation. Knowledge and know-how have to be sustainable at all levels of the population.

The vast experience of the Foundation's Council members as well as the Foundation's past activities led to the creation of the **enLINK Initiative**, a project which illustrates the proactivity of the Foundation regarding its core issues.

This initiative focuses on information transfer in the area of nutrition and malnutrition as well as on the resolution of specific research questions and their implementation at the public health level.

The name enLINK comes from the old English verb "to enlink", meaning "to chain together" or "to connect, as by links". The analysis of the semantic relations of "enlink" reveals related words which illustrate our central concepts and aims: to connect, to join, to associate, to unite, to tie, to conjoin.

Our mission is to link and join cultures, to associate and conjoin institutions and people locally to study and diminish the problems of malnutrition globally.

Malnutrition can only be solved by "enlinking" – connecting – different strategies and approaches. Malnutrition has to be addressed universally by joint strategies which address many levels, looking at the level of medical issues (such as infection) and hygiene (such as water quality), proposing changes at the level of agriculture as well as in the society at large, and, last but not least, working to improve the level of education and information.

The **enLINK Initiative** has three main levels:

1. **e**xploration in **n**utrition, which represents the research level
2. **e**ducation in **n**utrition, targeting populations such as researchers, medical doctors, or health care workers, or the general population or specific population groups such as women
3. **e**ndurable **n**utrition

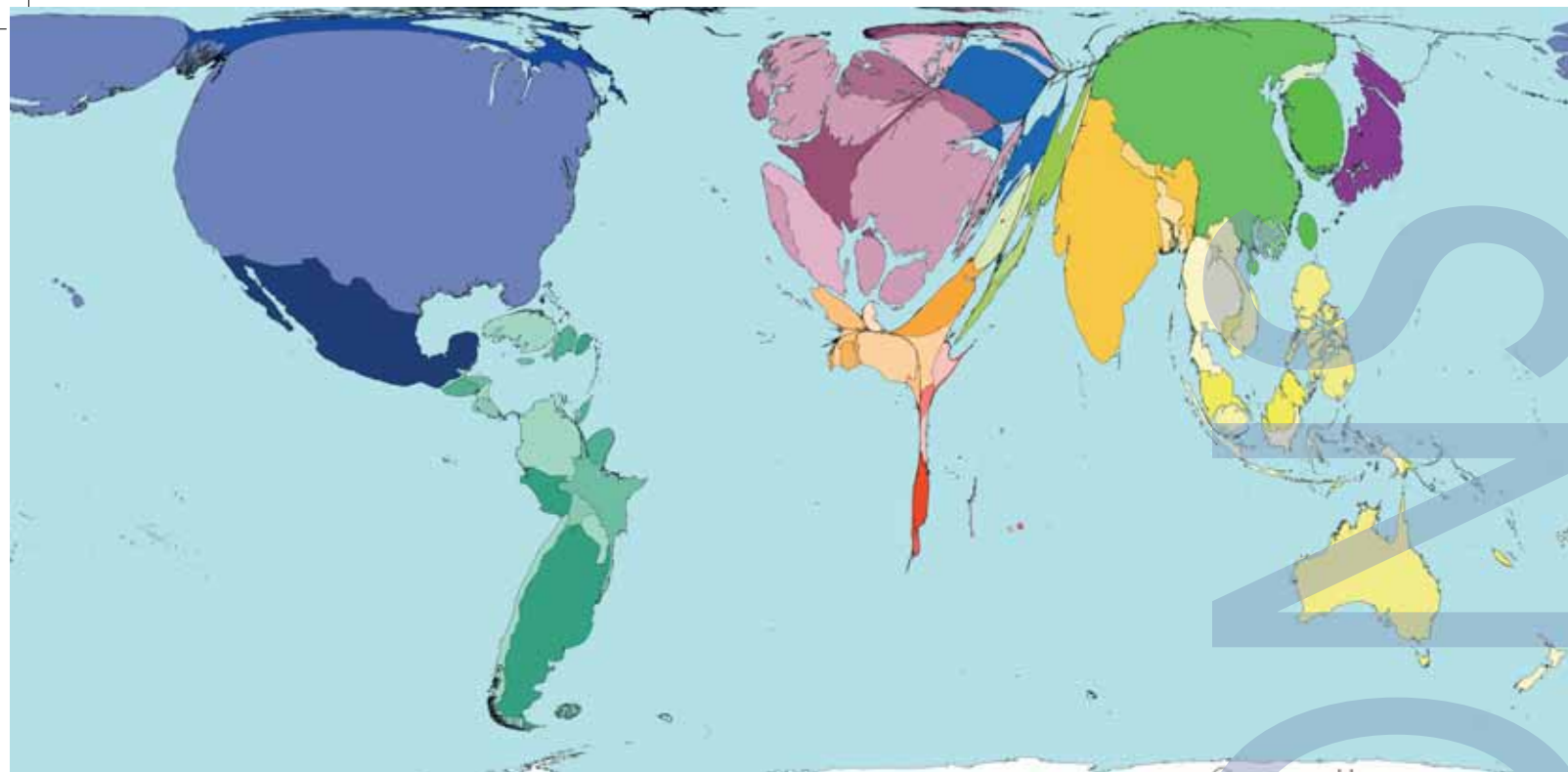
The elucidation of the bioavailability of provitamin A from spirulina algae has been studied in a metabolic ward study. The results of this first research project initiated by the Foundation has been published by Wang et al. (National Institute for Nutrition and Food Safety, Beijing, China) in the American Journal of Clinical Nutrition (see reference section at the end of the report). This paper can be regarded as one of the most important publications in vitamin A research. This enLink research showed that spirulina provitamin A has a high conversion rate to vitamin A and might therefore play a central role in the control of vitamin A deficiency. A follow-up study in form of an enLINK initiated intervention trial is currently ongoing in China.

The **enLINK** library – the electronic nutrition library – represents the core component of the educational level of the initiative. Information access is the key issue in education and for any improvement. Despite the internet and different digital media, printed documents in the form of books and other publications remain the cornerstone for education and information transfer. This is especially true for low-income countries where internet access is not yet fully developed or even lacking. Therefore books and printed materials are indispensable. The small and large orange **enLINK** library trunks are the new addition for sustainable capacity building.



"If you think education is expensive, try disease."





THE enLINK CIRCLE:

enLINKing actions and solutions

Finding solutions through action research

Four years ago the Foundation called the enLINK initiative into life. During the more than 40 years of the existence of the Foundation it had become obvious that nutrition is only one, but nevertheless a central aspect, for improving life and health in low-income countries. It becomes increasingly evident that nutrition cannot be regarded in isolation but has to be one main pillar among other issues: Nutrition goes hand in hand with medicine, hygiene, public health, agriculture and education. Only in the setting of a well-balanced interplay among these disciplines will health, economic well-being and finally also a happy, satisfying life ensue.

One of the main aims of the activities of the Foundation is capacity building. Capacity building corresponds to skill and competence building, or, more generally, education. There is no education without the possibility of access to information. Despite the advances in information technology the digital divide and lack of access to information resources is increasing and remains a major obstacle in many areas of the world.

Correctly targeted and focused provision of information leads to measurable changes in behaviour such as hygiene, agricultural practices, food habits, child feeding practices and basic medical care, just to mention a few. In disease prevention or also prevention of malnutrition, know-how and knowledge is of basic importance. There is no prevention in any field without the transfer of knowledge. The transfer of knowledge is not easy and definitely more time-consuming and also costly

than the distribution of, for instance, food or nutrient supplements. Yet in the long run a sustainable improvement can only take place when knowledge is transferred. "If you think education and prevention is expensive, try disease" – a well-known saying illustrates the central role of education and know-how transfer. There is no prevention without education and know-how. Implementing the different components of the enLINK circle in a sustainable manner is the basis of preventive health care and health-promotion activities and has been implemented by the Foundation for more than four decades.

The primary aim and focus of all public health intervention is to prevent disease conditions through focused surveillance and targeted promotion of healthy behaviors. One of the key tools in prevention is education. However, transfer of knowledge and also education can only take place when there is access to information. Access to information can take place in different circumstances, starting at the latest in primary school. Education represents a continuum starting early in life and is a never-ending endeavour. As illustrated in the Worldmapper map "Primary Education Spending Growth", in many areas of the world the spending for education is lagging behind in an increasingly disproportional manner. Actually even a small increase in access to information would result in a disproportional improvement of health within a short time frame. The transfer of already only a little knowledge in basic issues of medicine, hygiene, public health or agricultural issues would have a much larger impact than many if not most technology-driven approaches.

The Foundation is active in the promotion of research capacity in the field of nutrition. The Worldmapper map "Science Research" illustrates that the number of scientific papers published by

researchers in the United States was more than three times as high as that of the second highest-publishing population, Japan. Not surprisingly, more scientific research and the publication of results takes place in richer territories. This locational bias is nevertheless reflecting not only inequalities in allocation and distribution of research money but especially also of know-how. The primary aim of research supported by the Foundation is transfer of knowledge which can be applied in a sustainable manner even in the face of limited monetary resources. Much research is problem-oriented instead of solution- and action-oriented. "Action Research", i.e. learning by focusing on local problems and solutions, is of key importance for the Foundation.

Map Legend:

Primary Education Spending Growth (map on page 10): The territory size shows the proportion of all increases in spending on primary education between 1990 and 2001 that have occurred in the corresponding region. Between 1990 and 2001 state spending on primary education has increased in 130 of the 200 territories mapped – in nearly one third of countries no increase occurred.

On the map on page 11 **Science Research Publications** - the territory size represents the proportion of all scientific papers published in 2001 written by authors living in the corresponding region. In 2001 in the United States 690 scientific publications (from the disciplines physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering, technology, and earth and space sciences) were published per million people. In Central Africa (5.6) or Southeastern Africa (11.3) the number was negligibly low.

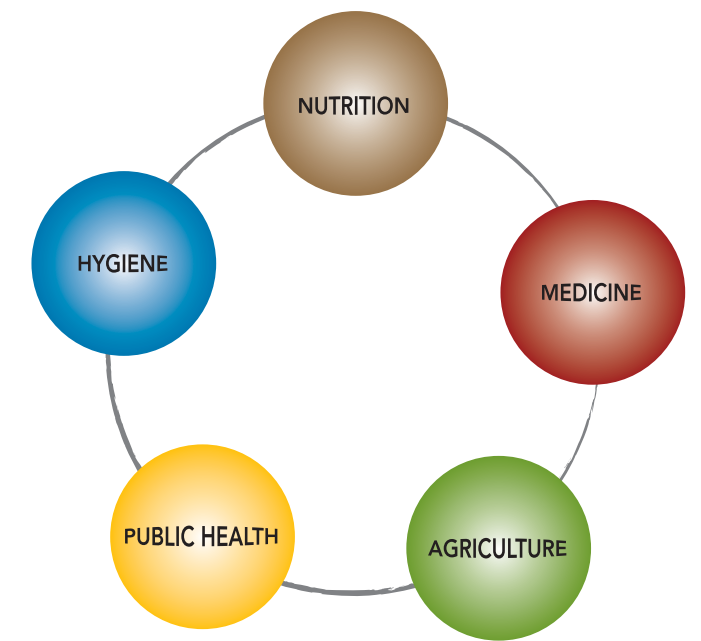
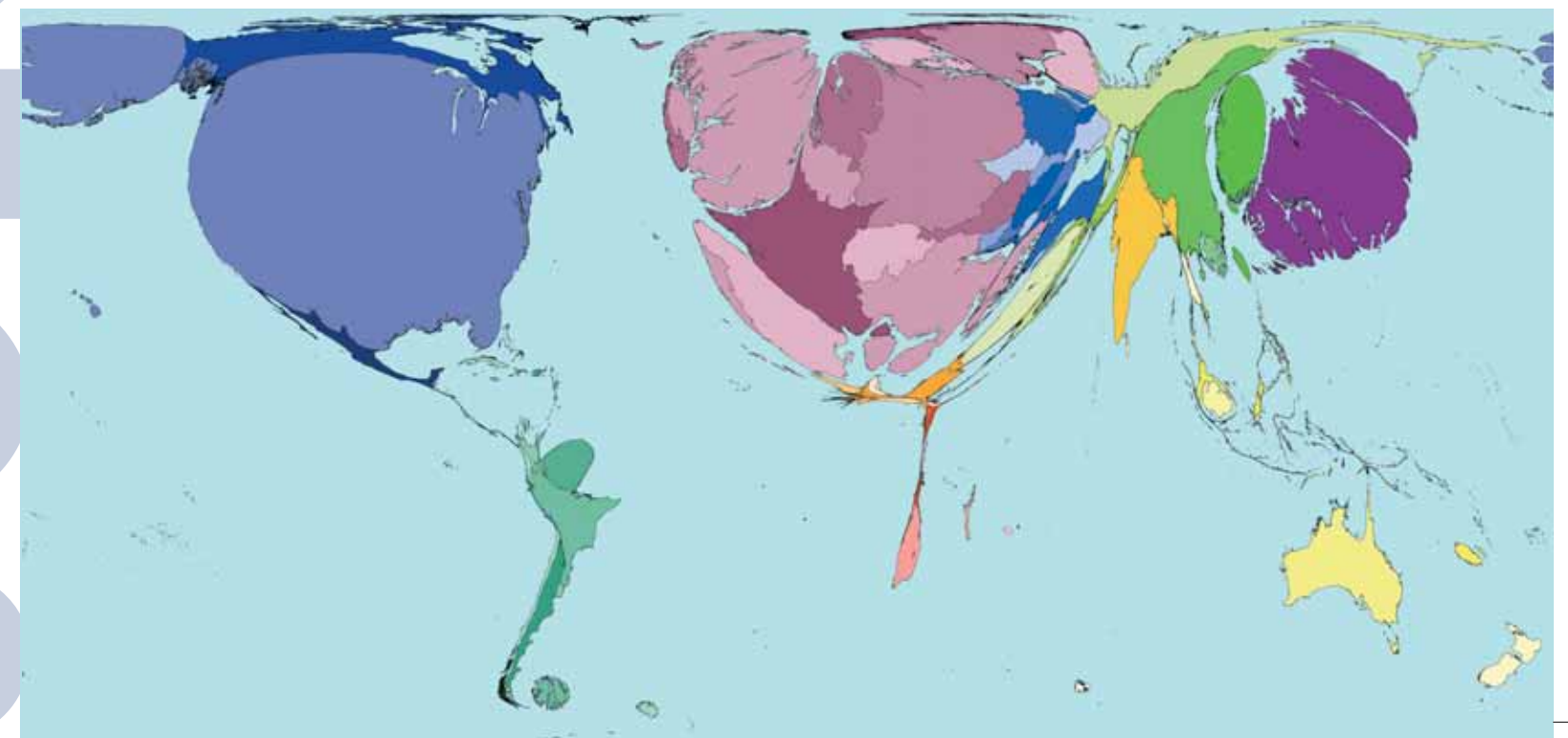


Figure 1: The five central fields of intervention for the control of poverty, malnutrition and hunger





CAPACITY BUILDING- BUSINESS AS USUAL?

The major mandate of the Foundation is capacity building in the field of nutrition. One of the main pillars to achieve capacity building is by supporting research activities in different fields of nutrition research. During the more than 40 years since the creation of the Foundation several hundred research projects have been supported; these have led in many instances to implementation of the research results and a resulting improvement of the nutritional status of certain population groups or even the whole population (e.g. wheat fortification with iron in Peru).

Health research, which includes aspects of research in the field of nutrition, is in many low-income countries difficult or even non-existent. One central condition for successful health research is the availability of a well-functioning health system offering the basic services for health maintenance and also health education. Unfortunately, in many low-income countries this basic condition is not fulfilled. Obviously such a setting is not an ideal place for high-powered research activities in the fields of modern health research, which focuses in the developed world more and more on molecular and genetic issues. Fortunately many national and international organisations as well as the governments of many countries are trying to establish or build up basic health services.

Modern research is without a doubt fascinating and important and will often lead also to new therapeutic options and the elimination of certain diseases. Despite these promising developments the implementation of today's research results in low-income countries will lag behind the implementation in the developed world simply due to the fact that basic health systems are not established and that the new therapeutic options are often unaffordable for the majority of the population. In such a setting only a small fraction of the population can gain access to new developments, leaving the majority without access to even basic health care.

Health is a continuum which starts with basic health care and ends at the molecular level. In the modern world, priority is set at the molecular level, leaving basic health care aside. This is an acceptable approach in Western countries with an established basic health care system, but it is not a good strategy in low-income countries with a suboptimal or often simply no basic health care system. As Professor Riley mentions in his VISION 2008 article on page 52, prevention of diseases leads to improvement and not necessarily the treatment of diseases. Prevention is promoted in basic health care facilities and these basic health care institutions have to be built, maintained and supported in a sustainable manner.

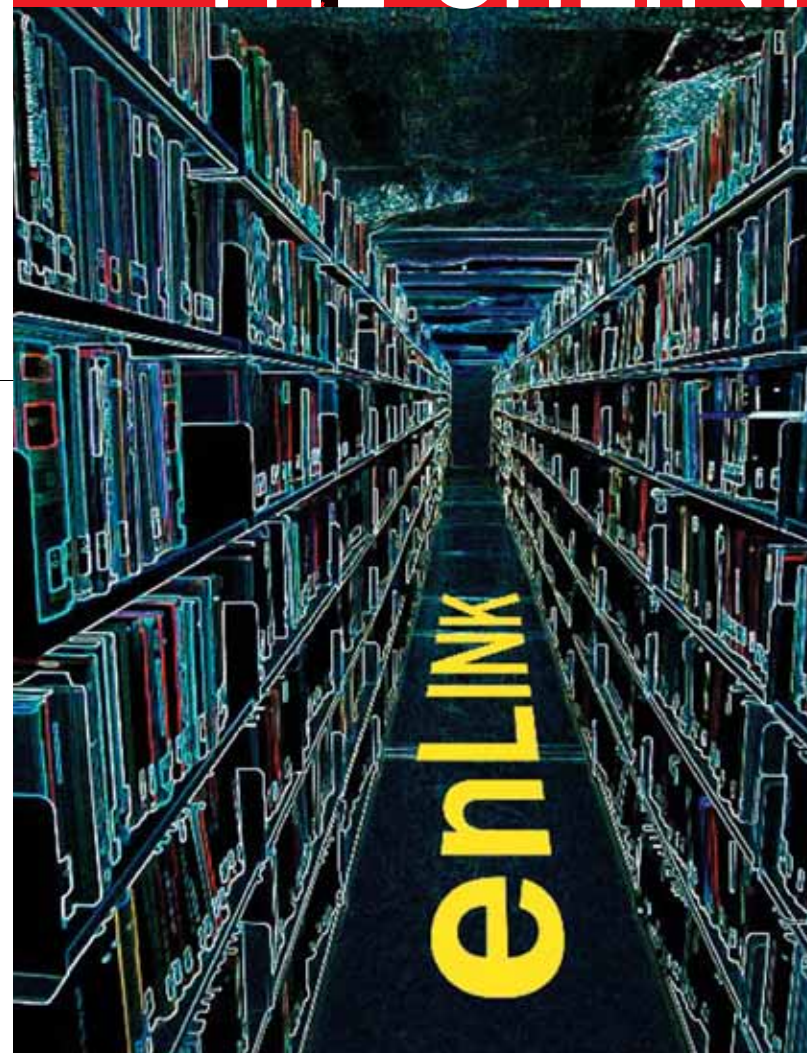
The Foundation is engaged in capacity building in different low-income countries, especially on the African continent. In many aspects of life the "one size fits all" approach will not lead to success, and especially not in Africa, since the African continent is too diverse and heterogeneous. Fortunately the "one size fits all" approach will work in the area of capacity-building activities, since the basic health problems are everywhere similar or even identical. This applies also to the solutions. Accordingly the Foundation as well as other organisations focus on action research with a strong (local) solution-orientated strategy. All activities of the Foundation contain a strong component of local competence building which will enable the creation of local solutions. No successful local solutions can be built without basic knowledge. The local problems can be solved with "global knowledge" but this knowledge has to trickle down to those who need it. The enLINK initiative is a starting point to achieve this condition.

