

## Nestlé Foundation

for the study of problems of nutrition in the world



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

**HUMAN RIGHTS BASED - FOCUS AND PRACTICE** 

RESEARCH - HIGH-IMPACT RESEARCH FOR DEVELOPMENT

**INNOVATION** – FOR SUCCESS

LOCAL CAPACITY BUILDING - AS A BASIS FOR IMPROVEMENT

**SUSTAINABILITY** – A KEY MISSION

**ENDURABLE NUTRITION** – THE PRESCRIPTION FOR SUCCESS

**PUBLIC HEALTH - ORIENTED** 

# THE FOUNDATION AT A GLANCE

**EVIDENCE-BASED** – PROACTIVITY

PARTNERSHIP - FOR LONG-TERM SUCCESS

**SOLUTION** – ORIENTED ACTION RESEARCH

enLINK - ing FOR A BETTER WORLD



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# PRESIDENT'S MESSAGE

Dear Readers of the Report,

I am writing this forward in the midst of the coronavirus crisis that is threatening the globe. It is challenging the health systems of the developed world in a major way and has already caused 66,000 deaths, predominately in the elderly population. It is clear that comorbidities such as poor general health predispose individuals to higher mortality from this infectious disease, thus putting the developing world at even greater risk, due to the lack of health systems and to living conditions which make it hard to apply measures to prevent a growing epidemic.

In these countries, though, outbreaks of infectious disease are not rare: malaria kills half a million people every year, HIV still kills one million people each year, and measles, with about 140,00 deaths per year, has a case fatality rate of 15% worldwide, whereas the current COVID-19 case-fatality rate is around 4-5%. On the other hand, malnutrition, mainly in the developing world, is responsible for four million deaths annually, so an infinitely higher number than what we hear from the coronavirus infection in the developed world thus far. The case fatality rate of children under the age of five with severe malnutrition ranges from 30-50%.

Research worldwide has been put into a lockdown except for research on coronavirus infection, with billions being put into this effort on a daily basis.

While certainly necessary, would it not be wonderful to see as many billions going into research to reduce malnutrition and save the lives of an estimated 14 million children (2019 WHO) with severe wasting in this world?

The Nestlé Foundation over the years has helped to support innovative research programs from within the developing world to tackle the problem of malnutrition. The limited financial support can certainly be viewed as a drop in the ocean but testimonies of nutrition scientists have for years stressed the importance of such career incentives and the progress in nutrition research made thanks to the Foundation's support of young local researchers.

So, given that half of the world is sitting at home and educating themselves, I am convinced that this year's report will be an inspiring reading adventure.

Enjoy it and best wishes for your health,

Petra S. Hüppi President



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 2004: the enLINK Initiative. This encompasses a set of interrelated efforts:



## THE enLINK INITIATIVE

- Promoting local capacity for nutrition research
  - Promoting local generation of research ideas
  - Promoting local ownership
  - Discouraging donor- or sponsor-driven research
  - Promoting critical evidence-based thinking and research
  - From idea to implementation: Assistance from the germ of a research idea and project through its sustainable implementation

### • Strengthening expertise and know-how

- Promoting access to information
- The enLink library
- Promoting local knowledge exchange and generation
- Needs-based, targeted assistance
- Network-system capacity building
- Promoting and furthering of researchers' stamina



Sustainability and public-health relevance have been and will remain key aspects for all activities of the Foundation. Research projects need to result in short- and long-term public-health implementation. Knowledge and know-how have to be sustainable at all levels of the population, meaning that the knowledge has to be implemented and become part of daily life. Knowledge has to trickle down to 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 in 2004, an initiative 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 five main levels:

- 1. exploration in nutrition building practical research capacity: This is the main purpose and aim of the Foundation.
- 2. education in nutrition: This level of the enLINK initiative also implies the creation of research-based evidence and subsequent transfer of the knowledge to the population.
- 3. the enLINK library: At present, after having shipped 217 library trunks to 34 countries, only digital content is provided (free of charge) in the enLINK digital library (www.enlink.org).
- 4. endurable nutrition: All activities should be implemented and sustainable.
- 5. Nestlé Foundation R4D initiative research for development (NF-R4D): Sustainable, targeted, concerted support of young researchers and their institutions.

The digital enLINK library is currently offering free full-text access to a few nutrition journals and more than 30 e-books-many of them indispensable classic textbooks-in the newest editions available. This digital 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





### PROMOTING EQUALITY

Once again the most recent World Food Report shows that global hunger is further on the rise (1): presently more than 820 million people are hungry (1). They do not have enough food to eat, although the global food production would be high enough to feed everybody. Food injustice—to use this term—is a widespread, increasing phenomenon in low-income countries but also globally and is most likely a good proxy for the increasing inequality in many aspects of livelihood affecting fundamental human rights. How can there be any equality and equity in livelihood if there is no equality regarding the basic human rights around access to healthy food and clean water?

The developments as presented in the World Food Report (1) show that we are living in a "strange new world": we have known about these problems for decades, we talk about them, we hold yearly conferences and meetings and we formulate goals such as the Sustainable Development Goals (SDG), defining important directions for further work. Without any doubt the SDG are very important-along with other goals, they serve as a compass to assure a meaningful direction in our work and activities. However, as we all know, these goals are already at the moment of their definition off course (3), as well as being legally non-binding and not enforceable. They represent political consensus norms (3), and we all know that a consensus-as explained in Wikipedia-"is not what everyone agrees to, nor is it the preference of the majority." Actually not an ideal starting point for successful completion.

The inequalities include not only the right to food but other issues such as basic agricultural production, clean water, disease prevention and access to basic medical care, adequate maternal and child care, environmental issues and finally the right to education, meaning basic literacy and numeracy for all. There are too many inequalities and they are increasing in the modern world-where should the priorities be set? Most likely the answer is in education. According to UNESCO data, around 260 million children are presently not in school (4). About two-thirds of those able to attend school-approaching more than 400 million children-show only a poor learning curve with inadequate literacy and numeracy at the end of their schooling (5). It is difficult if not impossible to gain health literacy or nutrition literacy or any other skill without basic literacy and numeracy. Recently an interesting global mapping of disparities in education across low- and middle-income countries was published (2). The authors reported a highly significant inverse relationship between changes in secondary educational attainment rate (assessed over a period of 17 years) for women aged 20-24 years and the change in the national index of dissimilarity (2), a measure of geographic inequality. The data show also subnational estimates of educational attainment and reveal significant within-country educational inequalities. Obviously these within-country inequalities are once more "man-made" and reflect in part also the increasing rural-urban inequalities. Further the authors underline how educational inequality is promoted by the commercialization trend in the area of education (2).

Education is a basic human societal right and should remain a public good accessible to everybody in all geographic regions, independent of their cultural background, social status or any other characteristic. In agreement with these data many studies reported



a similar inverse relationship between a reduction of educational inequality or in dissimilarities and maternal and child health (5, 6).

Also in a recent Nature publication (2) the authors underline the persisting fact that especially women and girls do not attain formal schooling. The reasons are manifold and long known. Why is schooling not enforced? There are many reasons but last but not least also issues around the "power of knowledge". Investing in basic education is likely the most sustainable investment for health and will sustain increasingly until an individual's last breath. The basic right to education and the right to food cannot be separated. In the literature the key role of the school for the improvement of malnutrition is nothing new. The Food and Agriculture Organization (FAO) recently entitled an article "Schools-the beginning of the end of malnutrition" (7); a similar message can be found in an interesting article by a Superintendent of Schools in New Jersey written nearly 100 years ago entitled "Malnutrition, a School Problem" (8).

We all know from our own experience that literacy is one of the prime door openers for a better livelihood. In any case it should be the duty of local governments as well as international society with its many donors and sponsors to assure that basic schooling is implemented in parallel as a condition of any collaboration, aid or even commercial activity. At the same time modern technologies might assist those who have not had a chance to acquire literacy. Data suggest that one can accurately predict illiteracy from mobile phone usage (9). Encouraging are further data reporting that mobile technology can promote and facilitate literacy in developing countries (10). Yet even if illiterate mobile users would become functional illiterates, it seems that also functional illiterates can hardly escape from the cycle of poverty. One has to be aware of the driving factors for the present digital trends in Africa: The main factors are access to electricity and economic well-being (11), but also urbanization and "good" political management and again literacy (11). So we are back again to basic schooling.

The Foundation's mandate since its beginning more than 50 years ago has been local capacity building, i.e. local education in research knowledge, which will result in better maternal and child health. In this context the foundation has always underlined the importance of basic schooling and education for children and assisted with building scientific as well as public libraries and supported research projects around education.

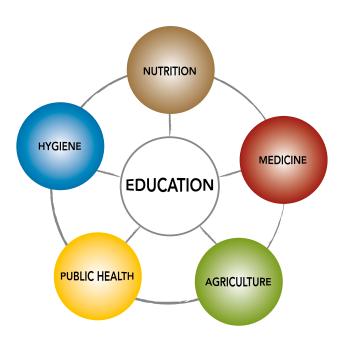


Figure 1
The enLINK circle: The five central elements for a better livelihood–education represents the key to success.

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### THE DIGITAL ENLINK LIBRARY

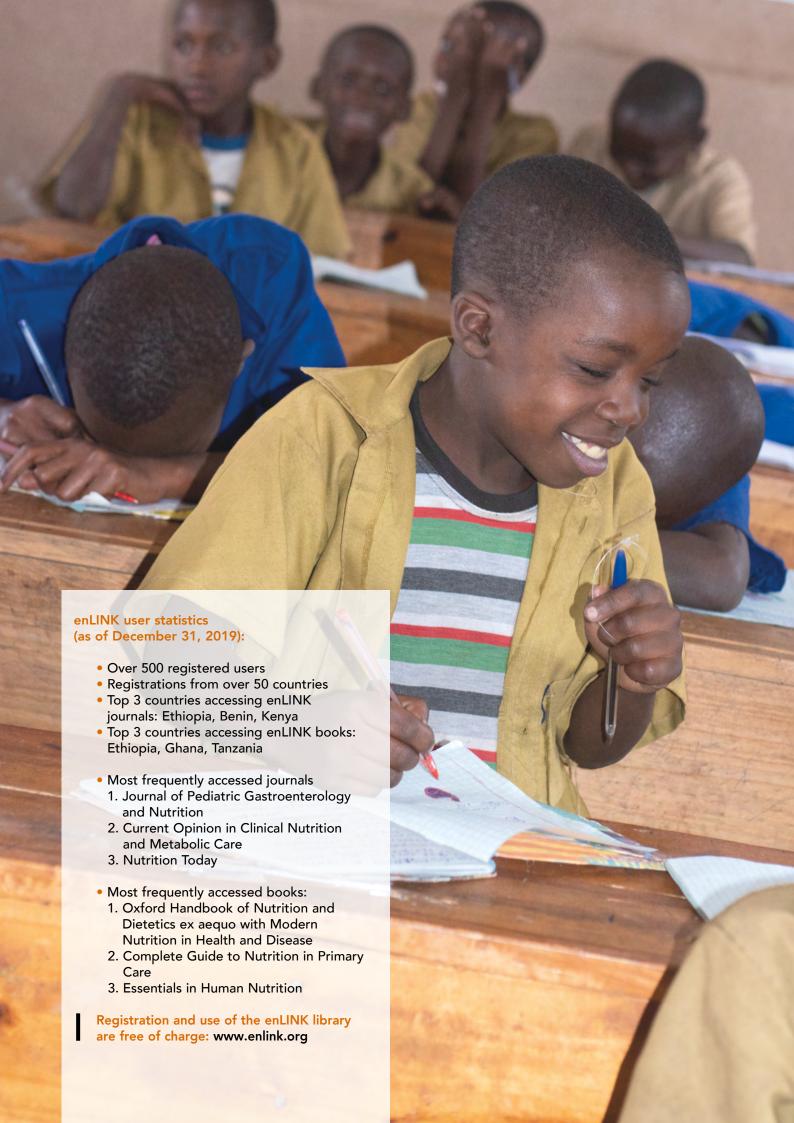
Also during 2019 the digital enLINK library remained an appreciated information source for many users in low-income countries. The number of registered users increased slightly by 43. Access to the library increased as compared to last year. There are only a few journals available and their usage is less significant than that of the books. In terms of the number of books offered (at present 38 e-books), the library remained stable. There are no new book additions since the basic textbook knowledge in nutrition does not change quickly. This basic knowledge is conditional for any research capacity and innovative owner-driven relevant research. Further this basic knowledge is required to make evidencebased decisions regarding many modern nutritional trends with no or only weak scientific evidence-an increasingly forgotten fact.

