



REPORT 2013

Nestlé Foundation

for the study of problems of nutrition in the world



Place de la Gare 4, PO Box 581, 1001 Lausanne, Switzerland
Phone: +41 (0)21 320 33 51 Fax: +41 (0)21 320 33 92
nf@nestlefoundation.org www.nestlefoundation.org
www.enlink.org

Nestlé Foundation

for the study of problems of nutrition in the world



Live as if you were to die tomorrow. Learn as if you were to live forever.

Mahatma Gandhi



REFERENCES AND CREDITS:

PAGE 2: Spirulina algae: courtesy of Prof. Dr. HR Preisig, Botanical Garden & Institute of Systematic Botany, University Zürich, Switzerland (middle picture). **PAGE XX:** 1. FAO, IFAD and WFP. (2013) The State of Food Insecurity in the World 2013. Rome, FAO. 2. Jerven M (2013) Poor Numbers. How We Are Misled by African Development Statistics and What to Do about It. Cornell University Press, Ithaca, USA. 3. Ladders KN (2008) Pyramids and champagne: the iconography of health inequities. J Epidemiol Comm Health 62:1098-1104. 4. Black RE et al. (2013) Maternal and child nutrition: building momentum for impact. The Lancet 382:372-375. 5. Hanf M et al. (2013) Global determinants of mortality in under 5s: 10 year worldwide longitudinal study. BMJ 347:f6427. 6. Hodge A (2013) Determinants of childhood mortality. BMJ 347:f6632. 7. Frieden TR (2010) A Framework for Public Health Action: The Health Impact Pyramid. Am J of Public Health 100:590-595. 8. World Development Indicators, accessed at www.wdi.worldbank.org/table/2.15.9. www.worldbank.org/en/topic/sanitation. 10. www.childinfo.org/immunization_status.php. 11. www.data.worldbank.org/topic/education. 12. Worldmapper. Map No 221 Hospital Beds. Reproduced with permission from Worldmapper (<http://www.worldmapper.org>) © Copyright 2006 SASI Group (University of Sheffield) & Mark Newman (University of Michigan). **PAGE XX:** 1. Glanz K et al. (2010) The Role of Behavioral Science Theory in Development and Implementation of Public Health Interventions. Annu Review of Publ Health 31:399-418. 2. Glanz K et al. (2010) The Role of Behavioral Science Theory in Development and Implementation of Public Health Interventions. Annu Review of Publ Health 31:399-418. 3. Olney DK et al. (2012) Identifying potential programs and platforms to deliver multiple micronutrient interventions. J Nutr 142:1785-855. 4. Scheper-Hughes, N (1992) Death without weeping: the violence of everyday life in Brazil. Berkeley: University of California Press. 5. Mabilia M (2005) Breastfeeding and sexuality: behavior, beliefs and taboos among the Gogo mothers in Tanzania. Berghahn Books. 6. Bentley ME et al. (1988) Rapid ethnographic assessment: Applications in a diarrhea management program. Social Sci & Med 27:107-16. 7. Scrimshaw S et al. (1991) The AIDS rapid assessment anthropological assessment procedures: a tool for health education planning and evaluation. Health Edu Quarterly 18:111-123. 8. Schensul JJ et al. (2012) The Ethnographer's Tool Kit. Second Edition. Latham: Altamira Press. 9. Blum, L et al. (1997) Community Assessment of Natural Food Sources of Vitamin A: Guidelines for an Ethnographic Protocol, Boston: International Nutrition Foundation for Developing Countries. 10. Peltó GH et al. (2012) The focused ethnographic study 'assessing the behavioral and local market environment for improving the diets of infants and young children 6 to 23 months old' and its use in three countries. Maternal & Child Nutrition 9:35-46. 11. de Zoysa I et al. (1998) Research steps in the development and evaluation of public health inter-

ventions. Bulletin WHO 76:127-133. 12. Jerome NW et al. (1980) An ecological approach to nutritional anthropology. In NW Jerome, et al. (Eds.), Nutritional Anthropology: Contemporary Approaches to Diet and Culture (pp. 13-45). Pleasantville, N.Y: Redgrave Publishing Co. 13. Bernard HR (2011) Research Methods in Anthropology: Qualitative and quantitative approaches. Fifth Edition, Latham: Altamira Press. 14. Scrimshaw N et al. (1987) Rapid assessment procedures for nutrition and primary health care: anthropological approaches to improving program effectiveness. University of California, Los Angeles, Latin American Center, 1987. ix, 70 p. (UCLA Latin American Center Reference Series Vol. 11) 15. Loechl CU et al. (2009) Using program theory to assess the feasibility of delivering micronutrient Sprinkles through a food-assisted maternal and child health and nutrition program in rural Haiti. Mat & Child Nutr 5:33-48. 16. Menon P et al. (2013) Bringing rigor to evaluations of large-scale programs to improve infant and young child feeding and nutrition: The evaluation designs for the Alive & Thrive initiative. Food & Nutrition Bulletin (Suppl.) 34:195S-211S. 17. Habicht JP et al. (2014) From biological to program efficacy: Promoting dialogue among the research, policy, and program communities. Adv Nutr 5:27-34. **PAGE XX:** www.cia.gov/library/publications/the-world-factbook/geos/pe.html; <http://data.worldbank.org/country/peru>; www.unicef.org/infobycountry/peru_statistics.html (all accessed December 5th, 2013), Der neue Fischer Weltalmanach 2014, Zahlen Daten Fakten, FISCHER Taschenbuch, Frankfurt am Main, 2014

PHOTO:

Cover: Cover: Aiming High: The Future of Vietnam – Children in the Cam Khe District (Phu Tho Province, North Vietnam) - photograph by Paolo M. Suter

PAGE 2 middle: Spirulina algae: Prof. Dr. HR Preisig, Botanical Garden & Institute of Systematic Botany, University of Zurich, Switzerland; **PAGE xx:** Worldmapper maps see above. **PAGE xx:** photo by Nelly Zavaletta (INN, Lima, Peru) All other pictures © by Paolo M. Suter

CONCEPT & TEXT: Paolo M. Suter

DESIGN: Diane Constans-Marsens

PRINT: MARSENS ETIQUETTES, CHÂTEL-ST-DENIS

© 2013 Copyright Nestlé Foundation. The contributions of third parties do not necessarily represent the view or opinion of the Nestlé Foundation.

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

4 PRESIDENT'S MESSAGE

6 PROJECTS INITIATED BY THE FOUNDATION:
THE *enLINK* INITIATIVE

18 OTHER ACTIVITIES

30 VISION 2013

44 PROFILE OF A NUTRITION INSTITUTE

50 ONGOING PROJECTS

60 PUBLICATIONS

TABLE OF CONTENTS

62 THE FOUNDATION

68 THE COUNCIL



PRESIDENT'S MESSAGE

Sustainability and public health relevance are the main requirements for research projects to be funded by the Nestlé Foundation. Very often, sustainability is tightly linked to the role of education in the project, be it education of health professionals, researchers or the population studied in the project. The key role of education has always been recognized and emphasized by the Foundation, as illustrated by the enLINK initiative, described on page 8 of this report. Briefly, the initiative intends to contribute to improvements in nutrition by four types of interventions: first, through the granted research projects; second, by supporting education in nutrition (targeting researchers, medical doctors, other health professionals or the general population, often women); third, by supporting access to knowledge in nutrition; and finally fourth, by supporting the

sustainability of a healthy nutrition. All four of these goals have a common difficulty: how can target populations best be reached and served? Reaching people in the least-developed countries of the world is still a big challenge, and although the effort of the Foundation to provide free electronic access to books on nutrition is of considerable value for many professionals involved in nutrition research or education, access via the internet is not available in many remote regions of the world. In an effort to overcome this problem, the Foundation tries to reach people in such regions by providing them with sets of books on nutrition.

Yet there is hope: access to the internet is improving all over the world, as illustrated by the rapidly increasing number of people who own a mobile

phone in African countries, for instance. Moreover, many universities try to reach people in developing countries with MOOC's (massive open online courses), as described in the contribution by Karl Aberer in this report. This way of reaching out to people should progressively allow a better coverage of remote regions. It could be developed and used not only for full pre-graduate courses with the possibility to obtain a master's degree, but also for more concise and focused teaching courses on themes for which present knowledge is not always easily available. For instance, many themes require an interdisciplinary approach, yet bringing together qualified people is not easy to organize and may take time. Such a gap has recently been identified by the authors of the series of articles on Maternal and Child Health in the Lancet (Lancet online, June 6, 2013), which in a comprehensive review stresses – among others – two especially important points: first, that many curricula in nutrition are outdated; and second that “leveraging health, agricultural or social safety net platforms for joint early child development and nutrition programming during the first thousand days of life would help focus on the crucial period of peak vulnerability for both nutrition and development”.

In accordance with the spirit of the enLINK initiative, an effort to provide a course including the most recent findings on the importance of appropriate nutrition in the first thousand days of human life combined with the appropriate technology could have a large impact. It could contribute to enabling researchers and health professionals to ask the right questions for their projects. The Council of the Foundation will continue to explore how the enLINK initiative can be developed further in this direction, with a special emphasis to reach those living in remote regions.

Susanne Suter

Susanne Suter





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.

PROJECTS INITIATED BY THE FOUNDATION

THE enLINK INITIATIVE

- Promotion of specific research questions
- The enLINK digital library
- The enLINK hard-copy service
- Small mobile enLINK library trunk in English & French & Spanish
- The large enLINK library trunk



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 core competence and activity of the Foundation is the support of nutrition research in low-income countries. The enLINK initiative is an add-on to our key activities to improve the research capacity.

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 four 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**lectronic **n**utrition
4. **e**ndurable **n**utrition

The digital **enLINK** library is currently offering free full-text access to 8 nutrition journals and more than 30 e-books. The library is accessible free of charge to registered users who all receive a personal password – registration is also free as long as the applicant comes from a low-income country. The library is continuously updated and adapted to specific needs and in response to user feedback. Evidence and content which make it into textbooks are usually more practice-related than the research knowledge from latest findings which is published in research journals. Therefore the weight of the library lies more in the e-textbook section to assure a good basic knowledge transfer as well as knowledge accessibility.

During 2013 different new preliminary projects in the field of e-learning and information transfer by new technologies have been evaluated.

Despite all the advances in information technology, books and printed materials will remain indispensable. Therefore the small and large orange **enLINK** library trunks will remain a key activity for capacity building. During the reporting period, small and large trunks were sent to different institutions in Africa. The enLINK trunks initiative will be prolonged for one more year, until the end of 2014.

"Don't find fault. Find a remedy."
Henry Ford





PRESETS FOR HEALTH

"Default health" should be the aim. The term "by default" originates in information technology. Wikipedia defines the term "default" as "a setting or a value automatically assigned to a software application, computer program or device, outside of user intervention. Such settings are also called presets."

Despite the global epidemic of diabetes, for over 840 million people, malnutrition and hunger remain a daily challenge and a key cause for untimely mortality. More than 10 to 15% of the world population is unable to cover their daily energy requirements. This means that one in 7 to 8 people in the world are suffering from undernutrition and hunger, most of them living in the developing world – especially sub-Saharan Africa (1). The numbers above are not only hard to believe but also shameful. This means that the hungry not only have a lack of food but a lack of practically everything, especially the lack of very basic health care, basic education or minimal economic security. Hunger and malnutrition do not come alone and need therefore to be addressed in a larger context.

As a research foundation, the Nestlé Foundation has explored causes and solutions for malnutrition for 47 years already, and with over 500 different research publications has contributed many pieces of evidence for a reduction and control of hunger and malnutrition. Despite the concerted efforts of many individuals and organizations – including the Foundation – disparities in nutrition and health remain a global problem, and children as well as their mothers are still the most affected victims of the lack of food and lack of health care.

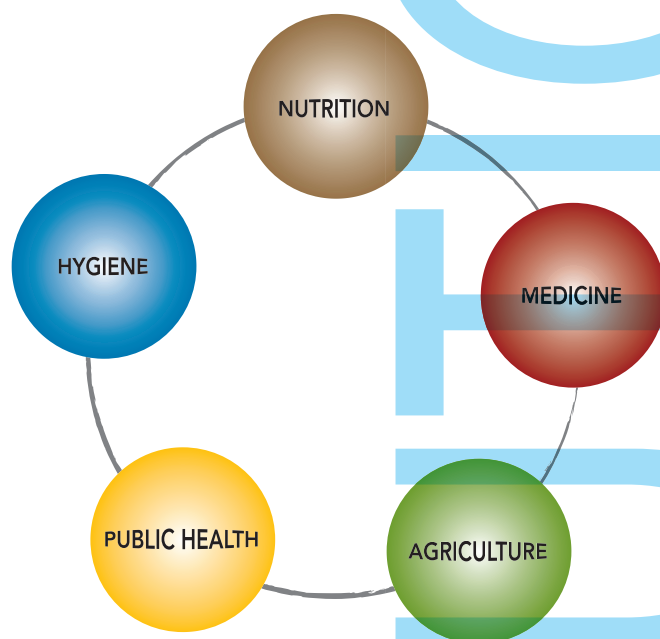


Figure 1: The enLINK circle: The five central fields of intervention for the control of malnutrition, hunger and poverty

The numbers above are also hard to believe in view of the life in more "developed societies". How good are these numbers? In view of the provocative and controversial book *Poor Numbers* (2), it can be assumed that the number of hungry and malnourished is most likely not very accurate and in fact higher than presently reported.

Research during the past 20 to 30 years has revealed the importance of nutrition as a modulator of child health and mortality (4). However, looking at the immediate causes of death in children (predominantly

infectious diseases), we have to admit that most of the causes of death in children would be avoidable and immediately treatable in a setting of a functional health system – even independent of any nutritional issue (5, 6). We know that an antibiotic therapy will most likely work immediately – if available and when given.

Adequate nutrition and food security is one aspect – although a key aspect – of a healthy life. To address the key issues in health and well-being it might be more appropriate to use the concept of the “health pyramid” (3). Obviously every expert – including most “nutritionists” – place their field of interest at the base of the pyramid. However, “nutritional factors” are just one part of the complex chain of events leading to malnutrition, as also outlined in the enLINK circle of the Foundation (see Figure 1). Hunger and malnutrition are often proxy-markers for other more imminent and/or hidden problems – comparable to a diseased patient who is not eating. In these cases only causal solutions are helpful and sustainable. The latter would apply especially to the most vulnerable population groups, i.e. mothers and their children.

In this context, the recently presented “Health Impact Pyramid” by T. R. Frieden (7, Figure 2) underlines the importance of a prioritized global approach to improve health and nutrition by focusing on specific public health issues in a hierarchical approach. The original Health Impact Pyramid is a five-tier pyramid describing five major levels of public health measures and interventions which might provide the basis and a framework for improved health at the population level but also at the individual level. The five tiers of the pyramid (7), from bottom to top, are:

- 1) Socioeconomic factors,
- 2) Changing the context to encourage healthy decisions,
- 3) Long-lasting protective interventions,
- 4) Clinical interventions,
- 5) Counseling and educational interventions.

Most authors place socioeconomic determinants of health at the base of the pyramid (i.e. socioeconomic inequality, poverty, housing, etc.). Poverty reduction and the role of all forms of inequality on health and survival are well known. There is a close relationship between socioeconomic status and access to health care, i.e. the availability and accessibility of, for instance, health stations and hospitals. In Uganda, for instance – based on World Development Indicators of the World Bank (8) – there is roughly one-half (0.5) hospital bed available per 1000 persons and 0.1 physician (the corresponding numbers for the Euro area are 5.7 and 3.6, respectively). For many developing countries these numbers are not even available. To come back to the “Poor Numbers” mentioned above: everybody will agree that it is easier and more reliable to count the number of hospitals or hospital beds than to count the number of hungry people. The needed actions could then be formulated much easier.