Everybody has the right to know the basic facts of life – this includes access to know-how in health, access to adequate nutrition and health care. It is time to enLINK and to abandon the "business as usual" approach.





THE enLINK LIBRARY



enLINK statistics as of December 31, 2008:

- 80 users from 33 countries
- More than 25,000 page views per month
- More than 500 page views per day

New Additions: e-books & Global Health Database

Without access to information there is no education. Five years ago, the Foundation put together the **enLINK** digital library of nutrition research, which is now appreciated by users in over 30 different low-income countries. This library is a concerted action between OVID Technologies, certain publishers and the Foundation.

For nutrition information the **enLINK** library is already an established and appreciated source of information. The **enLINK** library targets individual users and so far over 80 registered users have access to this unique library.

Scientific nutrition journals contain mostly the latest studies and report on ongoing developments in the field of nutrition research. Despite the expansion of the internet, the knowledge base of nutrition and medicine (especially for students and those with little experience) is still best found summarized in different textbooks.

During fall 2008 the **enLINK** library received a booster: On one site all new journals will be available again in full-text format. Full access was hampered for a limited time due to logistical and technical problems. The publishing business has not been spared the effects of the global financial crisis, which has led and which might also in the future lead to some difficulties. Nevertheless we do hope that we can solve the pending problems to assure uninterrupted access.

The classic nutrition textbook Modern Nutrition in Health and Disease (edited by Maurice E. Shils) has already been available online for **enLINK** users

since spring 2006. In addition 14 new e-books have been added and are now available in full-text format. Since know-how and different disciplines have to be **enLINKed**, other **e-books** will be added to the collection in the future.

Since fall 2008 the **GLOBAL HEALTH DATABASE** has been available free of charge to registered **enLINK** users. Global Health is a specialized bibliographic, abstracting and indexing database dedicated to public health research and practice. Derived from over 3500 journals, plus reports, books and conferences, Global Health contains over 1.2 million scientific records from 1973 to the present. Publications from over 158 countries in 50 languages are abstracted, and all relevant non-English language papers are translated to give access to research not available through any other database. The database's open serials policy and coverage of international and grey literature means that 40% of the material contained in Global Health is unique to the database. The information in this database is especially valuable to users in low-income countries since most of the information is practice-oriented information.

Do you want free full-text access to the enLINK library?

If you are from a low-income country and if you are working in your country of origin apply at **www.enlink.org** to become a registered user.

www.enlink.org

The orange library THE enLINK LIBRARY TRUNKS – THE ULTIMATE LIBRARY FOR NUTRITION

These are the impressive characteristics of the mobile enLINK nutrition library for institutions in low-income countries. According to medical criteria the enLINK trunk is definitively too heavy for its height – but as a rare exception these dimensions are welcomed since it represents a condensation of nutrition knowledge in a mobile trunk library.

There is no education without access to information. In today's world, information access is equated with access to the internet and other electronic media. Yet despite all the developments in information technology and computer sciences, this statement is in part a misconception. It is well known that a combined integrated access to hybrid collections of printed and electronic resources is at present the most powerful tool for education.



The large trunk:

Colour: orange
Height: 1.0 m
Weight: 80 kg
Number of books: 35
Number of brochures, booklets, etc: 120
Total number of pages: 30,000

The small trunk:

Colour: orange
Height: 35 cm
Weight: 30 kg
Number of books: 10
Number of brochures, booklets, etc: 40
Total number of pages: 10,000

Do you want an orange enLINK
library trunk free of charge ?

If you are from an academic institution in an eligible
low-income country you can download the order form at
www.nestlefoundation.org.

In addition to the digital enLINK library (see <http://www.enlink.org>) the Foundation created a small, traditional, "paper-based" mobile enLINK library. The mobile enLINK library represents an orange-coloured metal trunk containing more than 120 books, brochures and guidelines from the field of nutrition and health. Nutrition cannot be viewed separately from other disciplines, especially medicine, agriculture or public health. Accordingly, the enLINK trunk also contains books such as the Harrison's textbook of medicine or a textbook of tropical medicine. One can find "down to earth", ready-to-use guidelines for the treatment of severe malnutrition or the construction of a home garden.

The enLINK trunk has the same size and layout as the Blue Trunk Library from the World Health Organization (WHO). The enLINK trunk has been created as an addition to the WHO Blue Trunk Library and covers the major issues around the theory and practice of nutrition. The combined use of both trunks will without a doubt have a booster effect on the capacity of many institutions in low-income countries.

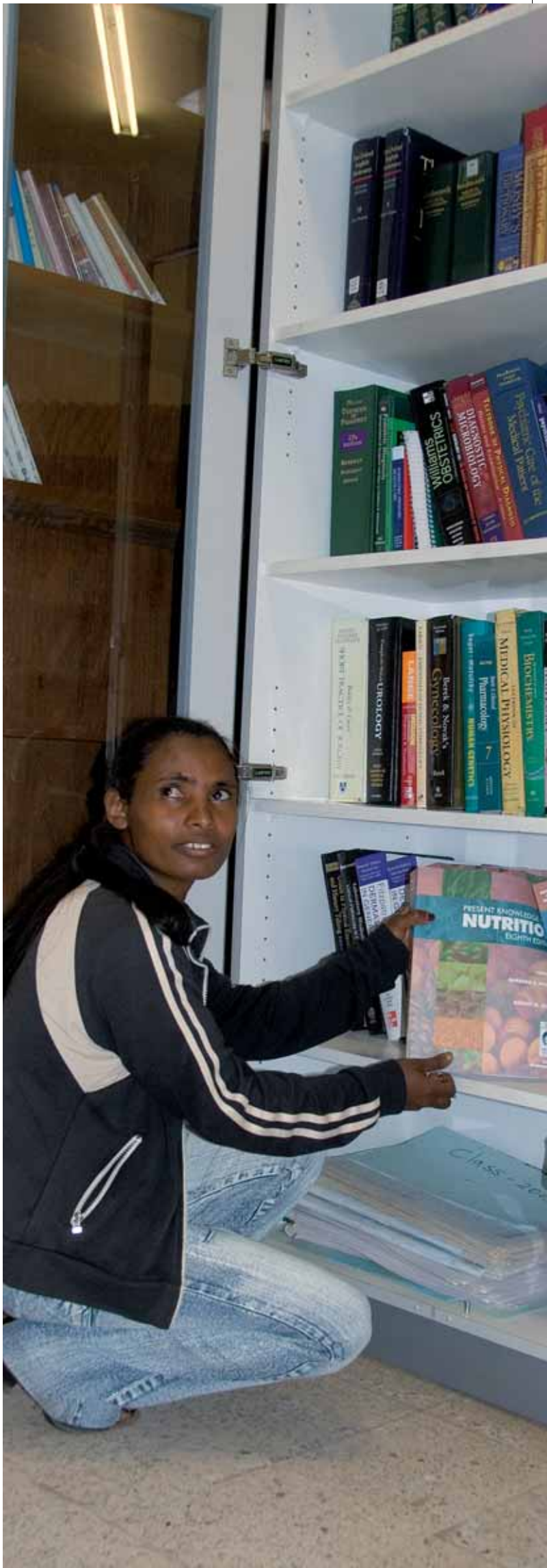
Without any prejudice it can be said that the trunk library in combination with the enLINK digital library represents the ultimate nutrition library, representing the basis for new capacity building for students in the field of nutrition but also as a booster and knowledge source for experts in the field.

The enLINK nutrition library trunk will initially only be offered as a present to selected nutrition institutes in low-income countries.

Trunks have been mailed to nutrition institutes in 15 countries, mainly in Africa and Asia. The next mailing of 50 large trunks and 100 small trunks will be started in Spring 2009.

Obviously, health care specialists working in the field with the population and patients do not necessarily have access to a library. They also have other needs. The power of knowledge can only work when it trickles down and is implemented. Therefore the Foundation decided to create, in addition to the large orange trunk, a smaller enLINK trunk available for smaller groups and selected frontline individuals in contact with those at the bottom of the pyramid.

> 30,000 pages of nutrition knowledge!





PRESENT KNOWLEDGE IN NUTRITION

Time is knowledge. Despite the increase in the availability of information in modern societies, in many parts of the world access to information is limited and still a time-consuming task.

"Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information on it." This saying from Samuel Johnson illustrates nicely the capacity-building activities of the Foundation. Present knowledge in nutrition can either be found in the enLINK digital library or in one of the leading textbooks about human nutrition, Present Knowledge in Nutrition (PKN).

Again in 2008 several hundred volumes of Present Knowledge in Nutrition (8th edition, 2002, ISBN: 3930954958) were shipped free of charge to interested individuals and institutions in countries such as Nigeria, Tanzania, Ivory Coast, India, Morocco and Indonesia. Since the start of the initiative more than 4,000 books have been sent to over 30 countries. This enLINK initiative is a concerted action of the Foundation and the International Life Science Institute (ILSI) in Washington, D.C. (USA). ILSI donated the 8th edition of the book and the Foundation financed the shipment.

Thanks to the PKN mailing, students at the Department of Food Science and Nutrition at the University of Agricultural Sciences in Bangalore (India) or medical students at the Orotta School of Medicine in Asmara (Eritrea) have their own copy to acquire the basic knowledge of nutritional science.

If you are interested
in ordering free copies
of the textbook **Present Knowledge
in Nutrition in English or Spanish**
for your library and students,
please get the order form at
www.nestlefoundation.org.



Knowledge is like a garden: If it is not cultivated, it
cannot be harvested.

Guinean Proverb



OTHER ACTIVITIES

NEW RESEARCH PROJECTS

INSTITUTIONAL SUPPORT

OTHER CAPACITY-BUILDING ACTIVITIES



In 2008 the Council decided to fund 10 research projects.



CHILD FEEDING

NUTRITION AND IMMUNE FUNCTION

FOOD SECURITY

NUTRITION EDUCATION

NEW RESEARCH PROJECTS

MINERALS

MICRONUTRIENTS

BREASTFEEDING

CHILD FEEDING

Nutrition, anaemia, growth and oxygen weaning in Low Birth Weight oxygen-dependent infants in a Kangaroo Clinic

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Bogotá, Colombia
USD 50,000

A major issue in managing infants with bronchopulmonary dysplasia is to attain and maintain an adequate nutritional status, including early detection and correction of anaemia. In Bogotá, oxygen-dependent preterm infants (ODPI) receive early discharge while in kangaroo position. At entry into outpatient care at Kangaroo Mother Care clinics, many of them are undernourished. Many are also anaemic, and diagnosis and follow up of this condition is complicated by the fact that drawing frequent blood samples is invasive and traumatic and might aggravate pre-existing anaemia. If a non-invasive, risk-free method for estimating haemoglobin levels in such infants can be validated, it will represent an invaluable tool for both screening for anaemia and monitoring management. Several objectives will be addressed: 1) to describe the evolution of the anthropometric indices of a cohort of ODPI under ambulatory KMC; 2) to validate a non-invasive method (Mediscan®) for measuring haemoglobin levels (HbL) in newborn infants; and 3) to explore the relationships between HbL, oxygen weaning and somatic growth. The first step of the research project consists of a conformity study in 202 paired measurements on HbL from term and preterm infants (NCU San Ignacio Hospital), on venous blood samples (reference method) and skin readings (Mediscan®) reliability assessed in the first 45 paired samples (Lin concordance index, variation coefficients). The second step in the research project represents a prospective cohort study of 150 ODPI (San Ignacio KMC program) estimating anthropometric indices, HbL, feeding patterns and morbidity, during their first six months of corrected age. The data on the evolution of nutritional status and HbL level will be used to propose efficient and safe cut-off Hb levels for deciding on anaemia treatment, to rationalize the use of blood transfusions and EPO, and to identify optimal feeding strategies to help correct anaemia and ameliorate its effects in ODPI.

NUTRITION AND IMMUNE FUNCTION

Impact of vitamin A and zinc supplementation on pathogen-specific diarrheal disease in Mexican children

Kurt Long & Jose I. Santos

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Hospital Infantil de Mexico "Federico Gomez"
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USD 99,537

The simultaneous supplementation of children in developing countries with vitamin A and zinc may offer a cost-effective means of improving childhood health and survival. However, the separate effects of each micronutrient may be modified when they are combined, since each has contrasting effects on specific health outcomes: Vitamin A supplementation reduces childhood mortality, but has no consistent effect on infectious disease morbidity, while zinc supplementation reduces morbidity, but has no consistent effect on mortality. These contrasting effects may be due to their separate effects on pathogen-specific outcomes. The research team has previously carried out a randomized, double-blind, placebo-controlled trial to address the efficacy of vitamin A-zinc supplements on paediatric diarrhoea in peri-urban areas of Mexico City. The project involved 747 children 6-15 months of age who were assigned to receive either a vitamin A supplement every two months, a daily zinc supplement, a combined vitamin A supplement, or a placebo, and followed for 12 months. The effects of vitamin A and zinc supplementation on diarrhoea were found to be modified by specific parasite infections and specific household factors. The research team now want to address the efficacy of supplementation on pathogen-specific outcomes and relate these findings to their overall efficacy. Stools collected once a month and following diarrhoeal episodes will be screened for bacterial and viral diarrhoeal pathogens. Poisson regression models will be used to compare the efficacy of vitamin A and zinc on pathogen-specific outcomes. Analyses will then be stratified by specific household factors that may be associated with these outcomes and so be used as markers to predict supplementation efficacy. These analyses will be compared to the efficacy of micronutrient supplementation on overall rates of diarrhoea and stratified by household factors. The results of these analyses will inform more cost-effective interventions for reducing diarrhoeal disease.

Effects of Vitamin A Supplementation during Lactation on Infants' Antibody Response to Hepatitis B Vaccine in China

Zhixu Wang

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USD 57,800

Studies have shown that vitamin A deficient (VAD) children have impaired immunity. Vitamin A (VA) supplementation has been associated with enhancing antibody response to tetanus toxoid and diphtheria, measles and Hepatitis B vaccine. VAD is highly prevalent in China; about 39.4% and 44.8% of rural infants under 6 months were VAD and marginal VAD, respectively. The prevalence of Hepatitis B virus infection was about 9.09% in China. Hepatitis B vaccine has been incorporated into China's National Immunization Program since 2002. But 1.89%–63.06% of young children manifested weak or null response to the vaccine. Thus, research is needed to assess the impact of vitamin A status on response to the vaccine. The overall goal of this study is to assess the effects of maternal VA supplementation during lactation on their offspring's vitamin A status and immune response to Hepatitis B vaccine. This will be a randomized, double-blind, controlled intervention trial. Lactating women (n=150) will be recruited before giving birth and randomly assigned to one of the following three groups: 1) large-dose VA supplements (60mg) each at 2 weeks and 3 months postpartum; 2) daily VA supplements (1.2 mg) for 6 months; or 3) no VA supplements. In addition, all of the mothers will be given daily a capsule containing 10 mg alpha-tocopherol and 10µg cholecalciferol in corn oil. Blood samples will be collected from the infants at 1 month after the third Hepatitis B vaccine to analyse plasma anti-Hepatitis B antibody, retinol and acute phase proteins (C-reactive protein and alpha-acid glycoprotein). Maternal venous blood will be collected to analyse plasma retinol concentration at the beginning and the end of the study. Breast milk samples will be collected from the mothers at the beginning, mid and end of the treatment period to analyse breast milk retinol.



FOOD SECURITY

Causes and control of food insecurity: a pilot model in Northwest Iran

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Tabriz, Iran
USD 30,900

Food security has been defined as access by all people at all times to enough food for an active and healthy life. It can be achieved through the availability of adequate and safe foods in a socially acceptable way. It does have considerable health impacts on the physical, social, and psychological status of individuals in communities suffering from food insecurity. It may also affect the quality of life of households. Food insecurity is frequent in both developed and developing countries, affecting from 5% to 25% of the general population. In this research project the total population in the study area (12,965 households with a total population of 50,513) in five districts (Sardrood 1, Sardrood 2, Khosroshahr 1, Khosroshahr 2, and Basmenj) in northwestern Iran will be included in this study to assess the food insecurity, its influencing factors and control measures. A short questionnaire (with six items) will be used for the screening of food insecurity and energy intake in the district. This simple and rapid tool has been validated before in the area for household food insecurity. After the screening programme (as the first part of the study), those families identified as having food insecurity will be recruited for the second part of the study which is a "community-based interventional programme". In the second part, we will organise small training campaigns among community leaders, health care workers and the public. This will take place through peer education programmes in the context of short-term courses for the target population. It is estimated that at least 20% of the study population will be identified as having food insecurity and will then be included for the second part of the study. Six months after the intervention, this group will be recruited again to compare their attitude and practice before and after the intervention. This project focuses on several aims: 1) screen the food insecurity in the study population, 2) identify the influencing factors of food insecurity in the study population, 3) develop the proper interventions for implementation in the area, 4) assess the effectiveness of the interventional programme in reducing the household food insecurity and, finally, 5) develop a public health model to reduce food insecurity.

NUTRITION EDUCATION

Care empowerment of mothers, cadres, and pre-married women to improve children's nutritional status

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Euro 35,000

UNICEF includes the aspect of care as one determinant factor of children's nutritional status. Realizing that in many households, there is limited knowledge and skills regarding care resources and practices, it is very urgent to make efforts to improve care practices and analyse their effect on children's nutritional status.

The objectives of the study are: 1) to develop care resources and care behaviour instruments; 2) to assess care resources and the behaviour of mother, cadre, and pre-married women; 3) to develop instructional materials and instruments of care empowerment; 4) to implement care empowerment intervention for mother, cadre, and pre-married women; and 5) to evaluate the role of care empowerment intervention on children's growth and development.

Method: This study will be conducted in West Java Province. The sample involves children under three years old and mothers (132 subjects), divided into two experimental units and four groups. Each experimental unit consists of two groups (poor and non-poor families). Group 1 is care intervention for a poor family; Group 2 is care intervention for a non-poor family; Group 3 is non-care intervention for a poor family; and Group 4 is non-care intervention for a non-poor family. About 20 village cadres and 20 pre-married women will also get intervention to support capacity building and the sustainability of activities.

Research activities are severalfold: 1) collection of base-line and end-line data, 2) development of instructional materials and research instruments, 3) care intervention, and 4) activities to extend the intervention to cadre and pre-married women. Care resources and care knowledge as well as behaviour will be studied and evaluated so that these activities can be better implemented in the future.