In the modern world there are many different information sources available and a quick check in Google is obviously faster than searching for an answer in a textbook or in a high-impact journal. Google offers very quick answers but usually there are many answers-often contradictory. The dilemma is then to separate evidence from fake information. To correctly evaluate the Google answers one needs a good basic knowledge of nutritional biochemistry and physiology as well as pathophysiology-this is again textbook knowledge. And indeed, our user statistics show that the "bibles" of nutrition, the books Modern Nutrition in Health and Disease and the Oxford Handbook of Nutrition and Dietetics, were the top scorers. This is actually an encouraging observation and a trend which was not the case in past years.

One advantage of the enLINK site is that it is static and non-personalized (i.e. unbiased and free of any competing interest) and that the content in these books is the required basic knowledge for nutrition researchers. Thus the needed basic knowledge creation is assured.

The textbook section in the enLINK library should assist students and young researchers in the specific field of nutrition to acquire basic knowledge, i.e. the established textbook knowledge, to build on in their future work. Only a good basic knowledge will allow successful nutrition research which is relevant to public health. Yet at the same time, much of today's research will never make it into a textbook and thus for students a blended reading approach which combines textbooks and research papers is most likely the best approach. However, daily practice shows that the priority for students is to acquire good basic knowledge to make evidence-based judgement on the - often only promotional - "new" scientific data. So we are back to the classic textbooks. The enLINK library offers these free of charge.

Reading habits and skills are developed early in life and then eventually perfected during university studies. The enLINK library is a welcome tool to cultivate effective critical and evidence-based reading habits early in one's career.







NEW RESEARCH PROJECTS

INSTITUTIONAL SUPPORT

OTHER CAPACITY BUILDING ACTIVITIES



# NEW RESEARCH PROJECTS

PSYCHOSOCIAL STIMULATION

DIETARY PATTERN IN THE ELDERLY

CHILD FEEDING IN EMERGENCY SETTINGS

NUTRITION TRAINING FOR RURAL WOMEN FARMERS

OPTIMIZING HOUSEHOLD AGRICULTURAL PRODUCTION

BREASTFEEDING

### NUTRITION EDUCATION

Maternal Health, Literacy and Pregnancy Outcomes: The Role of Specialized Nutrition Education

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USD 49,478

In Northern Ghana, the prevalence of low birth weight (LBW) is 29.6%. This is a public health concern as LBW is a predictor of infant mortality and onset of noncommunicable diseases in adulthood. Maternal health literacy (MHL) plays a role in maternal nutrition and the outcome of a pregnancy. Nutrition education (NE) interventions may improve pregnancy outcomes (PO). The main aims of the study are to: 1) determine the barriers to current NE in Northern Ghana; 2) assess MHL of pregnant women; and 3) determine the effect of a NE intervention on MHL, dietary intakes and PO of pregnant women (PW). The study will use a twophase, mixed-methods approach: Phase 1 will employ focus group discussions to assess barriers to NE and approaches to improving compliance with pregnancy guidelines. PW aged 18 to 40 years old will be included. The PW will teach their traditional recipes, which will be enhanced as needed based on observed deficiencies, and compiled into a community cookbook to form part of a NE protocol. For phase 2, 250 nulliparous pregnant women (BMI <20 kg/m²) will be recruited in their second trimester and randomly assigned to one of two groups. A series of different maternal indices and child outcome parameters will be assessed.

## **IODINE DEFICIENCY**

lodine Content in Salt Produced in Mozambique and the Producers' Knowledge about Salt lodization Health Benefits

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USD 20,000

Mozambique, a country in Southern Africa, has adopted a mandatory law on salt iodization. Despite many efforts in recent years to achieve universal salt iodization, the decline in the availability of iodized salt is alarming. The Demographic and Health Survey done in 2011 showed that iodized salt is least available in the most populous provinces of Nampula and Zambezia, where about 40% of the population lives. According to a recent consultancy report, out of 40 salt samples collected from ready-to-sell salt in the three main salt-producing provinces, 83% were not iodized. Making matters worse, since 2015 the responsibility for potassium iodate procurement rests on salt producers. This suggests that the hundreds of small-scale artisanal salt producers no longer have access to the concentrated iodine premix. In light of these facts, Mozambique is far from achieving the elimination of iodine deficiency by 2020. The understanding of the public-health issues related to iodized salt and regular external monitoring can encourage salt producers to strengthen their commitment to iodize salt in accordance with the law. But little was done in the past to inform and educate small-scale salt producers on the health benefits of iodized salt and to improve their technical capacity. The aim of this project is to determine the iodine content of iodized salt at the production stage, to assess the perceptions and knowledge of salt producers about the health benefits of iodized salt, and to examine the internal quality control procedures used during iodization. Salt producers' perceptions and knowledge about health benefits of iodized salt will be assessed by a questionnaire. Samples of freshly produced salt for iodine determination and information on internal quality control practices will be collected during a visit to salt-producing plants upon authorization.

# DETERMINANTS OF MALNUTRITION

Factors Other than Food Supply that Affect Children's Nutrition in Mongolia

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USD 43,919

This project will analyze the underlying economic, social, cultural and political factors at work that impact nutrition in Mongolian children. Specifically, factors such as family structure, employment, nutritional knowledge, cultural and religious beliefs will be examined. In 2010, Mongolia suffered one of its worst natural disasters (dzuds) in history, killing more than two million livestock nationwide, disrupting the food supply for families and ultimately leading to malnutrition and poverty. Since this time, Mongolia has experienced steady growth in both GDP and agricultural sector output, reaching all-time record highs in 2012. Yet despite so much growth, malnutrition among children, including vitamin and mineral deficiencies, still remains at levels similar to those in 2010. According to the Fifth National Nutrition Study initiated by the Mongolian Ministry of Health (MOH), "Nutritional Status of the Mongolian Population", one out of three children live in poverty, with 61% of children under the age of five being deficient in both vitamin A and D. These numbers are at or below the levels of 2010. Furthermore, in UNICEF's 2014 Analysis of the Situation of Children in Mongolia, despite tremendous economic growth, "poverty levels remain high and inequities are increasing." This study will address this issue by identifying the other causal factors for malnutrition in children and providing solutions for improvement, including developing policy recommendations for government nutrition programs. The research will be carried out in three target areas: Uvurkhangai aimag, Ulaanbaatar Songinokhairkhan District, and Ulaanbaatar Sukhbaatar District, areas with high poverty and large populations. Data will be collected by a research team, using a combination of a customized UNICEF questionnaire, anthropometric data (e.g. height, weight) and data from qualitative case studies. Data will be analyzed and compared against current benchmarks.





## **STUNTING**

Does Early Initiation of Homemade Yogurt Supplementation Prevent Stunting: A Pilot Randomized Controlled Trial

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USD 49,916

Stunting contributes substantially to child mortality and disease burden in low-income countries. In Bangladesh the prevalence of stunting among children <5 years of age is high (36%), reaching 50% in slum areas. The pathogenesis of stunting is multifaceted, yet nutritional inadequacy and repeated infections are established risk factors of stunting. Recent research suggests that environmental enteric dysfunction can cause nutritional deficits during early childhood. A pilot study in Dhaka found that probiotic supplements had a positive influence on gut function, but the high cost of probiotic supplements makes this approach unsustainable. Homemade yogurt has the potential to exert probiotic effects on the consumer's gut. We hypothesize that continued breastfeeding, adequate complementary feeding and supplementation with homemade yogurt have the potential to reduce stunting. A three-part randomized controlled trial in Dhaka's slum area is proposed. The children will be recruited from vaccination clinics. Infants at risk of stunting (-1 SD length-for-age z-score, LAZ) aged around 5 months are eligible for the study. Eligible children will be randomized to receive: 1) nutrition education on dietary diversity; 2) a combination of similar education plus daily supplementation of homemade yogurt; 3) a 'usual care' (control) group. We will recruit 120 children (40 per group). Intervention will be initiated a month before starting complementary feeding and will last 6 months. The yogurt will be supplied to the mothers every day at time of feeding. Primary outcome (LAZ) and secondary outcomes (WAZ, head circumference, food diversity score and adherence), will be measured at 9 months and 12 months of child age.

# OPTIMIZING HOUSEHOLD AGRICULTURAL PRODUCTION

Optimizing Household Agricultural Production for Nutrition: Association Between Farm Production Diversity, Marketing and Child Nutritional Outcomes in Rural Zambia

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USD 48,926

Despite Zambia's registering bumper agricultural yields, the country is ranked as one of the countries with alarmingly high levels of hunger. No wonder malnutrition levels among children are among the highest in Africa. One explanation for this includes a lack of information about the nutritional content of foods (including crops, livestock, fish and wild foods) that leads to suboptimal crop choices and misallocation between home consumption and sales. In the Northern Province of Zambia, the focus of this study, investment in agriculture has led to increased production of most food crops but child malnutrition has remained among the worst in the country. The objective of the proposed study is to investigate if there are suboptimal choices in crops grown, and suboptimal allocation between what is marketed and kept for home consumption and the impact of these allocations on nutritional outcomes, including stunting, wasting and underweight of children (6-59 months). The study will use a cross-sectional design to gather data related to farm production, diversity (number of crops, livestock and fish), anthropometry of children, food consumption, marketed quantities and demographics. To increase statistical power, they will survey 420 households from two districts (210 per district). Linear programming will be used to develop on-farm production and consumption strategies to optimize income and nutrition outcomes.





