Nestlé Foundation REPORT 2016

REPORT 2016

Nestlé Foundation
for the study of problems of nutrition in the world

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

Mahatma Gandhi

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51 YEARS OF RESEARCH AND CAPACITY BUILDING

FOCUSED AND GLOBAL

MATCHING POLICIES TO NEEDS

HIGH-IMPACT – RESEARCH PROJECTS TO REDUCE MALNUTRITION

INNOVATIVE – FOR SUCCESS

CAPACITY BUILDING – AS A BASIS FOR IMPROVEMENT

SUSTAINABILITY – A KEY MISSION

ENDURABLE NUTRITION – THE PRESCRIPTION FOR SUCCESS

PUBLIC HEALTH – ORIENTATED

The Foundation at a Glance

EVIDENCE-BASED – PROACTIVITY

PARTNERSHIP – FOR LONG-TERM SUCCESS

SOLUTION – ORIENTED ACTION RESEARCH

***enLINK-ing* FOR A BETTER WORLD**

Capacity Building

enLINK-ing for a better world

Public Health Orientated

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President's Message

"Human history becomes more and more a race between education and catastrophe."

H.G. Wells, The Outline of History

In this year's Vision section of our annual report, eminent scholars address the role of universities—or higher education—in the emergence of "knowledge societies" in developing countries. The mission of a knowledge society is to ensure that the acquired knowledge is passed on and, importantly, advanced by each generation. This directly underscores the intricate nature of learning and research, as only their intimate association will allow fulfilment of this noble assignment.

By 2030, it is expected that 85% of the world's population will be in developing countries. This means that the percentage of the world's population that lives in developed countries is declining, in fact from 32% in 1950 to an expected 15% in 2030. A burning question is whether higher education and research in developing countries will realize the contribution expected from them, namely supporting the social and economic development of by then more than 7 billion people. The challenges of higher education in developing countries have already been addressed in a report from the Task Force on Higher Education and Society of the World Bank (http://www.tfhe.net/) in 2000. Their conclusions remain amazingly timely 17 years later!

Developing countries are diverse and their higher education institutions come in all shapes and sizes. However, all these institutions must overcome similar formidable obstacles, some of them determined by external forces, such as demographic and climate changes, that they cannot influence directly, in contrast to others that can be mitigated, such as ineffective management. Alone, a more efficacious use of existing resources and mobilization of political support in their favour will result in big gains. Countries whose governments neglect higher education will irremediably show lower social and political progress, and will be more and more marginalized in an economy-driven world.

Obstacles and problems facing higher education can nevertheless be surmounted. The question is not so much whether higher education is more important than basic education, the health, or the agricultural sectors, but whether it becomes finally recognized as much more important to development than appreciated today in most circles, including the international community. Evils like the lack of vision, absence of financial commitment, questionable management, and an underdeveloped intellectual culture due to an insufficient critical mass of teachers and scholars have to be addressed aggressively, and now.

Higher education is flexible and allows close tailoring to the conditions specific to different developing countries from Latin America, to Africa and South East Asia. There is an opportunity for these regions of the world to develop novel models meeting their specific expectations rather than blindly replicating developed-world models, sometimes outdated and in need themselves of profound restructuring to adapt to the changing world. Whatever the model is, higher education is absolutely necessary to promote the following to achieve growth and consequently better living for people in all possible societies:

- Promoting a strong faculty. Educate or recruit and retain a well-trained and talented faculty motivated to participate in long-term development of their country.

- Training of educated and literate workers. Most importantly, the training of scientists, doctors, engineers and others, at ease with developing and operating modern technologies, and eager to address local problems of health, nutrition, agriculture, environmental protection, infrastructure and industrial development.

- Improving educational infrastructure. Offering researchers well-equipped scientific laboratories, access to information technology and basic infrastructure (study and recreation facilities, for example) that are necessary elements of a vibrant higher education institution.

- Combining learning and research. Conducting science education through research in both basic areas and applied fields to participate in knowledge expansion, a key mission of higher education.