The next pyramid tier is already more controversial. This tier includes issues that change the “context to make individuals’ default decisions healthy” (7), i.e. a setting which would allow healthy choices to be a default choice independent of other factors, especially also independent of the socioeconomic

THE ENLINK CIRCLE





level, i.e. the bottom tier. To this tier belongs also the status (i.e. empowerment) of women in general (especially the mothers) as well as availability and accessibility of “medical services”. Other important contextual determinants are basic issues such as clean water and air, and basic hygienic measures, but also road infrastructures (see also Report 2006). Also in this tier much work awaits: 69% of the population in sub-Saharan Africa has no access to appropriate hygienic means and sanitation, and globally about 2.5 billion individuals lack access to improved basic sanitation (4). The role of basic sanitation in child morbidity and mortality is more than well established and is regarded as a key determinant in the socioeconomic development and poverty alleviation.

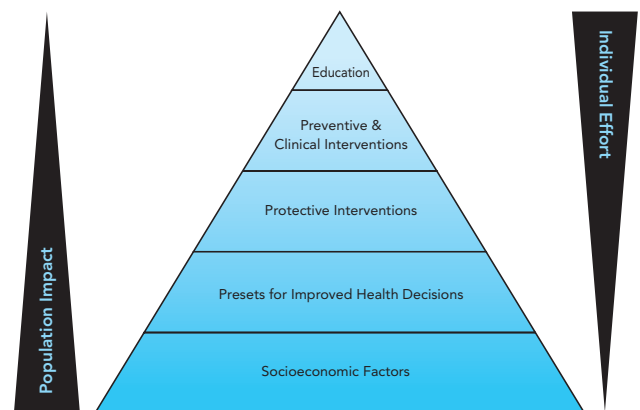


Figure 2: The Health Impact Pyramid
(adapted from (7))

The third tier focuses on targeted “protective interventions” such as immunizations (7). As compared to the other two tiers at the bottom, the third tier focuses less on the population level and more on the individual level. According to recent statistics, there are an estimated 22 million children worldwide who did not receive three doses of the DTP-containing vaccine. Of these, 16.3 million (or 72 per cent) live in 10 countries only (5). Also these numbers are most likely not very reliable; however, in view of the role of immunization in basic health maintenance they are once more unacceptable and are a reflection of the quality of the health care system.

The fourth tier is about “clinical interventions” (7). This tier will not be discussed here due to the specificity of the interventions focusing on specific individuals or smaller population groups.

The fifth tier is about “counseling and educational interventions” (7). Education is important but can only be effective if the formerly mentioned levels

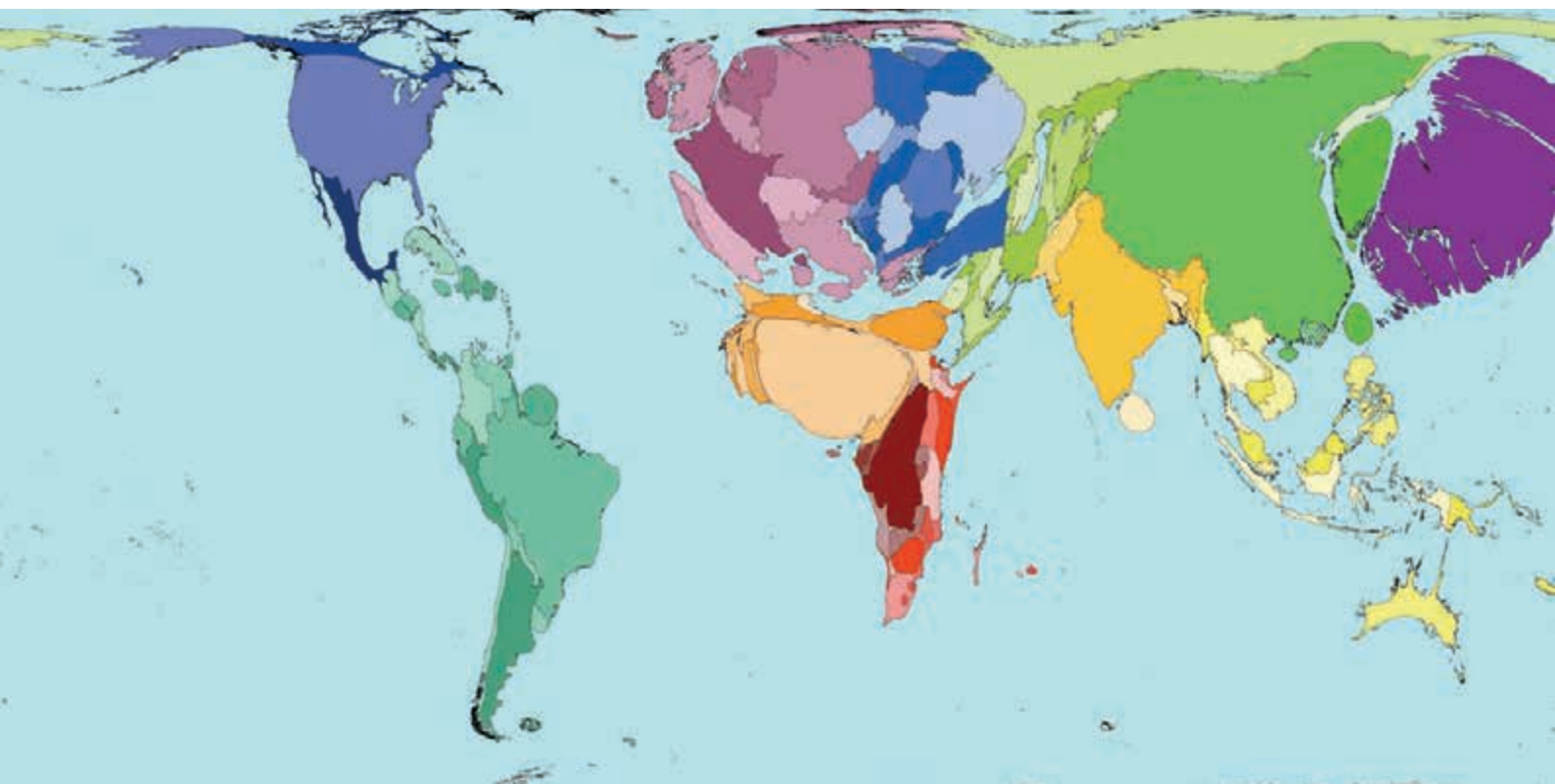
are established and functional. The aforementioned contextual changes would also include communities where schooling is available to every child. We know that education (see also Report 2012) is one of the most important single factors to reduce inequalities and poverty (6).

In the Health Impact Pyramid the bottom two tiers represent the basis for the creation of living conditions which allow the making of healthy “default decisions” (7) – regardless of education, income or other societal factors. For more than four decades the approach of the Foundation as a research foundation has always been around the enLINKing of different approaches to create “presets” on the way to good and sustainable “default” health and nutrition for all.

Map Legend:

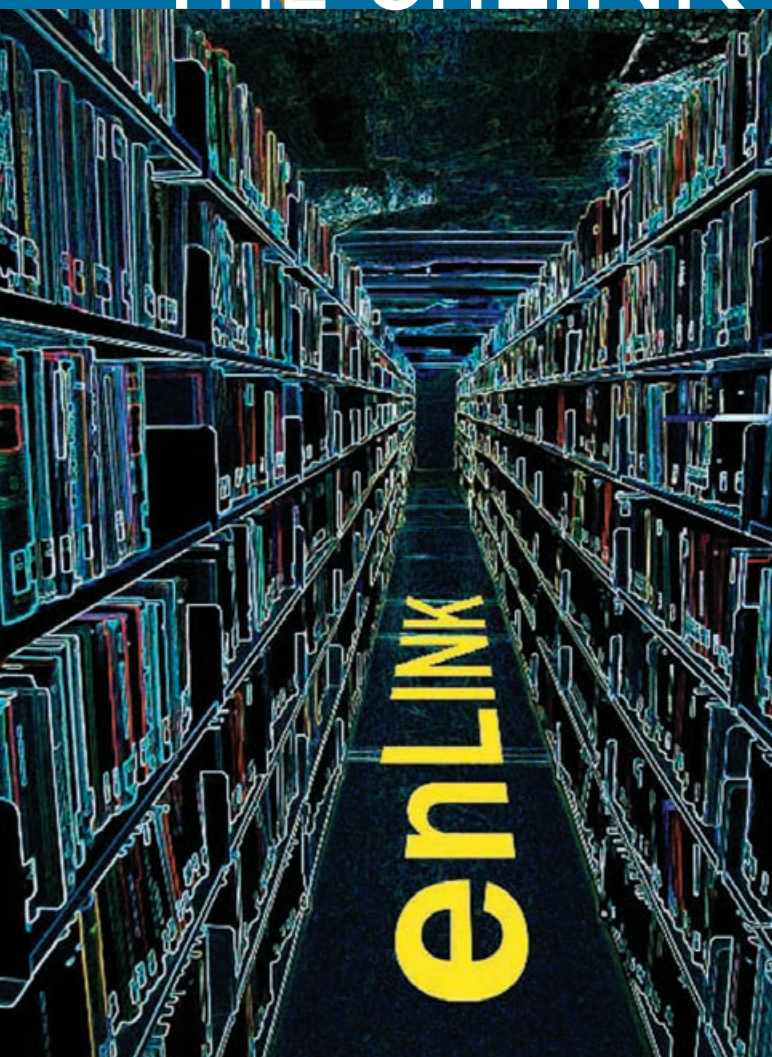
Hospital Beds

In this map hospital beds include beds in public and private hospitals, specialized hospitals, and rehabilitation centers. Since all types of hospitals are included, the map is a little biased from the point of view of a basic health care approach. The map is based on data from 2002: there were an estimated 19.6 million hospital beds in the world (adapted from reference 12). In the Euro area there are on average 5.7 beds per 1000 people. As a comparison (beds per 1000 people): Mali 0.1, Guinea 0.3, Mauritania 0.4, Mozambique 0.7, Indonesia 0.6, Ghana 0.9 or Germany 8.3, Monaco 16.5 or France 6.6 (all data from reference 8).





THE enLINK LIBRARY - 7D/24H



e-journals in nutrition

e-textbooks

e-books

There is no education and advancement in research without access to information. Information and information access is a basis for advancement for anybody in any aspect of life, and the right to information is actually one of the basic human rights as anchored in the Universal Declaration of Human Rights. Eight years ago, the Foundation constructed the Internet-based enLINK digital library of nutrition research, which is now appreciated by users in nearly 20 low-income countries.

The enLINK library is a concerted action between OVID Technologies, certain publishers, and the Foundation. As of December 2013, Annual Reviews, OVID Technologies, Wolters Kluwer Health, Inc., and Lippincott Williams & Wilkins participate in the enLINK library to offer high-level digital content.

For nutrition information, the enLINK library is for many users an established and appreciated source of information. After a recent “booster” with a new Internet appearance, new journals, and many new e-books in nutrition and, last but not least, a completely new technological infrastructure platform, user registration and usage increased again. The enLINK library targets individual users in low-income countries who are interested in nutrition and nutrition research.

Presently 8 journals and 33 e-books are accessible in full-text mode. Users will find the content and information they need in a small number of high-quality sources. “Small but beautiful”, as one user told us: the enLINK library is small, but nevertheless

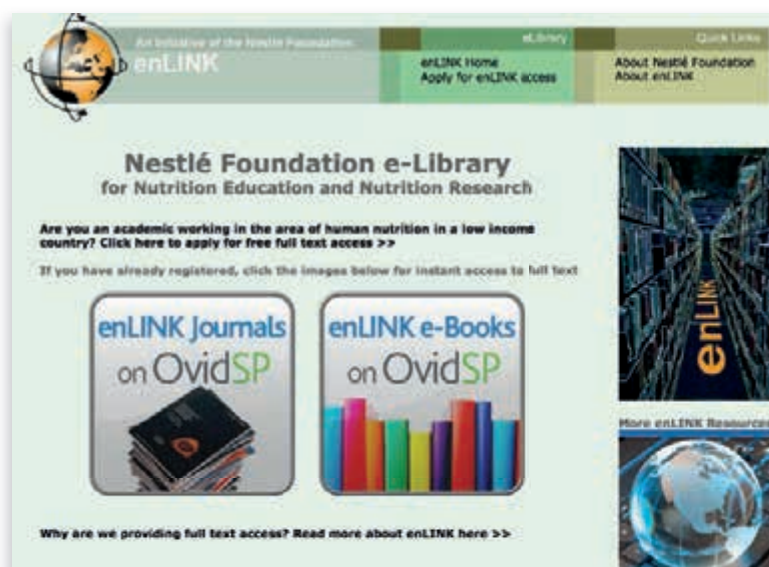
you can easily find reliable and evidence-based information on nutrition and health-related topics. In the enLINK library there is no danger of being drowned in the information flood.

The enLINK users have access, with the help of OvidSP, to e-journals and book content. Further, users can take advantage of OvidSP's search, alerting, and results management tools to stay current on their research interests. The language options (English or French) make the use of this tool even more user-friendly. There are no "opening hours" for this library – enLINK can be accessed 7d/24h.

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. (Please read the instructions carefully and follow the guidelines. Registration and use of the enLINK library are both free of charge.)

enLINK user statistics

- Over 200 registered users
- Registrations from 18 countries
- Highest number of PDF downloads per section: 18
- Longest single access time: 59 minutes
- Most frequently accessed journal: Journal of Pediatric Gastroenterology & Nutrition
- Most frequently accessed book: Essentials of Human Nutrition



The orange library

THE enLINK LIBRARY TRUNKS

Who does not know the famous book *Where there is no doctor* by David Werner? This book and many others are included in the orange enLINK book trunk from the Foundation since “where there is no Internet”, books are indispensable.

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 science, 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. In addition, there are many geographic areas without access to the Internet or only at high cost. There the mobile enLINK library trunk fills the gap.

The mobile enLINK library consists of an orange 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 Harrison's textbook of medicine and 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 enLINK nutrition library trunk will initially only be offered as a present free of charge (including free shipment) to selected nutrition institutes in low-income countries. Order forms for the enLINK trunk are available on the Foundation's website.

So far a total of 143 trunks have been shipped to more than 30 different countries. During 2013, 11 small and 13 large trunks were shipped to 13 institutions in 8 countries. Seven of the 11 small trunks were shipped to French-speaking countries.