# PSYCHOSOCIAL STIMULATION

The Effects of Psychosocial Stimulation on the Development, Growth and Treatment Outcome of Severely Malnourished Children age 6-59 Months in Southern Ethiopia: A Cluster Randomized Control Trial (EPSoSAMC Study)

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USD 19,415

Severe Acute Malnutrition (SAM) remains a major cause of child mortality. To improve the survival of children, the WHO has endorsed a protocol for the management of SAM which suggests the provision of psychosocial stimulation (PS) as part of the management process to prevent the long-term adverse developmental impact of SAM. However, PS intervention for children with SAM has received little programmatic and research attention in Ethiopia. The objective of this study is to examine the effect of PS provided in integration with the routine inpatient care and for six months thereafter on the development, growth and treatment outcome of children with SAM age 6-59 months in Silti Zone. The study will further explore the acceptability of the intervention among various stakeholders and the feasibility of integrating PS intervention with the routine care given to children with SAM. The study design is a cluster-randomized controlled trial approach. All children (n=144) with SAM age 6-59 months who show up to the nutrition unit of selected facilities during the recruitment period will be eligible to take part in the study. The study will have two groups: children with SAM admitted in the nutrition unit of the intervention health facilities will receive PS in addition to the routine in-patient care, and for six months thereafter, through home-based follow-up, their mothers/ caregivers will also receive health education on psychosocial stimulation. In the control children with SAM the routine in-patient care without PS and home-based follow up for six months thereafter will be done. All mothers/caregivers of children in both the intervention and the control group will receive health education on child-health-related issues for six months thereafter through homebased follow-up. The primary outcome of the study will be child development while the secondary outcomes will include child growth and treatment outcome.

# DIETARY PATTERN IN THE ELDERLY

Dietary Patterns of Indonesian Elderly and Their Associations with Sodium and Potassium Intakes: A Baseline Study to Develop a Nutrition Program for Non-Communicable Disease

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USD 25,000

Non-communicable disease (NCDs) is a leading cause of morbidity and mortality. Almost three-quarters of all NCDs deaths occur in low- and middle-income countries such as Indonesia. Indonesian NCDs are rapidly increasing, especially in the elderly population. Hypertension (HT) prevalence is 43-71%. Excess Sodium (Na) intake and insufficient potassium (K) intake are well-known risk factors for HT and cardiovascular disease. For promoting salt reduction programs, the WHO recommends the evaluation and monitoring of Na and K intakes in each population and sources of Na and K in the diet. A dietary pattern with lower Na and higher K intakes can be applied directly and effectively in nutrition program implementation to prevent HT. The overall aim of this cross-sectional study is to explore the dietary patterns of Indonesian elderly (aged > 60 ys) and the sources of Na and K in the diet by repeated 24h urine collection. The Na and K intake will be assessed by repetitive 24h urine collection. The dietary pattern will be assessed by using the Food Frequency Questionnaire (FFQ) of Indonesian diet.

# CHILD FEEDING IN EMERGENCY SETTINGS

Peer Groups to Improve Infant and Young Child Feeding in Post-Emergency Settlements in Uganda

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USD 20,000

Child malnutrition (MN) remains a health concerns in post-emergency settlements (pES). In the West Nile region of Uganda, there is a high prevalence of global acute MN and stunting rates are at 25% among refugee children. Optimal child feeding practices are critical in preventing child MN. However, in West Nile pES, the proportion of infants introduced to complementary foods at 6 to 8 months is as low as 37.5%. Early and late introduction of complementary foods are associated with increased risk of MN. Additionally, social support may positively influence caregivers in adhering to feeding recommendations. Furthermore, poor maternal mental health can negatively impact feeding practices. Yet, limited research has been conducted in pES where child feeding practices remain a public health concern, mothers' mental health is compromised, and social support structures are vulnerable. It is hypothesized that a peer-to-peer integrated intervention combining nutrition education and social support will improve infant and young child feeding practices. A total of 380 pregnant women in their third trimester of pregnancy and their partner/ spouse will be grouped in care groups. The 12-month intervention will be bi-monthly care group meetings led by locally selected peer-group leaders (mother-mother or father-father). Peer leaders will be trained to lead educational discussions related to feeding practices, hygiene, child stimulation, social support and mental health. The primary outcome is timely introduction of complementary food. Secondary outcomes will include breastfeeding and other complementary feeding indicators, as well as child stimulation, social support and maternal mental health.

## NUTRITION TRAINING FOR RURAL WOMEN FARMERS

Designing, Administering and Evaluating a Nutrition Training Package for Rural Women Farmers in Tanzania

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USD 20,000

In Tanzania, undernutrition is still a problem of public health concern. Among the main problems with respect to the nutrition situation in Tanzania is the significant gap between knowledge and application. Lack of nutrition knowledge among rural women, who are the main caregivers of children and families at large, is reflected in the poor nutritional status and compromised health in rural areas. Nutrition education programs are usually considered to be a good approach for nutrition interventions to improve nutrition knowledge, practices and attitudes; developing nutrition; promoting healthy eating; and improving health and nutritional status. This project aims to design, administer and evaluate a nutrition training package which is contextually and culturally specific for rural women farmers in Tanzania in order to improve their knowledge, attitudes, skills and practices for positive behavior change and optimum nutrition practices. The study will be done in Mzula village in Mvumi Tanzania and a corresponding control village in Mvumi. The project has three main phases: 1) the needs assessment phase, which will aim to explore rural women's nutrition knowledge, attitudes, practices and skills through a baseline survey; 2) the planning phase, which will involve developing the nutrition training program; and finally 3) the implementation and evaluation phase, where the actual training will be delivered to women.

### **BREASTFEEDING**

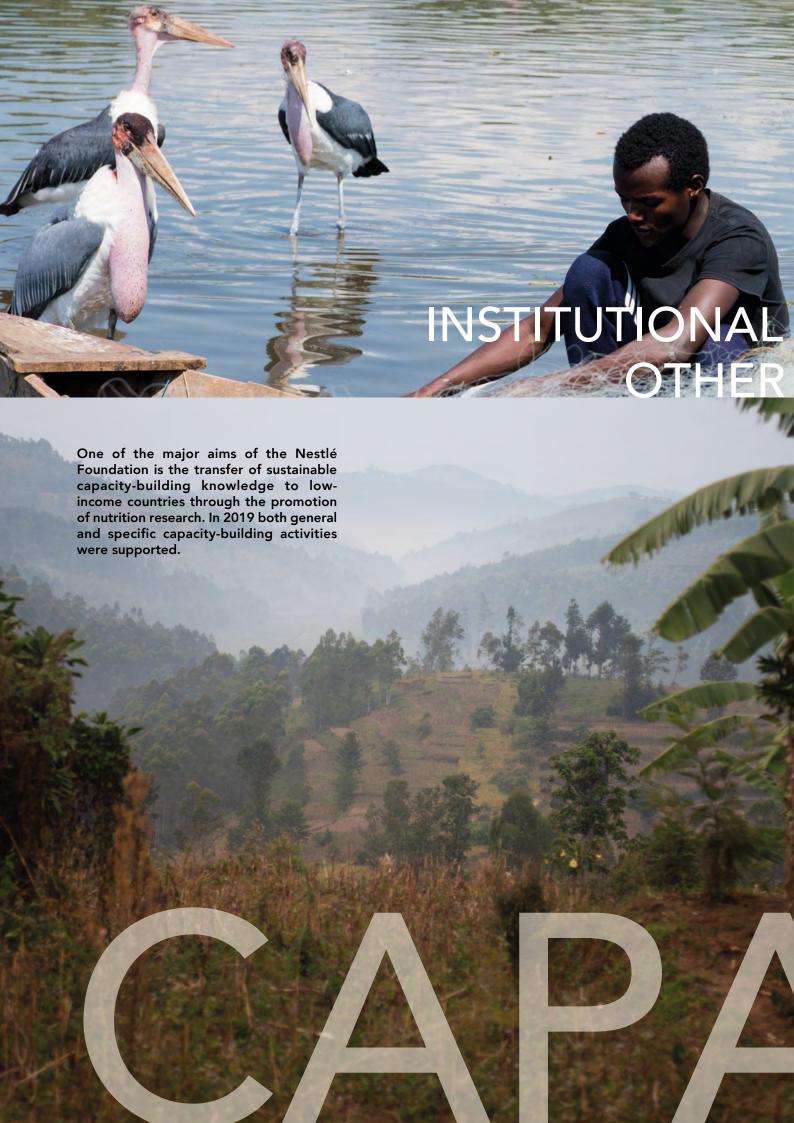
Effect of a Drama-Based Intervention Program on Breastfeeding Self-Efficacy and Breastfeeding Outcomes of Rural Pregnant Women, Ibadan, Nigeria

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USD 49,434

Mothers' breastfeeding self-efficacy has been identified as one of the most important factors influencing exclusive breastfeeding practices. Several educational interventions have been used to influence breastfeeding self-efficacy and the resultant breastfeeding outcomes such as initiation, exclusivity and duration of breastfeeding. In Nigeria, the exclusive breastfeeding rate is low (29%), hence there is a need to test various interventions that could address this situation. There is a dearth of empirical interventional studies on breastfeeding self-efficacy in Nigeria; therefore this study seeks to fill the observed gap by adopting a breastfeeding self-efficacy-based intervention (drama) among pregnant women. This study is a community-based, quasi-experimental design. The total sample size will be 198 pregnant women in their third trimester in Lagelu and Egbeda Local Government Area, Ibadan, Oyo State, Nigeria. These women will be randomly assigned into experimental and control groups, with those in the experimental group receiving the drama-based intervention while the control group receives only the adequate health talk. The drama will be written, staged and recorded by the drama troupe at the Department of Theatre Art, University of Ibadan. The recorded drama will be pre-tested. The women will be followed up after delivery at 4, 12 and 24 weeks and the Open Data Kit (ODK) software containing the pre-tested questionnaire will be used to obtain quantitative information both at baseline and follow-up periods. It is expected that this study will increase the breastfeeding self-efficacy and breastfeeding outcomes of pregnant women in the selected community.





### DISSEMINATION OF RESEARCH RESULTS

During 2019 the Foundation supported several researchers in presenting results from their Foundation-supported research projects at different local and international scientific meetings (including the 4th FANUS conference in Kigali, Rwanda).

Publication fees and page charges were covered in different journals for research projects supported by the Foundation.

The Foundation normally covers expenses such as conference attendance or publication fees only in connection with research projects supported by the Foundation. This year, though, as part of the FANUS meeting, the attendance of participants not linked to the Foundation was also subsidized.

### **BOOK DONATIONS**

Some researchers in low-income countries have requested printed books instead of e-books for different reasons, including the reality of stillpersistent access and technology barriers. Thus the Foundation paid for these books-a very much appreciated contribution. Most likely books will never disappear and some studies show that students in fact learn more efficiently from printed textbooks. The important role and enduring value of printed documents is also reflected in the fact that many libraries acknowledge our Annual Report as an important addition to their collection. This shows that the report is read and that the content is appreciated. Promotion of reading and access to information is a key aspect for self-empowerment in daily life but especially also research.





**AGROECOLOGY** 

BACK HOME TO UGANDA

RESEARCHER'S STAMINA

INCAP LONGITUDINAL STUDY

MAGNIFICATION OF EXCLUSION BY ENGLISH



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# AGROECOLOGY FOR THE REDUCTION OF HUNGER: FROM SCIENCE AND POLITICS TO IMPLEMENTATION

Too many projects to overcome hunger and malnutrition in resource-poor rural areas have failed. A key reason is that focusing too narrowly on increasing crop yields to feed people does not adequately consider the fact that hunger today is not so much a consequence of yields being too low or global supplies being unable to meet demand; rather it is due to poverty, deficient food distribution, food waste, lack of access to land, climate change and other aspects of the food system. A case in point is the global food crisis of 2008, which had devastating impacts on the world's poor-most of whom were peasant farmers. In this case, clearly

hunger resulted not from a lack of global food stocks but from food price inflation. Volatility and high food prices led conventional institutions such as the FAO, CGIAR and others that support the corporate food regime to call for a 70% increase in food production by 2050, re-emphasizing the need for a second green revolution based on genetic engineering and agrochemicals.