- Developing fruitful collaborations between higher education institutions in emerging and also in developed countries to confront different culturally influenced approaches, concepts and objectives.

- Supporting the creation of higher education institutions giving access to the financially less favoured but talented people, promoting gender equality, and protecting free and open discourse on all matters.

There is no doubt that in today's trends towards globalization, education and research in developing countries is crucial to put them on a development trajectory that avoids marginalization and catastrophe. The benefits of higher education have a long gestation period and will become apparent only after patient, continuous and strong-willed caring. Political leaders with a vision for their country and for how higher education can contribute to the public interest are a must today more than ever. The chance cannot be missed!

The Nestlé Foundation for the Study of the Problems of Nutrition in the World supports research in low- and lower-middle income countries (LMIC) aimed at improving the nutrition and health of the most vulnerable populations. The Council of the Foundation has recognized that sustained institutional capacity for combined education and research, as described above, continues to be a major weakness in many LMICs. To respond to this challenge, it is establishing a new funding program, the Nestlé Foundation Research for Development Initiative (NF-R4D). The basic requirement for participation in this program is the joint commitment of a higher education institution and an individual researcher, which together create the conditions of success (talent, institutional support, infrastructure), in the spirit of this president's message. The aim is simply to impact the outcome of the race of the education-research duo against the catastrophe solo!

Walter Wahli

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

Projects Initiated by the Foundation

The enLINK Initiative

- Promotion of specific research questions
- The enLINK digital library

The enLINK Initiative

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 2003, a project which illustrates the proactivity of the Foundation regarding its core issues.

This initiative focuses on information transfer in the area of nutrition and malnutrition as well as on the resolution of specific research questions and their implementation at the public-health level. The core competence and activity of the Foundation is the support of nutrition research in low-income countries. The enLINK initiative is an add-on to our key activities to improve the research capacity.

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

Our mission is to link and join cultures; to associate and conjoin institutions and people locally to study and diminish the problems of malnutrition globally.
Malnutrition can only be solved by "enlinking"—connecting—different strategies and approaches.

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

The enLINK Initiative has four main levels:

1. exploration in nutrition – building practical research capacity, the main purpose and aim of the Foundation.
2. education in nutrition: Also this level of the enLINK initiative 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 225 library trunks to 34 countries, only digital content is provided free of charge in the enLINK digital library.
4. endurable nutrition: All activities should be implemented and sustainable.

The digital enLINK library is currently offering free full-text access to a few nutrition journals and more than 39 e-books—many of them indispensable classical textbooks. The library is accessible free of charge to registered users who all receive a personal password—registration is also free as long as the applicant comes from a low-income country. The library is continuously updated and adapted to specific needs and in response to user feedback. Evidence and content which make it into textbooks are usually more practice-related than the research knowledge from latest findings which is published in research journals. Therefore the weight of the library lies more in the

e-textbook section to assure a good basic knowledge transfer as well as knowledge accessibility. Despite all the advances in information technology, books and printed materials will remain indispensable.

The approach of the Foundation in the enLINK initiative reflects the need for multidimensionality to solve the problems of under- and malnutrition (see also the contribution about the enLINK circle on page 10). Education and knowledge transfer are key components for any improvement.

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

EnLINK Circle

Do not forget multidimensionality

The nutritionist focuses on nutrition, the infectious-disease specialist on infectious diseases, the agronomist on agricultural issues, the economist on financial issues, the teacher on education, and so on … Everybody keeps his field of expertise as a priority, which has been and will remain a part of successful development. Nevertheless in the modern world, we now know that most if not all aspects of life are part of a network of interrelationships which should not and cannot be ignored. We live in a multidimensional world which, by its multidimensionality, becomes more complex, more uncertain and in some aspects for many people also frightening, and for many also increasingly "unreachable" and incomprehensible. There is an increasing number of new dimensions affecting the life of individuals and societies. This tsunami of new dimensions often blurs our view of key dimensions and components for sustainable development, including health and basic human rights.