The large trunk

ENGLISH

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

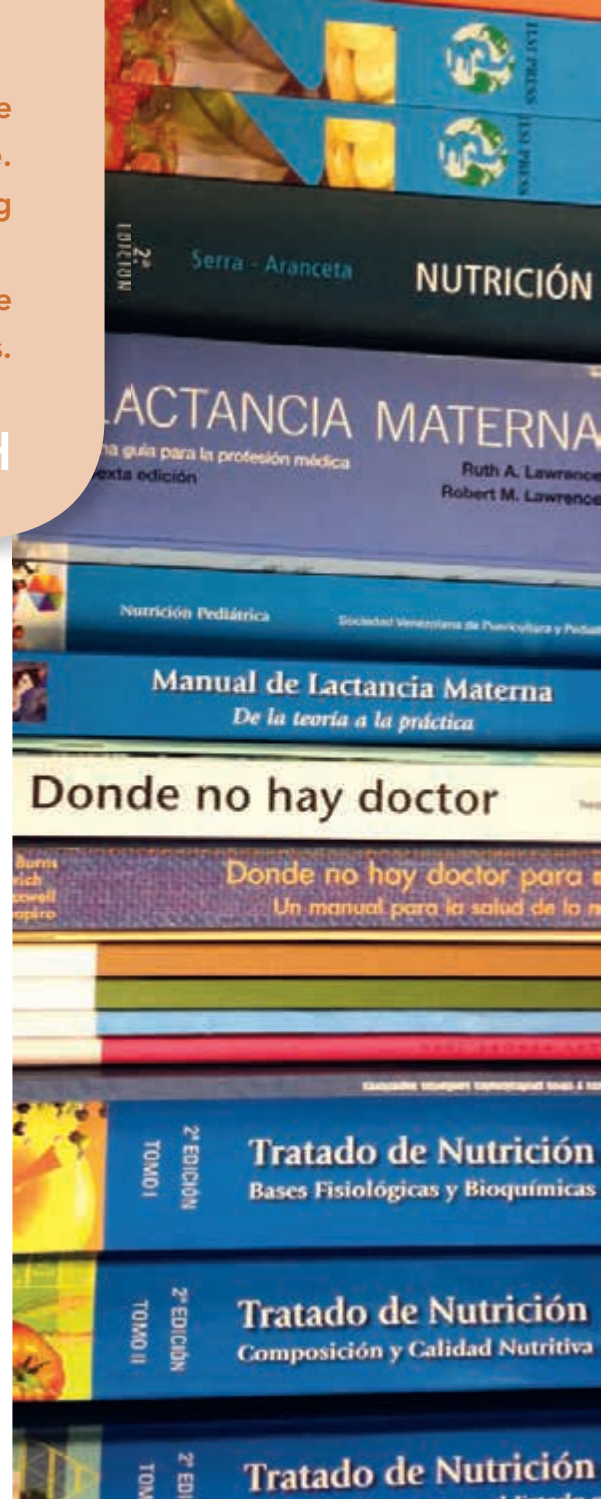
ENGLISH, FRENCH & SPANISH

Colour: orange
Height: 33 cm
Weight: 30 kg
Number of books: 10
Number of brochures, booklets, etc: 40
Total number of pages: 10,000

Order forms for the enLINK trunk are available on the
Foundation's website.
www.nestlefoundation.org

Remember that the trunk is free of charge (including free
shipment) for institutions in low-income countries.

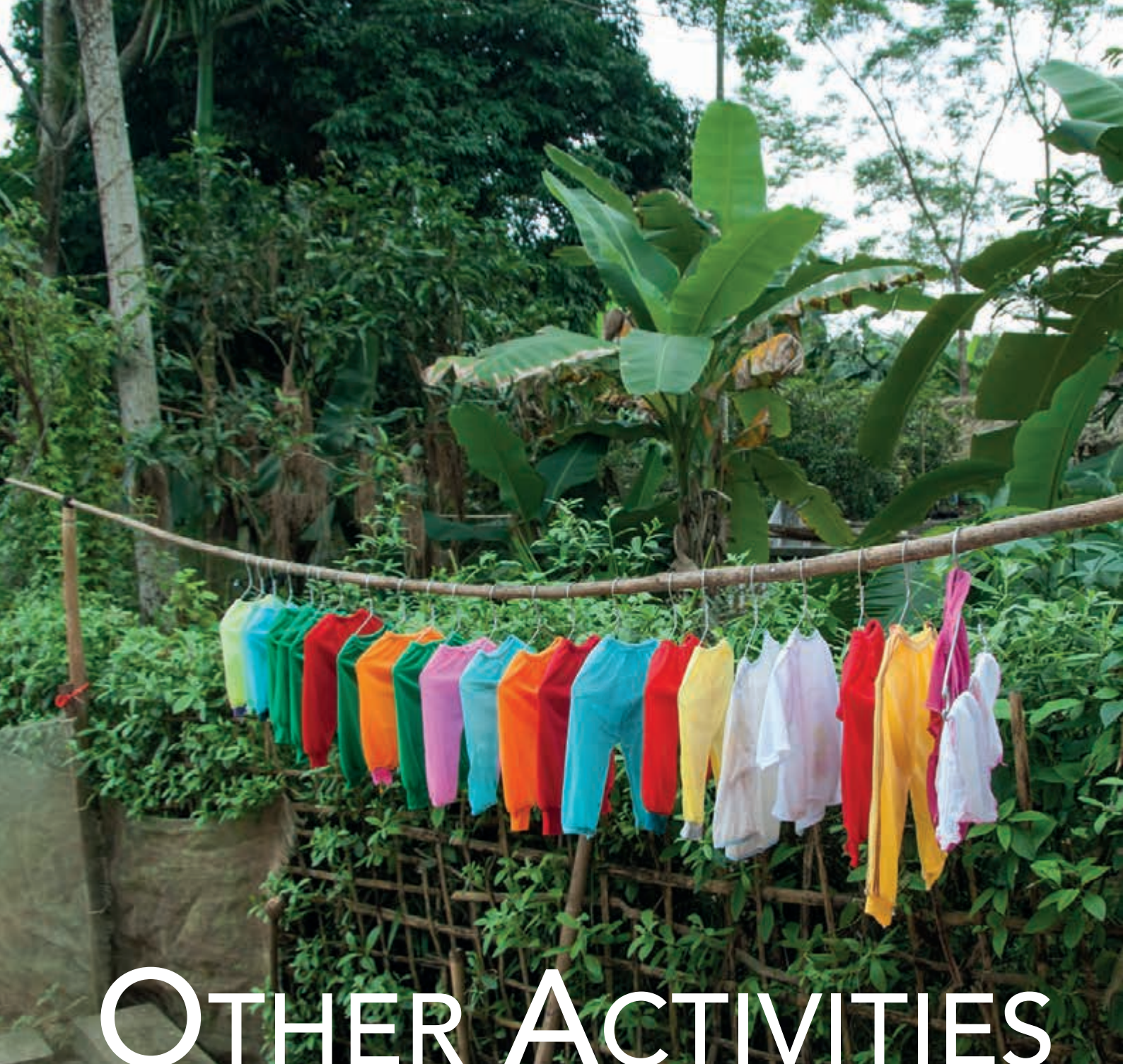
ALSO IN SPANISH



THE ENLINK TRUNK







OTHER ACTIVITIES

NEW RESEARCH PROJECTS

INSTITUTIONAL SUPPORT

OTHER CAPACITY-BUILDING ACTIVITIES



In 2013 the Council decided
to fund 10 research projects.



GROWTH MONITORING & PROMOTION

VITAMIN A

INTEGRATED HEALTH PROMOTION

IODINE REQUIREMENTS & TOXICITY

CHILD FEEDING

NEW RESEARCH PROJECTS

COMPLEMENTARY FOOD

PRE-PREGNANCY MICRONUTRIENTS

SCHOOL-BASED NUTRITION

HOME GARDENING

GROWTH MONITORING & PROMOTION

Child-centered counseling and home-based food production to improve dietary adequacy and growth of young children in southwestern Ethiopia

Abebe Gebremariam et al

Jimma University
Jimma
Ethiopia

USD 78,848

Growth faltering among Ethiopian infants and young children is one of the highest in sub-Saharan Africa. Nutrition education on infant and young child feeding has shown good potential to improve the growth of young children. The current nutrition education in Ethiopia, however, appears to be general and lacks the essential components for success. It is expected that low food access by poor households together with the present less motivational approach used may hamper the effectiveness of the current nutrition education in the country. In Ethiopia, a child-centered counseling approach is hypothesized to be more effective than the current nutrition and health education when investment in home-based food production is used as a platform for nutrition education. This project will evaluate the efficacy of a food-based intervention integrating child-centered nutrition counseling and home-based food production using a between-group comparative intervention study. The intervention comprises child-centered nutrition counseling for caretakers and support for 'developed' gardens and improved backyard poultry production; whereas the control will only receive the agriculture extension and the existing health and nutrition education. 404 households with infants of age < 6 months will participate in the study for 18 months. Child growth and infant and child feeding index are primary outcomes. Besides the effect on dietary adequacy and growth, the project aims at evaluating the interactive processes in a longitudinal way to provide evidence on the possible success factors and barriers encountered. Secondary outcomes include household production, income & expenditure in relation to the home-based food production; diet diversity; feeding and care practices; and morbidity.

VITAMIN A

Assess the impact of public health services distribution of vitamin A in under-five children in remote rural Zambia

Frederick D. Kaona

Mwengu Social and Health Research Centre
Ndola
Zambia

USD 20,000

Stunting in children 59 months and below is estimated at 45% in Zambia and has remained the same for the past ten years. Although vitamin A capsule distribution programs started in 1992, studies revealed that over 66% of children 59 months and below had low serum retinol concentration. Reasons attributed to a persistently high rate of low serum retinol concentration and an apparent lack of response to vitamin A supplementation programs have not been properly investigated. Vitamin A deficiency in children 59 months and below has stagnated at 54% since 2003, and hence still remains a major public health problem in Zambian children. Currently no sociological data exists to explain the inadequacy of vitamin A in relation to behavior change. The purpose of this study is to improve our understanding of community cultural values, perceptions and beliefs on the provision of vitamin A supplements to under-five children in Nakonde district. The assessment will fill the knowledge gap in adequacy of vitamin A distribution and vitamin A deficiencies while providing evidence for raising the profile of vitamin A nutrition. A cross-section study involving qualitative and quantitative methods will be done. Eligible individuals will be randomly selected from participating villages. Children 59 months and below and parents 18-49 years will participate in the study. A survey of 440 participants will be conducted, while carrying out 24 in-depth interviews and 24 focus-group discussions with caregivers. Health center staff in participating health centers will be interviewed. The results will be used to improve vitamin A programs.

INTEGRATED HEALTH PROMOTION

Behavior change and nutrition associated with integrated maternal/child health, nutrition and agriculture program

Manolo Mazariegos

Nutrition and Micro-Nutrient Division
Institute of Nutrition for Central America and
Panamá (INCAP)
Guatemala City
Guatemala

USD 284,541

INCAP proposes an innovative and integrated study which delivers interventions addressing food and nutrition security, health, education and community organization to vulnerable families of two selected population groups in rural southwestern Guatemala with the aim to improve the nutritional status of children under 24 months and of pregnant and lactating women (1,000-day window of opportunity). All families from two groups (n=200) will receive counseling at home in maternal and child health and nutrition, as well as training in raising nutritious plants and vegetables at home supported with extension services. One of the groups will also receive training in how to raise small livestock species, to add protein and key micronutrients into the household diet. It is hypothesized that the families receiving the gardening and livestock interventions will have better indicators of nutrition. The main outcome variable is hemoglobin in young children. This innovative approach links agriculture with nutrition, education and health at the community and household level. Gender and community organization will be cross-cutting components of the intervention. In addition to meeting research objectives via baseline, periodic and final assessments of anthropometric, dietary, hematologic status and other nutrition and health measures, the underlying goal is to measure the ability of the intervention methodology to generate sustainable strategies that work to reduce the incidence of chronic child malnutrition. This study will also provide insight into the critical influence of gender roles on the adoption and implementation of the education and training, and creation of community organizations.

IODINE REQUIREMENTS & TOXICITY

Study on effects of excess iodine and the tolerable upper intake level of iodine for children

Wanqi Zhang & Chen Zupei

School of Public Health
Tianjin Medical University
Tianjin
China

USD 286,500

With the implementation of Universal Salt Iodization (USI) in 1995, China has successfully combated Iodine Deficiency Diseases (IDD). However, China is a country with a complicated iodine geographical environment with wide natural variation in the iodine content of drinking water. It has been reported that the water iodine of at least 11 provinces and cities in China is high, with nearly 31 million people exposed to the risks of excessive iodine intake. This has raised a new public health concern that a safe upper level of iodine intake should be established to ensure that people avoid ingesting excessive iodine intake while continuing to implement USI to control IDD. Due to limited data on the safe upper intake level of iodine for children worldwide, current ULs of iodine for children are extrapolated from those for adults based on body weight or body surface area. This study envisions an observational study to investigate children who have been living with different drinking water iodine levels for over 5 years, observing the changes of thyroid function in response to each iodine exposure level. This will allow us to determine the iodine UL for children in China which might, in turn, provide additional data for foreign countries and organizations. The project will define adverse effects of excess iodine in children and provide data for establishing the UL of iodine for children in China. The results of the project will guide appropriate iodine supplementation in order to avoid the potential risk of excess iodine while eliminating IDD.



CHILD GROWTH

Food-based InteRvention & psychosocial STimulation to improve child growth & development: FIRST follow-up study

Umi Fahmida, Min Kyaw Htet & Risatianti
Kolopaking

SEAMEO RECFON
University of Indonesia
Jakarta
Indonesia

USD 40,710

Feasible and sustainable complementary feeding recommendation (CFR) which ensures adequate nutrient intakes of young children is important for their optimal growth and development. In addition, psychosocial care at an early age is important for developmental outcomes and benefits children through their late adolescence. In a previous study (FIRST Project) the effectiveness of 6-month CFR combined with psychosocial stimulation on feeding practices, nutrient intakes, growth and development of under-two-year-old children living in the rural area of East Lombok (Indonesia) was assessed. The CFR was developed using a linear- /goal-programming approach (LP) which is based on locally available foods and requires minimal changes to the local food pattern, and is therefore likely to be sustainable. In the former study, despite improved feeding practices, psychosocial care and nutrient intakes, the effect on nutritional status and development was not significant. It is hypothesized that 6 months are not sufficient to find a biologically significant effect, but improved feeding practices may in the longer run confer benefit on growth and development if mothers continue to provide nutrient-dense foods. To assess sustainability of the intervention, the present study aims to conduct a follow-up study 2 years after the intervention ended. Specifically, this study (n=480) will identify the proportion of caregivers with positive behavior in feeding practices (i.e. providing nutrient-dense foods, food hygiene, reading food labels) and psychosocial care, and also assess the nutritional status (growth, iron status, hemoglobin) and development of the children. Factors which potentially explain sustained and non-sustained practices will be explored using a qualitative approach.

CHILD FEEDING

Infant and young child feeding and care practices of caregivers in the province of Albay

Joyce Louise Cruz Ignacio

Institute of Human Nutrition and Food
College of Human Ecology
University of the Philippines
Los Baños, Laguna
Philippines

USD 16,959

Infant and young-child feeding (IYCF) plays a vital role in attaining good nutritional status of children and it should be timely, adequate, safe and appropriate. The sufficiency of IYCF does not only rely on the quality and quantity of foods provided, but also on the of caregivers' quality of care; these are usually the biological mothers, grandmothers, older siblings and household helpers. Improving the IYCF practices of the caregivers has been established to have great impact on young children's growth and development. This study aims to assess the current IYCF and care practices of caregivers and the dietary intake and nutritional status of children 0-24 months in Albay, Philippines. A two-stage cross-sectional study will be conducted in the province of Albay with 234 caregivers as the respondents of the study. Collection of data on the socio-economic characteristics, hygiene and sanitation practices, access to health services and participation in health and nutrition programs of the households and caregivers, anthropometric measurements and dietary intake of the children will be conducted through personal interviews and focus group discussions.