A productivist view of hunger fails to alter the tightly concentrated distribution of economic power that determines who can buy different foods, or have access to the seeds, breeding stock, knowledge, water and land to produce it. Instead, what is needed is to address the root causes of hunger and increase access to healthy diets, land and income by the poorest segments of the population. However not all agricultural approaches and technologies hold a transformative potential to address the above goals; those that have a strong foundation on traditional knowledge and ecology such as agroecology are particularly promising.

## Traditional agriculture, the ecological basis of agroecology

Agroecology is a science that applies ecological principles to the design and management of sustainable agricultural ecosystems. Inspired by the diversified models of traditional agriculture, agroecologists promote crop diversification (polycultures, crop-livestock combinations, rotations, agroforestry systems, etc.) as an effective agroecological strategy for introducing more biodiversity into agroecosystems, which in turn provides a number of ecological advantages to farmers such as natural soil fertility, pest regulation, pollination and others. Therefore an agroecological approach involves the application of blended agricultural and ecological sciences with indigenous knowledge systems.

For agroecologists, a starting point in the development of sustainable and resilient agricultural systems are the very farming systems that traditional farmers have developed and/or inherited throughout centuries. Such complex farming systems, adapted to the local conditions, have helped small farmers sustainably manage harsh environments and meet their subsistence needs without depending on mechanization, chemical fertilizers, pesticides or other technologies of modern agricultural science. polycultures developed by smallholders, productivity in terms of harvestable products per unit area is usually higher than under sole cropping with the same level of management. Yield advantages can range from 20% to 60%, because complex crop mixtures lead to the reduction of losses due to weeds, insects and diseases and a more efficient use of the available resources of water, light and nutrients. For example, in Mexico, 1.73ha of land has to be

planted with maize in monoculture to produce as much food as one hectare planted with a small farmer's mixture of maize, squash, and beans with no chemical inputs.

In drier environments, maize is usually replaced by sorghum in the intercropping without affecting the productive capacity of cowpeas or beans and yielding Land Equivalent Ratio values of 1.25–1.58. Moreover this system exhibits a greater stability of production under climatic stress as sorghum is more tolerant to drought. Generally, in polycultures, agricultural labor has a high return per unit of input. The energy return to labor expended in a typical highland Mayan maize-bean farm is high enough to ensure continuation of the present system. To work a hectare of land, which normally yields 4,230,692 calories, requires some 395h; thus, an hour's labor produces about 10,700 calories. A family of three adults and seven children eats about 4,830,000 calories of maize per year. Thus, current systems provide food security for a typical family of five to seven people.

## The potential of agroecology to enhance food sovereignty

Scientific evidence shows that agroecology can raise crop yields and animal production and thus total farm output, increase stability of production through diversification, enhance resilience of farms to climate change and conserve biodiversity and the natural resource base. In addition to increasing food production alongside other ecological benefits, agroecological systems can have many social and economic benefits, such as income diversification, improved diets, women's empowerment and greater farmers' autonomy by reducing dependency from external inputs and exerting control of their food production systems—all essential ingredients for improving the livelihoods of smallholder farmers.

An analysis of several agroecological field projects in operation in Latin America during the 1990s involving almost 100,000 farming families/units covering more than 120,000 ha of land showed that traditional crop and animal combinations can often be adapted to increase productivity when the biological structuring of the farm is improved and labor and local resources are efficiently used. In fact, most agroecological technologies improve traditional agricultural yields, increasing output per area of marginal land from 400-600 to 2,000-2,500 kg/ha, while also enhancing the general agrobiodiversity and its associated positive effects on food security and environmental integrity. Some projects emphasizing manures and other organic management techniques can increase maize yields from 1-1.5 t/ha (a typical highland peasant yield) to 3-4 t/ha. In Cuba, it is estimated that agroecological practices are used in 46-72% of the peasant farms producing over 70%

PRODUCTION	
Rotation	3.16 t
Home garden	1.12 t
Fruits	0.83 t
Milk	3,200
Meat	730 kg
Eggs	2,531 units
Honey	57 kg

of the domestic food production, including 67% of roots and tubers, 94% of small livestock, 73% of rice, 80% of fruits and most of the honey, beans, cocoa, maize, tobacco, milk and meat production. Small farmers using agroecological methods obtain yields per hectare sufficient to feed about 15–20 people per year.

In Chile, a 0.5 ha model agroecological diversified farm was able to satisfy 95% of the nutritional needs of a family of five with a surplus for sale. Most vegetables are grown in heavily composted raised beds located in the garden section, each of which can yield up to 83 kg of fresh vegetables per month. The rest of the 200-square-meter area surrounding the house was used as an orchard and for animals (cows, hens, rabbits, and Langstroth beehives). Vegetables, cereals, legumes and forage plants are produced in a six-year rotational system designed to provide the maximum variety of 13 basic crops in six plots. Fruit trees were planted as fencerows, producing over one ton of fruits. The cow produced 10 liters of milk per day and egg production reached 2,500 eggs per year. A nutritional analysis of the system showed that after a typical family of five has fed itself, the farm produces a 250% surplus of protein, 80% and 550% surplus of vitamin A and C, respectively, and a 330% surplus of calcium (Table 1). A household economic analysis indicates that the balance between selling surpluses and buying preferred items provides a net income beyond consumption of US \$790 while dedicating relatively few hours per week to the farm. The time thus freed is used by farmers for other onfarm or off-farm income-generating activities.

### Table 1

Yearly productivity (left) and nutritional output (below) of a half hectare farm in Chile.

Commercial Value2.435 USDProduction costs780 USDIncome1.600 USD

MARKETABLE SURPLUS (Nutritional output after family consumption)*	
Protein	310%
Calories	120%
Vitamin A	150%
Vitamin C	630%
Ca	400%
Р	140%

<sup>\* (</sup>if sold generates 1600 USD)

### **Conclusions**

Agroecologically oriented programs and initiatives have shown great potential especially by reducing poverty, enhancing food and nutritional security at the local level, conserving and utilizing biodiversity to strengthen ecosystem services, restoring soil and water resources, divorcing farms from their dependence on agrochemicals and fossil fuels and enhancing the adaptability and resilience of farming systems to climate change. All these contributions of agroecology are measurable through a set of ecological, cultural, social and economic indicators.

In order to unlock the potential of agroecology there is an urgent need for reforms in policies, institutions and research and development agendas to ensure that agroecological alternatives are adopted widely, and made equitably and broadly accessible. Transformative change can only be achieved by designing policies that ensure small farmers have secure access to land, water, seeds and breeding stock to produce food based on agroecological practices, processing and distributing diverse foods locally via solidaric markets, and making healthy foods accessible to all segments of urban and rural societies, in particular the hungry and food insecure and those suffering from micronutrient deficiencies. An important avenue to unleashing agroecology's scaling-up processes is to identify and analyze hundreds of local and dispersed initiatives throughout

the world which have allowed agroecology to "amplify" beyond isolated local experiences to include more farming families in larger territories. These agroecologically redesigned farms constitute the basis for farmers' autonomy and food sovereignty. To enhance the economic viability for the amplification of such agroecological initiatives, equitable local and regional market opportunities should also be developed. Experience shows that policies can be supportive of the agroecological transition if they ensure that agroecological alternatives are adopted broadly, and that the resulting production finds guaranteed outlets in local or social markets. Transitioning towards agroecology for a more socially just, economically viable and environmentally sound agriculture will be the result of the coordinated action of emerging social movements in the rural sector in alliance with civil society organizations that are committed to supporting the goals of these farmers' movements. Focusing food and agriculture policies

on agroecology as a main strategy to achieving zero hunger can rapidly transform the way we produce and consume food while addressing global challenges including climate change, biodiversity loss, poverty and deteriorating health.

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### Figure 1

The potential socio-ecological impacts of agroecology and the policy-economic conditions needed to achieve sustainable rural development.

### AGROECOLOGY PRINCIPLES AND PRACTICES Revitalization of small farms Ecologically based designs Optimization of traditional and management practices agriculture Enhanced yields and farm output Income diversification Conservation of biodiversity Diverse diets Soil and water restoration • Women's empowerment Reduced dependency on Involvement of youth external inputs Greater control of local food • Strengthened ecosystem systems services Supportive policies Local and regional solidarious market opportunities • Social networks and farmer to farmer collaboration • Alliances with local governments, NGOs, universities, etc. Political will Improved livelihoods Enhanced family food and nutritional security Local food sovereignty Greater farm autonomy

Resilience and adaptability to climate change



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# EXPERIENCES AND RECOLLECTIONS AS AN EXPATRIATE IN WEST AND HORN OF AFRICA: MY JOURNEY BACK HOME TO UGANDA

In July 2016, I moved back to Kampala, Uganda, after ten years of working outside my home country, in Benin, Cameroon, Gabon, DR Congo and Ethiopia. By returning home right after the expiration of my contract with the United Nations Food and Agriculture Organization (FAO) in Ethiopia and Horn Africa, I joined an emerging crop of African expatriates who seem to be reversing the African Countries' long-running brain drain problem. It is a trend that offers some hope of bridging the continent's huge skills gap. About nine in ten African PhD students studying abroad in top USA and European universities plan to work in their home countries.

Motivations behind the trend are understandable given the promising "Africa-rising" narrative and the continent being home to some of the world's fastest growing economies. In some circles this narrative appears challenging, with slowing economic growth, the lack of infrastructure, corruption and high unemployment challenges. From my experience, it is possible for professional African diaspora communities to make an impact on the continent, despite the numerous challenges at home.

When I left my job as a Research Associate at the National Agricultural Research Organization in Uganda, I was recruited as a Regional Nutritionist by Bioversity International. I was stationed at the International Institute of Tropical Agriculture (IITA), Abomey Calavi Campus in Cotonou city of Benin Republic. While in Benin, I had plans to do everything I could to stay at Bioversity International. I worked hard and applied for a contract renewal before my position as a nutritionist with my Eurocentric employer Bioversity International expired. Hiring and rehiring preferences by my employer foiled my expatriate ambitions. Reactions to job interviews betrayed the same sentiment: You're a great candidate; if only you were European. Despite setbacks getting a permanent position as an expatriate, I did work for two years as a nutritionist with the United Nations in Addis Ababa, Ethiopia. Along the way, while transitioning from Cotonou to Addis Ababa, I enrolled in the PhD program in Applied Human Nutrition at Makerere University.

From my experience when one is facing challenges in getting permanent placement outside one's home country, it is important to have a plan B. Going back to school provides the best cushion for the challenges of building a career while out of your home country. My own doctoral studies were conducted in Congo Basin Forest Countries, in particular Gabon, DR Congo and Cameroon, with partial sponsorship from my former employer Bioversity International. My PhD journey in Cameroon, DR Congo and Gabon was a revelation to me, showing why the African elite needs to solve their problems themselves, and not leave them to foreigners. Disappointed and disillusioned, I set my sights on returning home partly because I did not want to see what I experienced in Congo Basin Countries replicated in my country of origin.