According to the Webster dictionary the term multidimensional means "having or involving or marked by several dimensions or aspects" (1). Most aspects of life are multidimensional, including health, well-being and last but not least also nutrition and food. One person can have a single nutrient deficiency (such as an isolated vitamin-B12 deficiency due to malabsorption) or more often one can have a "multidimensional deficiency", i.e. a deficiency of several nutrients and substrates due to the well-known but often ignored collinearity of nutrients (2). For example, in the setting of protein energy malnutrition one will have most likely a deficiency of several micronutrients. Today such deficiencies are treated with micronutrient supplements, a mainly symptomatic one-dimensional strategy. Such a treatment approach does not address the causes of the deficiency, which are often due to inadequate intake of protein and energy and concomitant infections in an overall resource-poor living environment.

During the last decades poverty has emerged as a root cause of malnutrition and health disparities in many countries. Accordingly, poverty alleviation by increasing the income and improving the economic situation has been promoted as a one-dimensional strategy. Not unexpectedly we have learned that income or specific financial and economic parameters might represent only an inadequate or at least imperfect tool to understand the many aspects of poverty (3, 4, 5). It is well known that economically poor people report simultaneously many other handicaps such as presence of diseases, lack of hygiene and sanitation, lacking or inadequate education, lack of electricity, poor overall housing conditions, poor access to transportation, and social isolation—to mention just a few (3, 4, 5). The latter listing illustrates that these people do have a multidimensional deprivation and not only a financial deprivation. Accordingly a little more than five years ago a team at Oxford University developed the "multidimensional poverty index" (MPI) (3, 4, 5) which represents a more holistic picture of deprivation.

Briefly, the concept of the MPI is based on the fact that usually multiple overlapping key deprivations (not only financial deprivations, the classical meaning of the word poverty) are present at the level of a single individual or also at the family level. Obviously any measure or index is subject to criticism; nevertheless based on the 50-year experience of the Nestlé Foundation a multidimensional approach is most likely a more sustainable and meaningful approach, as

also proven in many Foundation-supported projects and also illustrated in the enLINK circle (Figure 1). The MPI (3, 4, 5) includes three key dimensions (3, 4, 5):

1. Education (years of schooling, children enrolled)
2. Health (nutrition, child mortality)
3. Standard of living (cooking, hygiene, fuel, water, electricity, assets etc.).

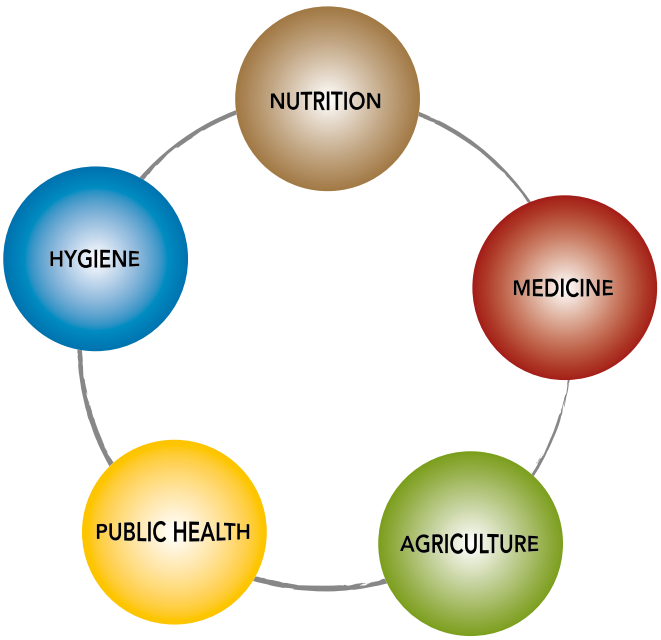


Figure 1:
The enLINK circle: The five central fields of intervention for the control of malnutrition, hunger and poverty

One crucial aspect in the calculation of the MPI is that the indicators need to originate from the same survey, which suggests a better reflection of the interrelationships among these key parameters than pooled data from different sources (3, 4, 5). Using this index, more than 50% of people in African countries have multidimensional poverty (6). Significantly more individuals suffer from MPI than when using the 1.90 USD/day poverty definition (6). In an analysis covering about 75% of the world population, 30% — corresponding to about 1.6 billion people — have been identified as multidimensionally poor (6) (see Figure 2).