MINERALS

Assessment and promotion of adolescents' dietary calcium intake in China

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Johns Hopkins University
Baltimore, USA and
Department of Epidemiology
Capital Institute of Pediatrics (CIP)
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USD 85,000

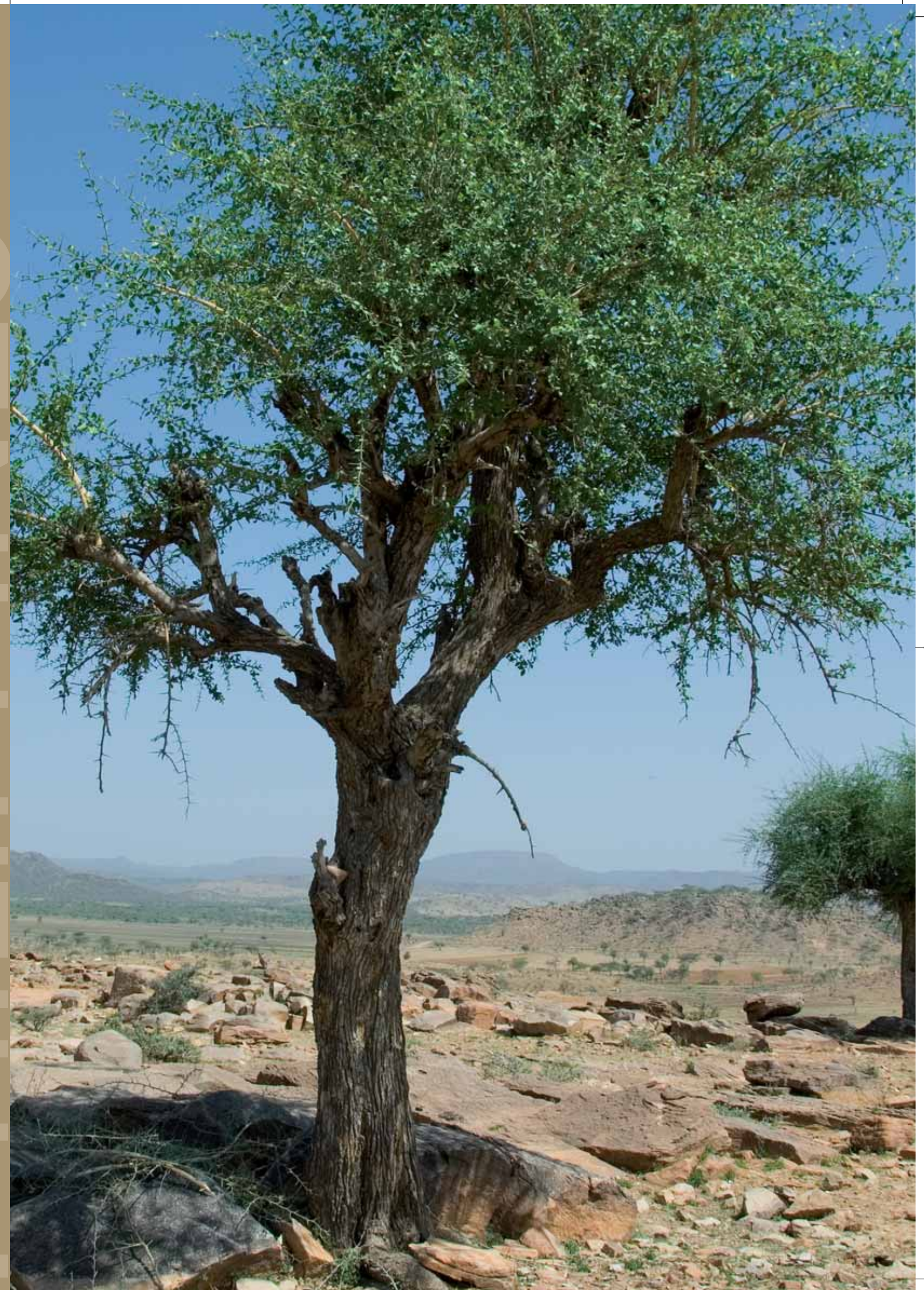
Adequate calcium intake is critical for bone health, and also plays a critical role in the regulation of arterial blood pressure. Recent studies have also suggested that increasing calcium intake (by supplementation or milk) may help in weight loss and weight maintenance and may reduce the risk for metabolic syndrome and type 2 diabetes. However, calcium intake inadequacy is a worldwide problem, and is more serious in low-income countries and in those having plant-based diets such as China. Childhood and adolescence are two key periods for forming life-long eating habits, and adolescence is the key period to reach peak bone density. The proposed study has two specific aims. The first is to develop and evaluate a quantitative food frequency questionnaire (Q-FFQ), to help assess the usual dietary patterns of Chinese adolescents (11-15 years old) with a special attention on dietary calcium intake. The Q-FFQ can be used in future population based studies, including our second aim, which is to develop and test an internet- and cell phone-based tele-health system for the promotion of calcium intake. This is a pilot study. This project will help address several major gaps in the related fields, and will help enhance the research capacity of the Chinese collaborators. A sample of 400 adolescents will be recruited in Beijing for the FFQ development and another 300 for the 1-year intervention trial, to be randomized into 3 groups (two treatment and one control group). Data will be collected at baseline, 6- and 12 month follow-up. Sophisticated statistical methods will be used in the data analyses. The results are likely to have some important public health implications for China and other lower-income countries that are facing similar nutrition and health problems.

The effect of a 10-month school-based provision of high-calcium milk and weight-bearing exercise program on the bone mineral status of 7- to 9-year-old prepubertal girls

Pura Rayco-Solon

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Western Bicutan
Manila, Philippines
USD 113,000

Osteoporosis has been described as a paediatric disease with a geriatric outcome. This is because bone mass is acquired during youth and is progressively lost later in life. The proper management of osteoporosis includes improving bone mineral content in the first two decades of life so that reserves are built up before bone loss ensues. The objectives and hypotheses of this study are to determine the effect of a 10-month, school-based provision of high-calcium milk and weight-bearing exercise program on the bone mineral status among prepubertal girls. This study is novel since it seeks to determine the effect of the combination of these interventions among girls in a developing country population whose calcium intakes are depleted and whose overall risks are much higher for osteoporosis. It is hypothesized that provision of either high-calcium milk or weight-bearing exercises will improve bone mineral density among prepubertal girls but that the bone accrual will be greater among those with both interventions. In addition, the researchers hypothesize that the changes will be more marked among those whose calcium intakes are lower. The study will be conducted among 104 prepubertal girls (on Tanner stage 1), aged 7-9 years. It is planned to use a two-by-two factorial design of (1) high-calcium milk (1000 mg/day) vs. placebo (115 mg/day) and (2) weight-bearing exercises vs. passive activities in a randomized controlled trial, for a total of 4 intervention groups: calcium+exercise, placebo+exercise, calcium+no exercise, placebo+no exercise. The potential impact of the study is severalfold: Understanding the relationship between calcium and exercise is of central importance since the study results could provide information on a workable intervention that promotes the multiple health benefits to young children that impact across their life cycle.



MICRONUTRIENTS

The development of new norms for indicators of iodine status during pregnancy and its impact on the prevalence of mental retardation in children

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USD 235,044

There is now substantial documentation that indicates that iodine deficient disorders (IDD), with a wide spectrum of negative consequences for the individual as well as the society, constitute a serious public health problem in China. Although impressive gains have been achieved in IDD prevention as a whole since 1995, severe forms of the condition still persist in at least 7 provinces of the country. It was a cause of added concern that new cases of cretinism were described in 2006 in these economically disadvantaged communities. The young age of these children suggests that they were born after the introduction of universal salt iodization. Furthermore, recent observations indicate the existence of nutritional deficiencies other than iodine deficiency. Iron deficiency was prevalent among pregnant and lactating women in these areas. The higher goiter rates and the severe nature of the mental retardation observed may have been aggravated by the iron deficiency observed in the area. Success in protecting China's overwhelming population of young children from various forms of IDD-related mental damage will require new scientific knowledge and efficient methods, including reliable indicators of iodine status, in particular for the period of pregnancy and lactation. The present project has three main objectives:

1. Available data indicate that TSH and T4 show changes during pregnancy that point to iodine deficiency in spite of seemingly normal urinary iodine. This paradox has caused some confusion in scientific and public health circles and needs to be addressed under different settings. The study design and the current Chinese situation offer a unique opportunity for the identification of new reference ranges for the interpretation of scientific and operational data in this context.
2. In view of the gravity of the effects of iodine deficiency on the intellectual development of children, identification of confounders may have wider ranging public health significance. The situation in western China provides an unusually suitable occasion for a study of the contribution of iron deficiency to the consequences of iodine deficiency.
3. An essential outcome of improved iodine status is protection of

young children from mental retardation and enhancement of their psychomotor development. The study areas that have been chosen will make it possible to relate the new reference ranges for iodine and iron status with the psychomotor development in young children on a longitudinal prospective basis.

Improving micronutrient status of Chinese children using dietary spirulina

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Chinese Center for Disease Control and Prevention
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USD 147,900

The goal of the present study is to evaluate the effect of dietary spirulina on the improvement of vitamin A and other micronutrients of schoolchildren living in the rural area of China. Children (6-9 years old) with height and weight adequacies between 80% and 90% with respect to the National Nutrition and Health Survey in 2002, from a rural area of Southern China (Hunan Province), will be randomly assigned to daily intake of foods fortified with 2 g spirulina or 5 g spirulina or the control group (supplement 600 ug vitamin A capsule) for ten weeks. A total of 180 children (60 in each group), from about six classes, will be selected for this study. Stable isotope dilution method will be used to determine the whole body stores before and after the intervention. At the beginning and the end of the study, the changes of anthropometry, serum retinol and carotenoids, 25(OH)D3, folic acid and haemoglobin concentrations and other dietary nutrient intakes will be measured. That is, up to 4 blood samples (3 ml/sample) will be collected from each child over a 16-week period for evaluating the efficacy of carotenoids from spirulina to vitamin A in improving vitamin and other micronutrient statuses. This research will be conducted through collaborations with Dr. Guangwen Tang from the USDA Human Nutrition Research Center on Aging at Tufts University. Because advanced technologies are required (the use of stable isotope and tracer analysis), all samples collected will be analysed at Tufts University. However, research scientists and graduate students from China will be trained to analyse samples at the Tufts Nutrition Center. The results from this study will be of importance for planning the use of spirulina in preventing vitamin A deficiency and in improving nutritional status programs.

This is a project initiated by the Foundation in the setting of the enLINK initiative.

BREASTFEEDING

Information and education to support and promote exclusive breastfeeding

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Nigeria
USD 18,749

Breastfeeding has been shown to be the ideal nourishment for newborns. Recent evidence shows that the benefits of breastfeeding are optimized when it is practiced exclusively. Although breastfeeding is widely accepted in Nigeria, exclusive breastfeeding (EBF) has been reportedly low, particularly in rural areas, due to ignorance, cultural beliefs and doubts about the ability of breast milk alone to satisfy the nutritional and hydration needs of the infant in hot tropical environments. Variations in breastfeeding patterns in different cultures show that it is a learned behaviour. Practices are often affected by traditional beliefs; grandparents; health workers, including traditional birth attendants (TBAs); and even husbands. Thus, the choice or opportunity to breast feed is hardly that of women alone. Empowering all these people who are significant in proffering help and information on breastfeeding rather than the women alone would be a more effective way to ensure success of the promotion. The researchers therefore would form a linkage with the local government to empower these people through workshops and train-the-trainers (TOTs) sessions on exclusive breastfeeding and adequate complementary feeding practices. The project would be carried out in four rural communities in two Local Government Areas (LGAs) of Abia State, Nigeria. A linkage would be formed with the LGAs to target sustainability and all the significant others. A pre-intervention key informant interview (KII) and focus group discussions (FGDs) would be used to identify their beliefs, fears, concepts, attitudes and constraints to exclusive breastfeeding. These will be included in the material for the training and workshop. TOTs will also be held at the LGAs for women selected from different groups. Researchers and LGA personnel will supervise these women for six months to assess their performance. Post-intervention FGD and KII would be carried out to evaluate the success of the intervention.

One of the major aims of the Nestlé Foundation is the transfer of sustainable knowledge to low-income countries and capacity building in general. Again during 2008 several endeavours in this area were undertaken.



INSTITUTIONAL SUPPORT

SENEGAL

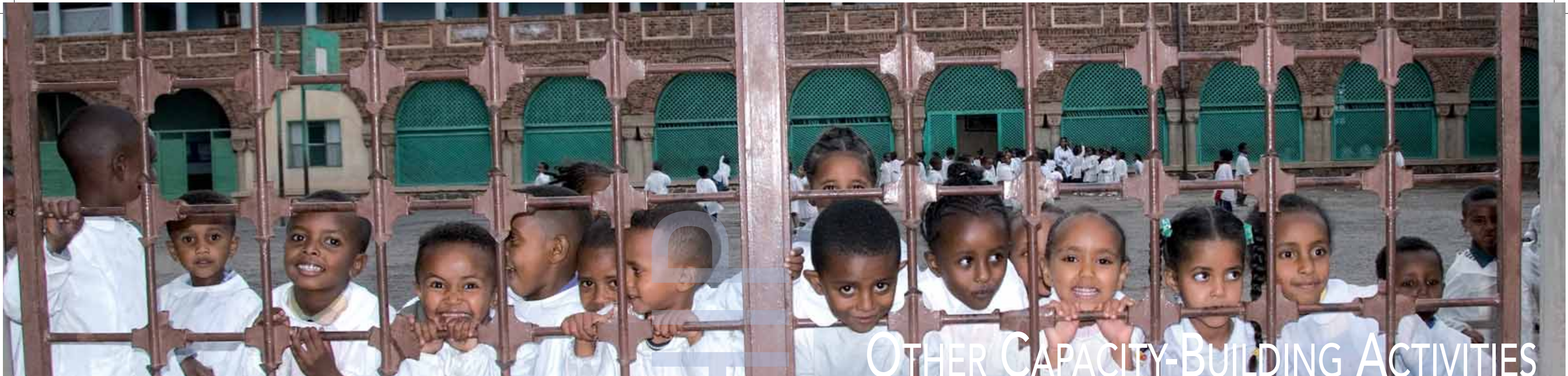
Institutional support for the Nutrition Unit of the Faculty of Sciences, University Cheikh Anta Diop in Dakar (Senegal) has been a rather long tradition. Prof. Salimata Wade organized a five-day course entitled "Regional training course on human nutrition" about the nutritional rehabilitation of severely malnourished children. The Foundation gave a grant to the organizers to sponsor the attendance of seven local participants or participants from other French-speaking African countries.

MALAWI

Based on a research application to test the efficiency of a fortified peanut-based spread in children for different malnutrition in the Mangochi Child Nutrition Intervention Study, a fellowship was given to two students from the Division of Community Health of the College of Medicine at the University of Malawi to complete their nutrition education at the Department of International Health at the University of Tampere Medical School in Tampere (Finland). Upon completion of their studies in Finland the two students will return to Malawi and strengthen the theoretical and practical capacity in the field of nutrition research at the College of Medicine in Mangochi (Malawi).

BENIN

The Faculty of Agricultural Sciences at the Université d'Abomey-Calavi, in Cotonou (Benin), has, since 1992, organised a course in nutrition and agriculture, by now familiar to many as the "FINSA course". FINSA stands for "Formation Internationale en Nutrition et Sciences Alimentaires". The FINSA course is one of the few annual courses in Africa which are held in the French language. The Foundation decided to support five students for the two-week FINSA course and one student for the four-week FINSA course. These students came from Cameroon, Ivory Coast, Niger, Togo and the Comoros. The support of the FINSA course leads to capacity building in nutritional science and research in French-speaking Africa. In addition, the FINSA course strengthens the local capacity of the Department of Human Nutrition, headed by Prof. Romain Dossa, who is also one of the main organizers of the FINSA course.



OTHER CAPACITY-BUILDING ACTIVITIES

AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT

Local dissemination of nutrition knowledge is of great importance. There are only a few nutrition journals on the African continent, one of them being the African Journal of Food, Agriculture, Nutrition and Development (AJFAND) (see also <http://www.ajfand.net>). Hon. Prof. Ruth Oniang'o, editor in chief, thinks that there is hope for Africa. Despite the grim television pictures of starvation and human suffering, there is tremendous hope for a continent whose people are its greatest resource. The AJFAND is meant to create awareness of the multiplicity of challenges facing Africa that lead to abject poverty and destitution. The Foundation is supporting this important effort with a contribution of USD 2,000 for each issue of the journal. Due to the high printing cost the journal is no longer available in a print version but only as a web-based publication. Despite being available only in digital form, the AJFAND is widely appreciated and is continuously improving. The submission of original articles and other contributions can only be encouraged.

AFRICAN NUTRITION LEADERSHIP PROGRAM

The African Nutrition Leadership Program (ANLP) is a leadership development and networking seminar in the field of human nutrition in Africa. The ANLP concept is based on activities initiated by the Food & Nutrition Program of the United Nations University (UNU-FNP) and the International Union of Nutrition Sciences (IUNS). Every year a one-week leadership program is held at the University of Potchefstroom (South Africa). The Foundation supports this program and yearly event with an annual contribution of USD 9,600.

THE ORANGE enLINK TRUNK LIBRARY

The orange enLINK trunk has been provided to 13 different nutrition institutions in Asia and Africa. Since the enLINK trunk contains only new books and publications, it represents a key addition to the existing libraries in different nutrition institutes. In certain institutions the enLINK trunk represents actually the foundation on which a nutrition library will be built. At present the small and the large orange enLINK trunk are offered free of charge to different institutions in low-income countries.

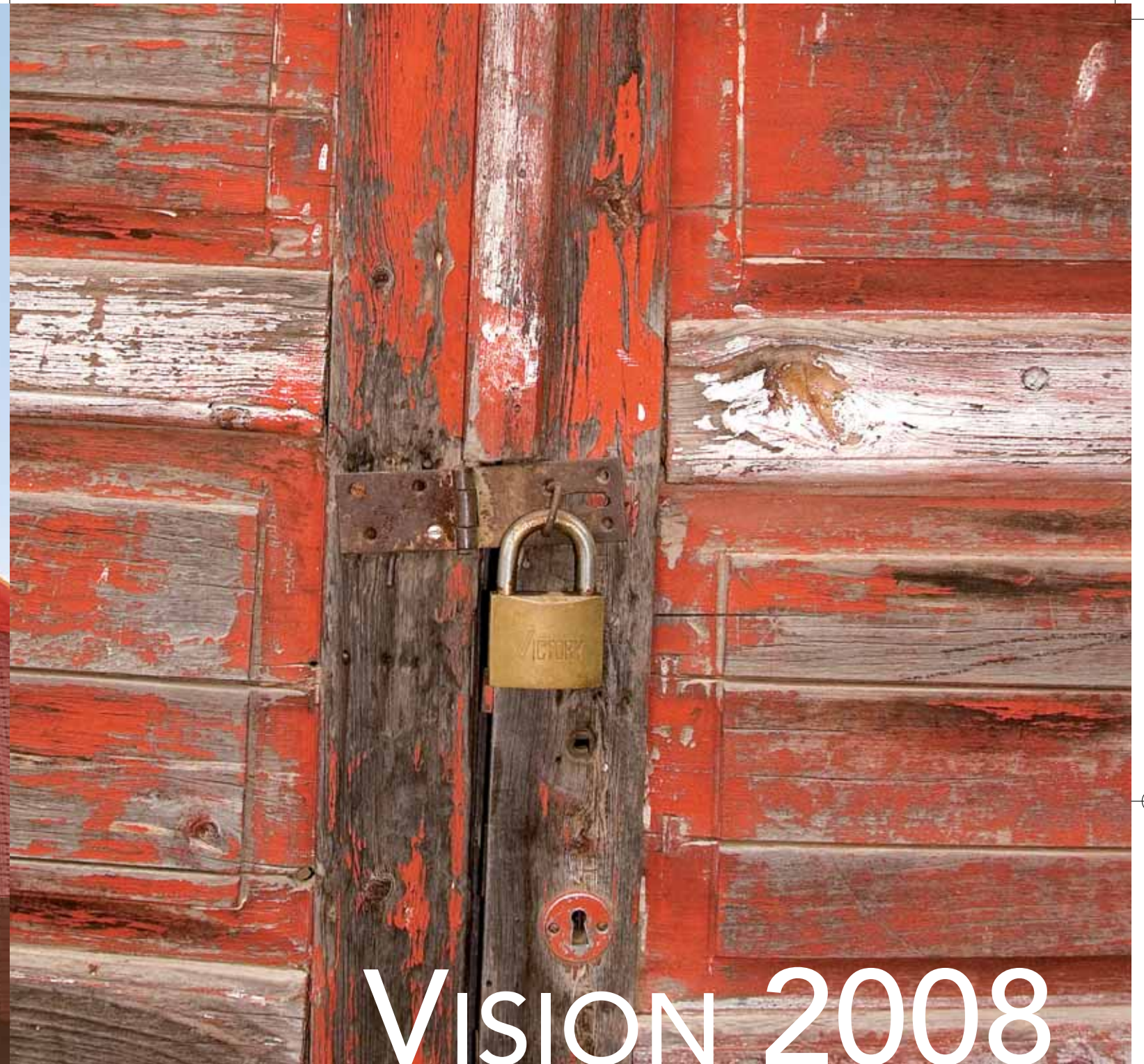


THE FOOD AND NUTRITION BULLETIN

The Food and Nutrition Bulletin (FNB) is published quarterly by the International Nutrition Foundation (INF) for the United Nations University (UNU), in collaboration with the United Nations System Standing Committee on Nutrition (SCN) and the International Union of Nutritional Sciences (IUNS). The FNB is intended to make available policy analyses, state-of-the-art summaries, and original scientific articles relating to multidisciplinary efforts to alleviate the problems of hunger and malnutrition in the developing world. The Foundation supports the journal by paying for the subscription for 400 individuals in low-income countries.