In 2018, I joined the academic world at Makerere University, as a Professor of Applied Human Nutrition. I did not want to settle for a position outside Uganda, which I was clearly overqualified for. I have seen friends and colleagues sacrifice career advancement simply for the chance to remain out of their countries, especially in Europe or North America. I have come to discover that it is easier and faster to advance your career by moving back

home. Since being back, I have been allocated more responsibilities by my alma mater Makerere University and my former employers. I have been awarded research opportunities in the form of grants and consultancies with international CGIAR centers and the United Nations. One such example is that I am the Technical Lead Consultant for the United Nations Food and Agriculture Organization (FAO), reviewing the Uganda School Feeding Guidelines, among many responsibilities. In mid-2019, I was selected to support the integration of biofortified beans in the food-value chains throughout Africa, for a CGIAR center, The International Center for Tropical Agriculture (CIAT). We work in over 35 African countries promoting the commercialization and utilization of high iron and zinc beans.

Presently, beyond the academic and research world, where I am in formal employment, there are several opportunities and networking entry points for African diaspora back home to tap. Recent World Bank data reveals how international corporations continue to invest more in the fast-growing African cities. This provides employment to specialized, western-trained African diaspora professionals. This has spurred brain gain movement in Africa. I have observed and personally experienced that international corporations such as the UN, where I am consulting in my home country Uganda, are replacing expatriates with top talent from the diaspora, because of the costs associated with maintaining expatriates, cultural ties, security concerns, and the advantages of speaking the local language. I have also noticed that there is a pay cut compared with what I used to earn in Ethiopia and West Africa: for me this meant earning half as much. While it might seem unfair, my employer at Makerere University, in Uganda, has made efforts to incentivize his offers by providing discounted housing, transportation and education allowances.

On the other hand, since 2006, while in Uganda and when I worked outside my country, I have been engaged in nutrition community mobilization and advocacy campaigns. At the age of 28 years in 2006, I was elected by members of the Uganda Nutrition Society as their Secretary General. This was a revelation to me. This voluntary opportunity opened the world to me, giving me the chance to interact with some of the top minds in the field of nutrition science and influencers. My work entailed planning and organizing the first ever Uganda Nutrition Congress in 2009, which attracted over 350 global participants and which the President of Uganda attended. The success of my tenure at the Uganda Nutrition Society led to my elevation to continental advocacy voluntary work. In October of 2010, while attending the Pan-African Nutrition Conference "The Africa Nutritional Epidemiology Conference (ANEC)" in Bloemfontein, South Africa,

I was elected Secretary of the African Nutrition Society (ANS). Then in 2018, I left ANS and joined the Federation of African Nutrition Societies (FANUS) as Vice President. FANUS is the conglomeration of National African Nutrition Societies, working with the International Union of Nutritional Sciences (IUNS) to support national societies in Africa and advocate for nutrition as a development agenda. My 14 years of volunteer experience with several Nutrition Societies across the continent has helped me forge international partnerships with elite global scientists and institutions in the field of nutrition. This has emboldened my desire to promote nutrition in Africa louder. While working for these societies, I noticed how the old perception of Africans that prosperity was only possible by leaving Africa for the Western countries is changing. I have seen guite a good number of professionals orchestrating a "soft landing" before moving back, which means having a variety of financial and social safety nets to cushion the impact of relocating to Africa and ease acclimatization. Nutrition professors in first-world universities in Europe and America are returning to Africa to work in African universities. There is a growing trend that prosperity is achievable on the continent as well. This comes with a variety of financial incentives and social safety nets of employers in Africa, to cushion the impact of relocating to a home country.





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## A PERSONAL VIEW FROM BURKINA FASO

Research is a highly competitive field, be it for innovative ideas, funding, or publishing. In any of those areas, there is a high demand for various competences, but most and above all for motivation, perseverance and stamina.

This is even more challenging in low-income countries where limited access to recent and relevant literature, scarcity or inexistence of local funds allocated to research, and lack of material and equipment to perform top-notch research take a high toll on research performance. Competition for external funding is therefore a significant part of every researcher's work in areas such as sub-Saharan

Africa, and time allocated to it may quickly become a source of frustration for the researcher who feels he/she should put more focus on the actual technical work.

According to the Oxford dictionary, perseverance is "the quality of continuing to try to achieve a particular aim despite difficulties" and motivation is "the feeling of wanting to do something, especially something that involves hard work and effort". Stamina is defined as "the physical or mental strength that enables you to do something difficult for long periods of time". All these concepts entail getting out of one's comfort zone and facing difficulties and hardship.

Motivation can come from an internal or external source (1-3), whereas perseverance is believed to be innate (4). Stamina, on the other hand, has to be developed, and whether you are perseverant by nature or not, this can be done if you have the right motivation. The question is then, how to stay motivated enough to build stamina?

I believe the key is to find what really motivates you and to be honest about it. We all want to find motivation in noble causes like protecting the vulnerable, saving lives or building a better world, but the truth is that that does not work for everyone. Whether what motivates you is earning big money, becoming famous, achieving pride or seeking praise from peers, you should be honest about it and tailor your research project to meet it. That is what will keep you going like a bloodhound in the pursuit of means to achieve your goals. Yet while this is a good starting point, the second set of motivations listed above is external by nature (2), and may not be sustainable in the long run. I will come back to this later.

Of course, due to the competitive nature of research, the actual living conditions in your country or to unforeseen circumstances, one is bound to experience rejections, setbacks or plain failures, and this will happen several times, even to the best of us. While we cannot change these circumstances, we can change the way we react to them or their consequences and that is when stamina can be built. So, how to work around those circumstances in research?

Prepare well ahead of time: Whatever time you think you need to write your proposal, start early enough to give yourself twice as much time. In low-income countries you might even want to top this up, as it will take you more time to put together the relevant literature and come up with an idea that addresses a gap in current knowledge. Things that can cause a delay in our countries and that remain exceptional occurrences in higher-income countries

include lacking or poor internet connections, power cuts (no electricity sometimes for entire days), and slow and redundant administrative procedures for obtaining information should you need any from your local government agencies.

Perform a thorough mapping of your needs:

Mapping your needs will give you an idea of the feasibility of your research given your particular circumstances. Questions to ask are: are there local competences or will I need to train people? Is the equipment and material I need to conduct the research already available or will I need to purchase everything? Sometimes it can go as far as having to build a laboratory from scratch.

Once your proposal is ready and submitted to funding bodies, here come yet a new set of challenges:

Know that your "perfect baby" is not that perfect:

When I first submitted my project for funding, I was convinced that the importance and relevance of the problem I wanted to tackle were obvious. Then reality struck: Not only were there many other research projects that were at least equally important and relevant, my project had also quite some room for improvement. The big lesson learnt here was that even when you think your project is perfect, think of alternative ways to express your ideas, alternative methods to meet your objectives, and come up with an alternative, if possible better, version of your proposal. This will get you ready for an eventual resubmission, should your project be rejected.

Furthermore, I had to explain my ideas over and over again to different sponsors, trying to get them on board. Before I knew it, I had become a marketer trying to sell what I once believed to be self-explanatory. Now this is not a nice feeling, but at the end of the day, nothing is more satisfactory then getting people to be as enthusiastic as you are about your idea.

Embrace competition: Do not fear competition, praise it. There will always be somebody better than you at something. Conversely, you will always be better at something than someone. Find your strong points and work with them; find your weak points and work around them, for example by seeking collaboration. Fierce competition is always present in research, so hope for the best but prepare for rejection.

Chase criticism: Whether your project has been accepted or rejected, ask for detailed feedback. What were the strong or weak points in your proposal? What went wrong? Was your subject a priority for the sponsor or funding organization? Were the competencies listed congruent with the work proposal? Were the methods right? Was

the budget reasonable? As a matter of fact, many researchers I have worked with in my country think that squeezing the budget to its minimum would warrant better chances of securing funds. But most likely in this case, the budget will fall short of what is needed to meet the objectives outlined in your proposal, and funding organizations will probably notice that.

Allow negative feelings to flow through: My project was rejected several times and due to social unrest in my country, I experienced delays in almost every activity I planned. Any rejection, setback or failure entails questioning and second-guessing yourself and sometimes feeling anger. Those are legitimate feelings; do not try to block them out. The sooner you allow yourself to experience these negative feelings, the sooner you can get back in the battle.

Resubmit: One important question is: should I resubmit to the same sponsor or to other funding bodies? Most researchers go to the second solution. However, in my view, a good question to ask when your project has been rejected should be when the next call will be launched. In the meantime, keeping good contact with the sponsor's representative and checking their website regularly might be the best practice.

Maintain your stamina and aim for long-term accomplishment: Maintaining stamina is a lifelong battle (5). As stated before, external motivation can get you started and help build some stamina, but as you become more experienced—and grow older—your priorities will probably change. Fortunately, for most of us, priorities will evolve into seeking satisfaction and joy in our work, and achieving our ideal self. It is then very important that our goals meet core values like integrity and positively impacting people's lives, ultimately leading to self-respect and a certain sense of usefulness.

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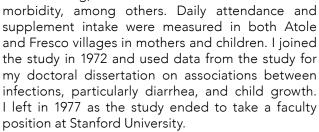
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# FIFTY YEARS OF STUDIES OF THE INCAP COHORT IN GUATEMALA: CONTRIBUTIONS TO KNOWLEDGE AND POLICY

The Institute of Nutrition of Central America and Panama (INCAP) hosted a symposium in September 2019 to celebrate the 50th anniversary of the establishment of a rural Guatemalan cohort that has continued to be studied since. With funding from the National Institutes of Health (NIH) of the USA, a nutrition intervention study was carried out from 1969 to 1977. The design was conceived in the late 1960s, a time when protein was believed to be the principal deficiency in poor countries like Guatemala (1). A supplement called Atole, containing high-quality protein, energy and micronutrients, was

provided to women during pregnancy and lactation and to children <7 years of age in two villages while in two control villages, a low-energy drink called Fresco was provided; both drinks contained micronutrients in equal concentrations (2). Children who were 7 years or under were included, as were children born into the study such that the birth years of the cohort ranged from 1962 to 1977 (n= 2392). The villages were assigned at random to the experimental groups. The key hypothesis tested was that protein supplementation improves child development; a

secondary aim was to confirm that the Atole was efficacious by assessing impact on physical growth. All villages received curative and preventive health care provided by nurses under the supervision of a physician. The study used rigorous methods. Various examinations in the home, clinic or testing centers were carried out for women and children, including state-of-the-art assessments at specific ages of child development, physical growth, breastfeeding, home diet and



I remember the disappointment among some of the psychologists when it became clear that the impact on child development was modest, at best. This was in contrast to the strong impact on biological outcomes. Compared with Fresco, Atole improved total nutrient intakes (protein, energy, and micronutrients), led to better growth in length and head circumference and reduced stunting dramatically, but only in children less than 2 or 3 years of age (3). As the importance of deficiencies in energy and micronutrients became evident in subsequent decades, it became untenable to claim that these impacts were specific to protein since the greater consumption of Atole compared to Fresco in young children led to substantial increases in all nutrients and not just in protein; rather, these effects are best attributed to overall improvements in diet.

At Stanford, I began to wonder about possible long-term effects of the nutrition intervention and in 1988 I obtained funding from NIH with colleagues from INCAP, Cornell and the University of California at Davis, where the late Ernesto Pollitt, a Peruvian psychologist, was on the faculty. Ernesto

was reluctant at first to join the team because he believed it was unlikely that we would find effects on intellectual functioning. To the surprise of all of us, we did. Performance on tests of knowledge, numeracy, reading, comprehension and vocabulary were better in Atole villages. Also, youth in Atole villages were taller, had greater fat-free mass and, in the case of males, had greater work capacity (3).