It is not only financial poverty which creates hunger and inequality: it is the network of deprivations which is crucial and which exacerbates already resource-limited living conditions. Accordingly, any sustainable solution to the problem of malnutrition and poverty requires a multidimensional solution targeting the key deprivations as assessed by the MPI. The list of multidimensional poverty is long and contains different interrelated aspects of daily life which most of the people in the North are no longer aware of. Environmental factors, such as climate change, can modulate the MPI within short time frames.

As mentioned above, experts do not recognize easily the multidimensionality of the problems and suggest focused and limited solutions in their corresponding field of expertise only. It is time for multidimensional solutions which are implemented at the same time in a synchronized approach. This seems to be the only way to achieve a sustainable solution — a kind of universal community approach and involvement. For obvious reasons this would require more intense coordination of activities. However, coordination of development activities still represents the hardest challenge in development aid (7). For instance, it was reported that fragmentation of aid or even competition for export markets represent central impediments towards a meaningful aid coordination (8). Multidimensional coordination would mean complementarity and thus a higher chance for overall improvement and sustainability.

Multidimensional thinking and action is absolutely needed for long-term success. Often "one-dimensional" strategies for the fight against malnutrition are chosen — for instance focusing only on a symptomatic treatment of nutritional deficiencies without any collateral supportive activities (see also contribution from Prof. Kraisid Tontisirin in this Report). It is time that a multidimensional approach addressing the key parameters of the MPI becomes mainstream and a condition for any assistance. It is conceivable that a supplementation program or also fortification program has to be accompanied in an obligatory manner by a support of basic education and basic health care. A recent study reported an impressively close relation between the MPI and the basic vaccination coverage in a population (9), pointing to the absolute need of a multidimensional approach for any public health interventions — including the area of nutrition. Arsenault et al. (9) reported that in certain countries the vaccine coverage was lower among malnourished children, although the malnourished are already at higher risk of infectious diseases. A really dangerous vicious cycle! This recent study underlines the high potential of a multidimensional assessment and intervention.

The MPI implies also a "multidimensional solution" for sustainable improvement. Similarly the Nestlé Foundation has pursued since its creation a multidimensional approach for the control and improvement of malnutrition as reflected in the enLINK circle. The enLINK circle with its five key components addresses the key areas of deprivation in many countries but at the same time also the key components for a solution.