The study will make use of both quantitative and qualitative approaches in explaining the relationship between and among variables, especially IYCF and care practices, which have impacts on the nutrition of young children. Results of this study will serve as the empirical basis for the capacity-building for the local government and for its health and nutrition officers and will provide substantial inputs in the development of appropriate programs and interventions on malnutrition on young children.

COMPLEMENTARY FOOD

Formulation and characterization of infant flours using spirulina powder in replacement of multivitamin-multimineral complex

Evariste Mitchikpe

Department of Nutrition and Food Sciences
University of Abomey-Calavi
Cotonou
Benin

USD 12,055

Child malnutrition is an important problem in most developing countries. In Benin, while prevalence of wasting among children under 5 years of age is within an acceptable range (estimated between 3 and 5%), prevalence of stunting (between 30 and 40%) is considered to be serious, according to the WHO classification of severity of malnutrition in a community. If wasting is a consequence of inadequate diet over a short period, stunting, on the contrary, is the result of an insufficient and poor-quality diet over a long term. Previous studies showed that the prevalence of stunting increases from 6 months to reach the highest level around 36 months. One of the main causes of this situation is the poor quality of complementary foods provided to children from 6 months onward.

The current study aims to elaborate infant flour with high nutritious value using only locally produced foods. Maize, sorghum, soya, and spirulina will be used as ingredients. Various combinations of these ingredients will be made to get flours. The composition of energy, protein, fat, carbohydrate, fibre, iron, zinc and calcium of these flours will be analyzed. The contamination of the flours with pathogenic microorganisms will be assessed and the acceptability of the different formulations will be determined. Flours with the best characteristics with respect to macro- and micronutrient composition, acceptability by children 6 to 24 months and pathogenic microorganism content will be identified. Rural communities will be trained on how to prepare these flours and on good infant- and child-feeding practices.



PRE-PREGNANCY MICRONUTRIENTS

Impact of pre-pregnancy micronutrient supplementation on infant growth and development

Phuong Hong Nguyen

Thai Nguyen University of Pharmacy and Medicine
Thai Nguyen
Vietnam

and

Rollins School of Public Health
Department of Global Health
Emory University
Atlanta, Georgia
USA

USD 285,026

Poor growth and development during early childhood continues to be a significant public health problem worldwide. In developing countries, nearly 200 million children suffer from growth retardation. One out of 5 infants are born low birth weight and consequently at higher risk of death, morbidity and poor development during early childhood. In Vietnam, the latest national survey found that on average 26.7% of children <5 years were stunted, with the highest prevalence concentrated in economically deprived regions of the country. The overall objective of this study is to evaluate the effect of pre-pregnancy weekly iron-folic acid or multiple-micronutrient supplementation on infant growth and development. We propose to expand the data collection of our ongoing study, "Impact of Pre-Pregnancy Micronutrient Supplementation on Maternal and Child Outcomes", a collaboration between Emory University and the Thai Nguyen University of Medicine and Pharmacy. In the parent study, 5011 women were enrolled and randomly assigned to one of three groups that receive pre-pregnancy weekly supplementation of either: 1) 2800 µg folic acid (control); 2) 60 mg iron and 2800 µg folic acid; or 3) multiple micronutrients. Women who conceive are followed through pregnancy, delivery and up to 3 months postpartum. A total of 1600 births are expected by September 2014. In this follow-up study, the investigators will collect data on child growth, development, feeding practices, and morbidity. Repeated measures of growth and development during the first 24 months of life will provide more accurate information on the dynamic process of infant growth and cognitive development.

SCHOOL-BASED NUTRITION

Healthy kitchens, healthy children:
A school-based cluster randomized
controlled trial

Hala Ghattas & Nadine Sahyoun

American University of Beirut
Beirut
Lebanon

and

University of Maryland
College Park, Maryland
USA

USD 255,430

Palestinian refugees in Lebanon are protracted refugees with fragile livelihoods, high rates of poverty and food insecurity. Studies reported that food insecurity in this population is associated with low household income; is more common in households with female heads; and results in poor quality diets, particularly a reduction in fresh food consumption. In this population only 13% of women are employed; however the enrollment rate of 7-12 year old children in school reaches 95%. The aim of this study is to evaluate the impact of a community partnership on the root causes of food insecurity in Palestinian refugees, such as the employment and income-generating potential of women, educational attainment, access to food-related assets and mental health. The study will consist of a two-pronged approach: 1) the establishment of community kitchens as small business enterprises where women are trained in food preparation, food safety and business entrepreneurship; 2) the development of a school feeding program for children aged 5 to 12 years catered by the trained women from the community kitchens. Working with UN Relief and Works Agency for Palestine refugees (UNRWA)'s social services program the researchers will recruit already existing community-based women's organizations to participate in the study and UNRWA elementary schools. The school feeding program will be designed as a school-based cluster randomized controlled trial with a matched pair design, and 8-month follow-up of children aged 5-12 years. Schools will be randomly assigned to 2 groups: intervention including school meals plus nutrition education or control including nutrition education only. School meals will provide 30% of children's nutrient requirements.



HOME GARDENING

Nutrition and food security: Impact of soil fertility and productivity of home gardens on family nutrition

Ravi Sangakkara & Emmanuel Frossard


Faculty of Agriculture
University of Peradeniya
Peradeniya
Sri Lanka

and

Institute of Agricultural Sciences ETHZ
Eschikon-Lindau
Switzerland

USD 70,100

Home gardens provide sustenance to most rural populations of South Asia, in terms of food, spices and medicinal plants. Productivity and diversity change in these units with climatic regions, and variations in soil fertility. Although home gardens are considered to be more fertile than fields, continuous production without proper management strategies leads to soil degradation. This affects crop diversity and productivity, and probably also household food and nutrition security. The administrative district of Kandy is home to many smallholder home gardens. The goal of the project is to determine the productivity of home gardens in the Kandy district and their impact on food supply to farm families to ensure nutrition, and health through agriculture. The specific objectives are to determine crop species and production of 40 randomly chosen home gardens in the Kandy district of Sri Lanka, where home gardens are prevalent, in relation to soil fertility, species diversity and contribution to household food and nutrition security over 12 months. Thus, the project is unique as it spans the continuum between soil fertility, crop productivity and family nutrition and livelihood. The project will also analyze plant production and soil fertility in home gardens by developing four on-farm model home gardens. Thus, the project will study the four key components of food security for Sri Lankan home gardens: production, access, use and stability. Students from the University of Peradeniya will be trained and will develop a network including crop scientists, a nutritionist and a pediatrician, to assess child health and cooperate in future projects.



One of the major aims of the Nestlé Foundation is the transfer of sustainable capacity-building knowledge to low-income countries. During 2013 several specific capacity-building activities were supported.



AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT

Local creation and 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>). 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 regular contribution for the infrastructure as well as for each issue. The journal is only available as a web-based publication. The submission of original articles and other contributions can only be encouraged.

DISSEMINATION OF RESEARCH RESULTS

During 2013 the Foundation supported several researchers from Vietnam, Ghana, Benin, Indonesia, China and Kenya to attend conferences in the US as well as the IUNS Congress in Granada, Spain to present results from their research projects which were supported by the Foundation. The presentations included different topics such as breastfeeding, child nutrition, iron bioavailability and obesity.



INSTITUTIONAL SUPPORT AND OTHER CAPACITY-BUILDING ACTIVITIES

THE enLINK TRUNK

During this year 11 small and 13 large trunks were shipped to 13 institutions in 8 countries. Seven of the 11 small trunks were shipped to French-speaking countries. The feedback from enLINK trunk users clearly underlines that books will most likely not disappear. A few years ago it was assumed that e-books and e-documents will cannibalize printed books. Since printed books are close to perfection they will outlive any digital book. Therefore we will promote for one more year the enLINK trunks.

NEW EDITION OF NUTRITION ET SANTÉ

In nearly 20 African countries French is one of the official languages. English as the global language in education and research as well as daily life still remains a handicap. There are not many practical books on applied nutrition in French. Accordingly the Foundation supported the printing cost for a 250-page paperback book entitled *Nutrition et santé* ("Nutrition and Health") by Dr. Jacques Courtejoie, Centre de Promotion de Santé (CPS) in Kangu-Mayumbe (Congo). The CPS is one of the major producers of educational materials for medical doctors, nurses and midwives in the Congo. The books are not only distributed locally - for instance, all midwifery schools in the Congo depend on educational material from the CPS - but also to other French-speaking African countries. CPS fills a gap for Francophone Africa.

enLINK TRUNKS FOR THE CENTRE FOR HEALTH PROMOTION

For nearly 40 years the Centre for Health Promotion in Kangu-Mayumbe, located in the province Bas Congo, has been one of the key institutions to promote health and health education in the Congo. Dr. Jacques Courtejoie and his team are key players in the health promotion and production as well as distribution of educational material in the Congo. Actually they are one of the few functional institutes in this country developing and printing health promotion materials, including books on nutrition and medicine. The five French enLINK trunks offered by the Foundation for the Library of the Centre as well as for some satellite offices will assist the activities of this unique centre.

enLINK DIGITAL LIBRARY

After the reboosting of the enLINK library the user numbers of the library have increased continuously. The enLINK library is a welcomed information source for individual users as well as librarians in many low-income countries. Based on the user statistics the enLINK library seems to have become a widely used and appreciated information source. Librarians appreciate the ease of usage as well as the focused content of the enLINK library.



Last year we published in The Report a memorable series of contributions out of Africa from “brain drain resistant” colleagues. Now we have a contribution from the President of the African Nutrition Society, who just recently returned to Ghana to realize the vision to promote nutrition research and education out of Africa, since only local action allows capacity building in a sustainable manner. Similarly Calestous Juma—Professor for the practice of international development—underlines the importance of niche crops for sustainable food security and reduction of malnutrition. Sustainable and implementable solutions depend on many factors. Accordingly a team around Gretel Peltó underlines the importance

of sociological and anthropological aspects for a sustainable implementation and impact. Similarly, Zulfiqar Bhutta recalls the “needs and deeds” for the control of maternal and child malnutrition and he stresses focusing more intensively also on underlying determinants of malnutrition, which range from climate change to governance. Most aspects of the latter four contributions depend on know-how and “educational presets”, as also outlined in the enLINK circle contribution on page 10. Accordingly, the last contribution, by Karl Aberer, addresses the increasing role of information technology for global education and thus poverty reduction and health.



VISION 2013

KEY INGREDIENTS
FOR CAPACITY BUILDING

GROWING
THE NUTRITIONAL REVOLUTION

ETHNOGRAPHY AS A TOOL

THE NEEDS AND DEEDS

THE DIGITAL REVOLUTION



KEY INGREDIENT FOR CAPACITY BUILDING:

Francis B. Zotor PhD, RNutr, FHEA
President African Nutrition Society
Head, Department of Family & Community Health
School of Public Health
University of Health & Allied Sciences
Ho, Ghana. West Africa

and

Paul Amuna, MD
Trustee, African Nutrition Society
Principal Lecturer
Department of Life Sciences
University of Greenwich
Medway, Kent, UK

A KEY INGREDIENT TO WORKFORCE DEVELOPMENT IN ENHANCING THE NUTRITION AGENDA IN AFRICA

The common interest and vision between the Nestlé Foundation (NF) and the African Nutrition Society (ANS) to support capacity building within the nutrition workforce can be likened to “love at first sight”. This was clear when key leadership of both organisations met at the African Graduate Students Network (AGSNet) preconference workshop in Bloemfontein, South Africa in October 2012. The preconference event was part of a tripartite leadership forum for young nutrition scientists and students in Africa prior

to the Nutrition Congress Africa (NCA) 2012, the largest scientific nutrition conference co-organised by the ANS and two other South African Nutrition Associations.

During the AGSNet workshop, both NF and ANS made separate presentations which were complementary and synergistic and thus created the platform for further dialogue and follow-up meetings between our two organizations to explore projects of mutual interest with a primary focus on strengthening training and nutrition leadership for, and led by, Africans. The NF, through its experience as a global organization dedicated to the study of challenges of nutrition at a global level, and the ANS, a leading nutrition movement in Africa, saw the need to work together to support the development of Africa's workforce by helping to offer nutrition training to African nutritionists using the ANS platform. The ANS is the natural home for such an important initiative because the organization's mission seeks to influence change in academic training, research and the execution of projects and programmes with the view to improving nutrition in Africa and reducing the burden of disease.

Furthermore the ANS as a scientific professional body and a learned society with broad individual continental membership across countries has the capacity to reach across the African continent, and the network to promote harmonized academic endeavor. In this respect the ANS will be expected to provide leadership which serves as a 'catalyst for change' in thinking and approaches to nutrition workforce training and practice. The NF, on the other hand, has the global experience and, having developed the digital **enLINK** library, an internet-based library for full-text access to key nutrition journals, selected e-books, could serve as a major partner to support access to and dissemination of relevant training materials to support the ANS vision for better training in Africa. Over the years, the Foundation has offered free access to registered individuals working in the field of nutrition and medicine in low-income countries and who have affiliations with a university, institute or other professional and teaching institutions. This partnership is therefore a natural extension of that vision to reach even wider audiences, hence the "love at first sight".

Following the NCA 2012, NF granted access to ANS members through its enLINK free registration to become users and to have access to the digital enLINK library. This unfettered access also includes varied documents including valuable e-books accessible in full-text format through NF with its different publishing partners. The immediate impact of this ANS association with NF is a significant upsurge in visits to the Foundation's website, an increase in applications and registrations to the enLINK database, and several trunks of academic

texts being successfully distributed to several institutions in Africa. These trunks come in the form of a mobile enLINK library in an orange metal trunk containing more than 120 books, brochures and guidelines from the field of nutrition and health. The books also span other disciplines, such as medicine, agriculture and public health. One such beneficiary has been the University of Health and Allied Sciences (UHAS) in Ghana, a new University established by an Act of Parliament and dedicated to the training of medical and allied health personnel to serve the Ghanaian health sector.

The African Nutrition Institute (ANI) was formed with the help of NF, and duly registered with the initial singular objective of being a neutral, unbiased information source for nutrition and a nutrition research platform for dissemination of academic training resources in Africa. The ANI was initiated to enhance the fulfilment of the mandate of the ANS and the realization of its goals for the advancement of nutrition and health in Africa. The institute, once fully established and operating at a steady state, will hopefully be able to add more sophisticated technologies or interactive courses to its portfolio. Undoubtedly through its role in the ANI, NF would also be attaining one element of its own overall agenda of promoting nutrition capacity-building activities in Africa.

In furtherance of the ANI's objectives, NF has further donated three sets of trunks to the ANS. This move is to support ANI's aim to create a hub of knowledge and scholarship within a physical infrastructure and "implementation body/institution" as part of its long-term objective for nutrition workforce capacity-building in Africa. Undoubtedly the NF is helping to create a "sharing platform" for the advancement and dissemination of nutrition training and nutrition knowledge with an impact on wellbeing and health in Africa. Through this partnership it is hoped that the ANI will have access to a global faculty of experts to contribute to training programmes through the virtual platform. This we believe is a step in the right direction in developing a new cadre of world-class African research scientists in the fields of nutrition and public health to help meet Africa's workforce capacity needs.

In conclusion, this partnership between NF and the ANS in Africa is creating an enabling environment for African nutritionists to forge their own identity and stand on the global stage with a rich breadth of knowledge, experience and practice, and we hope this will grow and benefit all.