The former participants of the study were between 11 and 27 years old in 1988-89. I was curious about



on educational outcomes: the Atole improved schooling, intelligence and reading, but only in those who received Atole and only before the age of 3y (4). In a widely cited publication in The Lancet, we reported that the Atole increased wages in men by 46% in those provided Atole through the age of 2 years (5). This improvement in wages increased annual incomes by \$914 or 33%. The findings were specific to men-not surprising since only a minority of women participated in the labor market.

There were several other follow-up studies, but I want to highlight one in which we assessed impact on adult metabolomic and cardiometabolic profiles in data collected in 2015-17, when they were 37-54 years old (6). The principal investigator of this study was my colleague Aryeh Stein. By this time, Guatemala, like much of the world, was experiencing an epidemic of obesity and related chronic diseases so it was within this context of dramatic rises in chronic diseases that we looked for possible impact. Our findings suggest a possible tradeoff. The Atole increased body fat and BMI; the risk of obesity was almost twice as likely compared to Fresco. However, the Atole reduced glucose levels and the prevalence of diabetes by 50%. We are currently exploring the mechanisms for these contrasting results. We think that the increased fatness in Atole villages is due to improved nutrition leading to better educational outcomes, which in turn resulted in greater income, changes in diet and less physical activity; while those for the decreases in diabetes are explained by improved nutrition in



early life leading to epigenetic changes that help people tolerate a high-sugar and high-fat diet.

The original INCAP study demonstrated clearly that nutrition interventions can improve physical growth and also improved outcomes we have not elaborated on here, such as birth weight and child mortality. As important as these finding were, the study might be largely forgotten today were it not for the follow-up studies that have and that likely will continue to be carried out. The key, overall contributions to knowledge of the INCAP cohort studies are as follows:

- These studies are the first to evaluate the long-term effect of a nutrition intervention on a wide array of outcomes of adult health and human capital. No other nutrition intervention study in poor countries has been followed up for as long. The results suggest that short-term evaluations may not capture fully the true impact that early nutrition interventions can have, as illustrated by the much greater effects on cognition in adulthood compared to those observed in childhood.
- Studies of the INCAP cohort have helped establish the importance of the first 1000 days (pregnancy plus the first two years) for improving growth and reducing stunting in early childhood and for adult human capital and productivity. Several reasons explain the vulnerability of the first 1000 days: rapid growth and development, high nutritional requirements, greater susceptibility to infections, high sensitivity to programming effects and full dependence on others for care, nutrition, and social interaction. At the same time, the first 1000 days are a window of opportunity when interventions will have enhanced impact, as shown by the INCAP studies.
- The intervention also led to tradeoffs in regards to metabolic diseases that we hope to understand better through ongoing analyses. The INCAP studies have several policy implications but two are salient.
- Investments in improving nutrition in the first 1000 days should be considered long-term economic investments because they improve human capital and economic productivity. These studies provide powerful evidence for promoting improvements in nutrition in pregnant women and young children in low-income countries, evidence that should be of interest to decision makers outside the health sector, such as education, development, finance and agriculture. They provide perhaps the strongest evidence anchoring the influential publication of the World Bank entitled "Repositioning nutrition as central to development", which advanced the notion that "good nutrition is not only a matter of

welfare or human rights [, ...] it is an economic investment [...,] an engine of economic growth". (7)

 The evidence also suggests that improvements in child nutrition need to be combined with attention to the promotion of healthy diets and active lives across the life course. Improvements in education and income, resulting from better childhood nutrition, may facilitate adoption of obesogenic diets and lifestyles brought on by globalization.

I express deep gratitude to the members of the INCAP cohort who continue to participate in the studies. In the three follow-up studies emphasized in this note, participation rates among the target sample-those alive, living in Guatemala and traceable-varied between 70 and 84%. This is due to efforts by INCAP to build trust and to the sharing of study results, such as information on diabetes or high blood pressure, with participants. I am also grateful to the many colleagues at INCAP and elsewhere with whom I have been involved in these studies, including dozens of students.

#### References

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Prof. em. Dr. Marco Baschera

University of Zurich Zurich, Switzerland

The fact that the sun rises in English, but is born every day in Portuguese (nascer do sol), indicates, despite its being the same natural phenomenon, culturally different ways of comprehending it. Or the fact that English knows two words for freedom-liberty and freedom-could draw the attention of German speakers to an important inner difference in the concept of freedom that may have been previously unknown to them. The same applies to Russian pravda and istina, which illuminate two different aspects of truth. A strengthening of the ethical-moral component of truth (pravda) would be very welcome in times of populism and fake news. In other words, detours

via foreign languages can sharpen one's attention and own thinking.

There can be no thinking without language and no language without thinking. Every language, with its grammar, vocabulary, etc., also forms its own thinking and culture. Those who speak several languages are able to put things into perspective by thinking in perspective, from different positions—an indispensable quality for a better understanding of the globalized world. "English only" commandeers precisely this fertile position between languages and threatens to reduce all other languages to mere dialects in a kind of linguistic imperialism. The productive tension that separates and at the same time connects languages threatens to wane under the weight of globalized English. Another consequence of this is the homogenization of thought and expression all over the world. The idea of only one language goes hand in hand with a dangerously uniform way of thinking, as for example the financial crisis of 2008 has shown. In addition, the standardization of global English is having an impact on the English language itself. It explodes the idea of one globally spoken English. Linguists have been speaking of "World Englishes" since 1977; a linguistics journal of the same name appeared in 1985. In their standard work International English: A Guide to Varieties of English Around the World, Peter Trudgill and Jean Hannah show thirteen different varieties of Englishes. On the other hand, there is also International English, which is becoming increasingly dominant in politics, business, higher education and tourism. It is practice-oriented, a pure "tool", and as such a carrier of the digital revolution and economic and technological progress. Thus it is closely linked to a machine-like notion of virtuality, which has very little to do with the living imagination of humans as linguistic beings.

#### The language of modern science

This also applies to the modern sciences, which are based on an ancient, Aristotelian understanding of thinking as a process of depicting the world that takes place without language. This thought process is universal and the same for all human beings. Thinking and communicating the thought are separate events that follow each other. The Greek term logos, which adorns the name of most sciences as a suffix, refers precisely to their inseparability. For the sciences, especially for the natural sciences, words are communicative instruments, a kind of pipeline through which the scientific results circulate. The linguistic expression does not seem to influence the content it transports in any way. Language must be transparent. It follows from this that there is no specific difference between languages on the basis of which one could be

privileged. And yet education in European sciences in modern times was linked to the replacement of the single language of Latin and the development of popular languages. The "back to things" was linked to the rejection of the authorities mediated by Latin scholarship. The loss of Latin as a lingua franca was partly offset by intensive translating activities and the multilingualism of researchers. The internationality of scientific thought was not guaranteed by the mere existence of an international language, but rather by the intensive exchange among the languages and cultures of Europe.

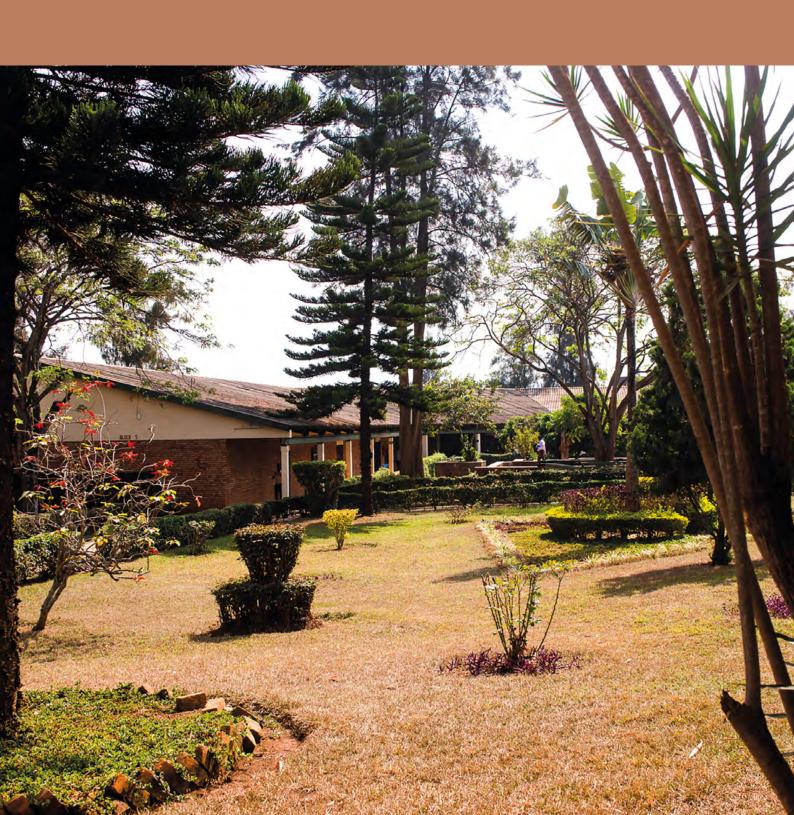
Today, the myth of the universal language English takes the place of Latin, with the significant difference that Latin was an artificial scholarly language in the Middle Ages and the Renaissance that nobody had as their mother tongue. It is a myth because, among other things, linguists have been talking about Englishes for many years, rather than English as such. English is a pluricentric language. That is its strength. On the other hand, it is exposed to great centrifugal forces. The constantly growing number of second- and foreign-language users leads to uncontrollable language change. What about the linguistic accuracy of scientific English under these circumstances? How much linguistic carelessness can precise, scientific conceptual work afford? What happens to other national standard languages that can no longer participate in technical and scientific progress? Are they degraded to dialects? Isn't Oxford English the first language to be condemned?

#### Multilingual thinking is required

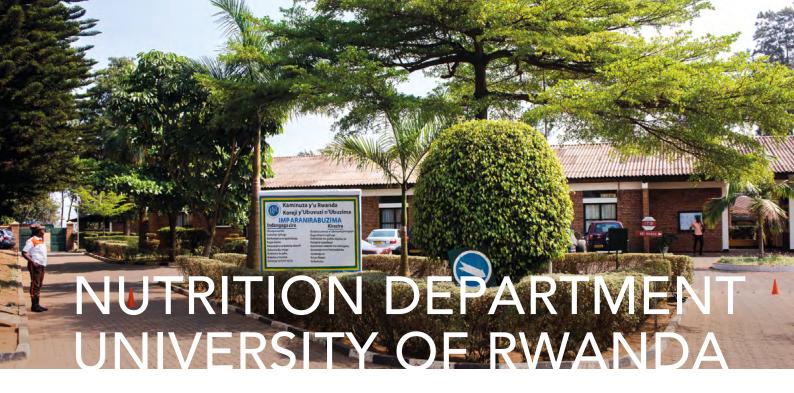
The scientific approach posits that all researchers around the world work on very similar things within a special field using the same methods and under the same conditions. The communication language used must be consistent worldwide. A single language should make it easier for researchers to communicate. However, the price for this methodically prescribed, universal unification in the name of scientific objectivity is high. It suppresses the cultural and linguistic differences of researchers, a cognitive and emotional richness that is reflected in the quality of research. Encountering different ways of thinking which arise from different languages opens new perspectives, which makes it possible to relativize and verify one's own ways of thinking. It is about the critical appropriation and productive implementation of other points of view in one's own thinking and acting. Through thinking and understanding in different languages, a sensitization to the linguistic composition of scientific knowledge is also created. Ultimately, it is a question of understanding that questions pre-reflexive, linguistically and philosophically naive concepts of knowledge. English is therefore not enough as a lingua franca in the sciences.