E-LEARNING IN NUTRITION FOR AFRICA

As a part of the enLINK initiative, we introduced the nutrition component into the Réseau en Afrique Francophone pour la Télémédecine (RAFT, Telemedicine Network in French-speaking Africa). This telemedicine network has multi-site e-learning facilities in a total of 14 countries in North, West and Central Africa as well as in Madagascar. In RAFT, health experts from different countries (especially from the South) have established a weekly e-Learning session which is integrated into the daily clinical work of many doctors in hospitals. Within the enLINK initiative a nutrition component has been added to RAFT which is presently coordinated by Prof. Kader Traoré (Bamako, Mali).



VISION 2008

Many factors influence and modulate food security and related issues, but demography remains a key factor which is often ignored. As Mr Martin Lees from the Club of Rome (<http://www.clubofrome.org>) makes clear in the first contribution in VISION 2008 aspects of population growth have to move up on the international agenda. Every year thousands of publications addressing different aspects of malnutrition are published. A large fraction of these publications can be classified as "l'art pour l'art" – they are published but the results are unfortunately not implemented in the field. Nevertheless, there are research activities ongoing which qualify as typical action research, research activities which are favoured by the Foundation. One typical example of action research is discussed by Prof. Chen Zupei and his colleagues (one of them a Council Member), illustrating how present knowledge can be complemented by targeted research and how the results can be implemented for more than a billion people. It is actually surprising to see that for most aspects of malnutrition the solution and knowledge to solutions are there, but no implementation is forthcoming. It might be better not to speculate about the causes of the lacking implementation.

Our Council Member Prof. Jo Hautvast emphasises what counts in capacity building in the field of nutrition from his point of view. His recipe to the solution is to create more leaders in low-income countries – a promising approach.

Income generation is often regarded as a prerequisite for any form of improvement. An increased income is for obvious reasons important and will lead to many changes. However, as Prof. James C. Riley points out, an increase in the income of a country does not necessarily lead to an improvement of the health and well being of all strata in a population. He reports that a sustainable improvement – independent from a change in income – can be achieved by the provision of information and knowledge. This is true especially in the field of prevention and public health.

Former grant recipient Dr. Judi Februhartanty shows how husbands can assist in improving breastfeeding practices. Apparently, there lies a hidden potential in husbands for improving breastfeeding practices. Supplementing "women power" with "men power" seems to be promising. Again, enLINKing is once more important.

DO NOT FORGET DEMOGRAPHICS

IODINE DEFICIENCY

LEADERSHIP TRAINING

OTHER ROUTES TO HEALTH

BREASTFEEDING: ROLE OF THE FATHER



DO NOT FORGET DEMOGRAPHICS

Global Food Security: coping with Demographics

R. Martin Lees
Secretary General
Club of Rome
Winterthur, Switzerland

Leaders in the public and private sectors throughout the world are grappling with an array of crises ranging from the deepest financial crisis and economic recession since the 1930's to the threats of accelerating climate change and the degradation of the ecological systems on which humanity depends. And these crises are hitting us at a time when hundreds of millions of people are living in poverty and deprivation in a wealthy world, excluded from

the processes of globalisation and development. All these issues are interconnected and they are impacting on the most basic needs of men women and children across the world, for the adequate food and water and the human security which are essential to a healthy and productive life. As Prime Minister Zapatero of Spain cogently declared: "While the financial crisis is a parenthesis for wealthy nations, in the countries suffering from hunger and extreme poverty, crisis is a way of life."

As a world community, we are already failing to provide for almost one billion people, and if we look ahead, how can we provide the necessary levels of food and nutrition to the additional 2.3 billion people who will arrive on this small and fragile planet in the next 40 years? In principle, the planet has the

potential to provide food for a growing world population but, as I will outline, for reasons of misdirection and lack of resources, lack of investment focus and commitment to improving agricultural performance, this potential is not realised.

The provision of adequate food has been the central focus of human effort for millennia. The achievement of food security in the modern world is however more complicated, affected by a complex array of factors, such as the availability of productive land and adequate water, the skills and energies of farmers, efficient transportation systems to bring produce to markets and reduce waste, and of course, favourable climatic and weather conditions. And these basic activities, ranging from the smallholder farmer to the massive multinational corporation, must fit within a complex world food system which seeks to balance diverse and unstable sources of supply with the demand of the ultimate consumers across the world.

The Club of Rome has launched a programme of international research and collaboration to define the elements of a New Path for World Development which recognises the critical connections between environmental and climate issues, issues of economic strategy and globalisation, issues of world developmental, and issues related to social transformation and peace.

These are the issues which will also determine the future of global food security. They cannot be treated separately: the world needs a coherent approach and renewed commitment and cooperation to achieve world food security for a growing population and to assure a sustainable path of world development which will provide fair and decent livelihoods for all.

Where are we now?

We are now facing a food crisis which is not only local, national or regional as in the past but is truly global. In December 2008, around 1 billion people were hungry, that is before the impacts of the financial and economic crises affected the flows of investment into developing countries. In 2008, the number of the hungry rose by 40 million, reaching 963 million across the world. In the view of the World Food Programme, "We are facing a silent tsunami."

A key factor driving the increase in world hunger is the price of food. The food needed for survival is often available but beyond the reach of the unemployed and the poor. Enabling the poor to generate the income they need to purchase food is a key component in resolving the food crisis. This implies that rural and urban employment must be given top priority, as advocated by the International Commission on Peace and Food which was chaired

by Professor M.S. Swaminathan of India almost 20 years ago.

The ability of the poor to purchase food depends of course on their income but it is also critically dependent on the prices at which the necessary food is available. In summer of 2008, prices for wheat corn and rice reached record levels which, in a food price explosion from January to April, saw the price of rice rise by 141%. This rise in prices triggered food riots from Haiti to Egypt, Mexico to Bangladesh. Appeals for food aid surged, from 33 countries in sub-Saharan Africa alone. Although the price of rice has dropped by half since July 2008, it remains 95% higher than in 2005. And, when world economic growth resumes, prices will rise again.

In effect, the food crisis of 2008 has thrown into reverse a 25 year decline in the proportion of undernourished people which is now around 17% of world population. And it has called in question the achievement of the Millennium Development Goal endorsed by all world leaders, to halve between 2000 and 2015 the proportion of people who suffer from hunger.

Today, the urban poor in Africa spend around 80% of their income on food: one in three of a total population of 240 million are chronically undernourished. According to the Economist, (19/4/08), "The era of cheap food is over. The surge in food prices has ended thirty years in which food was cheap, farming was subsidised in rich countries and international food markets were wildly distorted. The world has entered a new, unsustainable and risky period."

The problems we face reflect limitations on the supply side, for example, due to the decline in the productivity of overused land, the degradation of terrestrial and ocean ecosystems, including a catastrophic decline in fish stocks through overexploitation and the loss of productive land to urbanisation and infrastructure development. To these factors must now be added: limits and increased stresses on the supply of fresh water; rising prices for the energy which is essential for food production, transport and fertiliser; a sudden reduction in the availability of credit to farmers; and the growing impacts of accelerating climate change, particularly harvest failures due to changing weather patterns, droughts and floods and extreme weather events of increasing power and frequency. On the demand side, the needs of a world population increasing by 80 million people per year are a fundamental element. And this is compounded by the growing demand of an increasing world middle class for example in India and China who are eating more grain and meat. Added to these pressures has been the sudden surge in demand of the world's biofuels programmes: in 2007, 16% of the

US corn crop was devoted to the production of ethanol.

Underlying this sad state of affairs is a lack of investment in the agricultural sector over many years. Spending on farming as a share of public spending in developing countries fell by half between 1980 and 2004 (The Economist.) In parallel, assistance to poor countries to improve farming practices and to build up agricultural infrastructure such as transport networks, irrigation systems, dams and extension services fell from around 18.7% of ODA in 1979 to 5.2% in 2006.(OECD). This decline in support for agriculture in part reflects the fact that the positive effects of the Green Revolution were widely interpreted to imply that the world food problem was largely resolved.

In effect, one key reason why the world is suddenly hungry is because of decades of neglect. Consequently, an urgent, renewed focus on agriculture can help substantially to improve world food security. Farmers could overcome many problems with the right support. India for example feeds 17% of world population on around 3% of the world's farmland and with less than 5% of the world's water.

We are now confronted by a situation, described as follows by the President of the Chamber of Commerce of Côte d'Ivoire, "Its an explosive situation and threatens political stability." The last word should be given to a mother in Nairobi, Malahasa Juma, interviewed in Time in June 2008: "Everything is more expensive. The children need milk but I cannot afford that. Meat is a luxury now. We are living at God's mercy."

Where are we headed?

Let us now look ahead. The single most important demographic fact driving the demand for food is the growth of world population which will rise to around 9 billion people by 2050. Almost all this increase will take place in developing countries where the stresses on biodiversity, ecosystems, water and resources are already intense. This added demand will be compounded by the rising food consumption of a growing world middle class which could, on present trends, include an additional 2 billion people by 2030. As UN Secretary General Ban Ki Moon recently stated: "In order to avert a massive shortage of food, farmers will need to grow 50% more crops by 2030." And, this need is not simply a question of quantity: it is vital to provide adequate nutrition, especially for mothers and children. Where mothers and children do not receive the essential nutrition, the prospects for health and productive lives will be diminished for a generation.

If an increase in supply is to be achieved in practice sufficient to meet the projected increase in demand, we must anticipate and avert major problems arising from environmental degradation, for example, the effects of climate change. The US Center for Global Development in a recent study concluded that the climate change impacts on food production arising from changing rainfall patterns, desertification, sea level rise and extreme weather events could result in a fall in food production in Africa of 28% and of 38% in India by 2050, over a period when the Indian population is expected to increase by 400 million.

This general challenge can be seen clearly through the prism of desertification which arises through the complex interaction of a number of factors: entrenched poverty; rising population coupled with the overuse of fragile soils and limited water supplies; the destruction of ecosystems and biodiversity through the unsustainable agricultural practices which come from abject poverty and desperation. Every year, thousands of villages are overwhelmed by drifting sand: in China alone, 1,400 square miles are lost each year to advancing deserts. In Nigeria, which is losing 1,355 square miles to desert each year, the human population has risen from 33 million in 1950 to 134 million in 2006. In parallel, the number of livestock has risen from 6 million to 66 million. Where will Nigeria be in 20 years on the present path when its population will have risen to almost 300 million?

In Mexico, the degrading of cropland now forces around 700,000 Mexicans off the land each year in search of jobs in cities or in the United States – a clear demonstration of the links between population growth, environmental degradation, employment and migration.

We face in addition, a continuing crisis in the rapid destruction of ecosystems across the world. Humanity is now using each year around 30 % more ecological resources than the planet can produce and this overuse is increasing each year. We are in fact, living in large part off our biological capital. This is clearly unsustainable. As the Millennium Ecosystems Assessment states: "The bottom line of the Millennium Assessment findings is that human actions are depleting Earth's natural capital, putting such strain on the environment that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted."

In summary, we are heading into a very dangerous future. More focused, coherent and effective action is essential if food security is to be assured for a growing world population. The response to higher prices will lead, with a delay, to a gradual increase in production but food prices are likely to settle at around 30% - 40% higher than they were in 2000 – an increase beyond the margin of survival of the poor.

Already in El Salvador, the poor are eating only half as much food as they were some years ago.

In the absence of new policies and effective action, by almost any measure, human suffering is likely to be vast. Bob Zoelick, President of the World Bank considers that "food inflation could push another 100 million people into poverty, wiping out all the gains which the poorest billion have made during almost a decade of economic growth." The most profound danger is that poor policies, failed governance and lack of investment will aggravate hunger and poverty, leading to unrest and instability which will then eliminate the possibility of the sustained efforts needed to increase agricultural output to reduce hunger. This vicious spiral of cause and effect would lead increasingly to instability, migration and violence making it far more difficult to resolve the fundamental problem of food insecurity.

It must again become a priority of the world community to achieve food security for all. This is essential if we are to eradicate poverty, provide opportunity and decent livelihoods to the world's peoples and thus, to achieve sustainable and equitable progress and preserve world peace.

What must we do?

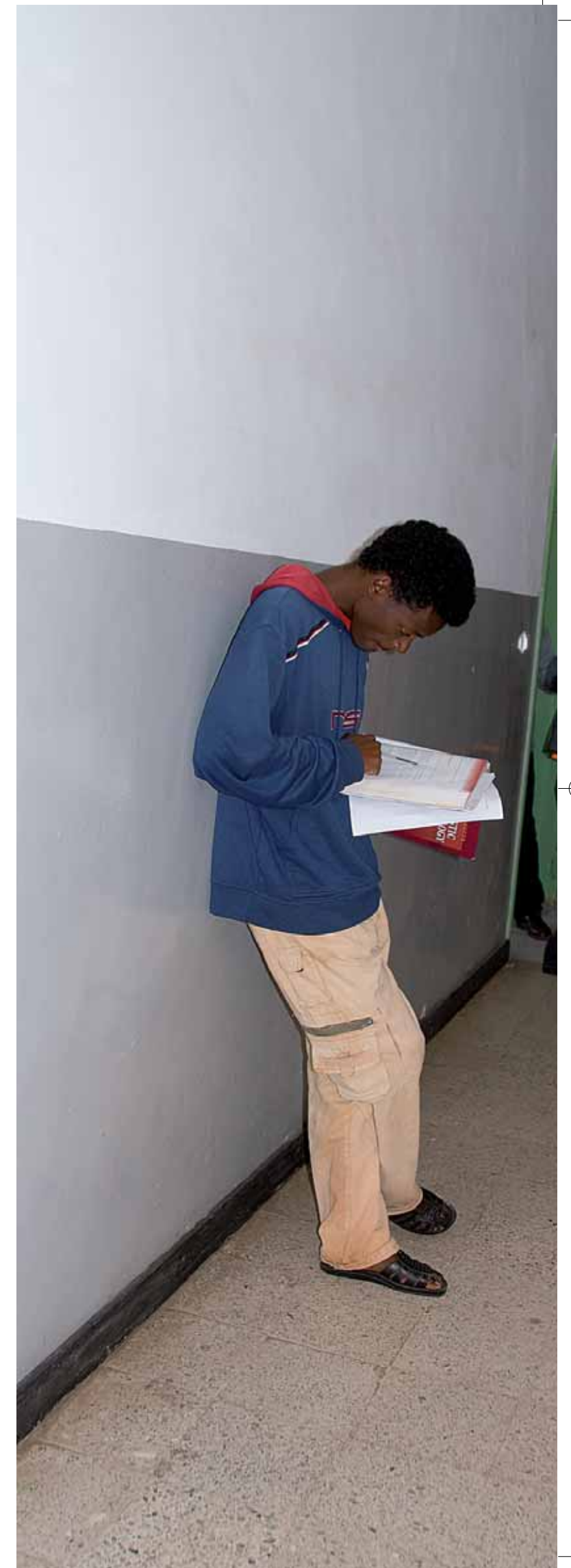
What must we do? I will outline three broad lines of action.

- To define a vision for a world without hunger and a strategy to achieve it.
- To mobilise the potentials of science, technology and innovation.
- To strengthen capacities in developing countries to achieve sustainable food security.

1. A vision and strategy for world food security

First, we must refocus international efforts, commitment and additional resources on an explicit, concerted international strategy to build food security on a sustainable basis for present and future generations. This is not a marginal problem but a problem central to the future of humanity.

The problem of world hunger is not simply a failure to balance demand and supply. It is compounded by problems of distribution. Food is often available, but in the wrong place or at a price beyond the reach of the poor. Thus, more coherent international strategies and enhanced intergovernmental cooperation will be needed to manage what are clearly, complex global problems in the world food system. And the immense capacities of civil society



must become an integral part of the process of defining and implementing the new approaches required.

In this international effort, the dynamic role of private enterprise through innovation, finance, knowhow and technology will be fundamental, but it must operate within a clear framework of public policy and purpose. Strengthened cooperation between the public and private sectors will be essential to build food security. This will demand renewed efforts to develop productive partnerships and will require changes in attitude and policy. It will pose very difficult policy dilemmas, for example the reduction of agricultural subsidies in the North and the proper balance of policy on patents and intellectual property. Such problems are more likely to be resolved within a concerted vision and a positive, forward looking strategy for world food security.

An international strategy must not position food security as an isolated goal. To achieve it, the underlying causes of declining food security must be resolved. Principally:

- the risk of irreversible climate change must be averted through mitigation of emissions and increased efforts for adaptation;
- the degradation of ecosystems must be reversed;
- energy security must be conceived in such a way as to assure that the essential energy supplies needed for transport, tractors and fertilizers in poor developing countries are available: in one year, the cost of fertilizers in Uganda doubled, and many farmers are now working without;
- concerted efforts must be made to conserve fresh water and preserve its sources from contamination;
- the path of globalisation and economic growth must be re-oriented not only to reduce carbon emissions but also to stimulate urban and rural employment and to provide trade opportunities for farmers and enterprises in developing countries;
- The reform of the global financial system must provide for enhanced flows of investment and credit to support agriculture in developing countries, reversing the current decline.

It will only be possible to provide food security on a sustainable basis to a growing world population if these underlying factors can be managed successfully in a systemic perspective.

This underlines the need for new interdisciplinary, analytical approaches, for better coordination of policies and implementation and for innovation in institutional architecture and processes. These issues are the focus of the work of the Club of Rome, (see www.clubofrome.org.) If we can meet these challenges, we can stimulate the virtuous cycle of employment, purchasing power, profits for farmers, improved productivity and efficient use of resources, stimulating growth and employment, preserving stability, and thus, reducing hunger and poverty.

A key element in such a strategy should be an international programme targeted to the recuperation of degraded lands and reforestation on a massive scale. This would achieve multiple goals by sequestering carbon from the atmosphere and reducing emissions on a significant scale, conserving biodiversity and ecosystems, providing employment and additional food security, providing renewable energy and conserving soils and water.

2. Mobilising science, technology and innovation

Second, we must mobilise the immense potentials of knowledge, science and technology to increase agricultural outputs, to reduce waste and environmental impacts, and to disseminate timely information and best practice etc. However, herein lies a danger.

The agricultural methods so well established in the North, based on high technology and the intensive use of energy, fertilizers and pesticides are, in many cases, not sustainable in the South. They can lead to a reduction of biodiversity, for example, the disappearance of insects and birds and the growing scale dead zones in the oceans, caused by the runoff of nitrates from excessive fertilizer use.