GROWING THE NUTRITIONAL REVOLUTION

Calestous Juma, PhD

Professor of the Practice of International Development
and Faculty Chair of the Innovation for Economic
Development Program
Co-chair of the African Union's High-Level Panel on
Science, Technology and Innovation
Belfer Center for Science and International Affairs
Harvard Kennedy School
Cambridge, Massachusetts, USA

A PLEA FOR NICHE CROPS

Introduction

The world is waking up to the urgent need to ensure that agriculture - through crop diversification - can help to address the world's nutritional needs. The challenge is not the absence of scientific, technological and engineering knowledge. It is the absence of institutions that can transform the widely available knowledge into practical programs that can bring agriculture, nutrition and health together to help improve the human condition.

The state of world agriculture and nutrition

Based on energy intake, the Food and Agriculture Organization of the United Nations estimates that 12.5% of the world's population (or nearly 868 million people) are undernourished. Some 26% of the world's children are stunted while 2 billion people suffer from one or more micronutrient deficiencies. It is estimated that 1.4 billion people are overweight, of whom 500 million are obese.

Agricultural production has only partially addressed the challenges of undernourishment and overnourishment. In some cases, existing agricultural systems have contributed to the problem through lack of diversity in food systems.

World food production patterns and global nutritional needs have over the centuries evolved along divergent pathways. The four leading staples (maize, wheat, rice and potatoes) were selected through geographical serendipity, indigenous knowledge and salient agronomic and nutritional properties.

Because of the lack of detailed knowledge on human nutritional needs, energy intake became the dominant indicator of food needs. Agricultural systems became preoccupied with quantitative targets on crop yields. The challenge to improve nutrition took root outside the agricultural system with emphasis on measures such as fortification.

Over the centuries the two food strands have evolved along divergent paths. The challenge today is to find ways of ensuring that agricultural production can shift its attention and seek to meet nutritional needs.

Efforts to align global agricultural and nutritional goals will involve at least two strategic approaches. First, policy makers need to appreciate the significant contributions that advances in science, technology and engineering can bring to a new revolution in nutrition. A large part of the knowledge involves more detailed understanding of the role that niche crops can play in improving human health.

Second, such knowledge can hardly be put to effective use without significant institutional innovations aimed at bringing research, teaching, extension and product commercialization under one roof. In effect, the world needs a generation of institutions of higher learning that can do for nutrition what older agricultural universities did for food production.

Niche crops and nutritional path-creation

Despite the dominance of a few major food crops, cultures around the world still use a wide range of

niche crops, many of which are called "ancient grains", "orphan crops", "lost crops", "famine crops", "local crops", "neglected crops" or "wild foods". In some countries, these crops were the subject of prejudice when exotic crop species were introduced.

However, it would be a mistake to ascribe the "neglect" to some willful conspiracy. The problem lies in the dynamics of moving along an established technological path along which low investments have yielded high returns until the concern for nutrition came along. The task is not to displace existing crops but to expand the size of the global food basket.

There are several building blocks that can be used to lay new nutritional pathways. First, advances in studies on areas such as the role of micronutrients as well as studies in human genetics now allow nutritionists to contribute significantly to the work of food scientists and agriculturalists. It is now possible to visualize health food systems in new ways.

Second, advances in fields such as plant genomics have put at human disposal the immense capacity to enhance existing crops and breed new ones to meet higher nutritional standards. Breakthroughs in genomic sequencing technologies and related reductions in costs have significantly lowered the entry barriers for crop research.

Third, local communities around the world still rely on niche crops to supplement their food intake. The nutritional qualities of some of the foods are known while thousands of others are understudied. For example, the US National Academy of Sciences has documented 14 grains, 18 vegetables and 14 fruits that could be part of an ambitious expansion of the market for nutritionally significant niche crops.

These efforts also need to be connected with the emerging concerns over climate change. Most of the major sources of starch are annual crops requiring extensive use of agricultural land. Little attention has so far gone into exploring the role of tree crops of nutritional significance whose cultivation may lead to less use of land.

Fortunately, advances in conservation biology and tissue culture propagation are contributing to the development of such tree crops. One leading example is breadfruit. The National Tropical Botanical Garden in Hawaii maintains 226 accessions and nearly 120 varieties of breadfruit from 34 Pacific islands as well as Indonesia, the Philippines, the Seychelles and Honduras.

The associated Breadfruit Institute is distributing on a small scale varieties developed from these collections but the effort could be part of a larger initiative to diversify nutritional sources while addressing the sustainability challenge.

The University of Hawaii has conducted studies of 20 of the varieties, examining basic nutritional content, chemical elements, total dietary fiber, vitamins and other essential compounds. There is a need to spread the benefits of such research to other tropical countries to address nutritional needs. But even more importantly, the work of the Breadfruit Institute serves as an important example that can be emulated to promote other niche crops, especially in centers of diversity.

Cultivating new strategies

Aligning agricultural production with nutritional goals will require bold institutional innovations that build on incremental ways that are being pursued today. Currently, much of the effort goes into raising awareness in the agricultural community on the importance of integrating nutritional objectives into plant breeding programs.

There is considerable work underway in finding ways to improve the nutritional content of African crops such as sorghum, cassava and bananas. Some of this has been inspired by advances in genomics and involves genetic fortification of existing crops. Similarly, efforts to sequence niche crops in Africa will yield important information that will help in future breeding activities. These efforts need to be supported and expanded.

Another option worth exploring includes the creation of a new generation of nutrition-based agricultural institutions of higher learning. Such institutions should help to bring research, teaching, extension, public education and community engagement under one roof. Their focus should be to create new pathways for enhancing nutrition through the expanded use of improved niche crops.

There are many strategic entry points for creating such institutions. Many existing universities and research institutes across the world already have programs that focus on improving niche crops. Similarly, many non-governmental and community organizations also work on such crops. Furthermore, these crops enjoy considerable local support and are conserved through a diversity of social networks.

The focus on the new institutional efforts would be to upgrade, consolidate or strengthen institutions working on niche crops of nutritional significance. But unlike conventional agricultural research facilities, such institutions should be guided by nutritional objectives that would include agriculture, health, genetic resource conservation and overall human development.

Political leadership is essential in guiding the integration of agriculture and nutrition given the entrenched separation between the two. One

possible way to support such initiatives is to add strong nutrition departments to existing ministries of agriculture while forging close links with the medical community.

Conclusion

Many of the ideas proposed above are not novel, as many countries already have departments of food and nutrition. What is different is the creation of institutions of higher learning that are dedicated to advancing the revolution in nutrition. This cannot be achieved without dedicated champions with the entrepreneurial spirit and drive to promote improved health by combining nutrition and agriculture. Today's niche crops represent an important starting point for growing a new nutrition revolution.





ETHNOGRAPHY AS A TOOL

Sera Young, PhD; Emily Tuthill, PhD;
and Gretel H. Peltó, PhD

College of Human Ecology
Division of Nutritional Sciences
Cornell University
Ithaca, New York, USA

ETHNOGRAPHY AS A TOOL FOR FORMATIVE RESEARCH AND EVALUATION IN PUBLIC HEALTH NUTRITION

In this essay we discuss the role of ethnographic research in the development and evaluation of nutrition interventions. In response to the challenge of developing effective methods for translating basic biological discoveries into improved health and nutrition of populations, a number of disciplines are now contributing actively in the arena of "Implementation Science" (1). Anthropology is among them, and within the various sub-disciplines in the field, "applied ethnography" is increasingly being employed to obtain essential data and insights for public health activities (2). To date, the bulk of research directed to improving public health nutrition has been undertaken

in connection with interventions that are designed to affect population health and nutrition through programs, delivered through specific platforms and health-center based frontline workers (3), which are implemented in communities.

Ethnography

"Ethnography" is derived from the Greek words for "people" or "culture" (ethnos) and "writing" (grapho). The systematic description of "culture" is thus at the core of ethnographic research. Although historically ethnographies aimed to describe an entire ethnic group or even a nation, most ethnography in medical and nutritional anthropology, whether undertaken in the context of applied research or as basic research, focuses on a relatively small subgroup, often studied within a specific community or comparatively, across several communities. Examples of extended descriptive ethnography are the study of women's management of child health in a Brazilian favela (4) or of breastfeeding women in Dodoma, Tanzania (5).

In academic research ethnographic description is generated during a lengthy period of fieldwork in which the ethnographer immerses herself or himself in community life and gathers data through a process of "participant observation," augmented by interviewing, particularly of key informants. Detailed analysis of fieldnotes is the primary analytic strategy. Some ethnographic research also includes surveys to obtain a quantitative data base. However, long-term ethnographic research is not compatible with the time and resource constraints of programs, and, beginning in the 1980s, anthropologists have been working to develop approaches, tools, and methods to enable ethnographic research that is feasible in programs. "Focused" or "rapid" ethnography began to be increasingly incorporated into program planning and evaluation (6, 7). Today there are a number of textbooks and handbooks (e.g. 8, 2) as well as subject-specific guidelines and tools (e.g. 9, 10) which are available to investigators who want to undertake applied ethnographic research on specific nutrition topics.

The theoretical underpinning of ethnographic formative research

Ethnographic studies for nutrition and health interventions are aimed at revealing the "why" and "how" that underpins the "who," "where," "when," and "how much" that are obtained with quantitative surveys. Both research modes - quantitative and qualitative - are essential for effective translation of biological interventions into public health interventions (11). Revealing the why and how requires that the research be grounded in a theoretical framework, which helps to direct attention to critical dimensions of human behavior. The anthropological paradigm of holism is a starting point, which can then be formalized with the aid of a specific theoretical approach, such as the "cultural ecological framework for nutrition" (12).

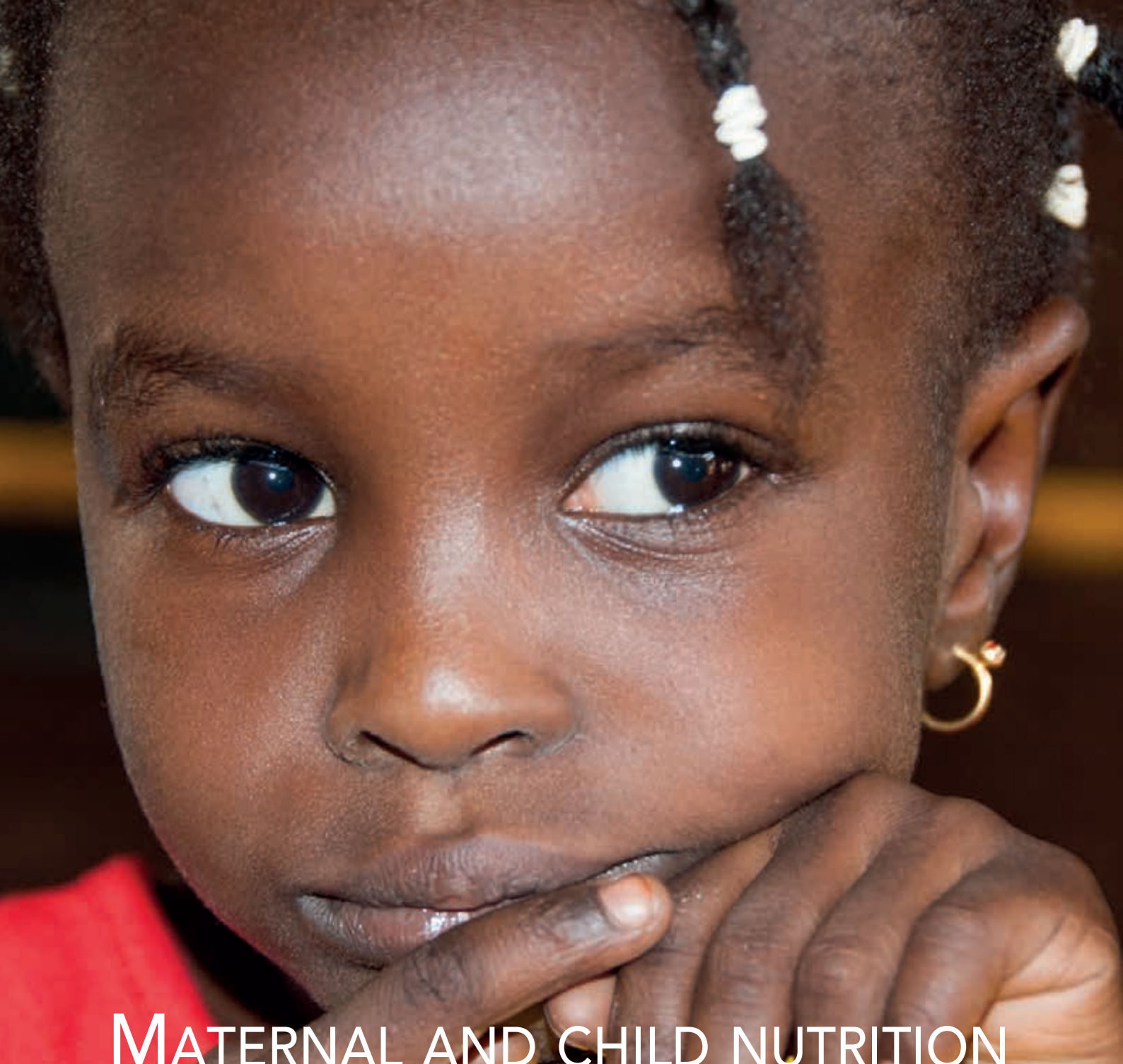
Ethnographic methods in formative research

Formative research is a general term that refers to

short-term, qualitative studies that are conducted prior to implementing a public health program. A variety of ethnographic techniques are used in formative research, and studies that are undertaken to provide information and insights for the design of programs often make use of several over the course of a study. Among the most commonly employed methods are in-depth, one-on-one interviews, structured observations, cognitive mapping techniques (to reveal the content and structure of beliefs and values, often referred to as "cultural domain analysis") and focus group discussions (13, 8). As is the case with longer-term ethnographic studies, a primary form of data analysis is qualitative analysis of "text" generated from interviews and fieldnotes. The ethnographer identifies "themes" and examines their distributions within the corpus of texts that constitute the research data. This analysis is often conducted with the aid of qualitative analysis software programs. The investigator begins with an initial set of themes, derived from several sources including: (i) the goals of the project; (ii) concepts and issues that emerged during the fieldwork; (iii) issues and variables that are suggested by the theoretical framework and; (iv) knowledge of the literature that informed the development of the questioning guides. Thematic analysis is iterative, involving multiple "passes" through the data as coding is refined in response to emerging insights and information. For example, if the investigator finds that signs of child undernutrition are attributed to three distinctly different causes, each of these causes becomes a code and further information about each of them is amalgamated by reviewing the passages from transcribed interviews that pertain to that code. Although samples are usually small, the quantitative analysis of formative research data includes descriptive data on relevant population behaviors and characteristics. For example, many formative ethnographic research studies for nutrition interventions include detailed dietary intake data. These reveal normative patterns. Although these data are incomplete for making population-level assessments of, for example, the extent of specific nutrient deficiencies, they reveal normative patterns critical to intervention development.

Ethnography in program evaluation

Ethnography is also important for program evaluation. In fact, the first ethnographic tool for nutrition was undertaken in the 1980s to provide an alternative to the costly, slow, large-scale quantitative surveys evaluating nutrition programs (14), and it was groundbreaking. In recent years, as process evaluation of on-going programs and efficacy trials of nutrition interventions have matured, ethnographic process evaluation is assuming an increasingly prominent role (15, 16). We can expect that as implementation research matures as a field, ethnography will become a standard part of the toolkit of methodologies in nutrition program research. The insights about "why" and "how" that ethnography reveals are essential for assessing Program Impact Pathways not only for the design and implementation of programs, but also for their evaluation (17).