New forms of encounter between different languages and cultures must be created, whether in laboratories or at scientific conferences. The multilingualism of researchers and the translation of scientific journals into different languages should be promoted. In addition, the different scientific cultures must come into closer contact with each other. Opening up to African, Arabic or Chinese forms of knowledge is a necessity of the hour and could, for example, counter the danger that French-speaking countries in Africa become excluded from the scientific community. Opening means here not simply the translation of these forms into other languages, but the crucial encounter that takes place between these forms and our scientific culture.









lyakaremye Damien

Lecturer and Head of Department

Maryse Umugwaneza, PhD Lecturer

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DEPARTMENT
SCHOOL OF PUBLIC HEALTH
COLLEGE OF MEDICINE AND HEALTH
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KIGALI, RWANDA

The main focus of the Human Nutrition and Dietetics Department (HND) is public health nutrition. We are particularly interested in the promotion of nutritionrelated health and well-being of the population through evidence-informed interventions. The Department of HND is part of the School of Public Health, in the College of Medicine and Health Sciences (CMHS) at the University of Rwanda (UR). The UR-CMHS consists of five different schools: the School of Dentistry, the School of Medicine and Pharmacy, the School of Nursing and Midwifery, the School of Public Health and the School of Health Sciences. There is also local collaboration with the College of Agriculture, Animal Science and Veterinary Medicine in Musanze. This underlines that nutrition, especially public health nutrition, can only be successful when embedded within other disciplines and the promotion of a vivid exchange in teaching and research. Our activities are in line with the main objective of the UR-CMHS to "develop interdisciplinary, problembased academic programs aligned with Rwanda's development needs". Accordingly, multiple focused international collaborations for teaching activities and research are ongoing.

#### **History of the Department**

The department of Human Nutrition and Dietetics (HND) was founded in September 2011, within the former Kigali Health Institute (KHI). The HND department offers a bachelor's degree in nutrition and dietetics.

# **RWANDA**

**AREA** 

Total: 26.338 km<sup>2</sup>

Agricultural land: 0.26 million hectares

(SAS 2019)

Arable land: 1.14 million hectares

(SAS 2019)

**POPULATION** 

Total: 12,374,397

(NISR 2019)

Urban population: 17.3%
Under age 15: 40.98%

Median age: 19.2 years

Rate of urbanization: 2.86%

**POPULATION GROWTH RATE** 

Total: 2.3% Urban areas: 17.3%

Total fertility rate: 3.75%

**GDP** 

GDP: \$719 (DHS 2014-2015)

LIFE EXPECTANCY AT BIRTH

Total: 64.5 years

Male: 62.6 years

Female: 66.5 years

**MORTALITY RATES** 

Neonatal mortality rate: 20 deaths per 1,000

live births (RDHS

2014 - 2015)

Infant mortality rate (at birth): 32 deaths per 1,000

live births (RDHS

2014 - 2015)

Under five mortality rate: 50 deaths per 1,000

births (RDHS 2014-

2015)

Maternal mortality rate: 27 deaths per 1,000

deliveries (RDHS

2014 - 2015)

**MICRONUTRIENT DEFICIENCIES** 

Household consumption

of iodized salt: 99.3%

(UNICEF)

Vitamin-A supplementation

(Two-dose coverage) 96%

INFANT AND YOUNG CHILD FEEDING

Breastfeeding rate: 84%

(RDHS 2014-2015)

Six-month exclusive

breastfeeding: 87%

(RDHS 2014-2015)

Early initiation of

breastfeeding: 81%

(RDHS 2014-2015)

Timely complementary

feeding rate (6-9 months): 64%

(RDHS 2014-2015)

Children who are still

breastfeeding at 12-23 months: 88%

(RDHS 2014-2015)

CHILDREN NUTRITIONAL ANTHROPOMETRY

Low birth weight: 6%

(RDHS 2014-2015)

Underweight: 9%

(RDHS 2014 - 2015)

Stunting: 38%

(RDHS 2014-2015)

Wasting: 2%

(RDHS 2014-2015)

ADULT NUTRITIONAL ANTHROPOMETRY

Overweight or obesity (adult prevalence rate):

(Rwanda nutrition profile, 2015)

Men (15-49 years): 6%

Women (15-49 years): 21% (17% overweight,

4% obese)

Underweight:

Men (15-49 years): 13%

Women: 7%

**OTHER PARAMETERS** 

Adult literacy rate (m/f): 84% / 80%

% of population using

improved sanitation facilities: 54%

% of population using improved sanitation facilities, urban: 42%

% of population using improved

sanitation facilities, rural: 57%

Antenatal care coverage (%),

at least four visits: 44%

Adult HIV prevalence (adults 15-49ys, RDHS 2014-1025, %): 3%

Physician density (physicians

per 10,000): 0.06

The main aim of this degree program is to give prospective professionals the general and specific skills to improve the nutrition and health of individuals and communities. Students are trained through lectures, research and clinical simulation labs, as well as through specific external placements.

Since its beginning the department has graduated 200 students, 75 of whom are women. In the current academic year (2019-2020), 141 students are enrolled in the degree program. The HND department has seven permanent lecturers.

Table 1
The teaching staff of the Human Nutrition and Dietetics Department at the University of Rwanda in Kigali

No	Full Name	Education Level	Title
1	MATSIKO Eric	PhD in Human Nutrition	Lecturer
2	UMUGWANEZA Maryse	PhD in Nutrition	Lecturer
3	AHISHAKIYE Jeanine	Masters in Nutrition and Rural Development (currently pursuing a PhD degree at Wageningen University, The Netherlands)	Assistant Lecturer
4	IYAKAREMYE Damien	DEA in Physiology and Patho-Physiology of Human Nutrition	Lecturer
5	UMWUNGERIMWIZA Yves Didier	Masters in Food Sciences (Currently pursuing a PhD degree at Ghent University, Belgium)	Assistant Lecturer
6	HABIMANA Jean de Dieu	Masters in Applied Nutrition (Currently pursuing a PhD degree at the University of Rwanda)	Assistant Lecturer
7	SUNDAY François Xavier	Masters in Food Security and Rural Development	Assistant Lecturer

## The Vision of the Department

"To be a centre of excellence in the training of future leaders in nutrition and dietetics capable of addressing nutritional problems for the well-being of the Rwandan population". These leaders will be dedicated to the promotion of health and prevention of diseases in communities and populations. Well-nourished Rwandans making smart food choices based on scientific evidence are an integral part of Rwanda's development.

## The Mission Statement of the Department

"To train undergraduate students to apply and disseminate the knowledge of principles of science, human nutrition and dietetics to enhance the quality of life and well-being of all Rwandan people". We make every effort toward excellence both in teaching and basic nutrition and dietetic research at individual as well as community levels, focusing on disease prevention. Graduates will be able to define the role of food and its components for optimum health for all Rwandans by conducting research and planning and evaluating programs. They will also be able to practice nutritional diagnosis and recommend appropriate diets accordingly.



#### **Admission Criteria**

The admission to the program is made by a direct entry scheme. The candidate has to fulfill the requirements of the Ministry of Education and those of UR-CMHS. The candidates must have completed and passed secondary school in the sections of Physics-Chemistry-Math, Physics-Chemistry-Biology, Math-Chemistry-Biology and Chemistry-Biology-Geography. Any other candidate who wants to join the program to complete their studies will be also considered and their individual background will be taken into consideration to decide which courses they will have to complete to become Human Nutritionists and Dieticians.

#### Outlook

The Department of Human Nutrition and Dietetics will continue to pursue its mandate from the government to promote public health nutrition in Rwanda. This aim will be achieved by the further development of the theoretical teaching of the students enrolled in our department but also by practical work and educational activities in all strata of the population as well as all geographic areas of the country. Our department in collaboration with the aforementioned schools, departments and government will further work to achieve the global nutrition targets for Rwanda. A motivated team of professors and students is assuring further progress in public health nutrition.











- 1 2014 / Minimizing the negative effect of iron supplementation and fortification on gut microbiota using local resources
- 2 2018 / Efficacy of micronutrient powder formulation with low-dose iron in Bangladeshi children living in areas of high iron in groundwater
- 3 2018 / Iron-biofortified fast-cooking cowpeas to reduce iron deficiency among children in malaria-endemic areas in Ghana
- 4 2019 / Iodine content in salt produced in Mozambique and the producers' knowledge about salt iodization health benefits
- 5 2010 / Intensive nutrition and hygiene education for improving nutrient intake of children 6-11 months old

- Siti Helmyati / Gadjah Mada University, School of Health and Nutrition, Faculty of Medicine, Yogyakarta, Indonesia
- Faruk Ahmed / Griffith University, Public Health, School of Medicine, Health Sciences, Queensland, Australia
- Sylvester Addy / CSIR Crops Research Institute, Kumasi, Ghana
- Sergio P Chibute / Eduardo Mondlane University Medical School, Department of Biochemistry, Maputo, Mozambique
- Dwi Nastiti Iswarawanti / SEAMEO Regional Center for Food and Nutrition, Jakarta, Indonesia
- 6 2012 / Food-based approaches to reduce childhood nutrients-energy malnutrition in Bangang community, Cameroon
- 7 2013 / Formulation and characterization of infant flours using spirulina powder to replace multivitamin-mineral complex
- 8 2017 / Nutrition, anemia, growth and oxygen weaning in Low Birth Weight oxygen-dependent infants in a Kangaroo Clinic
- 9 2018 / Development of complementary foods based on local products to improve iron status of school-age children in Senegal (NFR4D)
- 10 2019 / Does early initiation of homemade yogurt supplementation prevent stunting? A pilot randomized controlled trial

- Marie Modestine Kana Sop / University of Douala, Faculty of Science, Douala, Cameroon
- Evariste Mitchikpe / University of Abomey Calavi, Department of Nutrition and Food Sciences, Cotonou, Benin
- Nathalie Charpak / The Kangaroo Foundation, Bogota, Colombia
- Moussa Ndong / USSEIN University of Sine Saloum El Hadj Ibrahima Niasse, Bureau de Liaison, Dakar, Senegal
- Kaniz Khatun E Jannat / icddr, b, Infectious Disease Division, Environmental Intervention Unit, Dhaka, Bangladesh

- 11 2010 / Pre-conceptional vs gestational food supplements and pregnancy outcomes in rural Vietnam
- 12 2013 / Impact of pre-pregnancy micronutrient supplementation on infant growth and development
- 13 2016 / Improving child growth and development through nutrition and psychosocial intervention in early childhood education (PAUD) setting in rural areas
- 14 2017 / Underlying causes of poor dietary intake, nutritional status and birth outcomes in pregnant adolescents and adults (uninvited resubmission)
- 15 2018 / Impact of preconceptual micronutrient supplementation on child growth and development