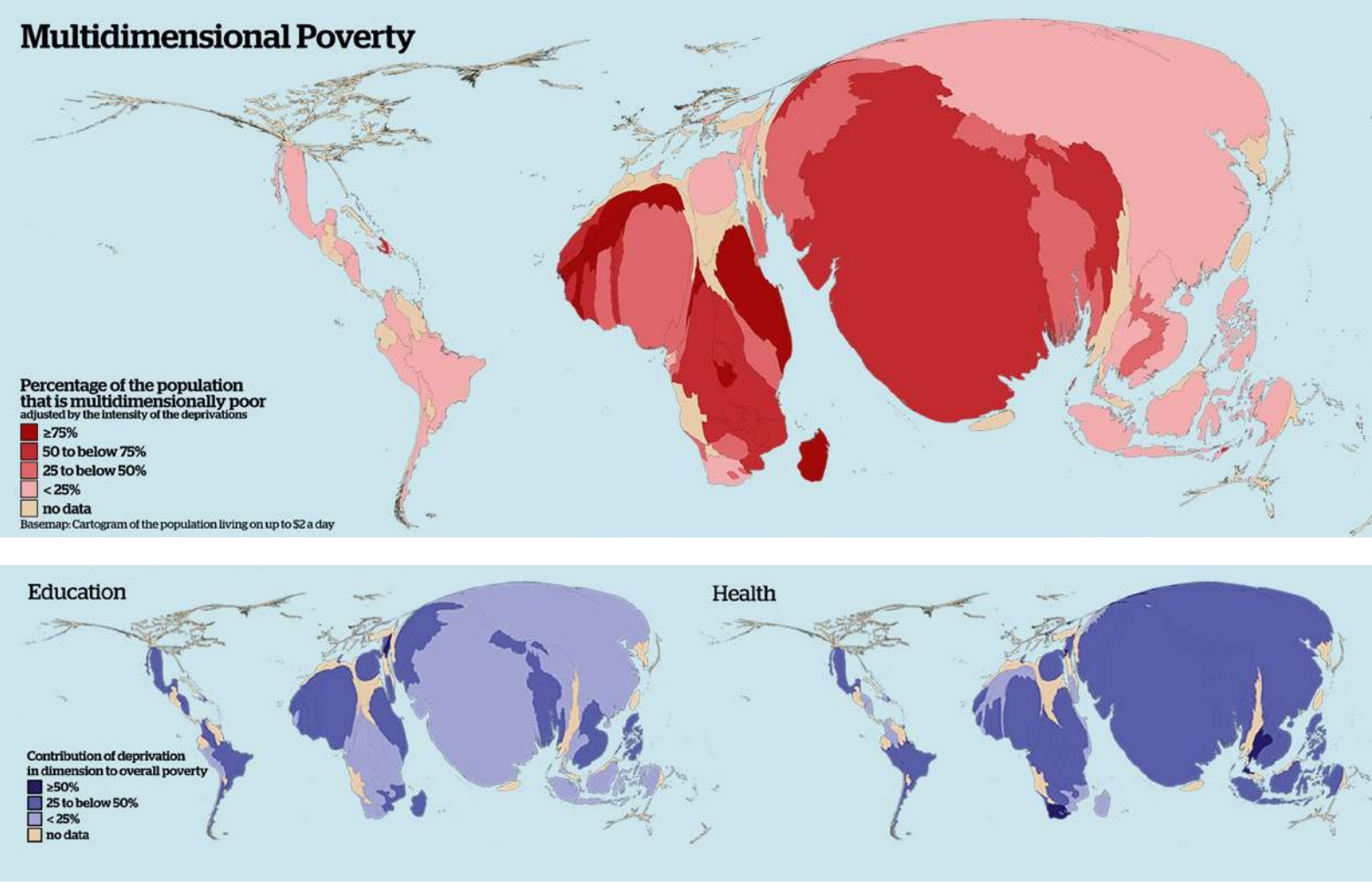


Figure 2:
Multidimensional Poverty Map: The size of each country corresponds to the number of individuals who have < $2 per day; the colour shading corresponds to the 2015 data of the MPI (1).

© www.worldmapper.org

The enLINK Digital Library

The digital enLINK library

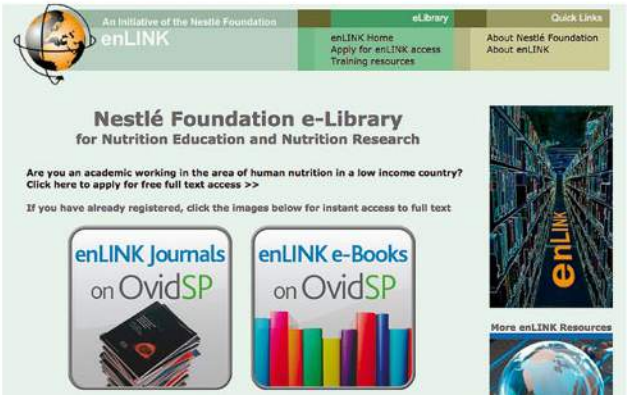
During 2016 the digital enLINK library again continued to grow, both in terms of number of books offered (at present 38 e-books) as well as registered users and usage. There are only a few journals available and their usage is less important than the access to the books.

enLINK user statistics (as of 31 December 2016):

- 421 registered users
- Registrations from 51 countries
- Doubling of full-text views during the last year
- Regular access from users living in Nigeria, Ghana, Kenya, Ethiopia, Burkina Faso, Uganda, Indonesia, Sudan, Vietnam
- Most frequently accessed journals:
  Journal of Paediatric Gastroenterology & Nutrition
  Nutrition Today
- Most frequently accessed books:
  Nutrition in Clinical Practice
  Essentials in Human Nutrition
  Modern Nutrition in Health and Disease
  Oxford Handbook of Nutrition and Dietetics

Anyone from a low-income country can apply to become a registered user. The detailed registration information is available at www.enlink.org. Registration and use of the enLINK library are both free of charge.