MATERNAL AND CHILD NUTRITION

Zulfiqar A Bhutta

Robert Harding Chair in Global Child Health
& Policy
SickKids Center for Global Child Health,
Toronto, Canada

and

Founding Director Center of Excellence
in Women and Child Health
The Aga Khan University,
Karachi, Pakistan

THE NEDS AND DEEDS

The Food and Agriculture Organization (FAO) reported that between 2010-12, nearly 900 million people, representing some 12.5% of the world's population, were undernourished, almost exclusively in low- and middle-income countries, and the majority of these cases represent women and children.

Recent estimates indicate that there were 6.6 million deaths in children under five years of age and almost half were attributed to some form of malnutrition (stunting, wasting and micronutrient deficiencies). Stunting rates among under-five children have only

come down marginally from 175 to 165 million; moreover, 101 million are underweight and 52 million wasted globally. Nearly 80% of these children live in just 34 countries, with the highest prevalence in Southeast Asia and sub-Saharan Africa, and in many countries more than 50% of all children are stunted. Prevalence of low BMI ($<18.5 \text{ kg/m}^2$) in adult women has also decreased in Africa and Asia since 1980, but still remains higher than 10%. During the same period, prevalence of overweight (BMI $\geq 25 \text{ kg/m}^2$) and obesity (BMI $\geq 30 \text{ kg/m}^2$) has been rising in all global regions. In 2011, an estimated 43 million children under five years were overweight, marking a 54% increase from an estimated 28 million in 1990. In Africa, the estimated prevalence increased from 4% in 1990 to 7% in 2011, while it is a little lower in Asia (5% in 2011) with the number of affected children being higher as compared to Africa (17 and 12 million respectively).

Micronutrient deficiencies are also widespread globally, especially among these vulnerable groups given their increased demands. Prevalence of iron-deficiency anemia (IDA) among pregnant women is around 19.2%, while that of vitamin-A deficiency is 15.3%. According to the World Health Organization (WHO), globally about 190 million preschool children and 19.1 million pregnant women are vitamin-A deficient, approximately 100 million women of reproductive age (WRA) have subclinical iodine deficiency, and an estimated 82% of pregnant women worldwide have inadequate zinc intakes to meet the normal needs of pregnancy. In addition, a third of under-five children are vitamin-A deficient and 18.1% have iron-deficient anemia.

These figures suggest that the magnitude of malnutrition and associated health consequences are widespread in the developing world. Furthermore, many of the low- and middle-income countries (LMICs) countries now bear the double burden of malnutrition due to the emerging issue of overweight and obesity along with the existing high rates of stunting and other micronutrient deficiencies. The recent Lancet Nutrition Series highlights the existing promising interventions to improve maternal nutrition and consequently reduce fetal growth restriction and small-for-gestational-age (SGA) births and also improve child nutrition specifically in developing countries. These include simple interventions like periconceptional folic acid supplementation/fortification; maternal balanced energy protein; vitamin A, multiple micronutrient and calcium supplementation; breast feeding promotion; appropriate complementary feeding; preventive zinc supplementation; and management of acute malnutrition in children. Scaling up of these identified interventions to 90% coverage could potentially reduce nearly 15% of deaths among children under five years, while also reduce stunting and severe wasting by 20% and 61% respectively.

Since maternal malnutrition, micronutrient deficiencies and SGA births remain major determinants of stunting in early childhood, malnutrition prevention needs to undergo a paradigm shift from targeting pregnant women to increased advocacy to target these deficiencies earlier in the lifecycle through promoting adolescent health and nutrition, delaying age at first pregnancy and increased birth spacing. An estimated 10 million girls younger than 18 years are married each year, putting them at a higher risk of delaying their own growth, poorer birth outcomes, delivery complications and mortality in mothers and children. Hence, intervening in this period would not only improve adolescent health but would go a long way towards improving health and nutrition in adult life, which could have manifold benefits by improving not only the individual quality of life but also that of future generations.

Malnutrition is not only dependent upon the direct determinants of nutrition and growth, including diet, behavior and health, but is also greatly affected by underlying determinants such as food security, education, environment, economic and social conditions, resources and governance. Growing populations and urbanization, inflation, climate changes and related water shortages, conflicts and emergencies, and natural disasters affecting agriculture production are also factors important in this context. Hence the agenda for malnutrition requires a multi-pronged approach involving not only interventions directed at the more immediate causes of suboptimum growth and development, but also the large-scale programs that broadly address the underlying determinants of malnutrition. These programs can also serve as delivery platforms for the nutrition-specific interventions and can be effective at reaching poor populations as these are often implemented at a larger scale. Many countries, including Brazil, China, Saudi Arabia, Kuwait and Chile, have achieved success in improving nutrition and health outcomes at the population levels through investments in agriculture, education, and social-sector development alongside implementing targeted nutrition-specific interventions to reach the poor and reduce inequities.



THE DIGITAL REVOLUTION IN EDUCATION AND RESEARCH

Karl Aberer, PhD

Distributed Information Systems Laboratory
Vice Presidency for Information Systems
École polytechnique fédérale de Lausanne (EPFL)
Lausanne, Switzerland

Over the past ten years the digital revolution has brought with it incredible changes to every aspect of our lives. Fuelled by advances in information technology and their wide adoption we have become used to interacting with others through social media anytime and anywhere, having knowledge at our fingertips and being informed in real-time about events around the world. The availability of mobile communications and widespread adoption of mobile computing devices has established an almost symbiotic relationship among humans and the information universe. A whole new information industry has emerged, spear-headed by giants like Google, Amazon, Facebook or Twitter, who count their number of clients in the hundreds of millions.

These developments have an obvious economic impact, as can be illustrated by many examples.

Big data analytics is directly impacting business. As early as 2004, in the Vioxx scandal, the study of 1.4 million patient records revealed risks of cardiovascular disease that were not identified by traditional clinical studies. As a result, the stock price of Merck dropped almost by half. Social media are becoming a driving force in business. A simple Twitter hoax in 2013 let the stock of Sarepta Therapeutics plummet temporarily by almost 10%. Crowd-sourcing enables completely new forms of collaboration among humans. After 244 years, Encyclopedia Britannica has halted print publication, as a result of the rise and continued success of Wikipedia.

But not only the economy is affected by the new tools of the information age, such as big data analytics, social media and crowd-sourcing.

Education has become a recent example of how the digital revolution affects even one of the most conservative domains of human activity, academic education. Over centuries the traditional model of university education, the ex cathedra lecture, has changed little and largely resisted technological and societal advances. Online education, though developing over the last 30 years in many sectors, had only a marginal impact on academic education. All of a sudden this has changed.

Driven by the new paradigms of social media and in the context of the increasingly difficult economic situation of the US academic system, with continually rising tuition fees, in 2012 a new phenomena emerged: Massive Open Online Courses (MOOCs). Offering top-level university courses for free on online platforms started a revolution. MOOCs synchronize large numbers of students in classes that reach tens of thousands of participants by using standard online tools such as videos and forums. University-level education was suddenly offered at scale, with the expectation of lowering the cost of education and improving access to high-quality education, in particular for disfavoured groups.

In Europe, EPFL has been the early adopter of this development and after less than two years has reached out to 400,000 students. The future of this new form of education and its impact on university systems world-wide is still unclear, but no one doubts that a revolution is under way.

MOOCs open up exciting perspectives for the access to knowledge for new groups of students. People already in their careers obtain an opportunity to update their knowledge. Students in developing countries have access to high-quality education materials. Currently EPFL is working with universities in sub-Saharan Africa, in order to explore the potential

of MOOCs for accelerating the development in these countries, in particular their knowledge economies.

But also research is clearly affected by the digital revolution. The generation and availability of massive amounts of data is changing scientific methodology. After theory, experimentation and simulation, data-driven science is becoming the fourth pillar of science. The analysis of vast amounts of complex data enables the derivation of models and predictions by algorithmic methods. The Human Brain Project at EPFL is a prime example of this development. In this project, data from complex simulations is combined with a wide array of experimental data to increase the understanding of the human brain. Many other disciplines, including environmental science, social sciences and medicine are following the same path.

But the impact of the digital revolution on science goes further. Scientists are quickly adopting social media and crowd-sourcing techniques to collaborate at scale. Mediated by collaboration tools, mathematical proofs are generated by groups of scientists in a fraction of the time that any single mathematician could have achieved working alone. Scientific communities are starting to organize their knowledge through collaborative systems, similarly to how Wikipedia helped to organize general human knowledge. Crowd-sourcing of experimental tasks allows for the involvement of citizens in the process of scientific exploration. This approach has been successfully applied in areas such as life sciences for protein-folding research and astronomy for classification of galaxies.

We can clearly see similar patterns of how the digital revolution is impacting both education and research. Knowledge is becoming universally accessible. Knowledge-intensive tasks can be performed now at very large scale. Existing boundaries start to dissolve, like those between experts and non-experts, education and work life, developed and under-developed regions in the world. These are all fundamental stepping-stones in the progression of humanity to a global knowledge society, with equitable access to knowledge and the capability to solve very complex problems in large-scale collaborations.

Improving the problem-solving capacities seems also to be the only way to address the enormous challenges humanity is facing today. This is where the digital revolution will have a truly positive impact, despite all the concerns engendered by recent events around the misuse of big data, privacy intrusion and global espionage.





PROFILE OF A NUTRITION INSTITUTE



INSTITUTO DE INVESTIGACIÓN NUTRICIONAL, LIMA

Nelly Zavaleta MD
Senior Investigator

**Instituto de Investigación
Nutricional, Lima, Peru**

Av La Molina 1885
Lima 12, Peru

The Instituto de Investigación Nutricional (IIN) is a Peruvian private non-profit organization dedicated to research and services in health and nutrition. Since 1961 it has been faithful to its mission to do high-quality research in order to generate new knowledge that contributes to the development and welfare of human beings, especially the most vulnerable ones.

In the beginning, the activities of the IIN were concentrated on the rehabilitation of the severely malnourished child, understanding the reasons for severe malnutrition and nutritional interventions to prevent it. Over time activities have widened to encompass the dietary, health and social determinants of both acute and chronic malnutrition including micronutrient deficiencies. This has meant that activities are now concentrated in the rural and periurban areas of the country, where the majority of the nutritional problems occur and are directly related to poverty and living conditions.

The IIN promotes and supports adequate nutrition in order to encourage good health and adequate development of children, especially during the early periods of life. During five decades, the IIN has conducted several projects to evaluate nutritional status, nutrition interventions and dietary adequacy of the population. At the same time it has served as a technical advisor for the implementation of policies to improve health and nutrition in the country, and also as a member of international technical groups in other countries.

The IIN main office has a modern infrastructure for research in nutrition and food sciences; the facilities include an outpatient nutrition clinic, lab space and equipment for nutritional status assessment and food analysis; and it also includes refrigerators and freezers for biological samples process and storage.

PERU

AREA

Total:	1,285,216 km ²
Arable land:	2.8 %

POPULATION

Total:	29,849,303 (July 2013 est.)
Urban population:	77 % (2010)
Under age 15:	30 %
Median age:	male / female 26 / 27.4 years

POPULATION GROWTH RATE

Total:	1 % (2013 est.)
Urban areas:	1.2 % (2001-2011)
Total fertility rate:	2.25 children born/woman (2013 est.)

GNP (per capita):	\$10,600 (2012 est.)
--------------------------	----------------------

LIFE EXPECTANCY AT BIRTH

Total:	72.98 years
Male:	71.01 years
Female:	75.05 years

MORTALITY RATES

Birth attended by skilled health personnel:	85 % (2009-13)
Neonatal mortality rate (2010):	9/1000
Infant mortality rate (under 1):	14/1000
Under-five mortality rate (2011):	18/1000
Under-five mortality rate (2009), Rank:	102
Maternal mortality ratio (2009-13):	67/100,000 live births
Life expectancy at birth (2011):	74 years

UNDERWEIGHT

Low birth weight (2007):	5.9 %
Underweight prevalence in children under five (%) 2007-2011:	5 %
Stunting prevalence in children under five (%) 2008-2011:	20 %

INFANT AND YOUNG CHILD FEEDING

Six-month exclusive breastfeeding rate (2010):	71 %
Early initiation of breastfeeding (% , 2007-2011)	51 %
Timely complimentary feeding rate (6-9 months):	82 %
Children who are still breastfeeding (12-23 months):	55 %

KEY NUTRITIONAL ANTHROPOMETRY

Stunting in children < 5 years:	20 % (2011)
Prevalence of wasting (moderate and severe):	1 % (2006-2010)

MICRONUTRIENT DEFICIENCIES

Percentage of households consuming iodized salt:	91 %
--	------

OTHER PARAMETERS

Median age at first birth among women 25-29 (2012 est):	22.3
Total adult literacy rate:	90 %
Primary school net enrolment ratio (%), 2008-2011:	98 %
% of population using improved sanitation facilities 2010, total:	71 %
% of population using improved sanitation facilities, 2010, urban:	81 %
% of population using improved sanitation facilities, 2010, rural:	37 %
% of population using improved drinking-water sources 2010, total:	85 %
Immunization 2011, 1-year-old children immunized against Measles:	96 %
Immunization 2011, 1-year-old children immunized against Polio:	91 %
Immunization 2011, 1-year-old children immunized against DPT:	94 %
Antenatal care coverage (%), at least once:	95 %
Delivery care coverage (%), skilled attendant at birth:	85 %

The IIN also has a library, office space for research, computer center and internet facilities. The IIN has research sites in the periurban area of Lima and in the provinces, as the projects require.

The IIN cooperates with government, private sectors, international organizations, and universities to conduct research studies on food security, food composition and quality, nutritional interventions, and dietary education. The IIN has developed solid relationships with many recognized academic institutions and international and national agencies, among them Johns Hopkins University, University of California-Davis, London School of Hygiene and Tropical Medicine, Swiss Federal Institute of Technology, Cornell University, Emory University, and McGill University.