It will be necessary to reconsider deeply the models of agricultural activity which are best suited to and sustainable in the real conditions of developing countries, particularly in regard to maintaining wide rural employment. Capital intensive, high productivity agriculture may be appropriate in the North where agricultural labour may be scarce or labour costs must be reduced but this is not an approach which will reduce poverty and hunger in the South.

Production based on deep local knowledge and the traditional methods of smallholder farmers, with careful support, should become a key element in agricultural strategies. In this connection, the role of micro-credit will be of great importance as will be a serious emphasis on enhancing the role of women who play an essential and often a central if undervalued role in all the processes of food production.

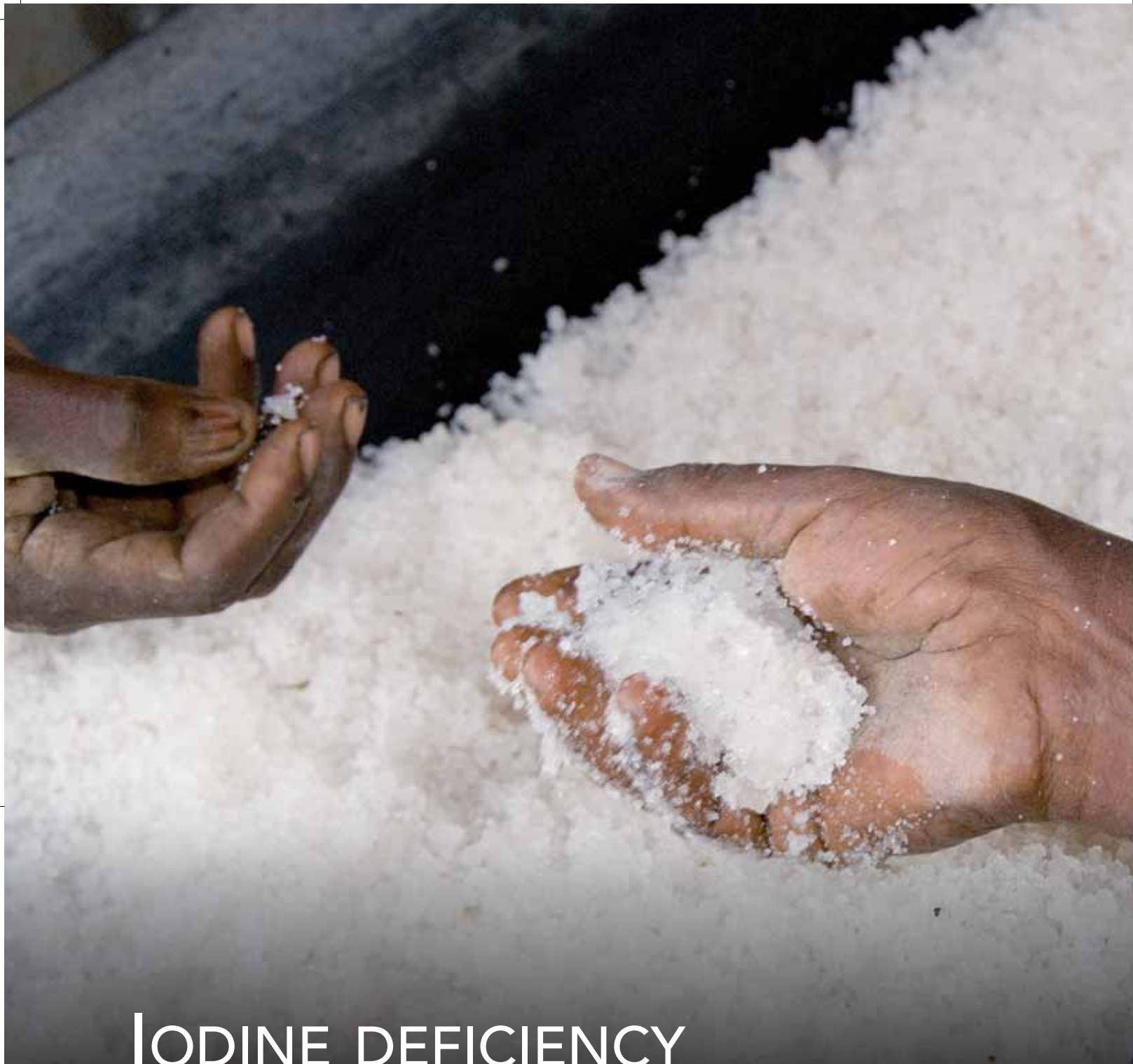
Research, development and innovation will be a critical component in the building of food security. But, as was clearly understood in the Seventies, a far greater proportion of R&D efforts must be undertaken within the developing countries themselves and these must be focused far more directly on the problems of food production in their real conditions. This will ensure that new solutions are productive and sustainable in the local cultures, societies and environmental conditions. Only a small percentage of world R&D is focused on the needs of the five billion people of the developing world. This must change. The issue was the focus of international action in the Seventies: it must become so again.

3. Building capacities in developing countries

Third, a fundamental component of any strategy to enhance food security will be the strengthening of capacities in the developing countries themselves. This will demand a greater focus on extension services to upgrade the understanding and skills of farming communities. Education and training must also become a priority to produce the large numbers of the scientists, experts, administrators and policy makers who will be essential in the developing countries to upgrade governance and policy implementation and create the conditions for sustainable economic and social progress. Strengthening the endogenous human capabilities of the developing countries will be, in fact, essential to enhance their food security. International expertise can be an important catalyst, but it cannot replace local efforts.

Just as we must use the financial crisis as an opportunity to question and rethink long entrenched ideas and policies, so we must use the food crisis to achieve an innovative and integrated approach to guide the underlying social, economic and technological forces which together can assure food security for future generations. Could we do this? Yes, we could.





IODINE DEFICIENCY

Preventing iodine deficiency disorders in China

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The occurrence of iodine deficiency disorders (IDD), manifested as goiter, was recorded in ancient Chinese medical literature as early as 3,000 BC. This condition has continued to be a significant public health problem, threatening the quality of life, human

potential and social economic development in China. An important epidemiological survey and intervention program was carried out in Chengde, Hebei Province in 1960, under the leadership of Xianyi Zhu and T Ma of Tianjin Medical College. This intensive study demonstrated that lack of iodine in the environment was the main etiology of endemic goiter and cretinism.

Recognition of this public health problem urged the central government to organize a national epidemiological survey in the 1970s, which revealed the existence of about 35 million individuals with visible goiter and 250,000 with clear signs of cretinism. In addition, it was estimated that about 700 million people were at risk of developing severe or

moderate iodine deficiency (1). Equally important was the observation, following meta-analysis, that between 5 and 15% of children residing in areas with iodine deficiency could have IQ levels ranging between 50 and 70 (2). There was thus a shift in the distribution of IQ levels in these communities amounting to a reduction with 10 to 12 points as compared to children with adequate iodine intake. These individuals are referred to as sub-cretins, a condition that is recognized as the main type of iodine-deficiency-induced brain damage in China (3).

Provision of iodized salt is the most efficient intervention for the prevention of iodine deficiency and its consequences. As a result of this, the central government adopted the National Iodized Salt Program as the main strategy for the control of IDD commencing in the 1970s, albeit only in areas with moderate and severe IDD. This resulted in a dramatic reduction of goiter rates in the intervention areas, although the IDD situation was still not under satisfactory control, due in part to insufficient political will and commitment, continued marketing of non-iodized salt and inadequate and inefficient monitoring of the intervention.

The 1993 National Advocacy Meeting: Milestone in the elimination of IDD in China

In 1993 the National Advocacy Meeting for the Elimination of IDD by the Year 2000 was organized by the State Council in Beijing, with State Councilor Madam Peng Peiyun as host. This historic event constituted a follow-up of activities spearheaded by the UN Summit for Children in 1990 in which Premier Li Peng also signed the Summit Declaration. In this manner, the Chinese Government made clear its political commitment to the elimination of IDD by the year 2000. The State Council subsequently approved a new National IDD Control Program and the Regulation on Iodized Salt. Universal Salt Iodization (USI) was accepted as the basic intervention for the prevention of IDD and was firmly on track for in virtually all of China by 1995.

Important components of this intervention included the Health Education and IDD Day that was observed throughout China. This recurrent event played a crucial role in social mobilization. Another event that greatly contributed to the success of the program was the creation of the Multi-Sectoral Leading Group, which was charged with the responsibility of coordination at State Council level, under the able leadership of Madam Peng Peiyun. A National and Provincial Iodized Salt Monitoring System were established with activities to be carried out at production and household levels. This comprehensive system that produced substantial amounts of data was coordinated by a national computer system.

Launching the universal salt iodization program: The power of legislation and monopoly in the delivery of health care

The State Council made an important and historical decision to assure that all edible salt, both for human and animal consumption, should be adequately iodized. In support of this decision, the Chinese Government promulgated the "Iodized Salt Management Regulation for Control of IDD in China" and the "Edible Salt Monopoly Regulation". Thirty-four local laws or regulations were formulated and enforced in each province in order to supply acceptable iodized salt and to prevent illegal salt from entering the market. This policy facilitated centralization of the salt industry and continuation of a centrally planned system, instead of a free-market mechanism, for the management of salt production and distribution. These legal strategies strongly supported the implementation of the universal salt iodization program in all of China.

A nationwide sales framework with a regulated salt market for wholesaling and retailing iodized salt was set up and continuously strengthened to assure edible salt iodization and distribution. A strong ban was imposed on producers and wholesalers who were not in possession of legal licenses. The centralization of iodized salt production and distribution led to high coverage of iodized salt (see table 1) in most areas, with the exception of remote ones, and contributed to effectively preventing non-iodized salt from entering the market.

Monitoring and quality control

The monitoring and quality control system in China has five components:

1. Iodized salt quality assurance at the production level. All the licensed salt plants have to set up their own laboratories for monitoring the iodine concentration in salt during the production process, and before packaging and transportation.
2. Iodized salt monitoring at the county level. The National Reference Laboratory carries out quality control at the household level in each county once or twice a year. Monitoring indicators include iodine concentration in salt, coverage of iodized salt and possible existence of non-iodized salt. The National Laboratory also plays an important role in quality assurance at the level of each county laboratory.
3. Impact evaluation is implemented every two or three years, by using WHO/UNICEF/ICCIDD criteria. Each province is considered as a basic unit for the epidemiological survey. The Probability Proportional to Size (PPS) cluster method was accepted for assessing IDD prevalence. Monitoring indicators include iodine concentration and coverage of iodized salt at the household level, total goiter rate and urinary iodine concentration in school children.

The National Laboratory is responsible for external quality control regarding determination of iodine in salt or urine. These activities were carried out by China Center for Disease Control over a number of years (4) (Table 1).

4. Feedback mechanisms. The Ministry of Health (MOH) regularly organizes consultation meetings whenever activities are completed. The National IDD Advisory Committee (NIDDAC) of the Ministry and various other experts or partners present their views, final suggestions and recommendations for consideration by the government. These consultations also provide an opportunity for the partners to share the data that have been produced and processed, experience gained and problems encountered in order to jointly find solutions or explore areas for future cooperation. Of particular importance is providing feedback to the National Monitoring Activity as it moves ahead into new areas of implementation.

TABLE 1:
National Monitoring Results 1995 to 2005

INDICATORS	1995	1997	1999	2002	2005
The proportion of households consuming iodized salt					
≥5 mg/kg (%)	39.9	81.1	88.9	95.2	94.9
20-50 mg/kg (%)	29.7	69.0	80.6	88.9	90.2
Median iodine levels (µg/L)	16.2	37.0	42.3	31.4	30.8
Median urinary iodine levels in children (µg/L)	164.8	320.2	306.2	241.2	246.3
Total goiter rate (%)					
by palpation	20.4	10.9	8.8	5.8	5.9
by ultrasonography		9.6	8.0	5.6	4.0

Achievements

The national data presented in Table 1 clearly show that China already achieved the goal of virtual elimination of IDD by the year 2000 and has succeeded in sustaining these results even after 2000 (1, 4). This fact is further validated by the results of surveys focusing on the iodine nutritional status of populations groups at risk of IDD, namely women of childbearing age, pregnant and lactating women and their babies (5) (Table 2). These groups nowadays live in areas where the coverage rate of iodized salt is about 90%.

Table 2
Urinary iodine concentrations in vulnerable groups and in milk (mg/L)

STUDY GROUPS	URINARY IODINE (µg/L)
CHOOOL CHILDREN	229.1
WOMEN OF CHILDBEARING AGE	220.3
PREGNANT WOMEN	178.8
LACTATING WOMEN	191.3
BABIES	240.4
MILK	145.0

The results of China's interventions reveal the following facts:

1. Samples of at-risk groups clearly display adequate iodine nutrition with no suggestion of excess intake of iodine.
2. The most sensitive groups, newborns and young children, seem to be adequately protected from the risks of iodine deficiency during a sensitive period of brain growth.
3. Urinary iodine levels between 150 and 250 g/L indicate adequacy of iodine nutrition for all women, including pregnant and lactating women.
4. Urinary iodine in school children with adequate iodine intake should not be below 150 ug/L. Concentration below this level suggest that their mothers are not receiving adequate iodine both during pregnancy and lactation.
5. The iodine nutrition of pregnant and lactating women should be carefully monitored in order to ensure an adequate supply to newborn and young children even in areas where iodized salt has been implemented.

Lessons learnt from the Chinese experience

- Strong and sustained political will and commitment to the elimination of IDD at the highest levels of leadership in central and provincial governments
- Multi-sectoral coordination with executive authority at both central and provincial levels
- Legislation on universal salt iodization and monopoly or strict control of the salt market nationwide
- Effective monitoring system with reliable quality control and data communication
- Strong technical support both from specialized national agencies and advisory groups with specific skills and know-how
- Strong international support from technical and aid agencies (WHO, UNICEF, UNDP, UNIDO, AusAID, CIDA, ICCIDD, World Bank, SIDA and Kiwanis).
- Education, communication and social mobilization program at all stages of implementation

A decade of Sino-Swedish co-operation (1995-2008) on "Prevention and Rehabilitation of Iodine Deficiency-Related Mental Retardation" has provided valuable experiences in the implementation and maintenance of programs at both the national and county levels. The chain of steps to success are:





LEADERSHIP TRAINING

Strengthen Leadership and Public Confidence

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In the past years I have become much involved in discussing topics which I find are also very relevant for nutrition sciences and nutrition guidance. Let me start with mentioning a few of these topics: leadership; public-private co-operation; responsive research in developing countries; knowledge transfer; creating supportive environments for guidance and care; nutritionism; social impact of

research; strengthening public confidence in nutrition; and, last but not least, stimulating visionary approaches to research needs in the future. I will elaborate briefly on some of these topics.

Nutrition sciences have shown an impressive development in recent decades. We should be aware that until about 30 to 40 years ago, nutrition sciences struggled to have a obvious contributive role in society, in the medical profession, in industry and in education. The strong development of public health in the past 30 to 35 years has given nutrition sciences the opportunity to become visible, powerful and relevant. As a consequence, nutrition scientists are asked to provide leadership on nutritional health issues. However, parallel to this development we can

observe the present “epidemics of nutritionism”, which can be described as an ideology with regard to foods and nutrients that is based upon unexamined assumptions (Michael Pollan, 2008). Nutritionism has developed with support both from nutritionists, whom we should perhaps rather call nutrition gurus, and from the food industry, through promoting foods with health claims not based upon solid scientific evidence. There is no doubt that the conflicting debate between nutrition sciences and nutritionism has undermined public confidence in nutrition. Therefore we should give priority attention to those activities in research and communication which may have societal impact and consequently lead to strengthening the public confidence in nutrition. One may judge that this is a relevant strategy. The problem, however, is that we cannot give a good answer, if asked, as to how societal impact should be measured. In general we can and do state that nutrition research will contribute to the improvement of population health and health care. This means that we have to show responsiveness about how research results are or can be translated into potential applications within the food, nutrition and health system. We always have to keep in mind that society is asking for solutions if (public) money is provided for research. A recent workshop report in the British Journal of Nutrition (2008,99,198-205) illustrates this new and relevant approach. The reported study was initiated by the UK Food Standards Agency. This Agency convened a meeting with an international group of expert scientists to review the Agency-funded projects on diet and bone health. The question to be discussed was whether these projects have helped to inform public health policy. The outcome was quite disappointing. It has also become evident for nutrition scientists that the societal impact of their research will be more critically reviewed in the future. This topic of responsive research is not only an issue in the developed world. It is very evident that studies in developing countries should also be responsive to local nutritional health needs. Likewise, products developed as a result of a trial should be made reasonably available to individuals and communities in which the research is done. Also the research topic should reflect the prevalence of local health problems. There is no doubt that the development of national science capacities will be measured as they will be instrumental in achieving a wanted societal impact. The development of high-level nutrition leadership programs in the past 10 to 15 years in Europe followed by such programs in Africa, Latin America, South-East Asia and the USA, and well supported by a few of the world’s largest food companies and foundations, has given a strong awareness to the profession about the roles we expect from our colleagues in the future.



I do realize that so far I have not given any attention to the fascinating achievements of nutrition sciences in the past decades. I will review very briefly a number of nutrition topics about which I am really very excited.

-- Nutrition and pharma. The research on the nutrition-pharma interface rightly gets more attention. Maybe it will teach us what Hippocrates already wrote: "Let food be thy medicine and medicine thy food".

-- Nutrigenomics. This research will undoubtedly lead to challenging and fascinating science. However it is too early now to question the societal impact of present findings. We just have to wait.

-- Nutrition and bone health. Much research attention is at present given to this topic. More and more data are becoming available about the role of vitamin D in physiologic systems. The criteria for vitamin D insufficiency and deficiency have recently been reviewed and as a consequence many more people in the world are either vitamin D deficient or insufficient. Michael Holick (2008) even expressed this as "Vitamin D Deficiency: The Silent Epidemic".

-- Double burden of nutrition problems in developing countries. In these countries there often is still a high prevalence of different kinds of malnutrition found in rural areas and in shanty townships. The cities in these countries, however, show increasing nutrition-related, chronic, non-communicable diseases such as hypertension, diabetes and cardio-vascular diseases. These people also ask for and should get care and treatment. This double burden requires a balanced approach by the Ministry of Health in order to serve all those who are in real need of getting adequate nutrition and medical care.