The enLINK Book Trunks are at the moment no more available.




DEAN
enLINK LIBRARY
www.enLINK.org
Medicine
Pediatric

Other Activities

NEW RESEARCH PROJECTS

INSTITUTIONAL SUPPORT

OTHER CAPACITY-BUILDING ACTIVITIES

In 2016 the Council decided to fund six research projects

CHILDHOOD STUNTING

FOOD SAFETY

VITAMIN-A DEFICIENCY

New Research Projects

BONE HEALTH

CHILD GROWTH AND DEVELOPMENT

Childhood Stunting

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

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USD 20,000

Uganda is among the developing countries where stunted growth is a significant public-health concern. It is estimated that 2.3 million children under five years (33%) in Uganda are stunted and the southwestern region has the third-highest prevalence of stunting (42%). Uganda loses up to $899 million (5.6% of GDP) annually due to malnutrition. The high prevalence of stunting in reportedly food-secure areas is attributed to limited understanding of the context-specific causal factors and consequences of stunted growth, missed opportunities and low national financial commitment to address stunting. The objectives of the proposed study are to determine the prevalence of stunting among children 6-59 months in Buhweju district; determine the context-specific causes of childhood stunting; evaluate the association between stunted growth and sub-optimal infant and young child feeding (IYCF) practices; and use evidence-based modelling tools to conduct cost-benefit analysis. Through this study, five key questions will be answered: 1) what is the prevalence and severity of stunting?; 2) what are the risk factors for stunted growth?; 3) what barriers hinder adaptation of optimal IYCF practices?; 4) how much will it cost to achieve zero stunted growth?; and 5) what are the benefits of recommended interventions? Nutrition Causal Analysis and Case-Control approaches will be used to determine the prevalence and risk factors for stunted growth. The cost-benefit analysis model using OneHealth Tool (OHT), Lives Saved Tool (LiST) and PROFILES will estimate the cost of interventions, number of stunted children averted and economic benefits based on three scenarios: 1) maintaining the status quo; 2) halving the prevalence of stunting by 2040; and 3) zero stunted growth by 2040.

Food Safety

Viral contamination of vegetables eaten raw: Sanitary impacts on the vulnerable population in Usme (Bogotá)

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and

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USD 49,995

Human enteric viruses are incriminated in acute gastroenteritis (AGE) with dramatic effects on children and the elderly. They are excreted in large numbers at the onset of illness and for weeks thereafter; they can survive for months in the environment. In Usme (Bogotá, Colombia), raw wastewaters are discharged into the Tunjuelo Stream that joins the Bogotá River, which is used to irrigate raw vegetables. Our objective is to assess the importance of AGE on the vulnerable population in Usme, the contribution of rotaviruses and noroviruses to these diseases and the importance of foodborne contamination. First is a characterization of young children and elderly subpopulations, looking at group sizes, consultations in hospital emergency rooms for AGE, and AGE estimates in Usme with regard to living standards and eating habits and their reliability from death statistics. Second is an assessment of AGE rotaviruses and noroviruses from (i) viruses in the stools of sick people at hospitals, and (ii) the quantities of viruses and other enteric pathogens found in Usme sewers. Third is an assessment of the relative contributions of vegetables eaten raw, water and air to (i) contamination from viral-RNA in these compartments, (ii) indirect estimates of virus inactivation, and (iii) peoples' habits (eating/drinking, etc.). Living standards and habits will be compared between families with and without AGE. Fourth is the identification of the steps strongly implicated in vegetable contamination from field to consumer, by comparing contamination before harvest, after-harvest, at the inlet/outlet of storage warehouses and in market stalls before and after client handling. Expected results will include an estimate of the proportion of viral AGE resulting from the consumption of raw vegetables, and the identification of steps during which most of infections appear. They should enable the definition of simple measures to reduce environmental contamination.