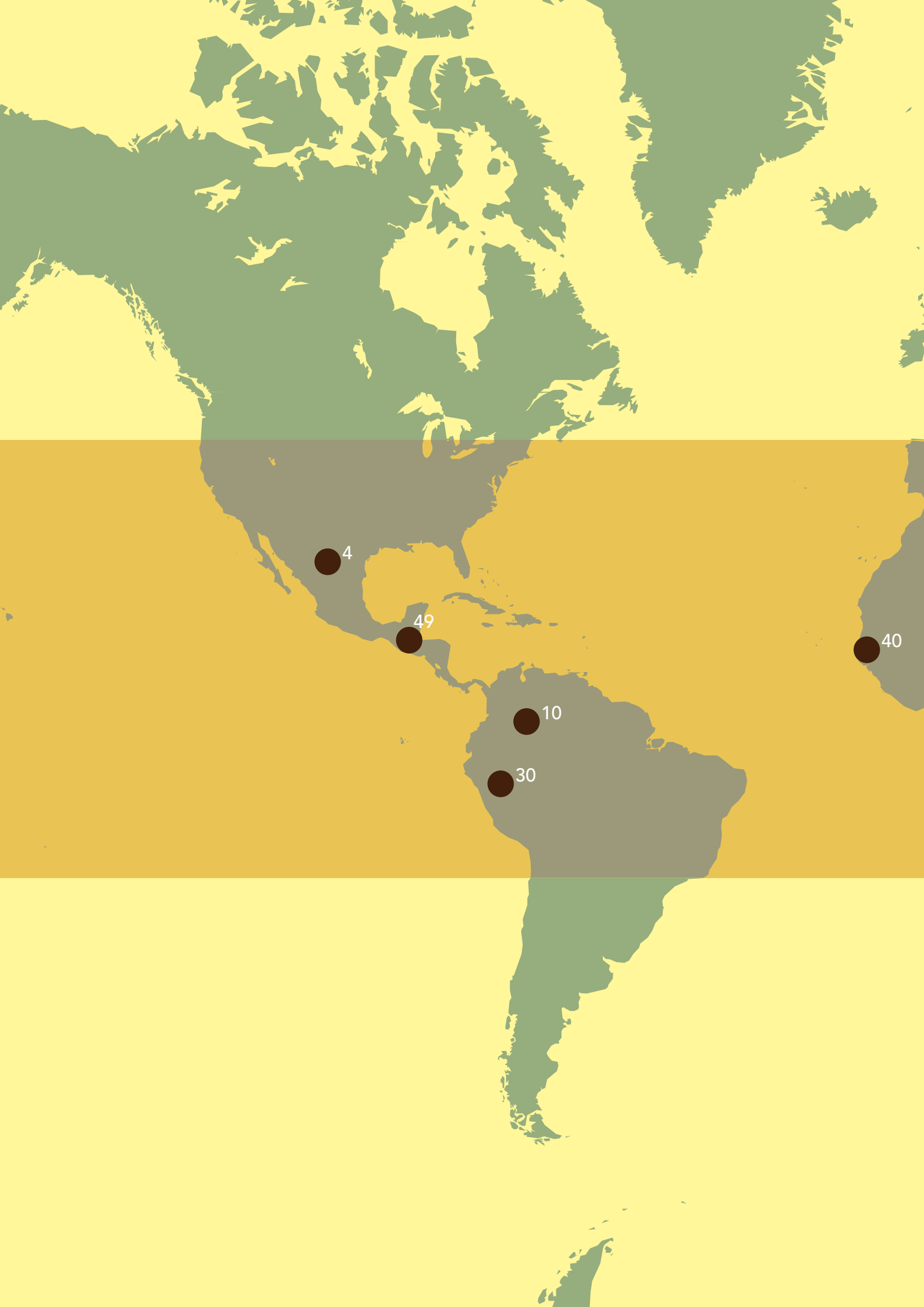
Currently the main areas of research are: maternal and perinatal health and nutrition; infant feeding; nutritional anemia and micronutrient deficiencies; food security and the link between agriculture and nutrition; nutrition rehabilitation; healthy lifestyles; nutrition and infection, including the development of vaccines; nutrition and development; poverty, health and nutrition; evaluation of nutritional status and nutrition interventions and implementation research. One of the projects that we are conducting which is supported by the Nestlé Foundation is a cross-sectional evaluation of a cohort of children born to women who participated in a Randomized Control Trial (RCT) of prenatal supplementation, with iron and folic acid with or without zinc. Results of this trial showed that children from zinc-supplemented mothers had improved fetal growth and neurobehavioral development. At a follow-up at 4.5 years of age, we demonstrated persistent effects of maternal zinc supplementation on child neurobehavioral development (e.g., lower mean heart rate, greater vagal tone). We are evaluating health, nutritional status, cognitive and autonomic function of children at 14 years of age. Autonomic function is a marker of stress response, and thus continued evaluation is important for linking the intrauterine environment with later health and performance outcomes.

The IIN has contributed with more than 500 publications on maternal and child health and nutrition, in particular on breast feeding; complementary feeding; nutritional anemia; iron, copper and zinc deficiency; calcium and preeclampsia; micronutrient deficiencies; management of the severely malnourished child; nutrition and child health and development; obesity; and efficacy of vaccines.

As researchers, we are very motivated to work in the search for evidence and new knowledge that will contribute to developing and sustaining policies to improve the living conditions of malnourished

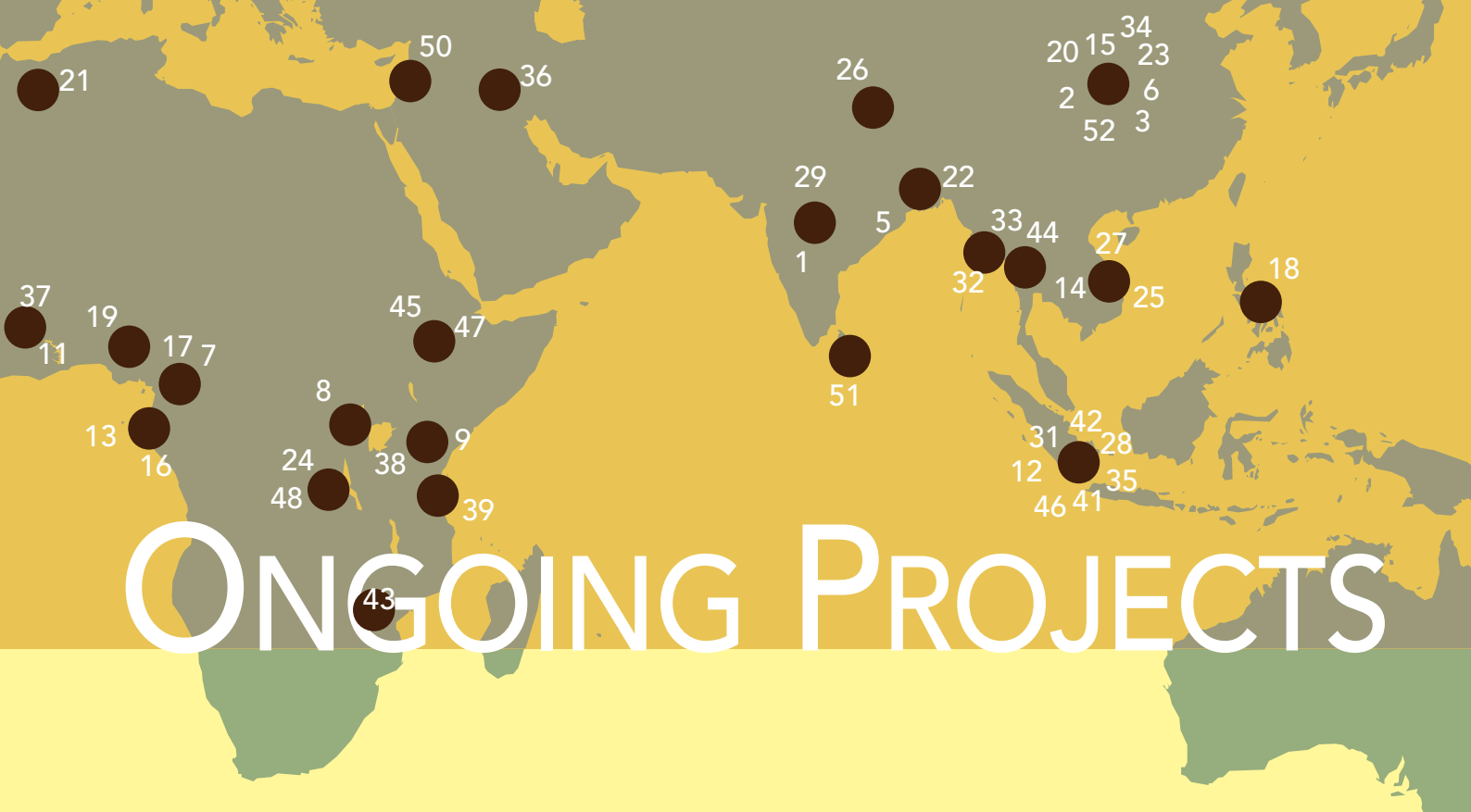
people. However, to do research it is necessary to have the resources, which are limited in many countries. The existence of organizations such as the Nestlé Foundation that support independent, competitive and ethical research is remarkable. From our experience we are very honored and impressed by the Nestlé Foundation, an organization that supports and promotes research. Moreover, it is committed to disseminating the evidence and new knowledge for policymakers and also stimulating capacity building and sustainable interventions in developing countries.







ONGOING PROJECTS





TITLE

PRINCIPAL INVESTIGATOR

MICRONUTRIENTS

BREASTFEEDING

- | | | |
|---|---|---|
| 1 | 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 |
| 2 | 2008 / Improving micronutrient status of Chinese children using dietary spirulina | Shi-an Yin
National Institute of Nutrition & Food Safety, Beijing,
China |
| 3 | 2008 / Effects of vitamin A supplementation during lactation on infants' antibody response to hepatitis B vaccine in China | Zhxiu Wang
Nanjing Medical University, School of Public Health,
Nanjing, China |
| 4 | 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, Australia |
| 5 | 2009 / Effect of maternal zinc supplementation during pregnancy and lactation on infants' immunity | Mohammad Bakhtiar Hossain
ICDDR, B, Clinical Research Division, Mohakhali-
Dhaka, Bangladesh |
| 6 | 2011 / Effect of soybean supplementation, parasite control and nutrition education on iron status of adolescent girls in rural China | Lei Li
Medical College of Xiamen University, Siming District,
Xiamen, China |
| 7 | 2008 / Information and education to support and promote exclusive breastfeeding | Ada C Uwaegbute
Michael Okpara University of Agriculture, Umuahia,
Nigeria |

- | | | |
|----|--|--|
| 8 | 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 |
| 9 | 2007 / Improving nutritional status of children aged 6-18 months in a semi-arid area in Kenya: The potential of amaranth seed flour | Alice Mboganie Mwangi
University of Nairobi, Applied Nutrition Programme, Uthiru-Nairobi, Kenya |
| 10 | 2008 / Nutrition, anaemia, growth and oxygen weaning in low-birth-weight oxygen-dependent infants in a Kangaroo Clinic | Nathalie Charpak
Fundacion Canguro, Bogota, Colombia |
| 11 | 2010 / Effect of fish meal and Vitamin C on the iron status of Ghanaian children consuming cowpea-based food | Godfred Egbi
University of Ghana, Noguchi Memorial Institute for Medical Research, Legon, Ghana |
| 12 | 2010 / Intensive nutrition and hygiene education for improving nutrient intake of 6-11 months children | Dwi Nastiti Iswarawanti
SEAMEO Regional Center for Food and Nutrition, Jakarta, Indonesia |
| 13 | 2010 / Testing the efficacy of an audio program and discussion guide in promoting exclusive breastfeeding in Cameroon, Africa | Susanne Montgomery
School of Public Health, Loma Linda University, Loma Linda, California, USA |
| 14 | 2010 / Efficacy of combined selenium and iron supplementation on micronutrient status of school children | Nguyen Van Nhien
National Institute for Food Control, Hanoi, Vietnam |
| 15 | 2011 / Effect of hookworm elimination and vitamin A intervention on anaemic status of pre-school children in Sichuan, China (resubmission) | Ke Chen
Chengdu Maternal and Children's Health Care Hospital, Chengdu, Sichuan, China |
| 16 | 2012 / Food based approaches to reduce childhood nutrients-energy malnutrition in Bangang community, Cameroon | Marie Modestine Kana Sop
University of Douala, Faculty of Science, Douala, Cameroon |
| 17 | 2012 / Drama for behaviour change communication on breastfeeding and complementary feeding practices in rural areas of Osun State, Nigeria | Beatrice Olubukola Ogunba
Obafemi Awolowo University, Department of Family, Nutrition and Consumer Sciences, Ile ife, Nigeria |



TITLE

PRINCIPAL INVESTIGATOR

18 2013 / Infant and young child feeding and care practices of caregivers in the Province of Albay, Philippines

Joyce Louise Cruz Ignacio
University of The Philippines Los Banos, College of Economics and Management, Laguna, Philippines

19 2013 / Formulation and characterization of infant flours using spirulina powder in replacement of multivitamin-mineral complex

Evariste Mitchikpe
Université Abomey Calavi, Département Nutrition & Sciences Alimentaires, Cotonou, Benin

20 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

21 2009 / Impact of daily consumption of vitamin-A-fortified oil on breast milk vitamin A concentration and vitamin A status of lactating Moroccan women

Najat Mokhtar
Ibn Tofail University, Nutrition Unit, Kenitra, Morocco

22 2009 / Role of vitamin B12 supplementation during pregnancy and postpartum to alleviate nutritional anaemia in Bangladeshi women and their infants

Towfida Jahan Siddiqua
ICDDR, B, Nutritional Biochemistry Lab, Dhaka, Bangladesh

23 2010 / SMS and web-based support for appropriate infant feeding to prevent childhood obesity in urban China

Hong Jiang
School of Public Health, Fudan University, Shanghai, China

24 2010 / Urinary iodine concentration of pregnant women in Zambia as an indicator of their iodine nutrition status

Cyprian Katongo
Copperbelt University, School of Mathematics and Natural Sciences, Kitwe, Zambia

MATERNAL NUTRITION

25 2010 / Pre-conceptional vs gestational food supplements and pregnancy outcomes in rural Vietnam

Tu Ngu
National Institute of Nutrition, Department of Applied Nutrition & Nutritional Surveillance at the National Institute of Nutrition, Hanoi, Vietnam

26 2011 / Assessment of iodine status in pregnant women and weaning infants in eastern region of Nepal

AK Nepal
Koirala Institute of Health Sciences, Department of Biochemistry, Kathmandu, Nepal

27 2013 / Impact of pre-pregnancy micronutrient supplementation on infant growth and development

Phuong Hong Nguyen
Thainguyen Medical School, Thainguyen, Vietnam

28 2009 / Food-based intervention and psychosocial stimulation to improve growth and development of <24mo Indonesian children

Umi Fahmida
University of Indonesia, SEAMEO RECFON, Jakarta, Indonesia

29 2011 / Effects of maternal iodine supplementation in an area of mild iodine deficiency on infant development to 2 years (a follow-on study to our previous Nestlé Foundation grant)

K Srinivasan
St. John's Research Institute, Bangalore, India

30 2012 / Maternal zinc nutrition: Its influence on human health and development in Peruvian children

Nelly Zavaleta
Instituto de Investigacion Nutricional, Lima, Peru

31 2013 / Food-based intervention and psychosocial stimulation to improve child growth & development: First follow-up study

Umi Fahmida
University of Indonesia, SEAMEO RECFON, Jakarta, Indonesia

CHILD BEHAVIOURAL DEVELOPMENT

TITLE

PRINCIPAL INVESTIGATOR





TITLE

PRINCIPAL INVESTIGATOR

IMMUNE DEFENSE
AND INFECTION

32 2010 / The role of sub-clinical inflammation on micronutrient status of Myanmar adolescent girls during micronutrient supplementation

Min Kyaw Htet
SEAMEO TROPED Network, Jakarta, Indonesia

33 2011 / Exploration of Myanmar rural caregivers' concepts on childhood diarrheal disease (6 -24 mo) and its management related to ORS use and feeding

Khaing Mar Zaw
SEAMEO RECFON UI, Jakarta, Indonesia

EPIDEMIOLOGIC
TRANSITION

34 2009 / A pilot study of school-based peer education and obesity-related behaviours in adolescents in Beijing, China

Zhaohui Cui
University of Sydney, The George Institute for International Health, Sydney, Australia

NUTRITION
EDUCATION

35 2011 / A multi-approach intervention to empower posyandu nutrition program to combat malnutrition problem in rural areas

Ali Khomsan
Bogor Agricultural University, Department of Community Nutrition, Bogor, Indonesia