- TuNgu / National Institute of Nutrition, Department of Applied Nutrition and Nutritional Surveillance at the National Institute of Nutrition, Hanoi, Vietnam
- Phuong Hong Nguyen / Thai Nguyen Medical School, Thai Nguyen, Vietnam
- Ali Khomsan / Bogor Agricultural University, Department of Community Nutrition, Bogor, Indonesia
- Reginald Adjetey Annan / College of Science KNUST, Department of Biochemistry and Biotechnology, Kumasi, Ghana
- Phuong Hong Nguyen / Thai Nguyen Medical School, Thai Nguyen, Vietnam

- 16 2016 / Daily consumption of dried bean curd and nutrition education on bone health of postmenopausal women in China (invited resubmission)
- Lei Li / Xiamen University, School of Public Health, Xiamen, China



administering

OTHER RESEARCH AREAS

# 2014 / The efficacy of biofortified pearl millet in a randomized controlled trial with children in rural Eastern Kenya

evaluating a nutrition training package for rural

pregnancy outcomes: The role of specialized

2019 / Maternal health, literacy and

2019 / Designing,

women farmers in Tanzania

nutrition education

2014 / Promoting food sovereignty through a cooperative model for sustainable organic farming in the Mayan Region

Hadijah Ally Mbwana / University of Agriculture, Department of Food Technology, Nutrition Sciences, Sokoine, Tanzania

Ruthfirst Eva Ayande / School of Allied Health Sciences, Department of Nutrition and Food Sciences, Tamale, Ghana

Mueni Hellen Ndiku / University of Eastern Africa, Baraton School of Science and Technology, Eldoret, Kenya

Cristina Osorio-Vazquez / Universidad Intercultural Maya de Quintana Roo, Quintana Roo, Mexico

# 2008 / Causes and control of food insecurity: A pilot model in the Northwest of Iran

2013 / Behavior change and nutrition associated with integrated maternal/child health, nutrition and agriculture program

2013 / Healthy kitchens, healthy children: A school-based cluster randomized controlled trial

Saeed Dastgiri / Tabriz University of Medical Sciences, Faculty of Medicine, Tabriz, Iran

Manolo Mazariegos / Institute of Nutrition of Central America and Panama (INCAP), Guatemala City, Guatemala

Nadine Sahyoun and 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

24 2014 / Nutrition Gap Map: A comprehensive mapping, quality assessment and summary of nutrition-relevant systematic reviews

Zulfiqar Ahmed Bhutta / Aga Khan University Hospital, Women and Child Health, Karachi, Pakistan

25 2014 / A cohort analysis of the sustainability of food insecurity control programs in the northwest of Iran

Saeed Dastgiri / Tabriz University of Medical Sciences, Faculty of Medicine, Tabriz, Iran

26 2015 / Participatory prototyping complex agro-ecosystems designs to produce diverse food products in East Java, Indonesia

Uma Khumairoh / University of Brawijaya, Fakultas Pertanian, Malang, East Java, Indonesia

27 2015 / Removing inorganic arsenic from rice

Andrew A. Meharg / Queens University Belfast, Plant and Soil Science, Belfast, Nothern Ireland

28 2015 / Formative evaluation of an intervention to enhance nutrition and health status of pregnant adolescents in Eastern Uganda using education, cell phone communication, and income generation

Josephine Nabugoomu / University of Waterloo, School of Public Health and Health Systems, Waterloo, Canada

29 2015 / Maternal folate supplementation and epigenetic changes in the offspring

Phuong Hong NguyenvThai Nguyen Medical School, Thai Nguyen, Vietnam

30 2015 / Effect of vitamin B12 supplementation during pregnancy and 6 month postpartum to improve B12 status and child development (resubmission)

Towfida Jahan Siddiquavicddr, b, Nutritional Biochemistry Lab, Sciences Division, Dhaka, Bangladesh

31 2016 / Risk factors and associated cost of preventing childhood stunting: A case study of Buhweju district, Uganda

John Bukusuba / Makerere University, School of Food Technology, Nutrition and Bioengineering, Kampala, Uganda

32 2016 / Viral contamination of vegetables eaten raw: Sanitary impacts on the vulnerable population in Usme (Bogota)

Carlos Arturo Guerrero-Fonseca / Universidad Nacional de Colombia, Molecular Biology Virus Laboratory, Faculty of Medicine, Bogota, Colombia





33 2016 / Processing and preservation of Moringa oleifera leaves for combating micronutrient malnutrition in Tanzania

Oscar Kibazohi / University of Dar es Salaam, Department of Chemical and Mining Engineering, Dar es Salaam, Tanzania

34 2016 / Vitamin A status in pregnant women eating traditional spirulina (Dihé) in Chad

Imar Djibrine Soudy / Institut Universitaire des Sciences et Techniques d'Abéché, Laboratoire de Biotechnopôle de IRED (Tchad), N'djamena, Chad

35 2017 / Improving vitamin A intake in Northern Cameroon through nutrition education on food habits

Richard Ejoh Aba / University of Bamenda, Department of Food and Bioresource Technology, Bambili, Cameroon

36 2017 / Designing improved complementary feeding for infant and young children from locally available foods in rural Western Ethiopia

Fekadu Gemede Habtamu / Wollega University, Food Science, Nekemte, Ethiopia

37 2017 / Consumer attitude and perception of consumption of edible insects in Western Kenya

Fanuel Kawaka / Technical University of Mombasa, Department of Pure and Applied Science, Mombasa, Kenya

38 2017 / Development of a bio-control approach for mitigation of aflatoxin in groundnuts using atoxigenic strains of Aspergillus spp in Tanzania

Juma Mfaume / Naliendele Agricultural Research Institute (NARI), Mtwara, Tanzania

39 2017 / In search of an EEG neural fingerprint of early malnutrition: A 50-year longitudinal study

Pedro Antonio Valdes-Sosa / Cuban Neuroscience Center, Havana, Cuba

40 2018 / Towards the introduction of edamame, vegetable soybean, for more nutritious diets and food availability in Benin

Eric Etchikinto Agoyi / University of Abomey Calavi, Cotonou, Benin

41 2018 / Enhancing the nutritional benefits and safety of maize to improve the health of Africans

Archileo N. Kaaya / Makerere University, Department of Food Technology and Nutrition, Kampala, Uganda

42 2019 / Factors other than food supply that affect children's nutrition in Mongolia

Sharavkhorol Erdenebileg / National University of Mongolia, The Mongolian University of Life Sciences, Ulaanbaatar, Mongolia 43 2019 / Optimizing household agricultural production for nutrition: Impacts of nutrition education on Zambian households

Kelvin Mulungu / Colorado State University, Fort Collins, Colorado, USA

44 2019 / The effects of psychosocial stimulation on the development, growth and treatment outcome of severely malnourished children age 6-59 months in Southern Ethiopia: A cluster randomized control trial (EPSoSAMC Study)

Tesfalem Teshome / St Paul's Millenium Medical College, Human Nutrition, Ethiopia

45 2019 / Dietary patterns of Indonesian elderly diet and their associations with sodium and potassium intakes: A baseline study to develop a nutrition program for non-communicable disease

Dianis Wulan-Sari / The University of Tokyo, Tokyo, Japan

46 2019 / Effect of a drama-based intervention program on breastfeeding self-efficacy and breastfeeding outcomes of rural pregnant women, Ibadan, Nigeria

Yetunde Ogundairo Omotola / University of Ibadan, Department of Human Nutrition, Faculty of Public Health, College of Medicine, Ibadan, Nigeria

47 2019 / Peer groups to improve infant and young child feeding in post-emergency settlements in Uganda

Joel J. Komakech / Oklahoma State University, University of Agriculture, Stillwater, Oklahoma, USA



#### **PUBLICATIONS**

Helmyati S, Rahayu ES, Kandarina BJI, Juffrie M. No difference between iron supplementation only and iron supplementation with synbiotic fermented milk on iron status, growth, and gut microbiota profile in elementary school children with iron deficiency. Current Nutr & Food Science 2019; 15:1-8.

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Khumairoh Uma. On complex rice systems. PhD thesis, Wageningen University 2019; 1-178. DOI: 10.18174/467331.

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Mananga MJ, Kana Sop MM, Nolla N, Tetanye E, Gouado I. Influence of complementary food composition on prevalence of anemia among children aged 6-24 months in West Cameroon. Int J Food & Nutr Research 2019; 3: 1-9.

Mfaume J, Matemu A, Mbega ER. Distribution and occurrence of indigenous strains of atoxigenic and toxigenic Aspergillus section Flavi in groundnut producing areas of Southern Tanzania. J of Biodiversity & Environmental Sciences (JBES) 2019; 14:14-20.

Rahman H, Carey M, Hossain M, Savage L, Islam MR, Meharg AA. Modifying the Parboiling of Rice to Remove Inorganic Arsenic, While Fortifying with Calcium. Environ Sci Technol 2019; 1-7 pp.

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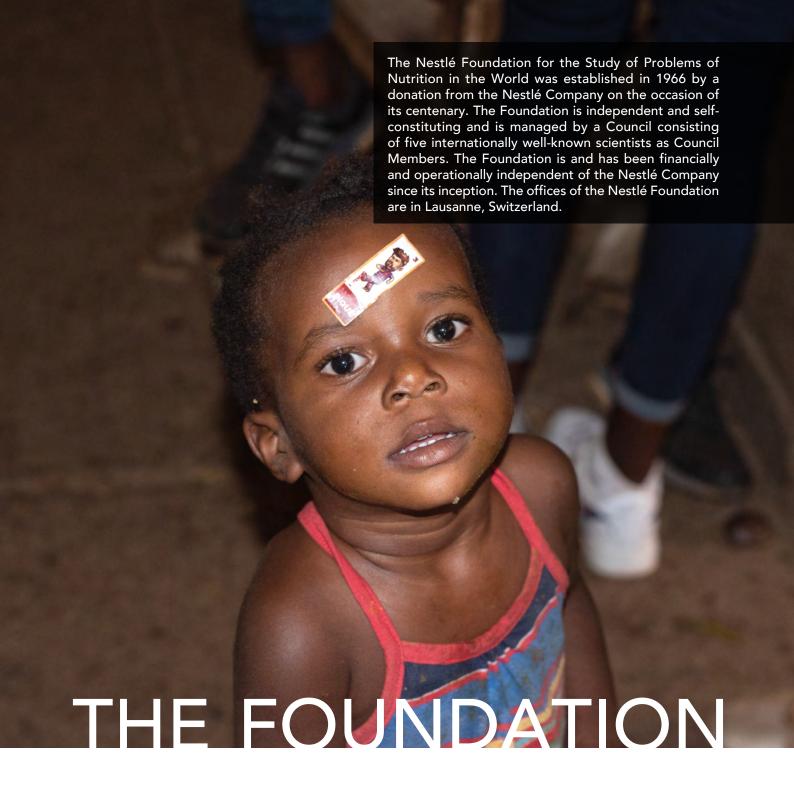
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The publications are available free of charge upon request.







#### 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 <a href="http://www.worldbank.org">http://www.worldbank.org</a>). 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 50 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.

#### **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. All 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):

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

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

Applications are accepted 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 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.

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From left to right: Reynaldo Martorell, Ben Caballero, Ann Prentice, Petra Hueppi, Dominique Darmaun, Anura Kurpad, Paolo M. Suter





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Throughout The Report 2019 all gender-specific terms are to be considered to refer to both the feminine and the masculine form – except when referring to a particular person. In addition the singular denotes the plural.



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