Vitamin-A Deficiency

Vitamin-A status in pregnant women eating traditional spirulina (Dihé) in Chad

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USD 19,350

Chad is a country with a high prevalence of vitamin-A deficiency. Spirulina, known under the name of Dihé, is an important source of ß-carotene, a precursor of vitamin A. This algae is produced around Chad Lake. The aim of the study is to assess if pregnant women (n=35) living near Chad Lake have a repleted vitamin-A status compared to those (n=35) living in a region without Dihé (Eastern Chad). Vitamin A status will be assessed by measurement of retinol and ß-carotene blood concentrations by HPLC. To achieve nutritional assessment, plasma proteins (Retinol Binding Protein (RBP), Transthyretin (TTR), Albumin, Alpha 1- Glycoprotein Acid (Orosomucoide) and C-Reactive Protein (CRP)) concentrations will be measured by immune-nephelometric method (Vista System). The prevalence of vitamin-A deficiency will be estimated by serum retinol concentration, RBP/TTR molar ratio and Vitamin A/RBP ratio. This study will improve knowledge on the potential beneficial effect of Dihé and will also be a practical training for one PhD student (combined program Cameroun and Chad).

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

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and

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USD 19,980

Vitamin A is very important for human health for development and maintenance of the immune system and good vision. Vitamin-A deficiency is associated with respiratory disease, gastroenteritis, pedal edema, and childhood exanthemas and sometimes deaths. Vitamin-A deficiency in Tanzania is 44% to 51% in the four regions of Pemba North, Kagera, Pwani and Manyara. Vitamin-A supplement is provided to less than 65% of children under five since it is costly and unsustainable. The deficiency can be addressed by consumption of foods fortified with Moringa oleifera (MO) leaves as a sustainable low-cost solution. MO leaf powder is easy to incorporate in many traditional diets and can be preserved for dry seasons when MO leaves are less abundant. However, communities are unaware of methods to prepare and incorporate the MO leaves in their traditional diets. Application of MO leaf powder to combat micronutrient malnutrition requires a better understanding of nutrient composition, which may vary with region, seasons and storage conditions. The proposed pilot project will evaluate the biomass yield of MO leaf from different agro-ecological conditions, the drying of MO leaf in above-house ceilings and the stability of vitamin A during storage. MO leaf will be cultivated in Pwani, Kagera and Manyara and harvested, dried, milled and stored in capped opaque jars. The powders will be analysed for vitamins A as ß-carotene. Powder will be stored at different temperatures and re-analysed quarterly during storage. The project will increase the knowledge of drying MO and the preservation and stability of vitamin A for better utilization of MO. It will also increase human capacity in Tanzania, and hence help combat vitamin-A deficiency. The pilot phase will be followed by studies to incorporate MO leaf powder in local diets by means of a utilization campaign of MO in vitamin-A-deficiency regions and finally in the whole country.

Bone Health

Daily consumption of dried bean curd and nutrition education on bone health of postmenopausal women in China

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USD 48,450

Osteoporosis is a progressive systemic skeletal disorder characterized by reduced bone mass and poor bone quality. Elderly women, especially postmenopausal women, are the major susceptible population affected by osteoporosis. Soybean and soy products, the traditional food of China, are rich in calcium, protein, and isoflavones, which may reduce the bone loss of postmenopausal women. The goal of the project is to determine whether daily consumption of dried bean curd (a kind of soy product) and nutrition education have an effect on bone turnover and their place in the postmenopausal osteoporosis prevention of elderly women. Three hundred and twenty elderly postmenopausal women aged from 50 to 65 years old will be recruited from rural China. Subjects will be allocated into two groups. One group will be given 100 grams of dried bean curd (containing 16.2 mg protein, 308 mg calcium and 64.4 mg isoflavones) a day for 24 months. Nutrition education will be given to the subjects twice a month as well. The other group will be only given rice cakes of 100 grams (containing 3.3 mg protein, 31 mg calcium and no isoflavones) as the control. At baseline and once every half-year after baseline, the effect of dried bean curd and nutrition education will be evaluated. Outcome measures will include bone mineral density (BMD) of the lumbar spine and total body, biomarkers of bone formation and bone resorption, isoflavones in serum and adverse events.