- | | | |
|----|--|---|
| 36 | 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 |
| 37 | 2010 / Improving nutritional status of school-children through consumption of cowpea: A food sovereignty perspective | Abdul-Razak Abizari
School of Medicine and Health Sciences, Community Nutrition Department, Tamale, Ghana |
| 38 | 2010 / Pilot study to assess the acceptability of pearl millet grain at macro- and micro-levels in rural Eastern Kenya | Mueni Hellen Ndiku
University of Eastern Africa, Baraton (UEAB), School of Sciences & Technology & Department of Public Health, Eldoret, Kenya |
| 39 | 2011 / Effectiveness of nutrition package in improving growth of rural children (6-23 months): A cluster randomised trial | Kissa B.M. Kulwa
Sokoine University of Agriculture, Department of Food Science & Technology, Morogoro, Tanzania |
| 40 | 2012 / Prenatal and young child nutritional supplementation and early childhood body composition, growth and development | Momodou K Darboe
MRC International Nutrition Group, Banjul, Gambia |
| 41 | 2012 / Optimized complementary feeding versus iron supplementation on micronutrient status and gut microbiota of children (resubmission) | Lwin Mar Hlaing
University of Indonesia, SEAMEO RECFON, Jakarta, Indonesia |
| 42 | 2012 / Effects of dietary/lifestyle counselling on risk of major cardiovascular events in CAD and non-CAD population in Indonesia (resubmission) | Iqbal M. Husein
Gadjah Mada University, School of Medicine, Makassar, Indonesia |
| 43 | 2012 / Consumer acceptability of spirulina in Zimbabwe, and effect of cooking on spirulina provitamin A carotenoids | Tawanda Muzhingi
Tufts University, Avondale, Harare, Zimbabwe |
| 44 | 2012 / Sustainable community-based diabetes prevention program by lifestyle modification for at-risk populations in Thailand | Kitti Sranacharoenpong
Institute of Nutrition, Mahidol University, Phut-tamonthon, Thailand |



TITLE

PRINCIPAL INVESTIGATOR

TITLE

PRINCIPAL INVESTIGATOR

- | | |
|--|---|
| <p>45 2012 / Community salt iodization & relation of iodine intake to Visual Information Processing (VIP) of Ethiopian infants</p> <p>46 2012 / Effect of nutrient-dense complementary food on catch-up growth of Indonesian moderately stunted children</p> <p>47 2013 / Child-centered counseling and home-based food production to improve dietary adequacy and growth of young children in southwestern Ethiopia</p> <p>48 2013 / Assess the impact of public health services distribution of vitamin A in the under-five children in remote rural Zambia</p> <p>49 2013 / Behavior change and nutrition associated with integrated maternal/child health, nutrition & agriculture program</p> <p>50 2013 / Healthy Kitchens, Healthy Children: A school-based cluster randomized controlled trial</p> <p>51 2013 / Nutrition and food security: Impact of soil fertility and productivity of home gardens on family nutrition (resubmission)</p> <p>52 2013 / Study on effects of excess iodine and the tolerable upper intake level of iodine for children</p> | <p>G Tafere
Hawassa University, Human Nutrition, Hawassa, Ethiopia</p> <p>Duma Octavia Fransisca
University of Indonesia, SEAMEO RECFON, Jakarta, Indonesia</p> <p>Abebe Gebremariam
Population And Family Health, Jimma, Ethiopia</p> <p>Frederick D Kaona
University of Zambia, Mwengu Social and Health Research Center, Ndola, Zambia</p> <p>Manolo Mazariegos
INCAP, Guatemala City, Guatemala</p> <p>Nadine Sahyoun & Hala Ghattas
University of Maryland, Department of Nutrition and Food Science, College Park, Maryland, USA and American University of Beirut, Center for Research on Population and Health, Beirut, Lebanon</p> <p>U R Sangakkara
University of Peradeniya, Faculty of Agriculture, Peradeniya, Sri Lanka</p> <p>Wanqi Zhang
Tianjiin Medical University, Public Health College, Tianjin, China</p> |
|--|---|



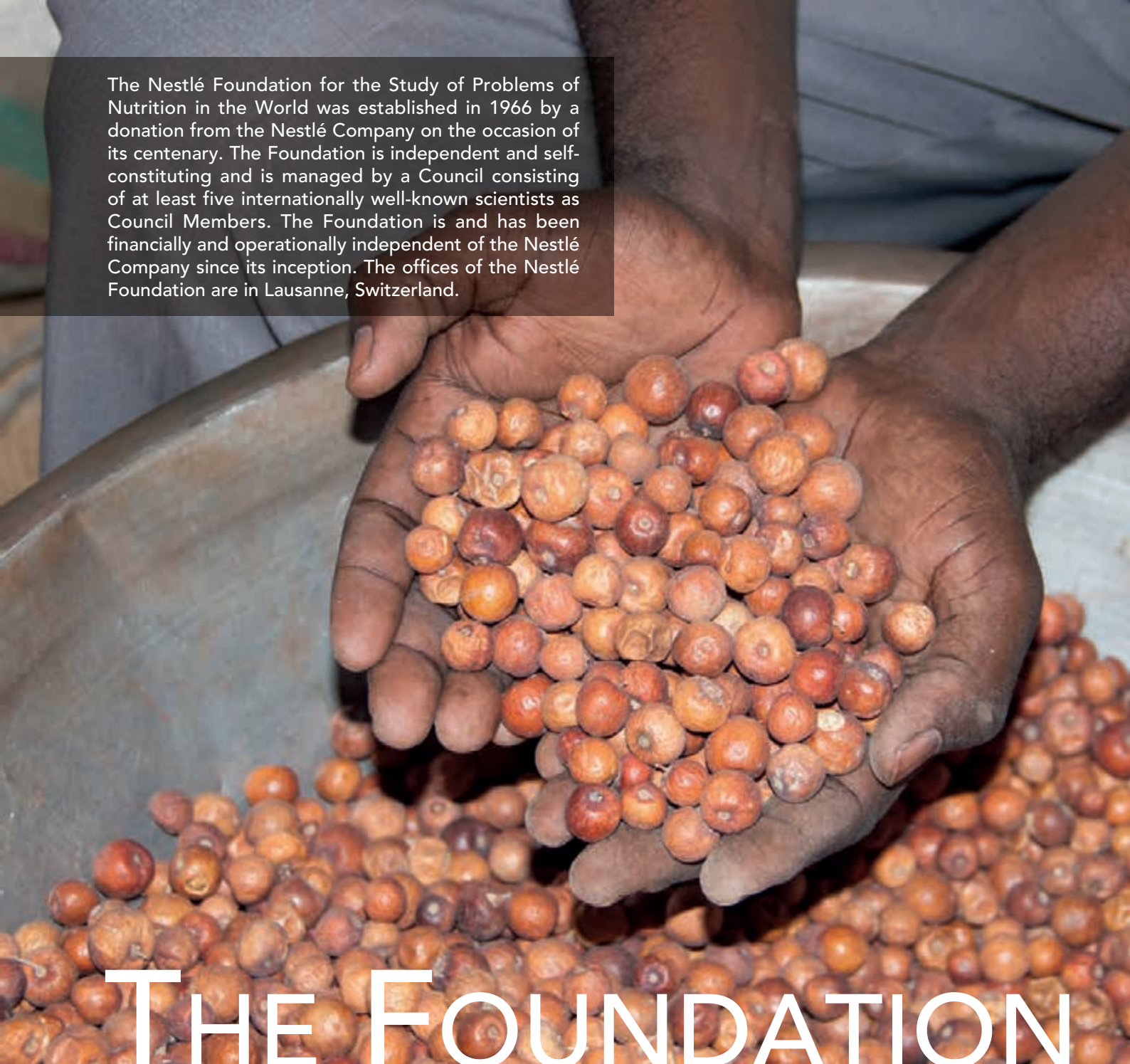
PUBLICATIONS

- Abizari AR. Efficacy of iron fortified cowpea flour in improving iron status of schoolchildren in malaria endemic rural Ghana. Ph.D. Thesis, Wageningen University, Wageningen, NL, 2013:191pp.
- Ayoya MA, Spiekermann-Brouwer GM, Traoré AK, Garza C. Effect on school attendance and performance of iron and multiple micronutrients as adjunct to drug treatment of Schistosoma-infected anemic schoolchildren. *Food and Nutrition Bulletin* 2012;33:235-41.
- Egbi G, Steiner-Asiedu M, Saalia F, Ayi I, Ofosu W, Setorglo J. Iron stores and anaemia prevalence among school children fed cowpea-based food plus fishmeal with vitamin C-rich drink. *Ann Nutr Metab* 2013;63(suppl 1):1-1960 (PO1351).
- Finkelstein JL, O'Brien KO, Abrams SA, Zavaleta N. Infant iron status affects iron absorption in Peruvian breastfed infants at 2 and 5 mo of age. *Am J Clin Nutr* 2013;98:1475-84.
- Flax VL, Phuka J, Cheung YB, Ashorn U, Maleta K, Ashorn P. Feeding patterns and behaviors during home supplementation of underweight Malawian children with lipid-based nutrient supplements or corn-soy blend. *Appetite* 2010;54:504-11.
- Hong TK, Trang NH, Dibley MJ. Prevalence of metabolic syndrome and factor analysis of cardiovascular risk clustering among adolescents in Ho Chi Minh City, Vietnam. *Prev Med* 2012;55:409-11.
- Hong TK, Trang NH, van der Ploeg HP, Hardy LL, Dibley MJ. Validity and reliability of a physical activity questionnaire for Vietnamese adolescents. *Int J Behav Nutr Phys Act* 2012;9:1-7.
- Htet MK, Fahmida U, Dillon D, Akib A, Utomo B, Thurnham DI. The influence of vitamin A status on iron-deficiency anaemia in anaemic adolescent schoolgirls in Myanmar. *Public Health Nutr* 2013 Oct 16:1-8. [Epub ahead of print]
- Hu QZ, Jiang H, Li M, Wang H, Cheng J, Qiu J, Qu JQ, Gao YN, Qian X. Descriptive study on workplace support for breastfeeding in Shanghai (no electronic version available). *Chinese J of Maternal and Child Health Care* 2013;28:1778-81.
- Jiang H, Li M, Wen LM, Hu QZ, Yang DL, He GS, Baur LA, Qian X. Effect of a short message service intervention on infant feeding practices in Shanghai, China: a prospective, community-based, controlled study. *Lancet* 2013;382:4.
- Li L, Zhao X, Wang J, Muzhingiri T, Suter PM, Tang G, Yin S. Spirulina can increase total-body vitamin A stores of Chinese school-age children as determined by a paired isotope dilution technique. *JNS* 2012;1:1-7.
- Ochola SA, Labadarios D, Nduati RW. Impact of counselling on exclusive breast-feeding practices in a poor urban setting in Kenya: a randomized controlled trial. *Public Health Nutr* 2013;16:1732-40.
- Rahman MA, Rahman B, Ahmed N. High blood manganese in iron-deficient children in Karachi. *Public Health Nutr* 2013;16:1677-83.
- Reinsma KR. The efficacy of an audio program and discussion guide in promoting exclusive breastfeeding in Cameroon, Africa. A dissertation in partial fulfillment of the requirements for the degree of doctor of public health in nutrition. Loma Linda University, Loma Linda, CA, USA 2012: 233pp.
- Tang G, Suter PM. Vitamin A, nutrition, and health values of algae: spirulina, chlorella, and dunaliella. *J of Pharmacy & Nutr Sciences* 2011;1:111-8.
- Tang G, Muzhingiri T, Grusak M. Vitamin A equivalence of spirulina B-carotene in US men. *FASEB J* 2013;27:638.8.
- Thakwalakwa CM, Ashorn P, Jawati M, Phuka JC, Cheung YB, Maleta KM. An effectiveness trial showed lipid-based nutrient supplementation but not corn-soya blend offered a modest benefit in weight gain among 6- to 18-month-old underweight children in rural Malawi. *Public Health Nutr* 2012;15:1755-62.
- Thakwalakwa CM, Kuusipalo HM, Maleta KM, Phuka JC, Ashorn P, Cheung YB. The validity of a structured interactive 24-hour recall in estimating energy and nutrient intakes in 15-month-old rural Malawian children. *Matern Child Nutr* 2012;8:380-9.
- Thakwalakwa CM, Ashorn P, Phuka JC, Cheung YB, Briend A, Maleta KM. Impact of lipid-based nutrient supplements and corn-soy blend on energy and nutrient intake among moderately underweight 8-18-month-old children participating in a clinical trial. *Matern Child Nutr* (in press).
- Tofail F, Hamadani JD, Mehrin F, Ridout DA, Huda SN, Grantham-McGregor SM. Psychosocial stimulation benefits development in nonanemic children but not in anemic, iron-deficient children. *J Nutr* 2013;143:885-93.
- Trang NH, Hong TK, Van der Ploeg HP, Hardy LL, Kelly PJ, Dibley MJ. Longitudinal physical activity changes in adolescents: Ho Chi Minh City Youth Cohort. *Med Sci Sports Exerc* 2012;44:1481-9.
- Ziem N, Egbi G, Steiner-Asiedu M, Armar-Klemesu M. Prevalence and determinants of anemia among older school children in the Volta region of Ghana. *Ann Nutr Metab* 2013;63(suppl 1):1-1960 (PO1157).

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 from 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 five 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

GUIDELINES FOR GRANT APPLICATIONS TO THE NESTLÉ 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.

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. If 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. All grants will be paid in Swiss Francs (CHF) only.

Applications are accepted throughout the year, 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 at least five Council Members and 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 jointly by the Director and the President of the Foundation.

COUNCIL MEMBERS

Susanne Suter, MD
President Nestlé Foundation
Professor Emeritus of Pediatrics,
University of Geneva, Geneva, Switzerland

Dominique Darmaun, MD, PhD
University Hospital of Nantes, INRA U 1280, CRNH,
Hotel-Dieu, Nantes, France
Nemours Children's Clinic, Division of Endocrinology,
Diabetes and Metabolism, University of Florida,
Jacksonville, Florida, USA

Janet C. King, PhD
Children's Hospital Oakland Research Institute,
Oakland, California & The University of California at
Berkeley and Davis, USA

Robert M. Russell, MD
Professor Emeritus of Medicine and Nutrition
Former Director, Jean Mayer Human Nutrition
Research Center on Aging, Tufts University, Boston,
Massachusetts, USA
Former Editor-in-Chief, Nutrition Reviews
US National Institutes of Health, Bethesda, Maryland, USA

Prakash S. Shetty, MD, PhD
Professor of Public Health Nutrition, Institute of Nutrition,
University of Southampton, Southampton, UK
Former Chief, Nutrition Planning, Assessment &
Evaluation, Food & Nutrition Division, Food and
Agriculture Organization of the United Nations (FAO),
Rome, Italy

Kraisid Tontisirin, MD, PhD
Professor, Mahidol University, Salaya Campus, Nakhon
Pathom, Thailand
Former Director, Nutrition and Consumer Protection
Division, Food and Agriculture Organization of the
United Nations (FAO), Rome, Italy

Walter Wahli, Ph.D.
Professor Emeritus, University of Lausanne
Founding Director of the Center for Integrative
Genomics (CIG), University of Lausanne, Lausanne,
Switzerland
Visiting Professor, Lee Kong Chian School of Medicine,
Imperial College London and Nanyang Technological
University, Singapore

DIRECTOR

Paolo M. Suter, MD, MS
Professor of Medicine, Clinic and Policlinic of Internal
Medicine, University Hospital, Zurich, Switzerland

SECRETARIAL OFFICES

Catherine Lieb
Assistant to the Director

AUDITOR

Ernst & Young AG, Lausanne, Switzerland