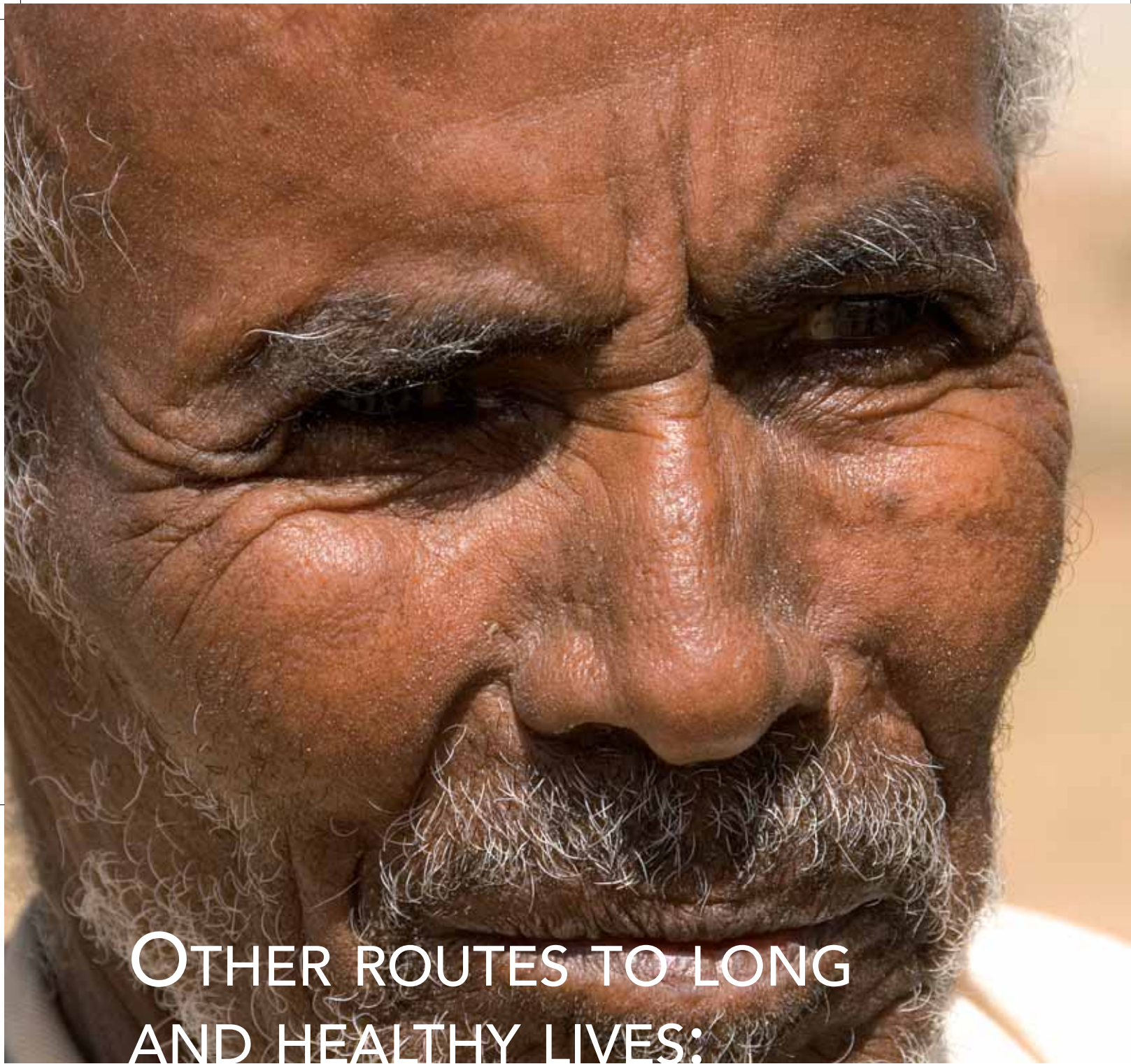
-- "Brain food". This topic is at present rightfully receiving worldwide attention as the mental performance in different age groups is becoming a subject of great concern. We are in need of solid scientific data before successful food products or medicines can be introduced.

Nutrition scientists will continue to unravel the fascinating impact of food and nutrients on human health and performance. There can be no doubt that they will come up with intriguing new findings which are going to play a significant role in maintaining good health and performance. We have become aware that the outcome of our scientific work should serve people and communities in that part of the world where the specific nutritional health problems are. When we show leadership and when we have a good understanding of how to improve the societal impact, then the public confidence in nutrition will gradually recover.

Finally a short word about the contribution of the Nestlé Foundation in the past decennia to the topics mentioned in this contribution. The Council of the

Nestlé Foundation has always given priority to nutrition-research topics which reflect serious public health problems in developing countries. Further we always review whether the research proposal is embedded in a local nutrition institutional development program in order to strengthen both individual and institutional capacities. We strongly believe that the developing world also is in need of strong nutrition institutions which have professionals with skills to assess the consequences of certain local dietary patterns on health and who are also able to contribute to the debate about how poor nutritional health can be prevented. We believe that such an approach will facilitate leadership in nutritional health issues and having this leadership position, both public and private organisations will look to them for guidance and advice. Thus, the Foundation has always shown a strong interest in the professional development of scientists involved in nutrition topics. For this purpose the Foundation has been very supportive of highly qualified candidates in these countries by facilitating participation in PhD, MSc or Leadership programmes.





OTHER ROUTES TO LONG AND HEALTHY LIVES:

How did some poor countries match rich lands in life expectancy?

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In some low-income countries people have life expectancies as high, or nearly as high, as do their counterparts in the rich lands. Most of those low-income countries achieved this position by 1960. Thus they did not rely on biomedicine, just becoming

available to the non-Western world by 1960, and they did not rely on economic development. They found other means, which are identified for twelve countries in Low Income, Social Growth, and Good Health (Berkeley: University of California Press, 2008). The twelve are Japan, Korea, Sri Lanka, Panama, Costa Rica, Cuba, Jamaica, the Soviet Union, China, Venezuela, Oman, and Mexico.

Since all twelve were poor countries when they began to improve survival, and most of them remain poor in income, nutritional resources, housing, and other gauges in 1960 and today, they had to find routes that did not rely on money. It is important that all twelve had already reached a certain stage of

development: Their governing institutions and their people were capable of organized collaboration toward shared goals.

For health, the leading task was to reduce mortality, especially in infancy, childhood, and early adulthood, from three communicable diseases: tuberculosis, probably the leading cause of death across the world in 1900; diarrheal diseases, especially those communicated through human waste; and malaria.

All twelve countries had access to emerging western ideas about how to control these diseases. For tuberculosis the new ideas required people to learn how to recognize the disease, and for the sick to understand and cooperate in protecting the healthy. For diarrheal diseases they required that people understand the dangers of contact with human waste and, mostly by digging pit latrines and keeping the above-ground part of the latrines clean, how to dispose safely of fecal matter. And for malaria these ideas required that people search out the breeding sites of anopheles mosquitoes and interrupt the mosquito's reproductive cycle.

The first country to control smallpox had been Sweden, which deployed not wealth, for it was still a poor land around 1810, but social organization. Such was the common pattern also among the twelve low-income countries a century later. They turned not to the purchase of public health and medicine but to rudimentary and low-cost substitutes. The keys were things people did for themselves, such as reducing contact with anyone in the family who had tuberculosis, digging a pit latrine, or monitoring mosquito breeding sites on their own property. In most of these countries broadened education, reaching the point where most children attained four years of schooling, played a central role in communicating information about disease recognition and control, and in getting people to understand the steps of prevention. Thus an alliance developed between public health and medical authorities, who disseminated ideas about what to do, and the general public, which mastered how to put those ideas into practice in their own lives.

These various steps can best be understood under the heading of "social growth", meaning development of the community and its people toward the point that they could receive and act on useful ideas about disease control. A country and its people needed to attain, or improve, their capacity to organize and manage primary schooling, to use the schools to educate children in health issues, to find and apply low-cost strategies for reducing health risks, and to engage large numbers of people in the tasks of disease prevention and control. They needed to modernize in the sense of adopting the norms of promoting good health.

From the Western point of view, most of the effort to improve health in low-income countries has concentrated on exporting Western technology, especially medicines and immunizations. That approach assumes that low-income countries can skip the agonies of building their own systems of public health, health education, and the modernization of behavioral norms. Since the 1950s interventions by the West have had some good effects, most recently in mobilizing support for the use of anti-retroviral medications to treat people with HIV/AIDS.

But the gap in life expectancy between countries doing the best and the worst has not disappeared. Indeed it widened from about 35 years in 1900 to about 50 years in 2000. Average global life expectancy has risen, but for too many people life still ends prematurely and decades of potential life are still lost. Meanwhile, in the West, too, many people have grown accustomed to hoping that biomedicine and medical technology will solve their health problems.

The main point of this book is that the emphasis needs to fall less on biomedicine and more on two other things. First, the world needs good and specific ideas about what people can do for themselves to avoid, prevent, and manage the diseases they face. Second, public health and medical authorities need to engage people in the tasks of disease control, and the people need to discover that they can effectively be engaged in those tasks.

The main successes these twelve low-income countries enjoyed in improving survival came not from disease treatment but from prevention. Their successes constitute a powerful argument in favor of making prevention the basic strategy in efforts to combat today's diseases and health problems: not just tuberculosis, diarrheal diseases, and malaria, but also AIDS. Popular engagement in controlling disease risk can also reduce risks from many chronic maladies, especially heart disease and stroke.



BREASTFEEDING

Fathers' role in breastfeeding: does it count?

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In a country like Indonesia, breastfeeding in general remains a normative act both in rural and urban areas. However, exclusive breastfeeding practice is much less common in this society. As studied in both developed and developing countries, this failure is found to be due to multifaceted factors. The nursing mother's social network has been found to play roles

aside from her internal motivation. The father has been identified as one of the important influences on successful breastfeeding. Unfortunately, in most parts of the world and also in Jakarta, the capital city of Indonesia, child care, and certainly breastfeeding, has long been regarded as a women's issue. Fathers, with the many work-related demands on them, have been thought to be lacking in their parenting function. This assumption triggered a study about the father's role in breastfeeding among fathers and mothers in Jakarta who have infants under the age of 6 months. This study aims to explore fathers' roles in timely breastfeeding initiation and exclusive breastfeeding practices, and also to investigate factors influencing fathers' roles in breastfeeding.

ROLE	DESCRIPTION	ACTUAL PRACTICE	INFLUENCE ON BREASTFEEDING PRACTICES	
			TIMELY BREASTFEEDING INITIATION	EXCLUSIVE BREASTFEEDING
1	seeking information about breastfeeding and infant feeding	38%	POSITIVE	POSITIVE
2	participation in decision making of current feeding mode	23%		
3	involvement in the selection of place for antenatal care (ANC), delivery, and postnatal care	75%		
4	involvement in the examination room during ANC visits	4%	NEGATIVE	NEGATIVE
5	having positive attitude towards the marriage	60%		
6	involvement in some child-care activities	57%		POSITIVE

Employing exploration using qualitative research methods (focus group discussion, in-depth interviews, and observation) and quantitative surveys, the study found six major roles of the father which influence breastfeeding practices both positively and negatively, as shown on this table:

The table reflects that the father does play a role in breastfeeding. However, the most commonly performed role (role 3) had no influence on breastfeeding practices, suggesting a waste of effort on the part of the father. On the other hand, roles very influential to breastfeeding (roles 1, 2, and 5) were not optimally practiced. These imply unmatched conditions between support from the father and the effect of the support on breastfeeding. Interestingly, participation of the father in the examination room during antenatal care (ANC) visits negatively influenced both breastfeeding practices. Although it needs further investigation, one possible hypothesis may be that these fathers were passive (due to lack of knowledge), and so the health personnel dominated the ANC session. This is probably worsened by the fact that the health personnel's point of view is often perceived as "the best" by this type of father.

Furthermore, different roles played by the fathers were associated with numerous factors. Generally, being primiparous, exposed to mass media and interpersonal communication, being generally knowledgeable about breastfeeding-related matters, and a higher income level were all related positively to fathers' roles. However, living as a nuclear family prevents fathers from performing their roles sufficiently. This suggests that the findings from the present study lead to a convergence outlook that the father's knowledge is a predisposing factor influencing his support of breastfeeding practices, irrespective of his work demand as the breadwinner.

Nevertheless, an overall impression towards gender issues in breastfeeding as found in this study is related to the existence of gender discrimination. Who is the victim? In my personal reflection during the course of the study, the answer to this question is both the mother and the father. Why? In order for the father to play a role in improving breastfeeding practice as expected, the father should be equipped with knowledge relevant not only to breastfeeding but also to parenting issues. Where could the father get such resources for him to provide appropriate support for the mother? In this study, most fathers waited outside the examination room during ANC, delivery, and PNC visits. Some admitted they were forbidden to be inside the room by the health personnel. Some mentioned that they found it difficult to work with the health personnel. There is seemingly nobody to turn to when it comes to fatherhood preparation. Fathers just have to be ready, and learn by doing. These facts clearly show how the father is discriminated against in matters of maternal and child health. Unfortunately, with all of these obstacles, fathers have come to be solely focused on their role in the so-called "male domain", leaving the nursing mother with no one to share her load as a parent.

Finally, the study concludes that fathers may support breastfeeding practices when they have sufficient knowledge about breastfeeding and parenting-related matters, have a good relationship with the mother, and have formed a solid breastfeeding triad (father-mother-infant relationship). Information on breastfeeding and infant feeding needs to be made available to fathers. Fathers need to be exposed to resources which will help increase their access to quality time with their families, particularly regarding their involvement with child feeding.



PROFILE OF A NUTRITION INSTITUTE



PROFILE OF A NUTRITION INSTITUTE

Establishment of a Nutrition Unit at the School of Public Health of the College of Health Sciences, in Asmara, Eritrea

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Eritrea is a newly emerging nation which was liberated after 30 years (1961-1991) of a fierce and destructive war for independence against Ethiopian occupation. After an internationally supervised referendum, independence was declared in May 1993.

The Government of Eritrea established the College of Health Sciences (CHS) in 1995, offering degree programs in Nursing, Pharmacy, and Clinical Laboratory Science to address the acute shortage of human resources in health care. The College has evolved rapidly since its establishment and is striving to fulfill its mission of producing competent health-care professionals and scholars who are equipped with basic knowledge, professional skills, attitudes and ethical principles, and who are capable of addressing national health needs by providing and continuously striving to improve health care. More programs are being opened and the college is going through an integration process with newer degree programs and old diploma programs of the Ministry of Health (MOH) in an effort to establish a national health sciences university.

In a bold move, the Honorable Minister of Health, Saleh Meky, launched the opening of the first medical school in the country, the Orotta School of Medicine (OSM), in 2004. The School will celebrate the graduation of its first class of 30 medical students at the end of 2009 and more will follow in the coming years. Postgraduate training in Surgery and Paediatrics started in January 2007 and an Ob/Gyn residency program is set to start in the summer of 2009, with the objective of improving both the quantity and quality of health service providers.

The School of Public Health is the most recently established of all the schools at the College of Health Sciences. The objective for the establishment of the school is to strengthen the aspects of health promotion and disease prevention within the field of health services, and to address the primary health care priorities of the MOH in Eritrea. With the assistance of the University of Florence, Italy, the school was launched in 2006, enrolling 45 students as its first class, who are due to graduate with a Bachelor's degree in Public Health in 2010.

The School of Public Health is currently establishing a nutrition unit which will work collaboratively with the nutrition unit of the MOH, especially during the initial phases. Along with the School of Public Health, this unit will provide the educational requirements for all the other health sciences education programs, namely: medicine, nursing, pharmacy, dentistry, and allied health. The establishment of a Nutrition Unit with education and research mandates within a tertiary educational institution is expected to strengthen nutrition-related education and research activities in the country. Although there is no separate nutrition institute at present, departments of the College of Health Sciences together with the

ERITREA

AREA

Total:	121,320 sq km
Coastline along the Red Sea:	1,151 km
Arable Lands	12%
Permanent Crops	1%
Permanent Pasture	49%

POPULATION

	4.8 million
urban population:	20%
under age 15:	2.3 million (43%)
median age:	18.3 years

POPULATION GROWTH RATE: 2.63%
(estimate for 2008)

GNP: 249 USD
(estimated for 2007)

LIFE EXPECTANCY

Total population: 61.38 years
Male: 56.4 years / female: 63.5 years

Nutrition, undernourished 3.1 million
(2003 FAO estimates)

Births attended by skilled health personnel 28.3%

MORTALITY RATES (2007)

Infant Mortality Rate
44 / 1000

Under-Five Mortality Rate
78 / 1000

Maternal Mortality Ratio
630 / 100,000 live births (2000)

UNDERWEIGHT

Newborns with low birth weight
21%

Children under 5 moderately or severely underweight
39.6% (2002)

Children under 5 severely underweight
11.5% (2002)

Infant and young child feeding

Exclusive breastfeeding rate (0-5 months)
52%

Timely complementary feeding rate (6-9 months)
43%

Key nutritional anthropometry

Stunting in children under 5
38%

Children under five stunted for age
44%

Prevalence of wasting (moderate and severe)
13%

Prevalence of underweight children (m/f)
39% / 41%

Micronutrient deficiencies

Prevalence of goitre in school-age children (1997)
35%

Percentage of households consuming adequately iodized salt
68%

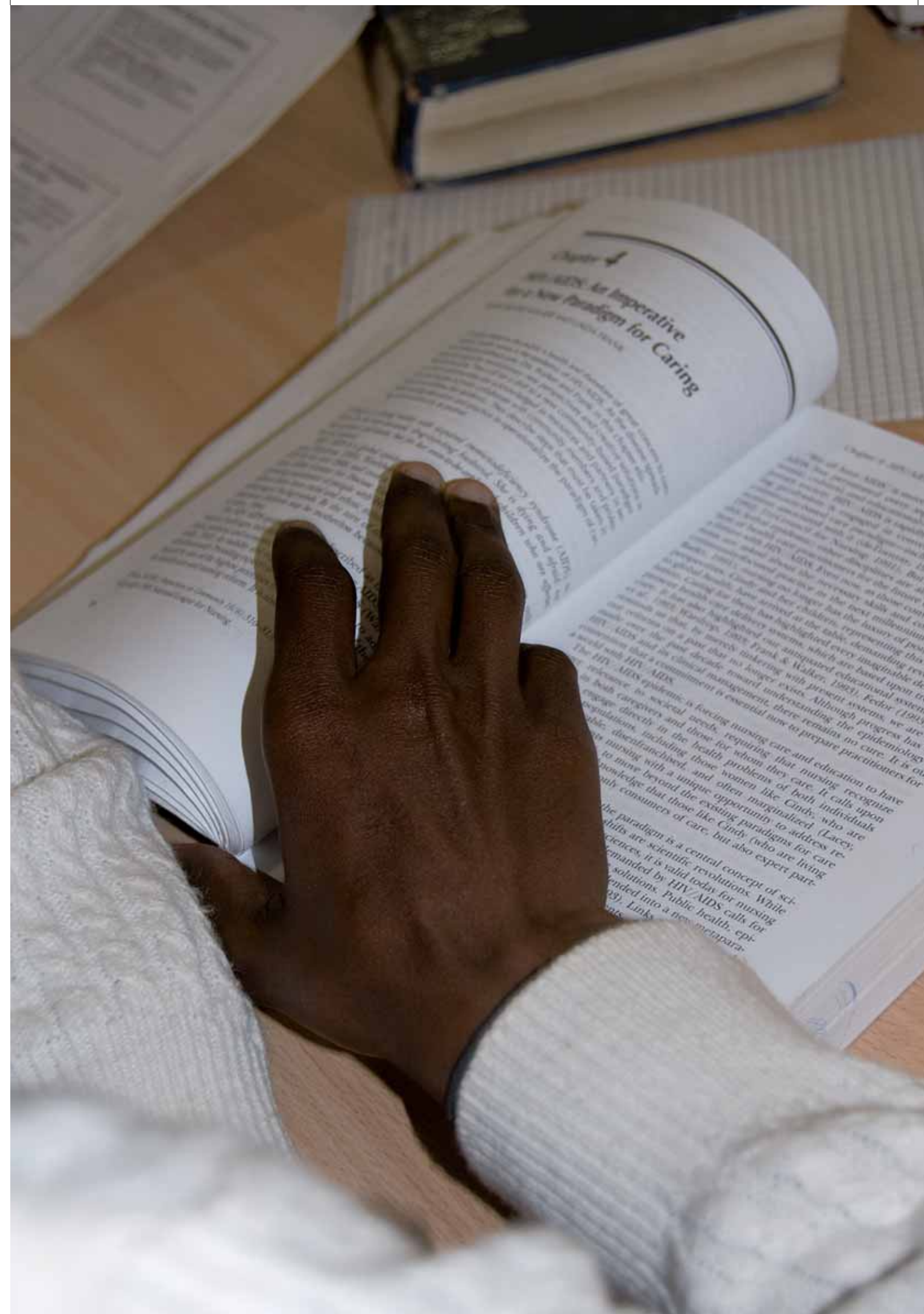
Prevalence of vitamin A deficiency according to serum retinol levels in preschool children
42.8%
(3.8% deficient and 39% low vitamin A)

Prevalence of vitamin A supplementation in children
49.8%

Ministry of Health (MOH) focus on different aspects of nutrition and nutrition research.

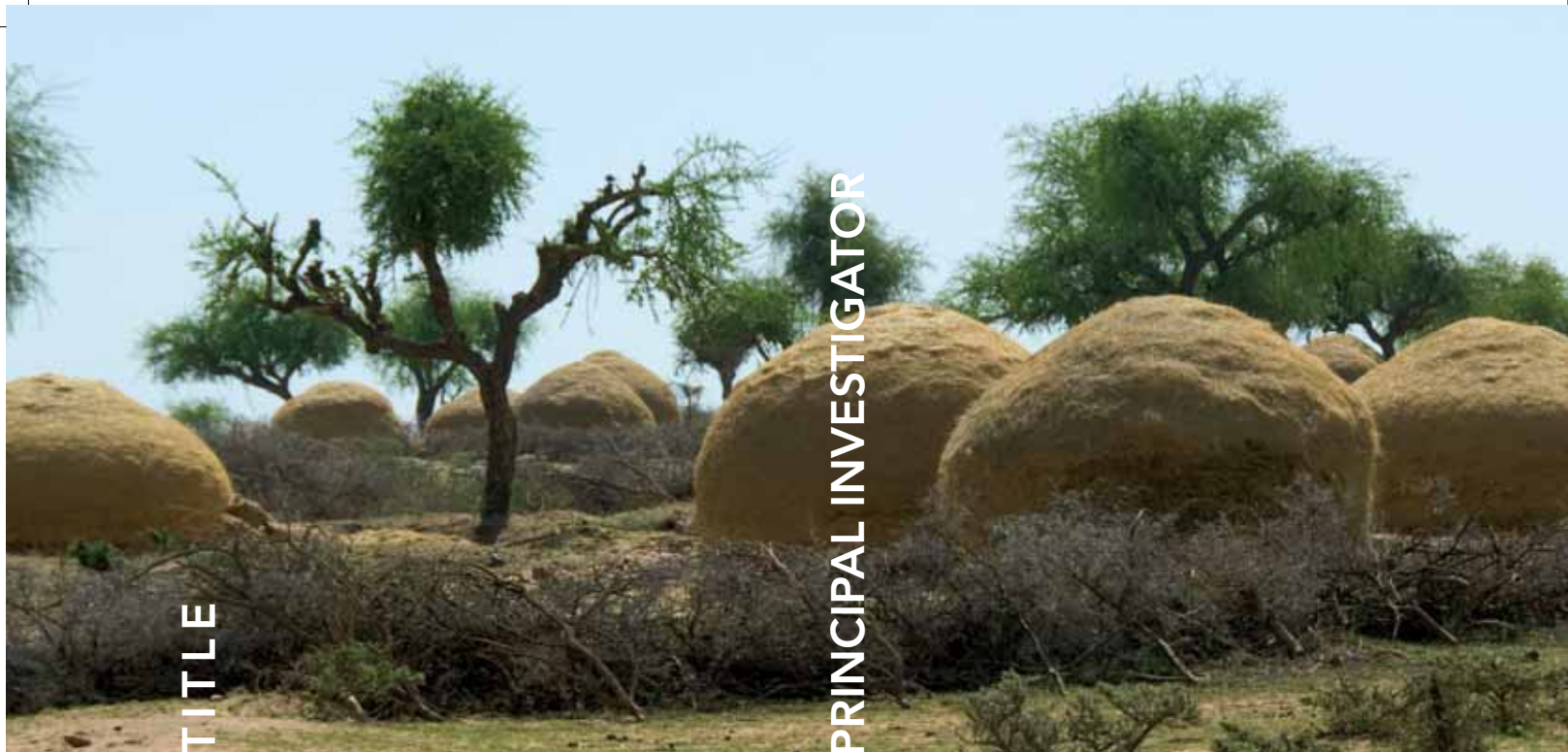
In addition to the development of educational institutions, the rapid expansion of a high quality health infrastructure is an important success factor among the strategies identified for improving health service delivery in Eritrea and has made a significant contribution in reducing infant and maternal mortality; malaria transmission; the spread of infectious diseases, including HIV/AIDS and TB; and vaccine-preventable diseases, such as the eradication of polio. The focus is now shifting to addressing non-communicable diseases, such as hypertension and diabetes.

Despite these remarkable achievements, Eritrea faces major health challenges, the health workforce shortage being the most important factor. According to the WHO 2006 report, Eritrea has one of the lowest physician-to-population ratios in the world, 5:100,000 compared to 293:100,000 in the U.S. The ratios for nurses, dentists, and pharmacists are 1:4,500, 1:400,000, and 1:30,000 respectively. The strengthening of the educational programs is expected to contribute significantly to rectifying many of the health workforce shortages.





ONGOING PROJECTS



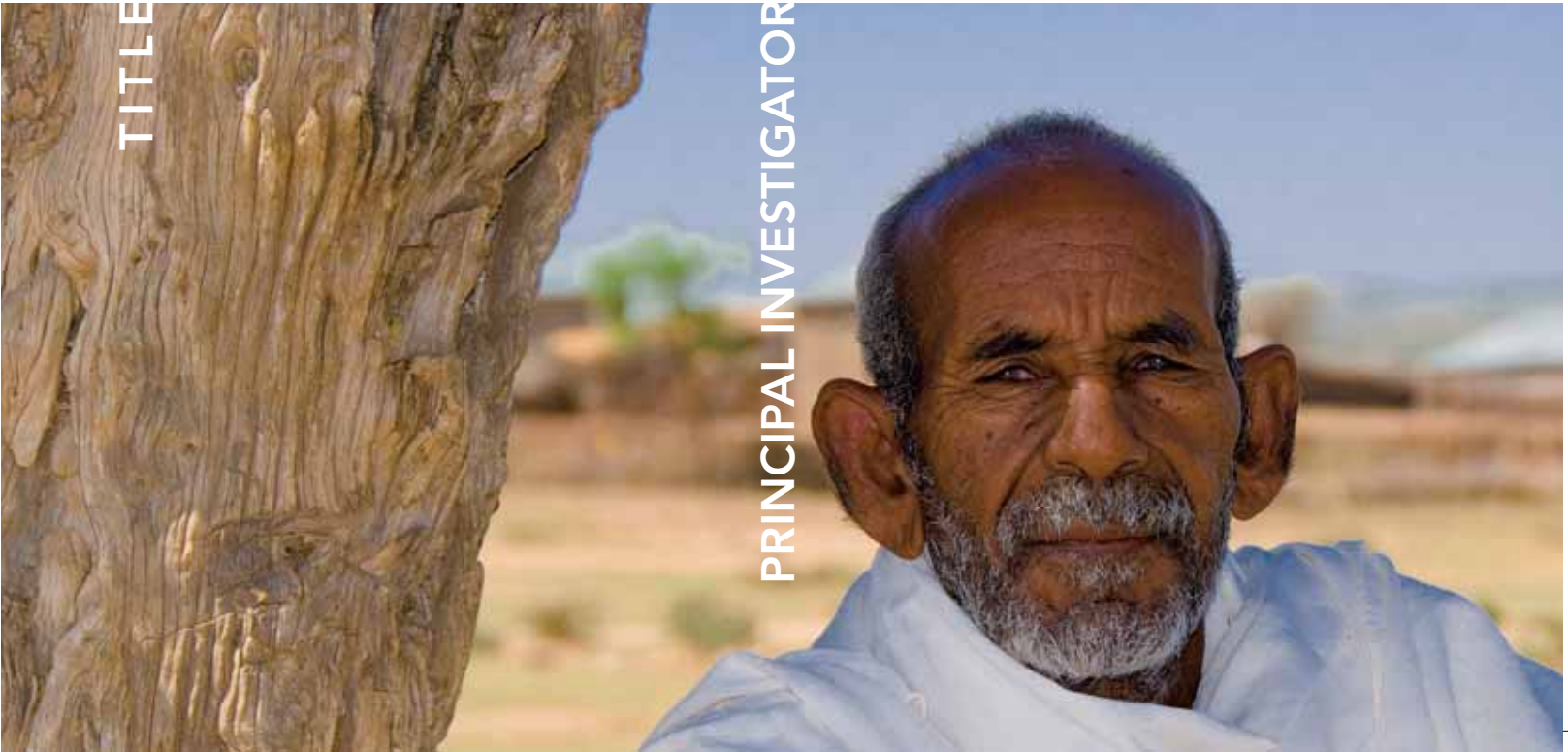
TITLE

PRINCIPAL INVESTIGATOR

- | | | |
|----|--|--|
| 1 | 2001 / Effect of vitamin A and B2 supplementation added to iron on anemia of pregnant women in China | Aiguo Ma
Qingdao University Medical College, Institute of Human Nutrition, Qingdao, China |
| 2 | 2002 / Efficacy of multiple micronutrients supplementation in improving micronutrient status among anaemic adolescent girls in Bangladesh | Faruk Ahmed
University of Queensland, School of Population Health, Brisbane, Australia |
| 3 | 2002 / Effect of calcium supplementation to low calcium intake pregnant women on placental hemodynamic and fetal growth: A randomized clinical trial | Guillermo Carroli
Centro Rosarino de Estudios Perinatales, Rosario, Argentina |
| 4 | 2002 / Effects of an additional meal fortified with multiple micronutrients on the nutritional and micronutritional status of Vietnamese children | Nguyen Quang Dung
National Institute of Nutrition, Basic Nutrition Department, Hanoi, Vietnam |
| 5 | 2003 / Evaluation of valid biomarkers to distinguish between iron deficiency anemia and anemia of inflammation in areas of high rates of parasite infestation and nutritional deficiencies | Mohamed Ag Ayoya
Cornell University, Division of Nutritional Sciences, Ithaca, USA |
| 6 | 2003 / Effect of zinc supplementation and its interaction with vitamin A on child immune responses and morbidity rate | Martha I Kartasurya
Diponegoro University, Nutrition Department, Medical Faculty, Semarang, Indonesia |
| 7 | 2003 / Usefulness of ferrous fumarate and ferric pyrophosphate as food fortificants for infants and young children in developing countries | Shafiqul Sarker
ICDDR,B, C. for Health and Population Research, Dhaka, Bangladesh |
| 8 | 2003 / Zinc homeostasis in and zinc requirements of young Chinese children | Xiaoyang Sheng
Shanghai Jiao Tong University, Department of Child and Adolescence Healthcare, Shanghai, China |
| 9 | 2004 / Effect of iron fortification of nursery complementary food on iron status of infant | Kim Su Huan
Institute of Child Nutrition, Pyongyang, Korea Democratic Republic |
| 10 | 2004 / Effects of multi-vitamin and multi-mineral supplementation on pregnant women and their infants in Chongqing, China | Ting-Yu Li
Chongqing University of Medical Sciences, Children's Hospital, Chongqing, China |

MICRONUTRIENTS

- | | | |
|----|--|--|
| 11 | 2004 / Investigation of blood, hair lead and manganese levels in children with different degrees of iron deficiency in Karachi | Mohammad Ataur Rahman
University of Karachi, Centre for Molecular Medicine & Drug Research, Karachi, Pakistan |
| 12 | 2004 / Vitamin A value of spirulina carotenoids in humans | Guangwen Tang
Tufts University, Human Nutrition Research Center on Aging, Boston, USA |
| 13 | 2004 / Study on the causes of anemia in the elderly women in China | Jian Zhang
National Institute of Nutrition and Food Safety, Department of Elderly Nutrition, Beijing, China |
| 14 | 2005 / Environmental supplementation of iodine by iodination of irrigation water in the Ferghana Valley | Maksuda Abidjanova
Association of Endocrinologists, Kokand City, Uzbekistan |
| 15 | 2005 / Stability and efficacy of vitamin A fortified cooking oil on nutritional status of Vietnamese children 36-60 months | Cao Thi Thu Huong
National Institute of Nutrition, Department of Micronutrient Research & Application, Hanoi, Vietnam |
| 16 | 2006 / Vitamin A status of households according to the seasonal availability of vitamin A and beta-carotene rich foods | Romain A.F. Dossa
University of Abomey-Calavi, Department of Food Sciences and Nutrition, Cotonou, Benin |
| 17 | 2006 / Effect of psychosocial stimulation on development of iron-deficient anemic infants: a randomized controlled trial | Jena D. Hamadani
ICDDR,B, C. for Health and Population Research, Dhaka, Bangladesh |
| 18 | 2006 / Assessment of iron status of children in rural communities in Abia State, Nigeria | Ignatius Onimawo
Ambrose Alli University, Biochemistry Department, Ekpoma, Nigeria |
| 19 | 2006 / Efficacy of multiple micronutrients supplementation on anaemia in 6-23-months-old rural Burkinabe children | Hermann Ouedraogo
Institut de Recherche en Sciences de la Santé, Ouagadougou, Burkina-Faso |



TITLE

PRINCIPAL INVESTIGATOR

MICRONUTRIENTS

MICRONUTRIENTS

20	2007 / Iodine supplementation in mild-to-moderately iodine-deficient, pregnant women: effects on pregnancy outcome and infant development	Sumitra Muthayya St John's National Academy of Health Sciences, Institute of Population Health & Clinical Research, Bangalore, India
21	2008 / Improving micronutrient status of Chinese children using dietary spirulina	Shi-an Yin National Institute of Nutrition & Food Safety, Beijing, China
22	2008 / Effects of vitamin A supplementation during lactation on infants' antibody response to hepatitis B vaccine in China	Zhxiu Wang Nanjing Medical University, Nanjing, China
23	2008 / Impact of vitamin A and zinc supplementation on pathogen-specific diarrheal disease in Mexican children	Kurt Long University of Queensland, Division of International & Indigenous Health, Brisbane, Queensland, Australia
24	2003 / Evaluation of two counseling strategies to improve exclusive breastfeeding rates among HIV-negative mothers in Kibera slum of Nairobi, Kenya: a randomized clinical trial	Sophie Ochola Kenyatta University, Department of Nutrition, Nairobi, Kenya
25	2008 / Information and education to support and promote exclusive breastfeeding	Ada C Uwaegbute Micheal Okpara University of Agriculture, Umuahia, Nigeria

REHABILITATION FROM MALNUTRITION

26	2001 / Oral rehydration solution containing amylase resistant starch in severely malnourished children with watery diarrhea due to Vibrio cholerae	Nur Haque Alam ICDDR,B, Centre for Health and Population Research, Dhaka, Bangladesh
27	2004 / Rehabilitation of severely malnourished children in Senegal (West Africa): use of a local solid food equivalent to WHO F100 with high energetic value. Part II	Salimata Wade Université Cheikh Anta Diop (UCAD), Equipe de Nutrition, Dept de Biologie Animale, Dakar, Senegal
28	2003 / Comparison of the efficacy and acceptability of three types of micronutrient supplements added to complementary foods for infants in Ghana	Anna Lartey University of Ghana, Department of Nutrition and Food Science, Legon, Ghana
29	2005 / Food-based approach for the control of stunting among preschool children	Chineze Agbon University of Agriculture, Department of Home Science & Management, Abeokuta, Nigeria
30	2006 / STEP I: Complementary feeding-based approach to alleviate linear growth retardation and nutrient deficiencies in infants aged 6 to 12 months in the south of Benin	Romain A.F. Dossa University of Abomey-Calavi, Department of Food Sciences and Nutrition, Cotonou, Benin
31	2006 / Promoting breastfeeding: a formative research among women and their husbands having infant aged 0-6 months in urban households	Judhiastuty Februhartanty University of Indonesia, SEAMEO-TROPED RCCN, Jakarta, Indonesia
32	2007 / Mangochi Child Nutrition Intervention Study	Kenneth Maleta University of Malawi College of Medicine, Division of Community Health, Mangochi, Malawi

INFANT AND CHILD NUTRITION

BREASTFEEDING

INFANT AND CHILD NUTRITION

MATERNAL NUTRITION



TITLE

PRINCIPAL INVESTIGATOR

- | | | |
|----|--|--|
| 33 | 2007 / Potential of amaranth grain seeds to improve the nutrition and health status of school children | John Muyonga
Makerere University, Department of Food Science and Technology, Kampala, Uganda |
| 34 | 2007 / Improving Nutritional Status of Children 6-18 Months in Semi-Arid Area in Kenya. The Potential of Amaranth Seed Flour | Alice Mboganie Mwangi
University of Nairobi, Applied Nutrition Programme, Uthiru-Nairobi, Kenya |
| 35 | 2008 / Nutrition, anemia, growth and oxygen weaning in Low Birth Weight oxygen-dependent infants in a Kangaroo Clinic | Nathalie Charpak
Fundacion Canguro, Bogota, Colombia |
| 36 | 2008 / Assessment and promotion of adolescents' dietary calcium intake in China | Youfa Wang
Johns Hopkins School of Public Health, Dept. of International Health, Baltimore, USA |
| 37 | 2008 / The effect of a 10-month school-based provision of high-calcium milk and weight-bearing exercise program on the bone mineral status of 7- to 9-year old prepubertal girls | Pura Rayco-Solon
Nutrition Center of the Philippines, Manila, Philippines |
| 38 | 2007 / Nutrition Education to Improve Mother and Cadre Nutritional Knowledge and Children Nutritional Status in Indonesia | Ali Khomsan
Bogor Agricultural University, Department of Community Nutrition, Bogor, Indonesia |
| 39 | 2007 / Effect of tempe and vitamin C rich fruit supplementation during pregnancy on iron status and pregnancy outcomes | Maria Wijaya-Erhard
University of Indonesia, SEAMEO-TROPED RCCN, Jakarta, Indonesia |
| 40 | 2008 / The development of new norms for indicators of iodine status during pregnancy and its impact on the prevalence of mental retardation in children | Chen Zupei
Tianjin Medical University, Institute of Endocrinology, Tianjin, China |

CHILD BEHAVIOURAL DEVELOPMENT

IMMUNE DEFENSE AND INFECTION

- | | | |
|----|---|--|
| 41 | 2001 / Cognitive performance of iron deficient, non-anemic Peruvian infants | Theodore Wachs
Purdue University, Department of Psychological Sciences, West Lafayette, USA |
| 42 | 2005 / Development of term low birth weight infants at 6 years, and the benefits of early stimulation | Susan Walker
University of the West Indies, Tropical Medicine Research Institute, Kingston, Jamaica |
| 43 | 2002 / Nutrition assessment of children orphaned from HIV/AIDS | Judith A Ernst
Indiana University, School of Health & Rehabilitation Sciences, Indianapolis, USA |
| 44 | 2002 / Examination of the relationships between low body mass index and micronutrient malnutrition and the risk of morbidity in adults aged 18 to 60 years in rural Vietnam | Tran Thanh Do
National Institute of Nutrition, Hanoi, Vietnam |
| 45 | 2004 / Molecular and biochemical analysis of intestinal microflora in malnourished children with cholera treated with oral rehydration solution with and without amylase resistant starch | Motiur Rahman
ICDDR,B, C. for Health and Population Research, Dhaka, Bangladesh |



TITLE

PRINCIPAL INVESTIGATOR

EPIDEMIOLOGIC
TRANSITION

TITLE

PRINCIPAL INVESTIGATOR

- | | | |
|----|---|--|
| 46 | 2003 / Assessing physical activity of obese children by a clinical score | Claude Godard
INTA, Unidad de Endocrinología Infantil, Santiago, Chile |
| 47 | 2004 / Changing diets, levels of physical activity and environments and their relationship to the emergence of adolescent overweight and obesity in Ho Chi Minh City, Vietnam | Hong K Tang
Community Health Department, Training Centre for Health Care Professionals, Ho-Chi-Minh City, Vietnam |
| 48 | 2007 / Diet, physical activity or environmental change: what are the key factors underlying the emerging child obesity epidemic in Ho Chi Minh City Vietnam. | Hong K Tang
Community Health Department, Training Centre for Health Care Professionals, Ho-Chi-Minh City, Vietnam |
| 49 | 2002 / Genetic, pubertal and nutritional determinants of peak bone mass accretion in adolescence | Heather Greenfield
University of Sydney, Department of Animal Science, Sydney, Australia |
| 50 | 2002 / Determinants of nutrition-related rickets in Chinese children and associated health outcomes | Mark A Strand
University of Colorado, Health and Behavioral Sciences, Denver, USA |
| 51 | 2003 / Heritability, nutrition and adolescent bone health | Ghada El-Hajj Fuleihan
American University of Beirut, Calcium Metabolism & Osteoporosis Program, Beirut, Lebanon |
| 52 | 2004 / Effects of parathyroid hormone on bone metabolism in older people in China | Bo Zhou
Shenyang Medical College, Department of Preventive Medicine, Shenyang, China |

BONE HEALTH

NUTRITION
INTERVENTIONS

- | | | |
|----|---|--|
| 53 | 2002 / Impact of vegetable gardening, fishpond and animal husbandry on household food security and nutritional status in some communes in Midland Vietnam | Phan Van Huan
National Institute of Nutrition, Planning Department, Hanoi, Vietnam |
| 54 | 2003 / School-based nutrition intervention pilot program | Dien N Le
Fonterra Brands, Ho Chi Minh City, Vietnam |
| 55 | 2005 / A community-based randomized controlled trial of complementary feeding strategies in a squatter settlement of Karachi | Zulfiqar Ahmed Bhutta
Aga Khan University Medical Center, Department of Paediatrics and Child Health, Karachi, Pakistan |

NUTRITION
EDUCATION

- | | | |
|----|---|--|
| 56 | 2006 / Application of learning technologies to support community-based lay health care workers and build capacity in chronic disease prevention in Thailand | Rhona M. Hanning
University of Waterloo (UW), Department of Health Studies and Gerontology, Waterloo, Ontario, Canada |
| 57 | 2008 / Care empowerment of mothers, cadres, and premarried women to improve children nutritional status (Resubmission) | Euis Sunarti
Bogor Agricultural University, Department of Family and Consumer Science, Bogor, Indonesia |

OTHER RESEARCH
AREAS

- | | | |
|----|---|---|
| 58 | 2004 / Genetic diversity and selection of cassava (<i>Manihot esculenta</i> Crantz) with high beta-carotene content using molecular markers | Claudia Fortes Ferreira
Embrapa Mandioca e Fruticultura, Cruz das Almas - BA, Brazil |
| 59 | 2008 / Causes and control of food insecurity: a pilot model in the Northwest of Iran | Saeed Dastgiri
Tabriz University of Medical Sciences, Faculty of Medicine, Tabriz, Iran |
| 60 | 2008 / Contribution à l'amélioration de l'état nutritionnel et sanitaire des enfants de 06 à 59 mois dans la commune de bopa par des actions communautaires | Romain A.F. Dossa
University of Abomey-Calavi, Department of Food Sciences and Nutrition, Cotonou, Benin |

TITLE

PRINCIPAL INVESTIGATOR



PUBLICATIONS

Adu-Afarwuah S, Lartey A, Brown KH, Zlotkin S, Briend A, Dewey KG. Home fortification of complementary foods with micronutrient supplements is well accepted and has positive effects on infant iron status in Ghana. *Am J Clin Nutr* 2008;87:929-38.

Ahmed F, Khan MR, Banu CP, Qazi MR, Akhtaruzzaman M. The coexistence of other micronutrient deficiencies in anaemic adolescent schoolgirls in rural Bangladesh. *Eur J Clin Nutr* 2008;62:365-72.

Fortes Ferreira C, Alves E, Nogueira Pestana K, Junghans DT, Kobayashi AK, de Jesus Santos V, Pereira Silva R, Silva PH, Soares E, Fukuda W. Molecular characterization of Cassava (*Manihot esculenta* Crantz) with yellow-orange roots for beta-carotene improvement. *Crop Breeding & Applied Biotechnol* 2008;8:23-29.

Hong TK, Dibley MJ, Sibbritt D, Binh PN, Trang NH, Hanh TT. Overweight and obesity are rapidly emerging among adolescents in Ho Chi Minh City, Vietnam, 2002-2004. *Int J Pediatr Obes* 2007;2:194-201.

Ma AG, Schouten EG, Zhang FZ, Kok FJ, Yang F, Jiang DC, Sun YY, Han XX. Retinol and riboflavin supplementation decreases the prevalence of anemia in Chinese pregnant women taking iron and folic acid supplements. *J Nutr* 2008;138:1946-50.

Maalouf J, Nabulsi M, Vieth R, Kimball S, El-Rassi R, Mahfoud Z, El-Hajj Fuleihan G. Short- and long-term safety of weekly high-dose vitamin D3 supplementation in school children. *J Clin Endocrinol Metab* 2008;93:2693-2701.

Moore SE, Jalil F, Szu SC, Hahn-Zoric M, Prentice AM, Hanson LA. Revaccination does not improve an observed deficit in antibody responses in Pakistani adults born of a lower birth weight. *Vaccine* 2008;26:158-65.

Nabulsi M, Mahfoud Z, Maalouf J, Arabi A, Fuleihan GE. Impact of maternal veiling during pregnancy and socioeconomic status on offspring's musculoskeletal health. *Osteoporosis Int* 2008;19:295-302.

Onimawo IA, Asumugha VU, Chukwudi NK, Echendu CA, Nkwoala CC, Nzeagwu OC, Okudu H, Anyika JU. Body composition and nutrient intake of children suffering from worm infestation and malaria parasites. *Nigerian J Nutr Sciences* 2008;29:101-107.

Strand MA, Perry J, Guo J, Zhao J, Janes C. Doing

the month: rickets and post-partum convalescence in rural China. *Midwifery* 2008.

Tang HK, Dibley MJ, Sibbritt D, Tran HM. Gender and socio-economic differences in BMI of secondary high school students in Ho Chi Minh city. *Asia Pac J Clin Nutr* 2007;16:74-83.

Wang J, Wang Y, Wang Z, Li L, Qin J, Lai W, Fu Y, Suter PM, Russell RM, Grusak MA, Tang G, Yin S. Vitamin A equivalence of spirulina beta-carotene in Chinese adults as assessed by using a stable-isotope reference method. *Am J Clin Nutr* 2008;87:1730-7.

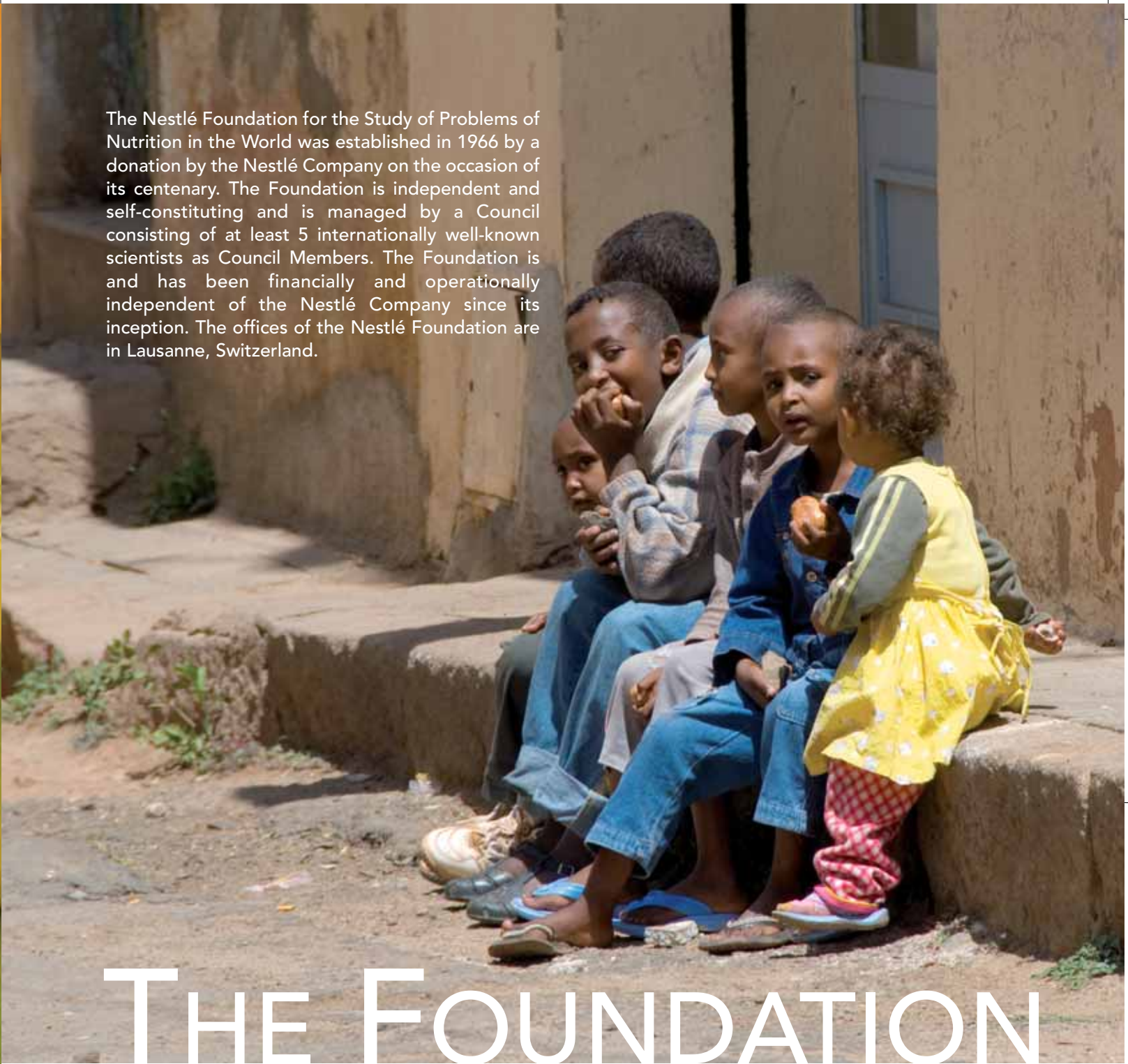
Xue Min-Bo, Zhu Xi-Xiang, Shen Li-Xiao, Sheng Xiao-Yang. Comparison of foodintake pattern of 18-24 months toddlers between rural and city community for improving nutrition status of rural toddlers. *J Clin Pediatr* 2007;25:1016-19 (in Chinese).

Zhou B, Wang X, Wang S, Guo L, Xu C, Zhang Z, Kan Z. Apolipoprotein E polymorphism, BMD, and bone loss in older adults*. *J of Shenyang Med College* 2007;9:155-8 (in Chinese)

Zhou B, Yan L, Wang X, Goldberg G, Prentice A. Seasonal changes in biochemical markers of bone metabolism and hip bone mineral status in older northern Chinese men and women*. *Chinese J of Osteoporosis* 2007;13:531-6 (in Chinese).

The publications are available free of charge upon request.





The Nestlé Foundation for the Study of Problems of Nutrition in the World was established in 1966 by a donation by the Nestlé Company on the occasion of its centenary. The Foundation is independent and self-constituting and is managed by a Council consisting of at least 5 internationally well-known scientists as Council Members. The Foundation is and has been financially and operationally independent of the Nestlé Company since its inception. The offices of the Nestlé Foundation are in Lausanne, Switzerland.

THE FOUNDATION

PURPOSE

The Nestlé Foundation initiates and supports research in human nutrition with public-health relevance in low-income and lower-middle-income countries according to the World Bank classification (see <http://www.worldbank.org>). The results of the research projects should ideally provide a basis for implementation and action which will lead to sustainable effects in the studied populations as generally applicable to the population at large. They should also enable institution strengthening and capacity building in a sustainable manner in the host country, and further cooperation and collaboration between institutions in developed and developing countries.

The Foundation expects research proposals to be primarily the initiative of local researchers from the developing countries. However the Foundation will be inclined to consider favourably those applications made jointly by scientists from developed countries with those from developing countries provided it is clear that the initiative will result in capacity building and human resource development in the latter and that the bulk of the budget is spent in the developing country.

CURRENT POLICY

Sustainable improvement in human nutrition is one of the major issues in the portfolio of the Foundation. During more than 40 years basic and applied research in nutrition has been supported by the Foundation in over 50 developing countries. In view of the past activities of the Foundation as well as the world's situation at the turn of the millennium, it was recognized that the public health relevance of the supported research as well as aspects of sustainability, capacity building and educational issues should have a higher priority. Thus, priority is given to projects which lead to sustainable developments with strong elements of capacity building, and the implementation of the results of a research project should be immediate and sustainable. Highly sophisticated nutrition research of mainly academic interest without public-health relevance has lower priority for support, as do solely laboratory-based studies or animal experimentation.

RESEARCH TOPICS

At present the Foundation's work is primarily concerned with human nutrition research issues dealing with:

- (1) maternal and child nutrition, including breastfeeding and complementary feeding,
- (2) macro- and micronutrient deficiencies and imbalances,
- (3) interactions between infection and nutrition, and
- 4) nutrition education and health promotion.

The precise priorities and goals of the Foundation are modified from time to time to meet emerging public health and nutritional needs in the developing world.

Studies in other areas of human nutrition research might also be considered, as long as they are dealing with problems of malnutrition in eligible countries (see above). Other areas of research may possibly be considered for support if the applicant can offer specific and convincing evidence and justification for the choice of the research topic.

Funded projects are usually of one- to three-year duration. Projects with a high potential for effective and sustainable improvement of the nutritional status as well as a high capacity-building component will be funded preferentially. The budget of the projects

must be appropriate and reasonable and has to be justified in detail.

One of the Foundation's main aims is the transfer of scientific and technological knowledge to target countries. In cases where Foundation-sponsored research projects are realized in collaboration with scientists at universities and research institutes in high-income countries, at least 75% of the budget has to be earmarked for use within the low-income country.

Research grant applications from high-income countries are only considered under rare and exceptional conditions.

The Foundation does not normally fund:

- (1) projects with low public-health relevance
- (2) projects with doubtful sustainability
- (3) projects lacking transfer of scientific, technical and educational knowledge, i.e. lacking a capacity-building component
- (4) large-budget projects, meaning projects that exceed USD 100,000 per year or USD 300,000 over the total duration of a 3-year project
- (5) nutrition surveys or surveillance studies
- (6) research on food policy, food production and food technology except when linked to an intervention with high potential for sustainable improvement of the nutritional status
- (7) in vitro and/or animal experiments.

Although obesity and related diseases are of emerging importance in several low-income countries, the Foundation does not generally support projects in this specific area unless the proposal demonstrates linkages with under-nutrition, and the protocol is innovative and exceptionally well justified.

ELIGIBLE INSTITUTIONS

Eligible institutions are departments or institutes from universities, hospitals, and other institutions of higher education in low- or lower-middle-income countries. Joint applications from more than one institution (especially South-South) are welcomed. Joint applications from more than one institution involving a North-South collaboration may also be considered. For project applications demonstrating North-South collaboration, it is important that the following criteria are fulfilled: (i) the Principal Investigator is from the South and the proposal has relevance to nutritional problems of the South; (ii) the majority of the budget is earmarked for the South; and (iii) demonstration upon completion of the project of institution and capacity building in a sustainable manner in the South.

The capacity-building component represents a core issue for all applications to the Foundation. This means that every application needs to demonstrate a training and human resource and capacity-building component for the developing world. Ideally graduate students or young investigators should play a key role and, where possible, be designated as the Principal Investigator (PI), i.e. be the primary grant applicant, or Co-PI. Established researchers can nevertheless apply but need to clearly indicate the capacity-building component and the designated beneficiaries. Established investigators alone are not usually eligible to apply for a grant, except when they address innovative and exceptionally well-justified research questions in developing countries. Such applications need to clearly state the capacity- and human-resource-building components in the host country as well as the long-term sustainability of research in the host institution. Applications from individuals who are non-affiliated researchers and not attached to research or academic institutions can be considered only in very special cases.



Types of Awards

The Nestlé Foundation offers different award and grant categories, some of them using a modular approach; for example, the Pilot Grant Program represents the starting grant module for a later Full Grant Research application. The eligibility criteria as well as the research objectives and topics have to be fulfilled no matter what the award category (for further details see www.nestlefoundation.org):

A. Research Grants

Grant type	Description	Budget (in USD)
Training Grant (TG)	The Training Grant (TG) Program supports a small research project such as a MSc or PhD thesis project or another training endeavour.	up to 20,000 in total
Pilot Grant (PG)	The Pilot Grant (PG) Program of the Foundation provides support for pilot research that has a high potential to lead to a subsequent full research project grant. Usually the Foundation does not support nutritional survey research, but often to be able to identify areas of problems for potential intervention one has to collect baseline data. A pilot study (pre-study or baseline study) will create the needed data for a larger research project. The PG program may assist this. The pilot study and PG usually represent the starting point for a later full research grant application (i.e. a SG or LG) to the Foundation.	up to 20,000 in total
Small Research Grant (SG)	The Small Research Grant (SG) provides support for a small research study. This may represent a continuation of a TG or a PG.	up to 50,000 in total
Large Research Grant (LG)	Full grant application of a complete research proposal according to the guidelines.	up to 100,000 per year to a maximum of 300,000 for 3 years
Re-Entry Grants	To encourage post-graduate students to return to their own countries and to aid them in establishing their careers, the Foundation will support a research programme for eligible candidates. The host institution will need to guarantee a post for the returnee and ensure career development within the host institution. Contribution of support to the eligible candidate from the host institution is essential, while support and collaboration from the overseas institution where the candidate trained is helpful.	up to 50,000 in total

B. Institutional Support

Institutional support involves the support of research or educational projects in specific institutions in low- or lower-middle-income countries which contribute to a focused development of capacity and know-how and human resource development in the corresponding institution.

How to Apply

Interested scientists should first submit a Letter of Intent in which they describe very briefly the kind of project they would like to undertake, including an estimated budget. Instructions for the letter of intent are available on the Foundation website at www.nestlefoundation.org. For a submission of a letter of intent only the downloadable form on our website should be used. If the suggested project is compatible with the Foundation's current funding policy, applicants will receive an invitation to submit a full grant proposal. The guidelines for the submission of a full grant proposal are also available on our website. Other formats will not be accepted, neither for the letter of intent nor for the full grant applications.

In the letter of intent and in the grant application, detailed, evidence-based information about the public health relevance of the project as well as its immediate impact and sustainability have to be reported. This part of the application is as important as the scientific section of the application.

Research grant applications are evaluated twice a year by the Foundation's Council, a group of independent international scientists. The funding of projects is primarily based on the scientific quality, public health relevance in the short and long term, sustainability, capacity-building component and, last but not least, budget considerations.

Applications are accepted all year round, and the Foundation encourages applicants to submit their proposals early to allow sufficient time for internal as well as external reviews. All submissions should be made electronically by e-mail. Final deadlines for submission are January 10 and May 10 for the Spring and Fall Council Meetings, respectively.

For more information consult www.nestlefoundation.org



The Council of the Foundation consists of 5 Council Members and 2 Advisors. All Council Members and Advisors are internationally well-known scientists with a specific expertise in different fields of nutrition. The Council is self-constituting and operates independently. The Foundation is directed by the Director and the President of the Foundation.

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The direction in which education starts a man will determine his future life.

Plato



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Cover: **Women in a flour mill in Asmara (Eritrea)** - photograph by Paolo M. Suter

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