Soybean and its products are a traditional food in China and easily obtained. Therefore, it is practical and easy to sustain, which may provide some scientific data on postmenopausal osteoporosis prevention of elderly women in rural China.

Child Growth and Development

Improving child growth and development through nutrition and psychosocial intervention in early childhood education (PAUD) settings in rural areas

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USD 49,995

The health of individuals in the future can be affected by events of their early childhood. Six goals are formulated for this study: 1) to analyse food consumption quality and nutritional intake of young children; 2) to analyse feeding practice and eating problems of young children; 3) to analyse the childcare practices of young children; 4) to analyse the growth and development, both cognitive and psychomotor, of young children; 5) to improve early childhood education (PAUD) for better child development; and 6) to analyse the effect of nutrition education and psychosocial stimulation on growth and development (cognitive and psychomotor) of young children. Ten research steps are planned: 1) conducting a preliminary survey in rural areas in Bogor and choosing early childhood education programs (PAUD) based on their willingness to cooperate; 2) developing a sampling framework consisting of children registered in early childhood education (PAUD), their mothers and their teachers and establishing a sample size of 120 children, 120 mothers, and the available teachers; 3) developing instruments and collecting data on food consumption, nutritional intake, feeding practice, eating problems and childcare practices of young children; 4) assessing the nutritional status (anthropometry) of young children; 5) assessing the development (cognitive and psychomotor) of young children; 6) implementing nutritional education for mothers, teachers and the Association of Early Childhood Education (HIMPAUDI) Committee; 7) implementing psychosocial intervention for mothers, teachers, and the HIMPAUDI Committee; 8) providing educational toys to PAUD for better child development; 9) conducting focus-group discussions and workshops with stakeholders who are responsible for improving early childhood education; and 10) evaluating whether the nutrition education and psychosocial intervention are able to improve the knowledge, attitude, and practices of mothers and teachers as well as the growth and development of young children.

One of the major aims of the Nestlé Foundation is the transfer of sustainable capacity-building knowledge to low-income countries. During 2016 several specific capacity-building activities were supported.

African Journal of Food, Agriculture, Nutrition and Development

Local creation and dissemination of nutrition knowledge on the African continent is crucial. The African Journal of Food, Agriculture, Nutrition and Development (AJFAND) (see also www.ajfand.net) is a nutrition journal made by Africans for Africans, thus creating awareness of the multiplicity of health and nutrition challenges facing Africa. The Foundation supports AJFAND with a regular contribution for the infrastructure as well as for each issue.

Dissemination of research results

During 2016, Foundation support allowed several researchers to present results from their research projects that had been supported by the Foundation. The presentations included several specific topics at the African Nutritional Epidemiology Conference (ANEC VII) 2016 in Marrakesh (Morocco) and others at the EB-2016 meeting (Experimental Biology 2016). The Foundation only supports conference attendance in conjunction with research projects which have been supported by the Foundation.

Institutional Support and Other Capacity-Building Activities

Spanish enLINK trunk

During 2016 the Foundation shipped the last remaining eight Spanish enLINK book trunks to Central America (Guatemala and Costa Rica). For the moment no more complete book trunks will be compiled.

Books for African libraries

Selected new books on food and nutrition as well as food technology were shipped to Benin for the library at the Département de Nutrition et Sciences Alimentaires, Faculté des Sciences Agronomiques, Université d'Abomey-Calavi, Cotonou, Benin. Despite the global IT revolution books remain a cornerstone in education at all levels.

New edition of "How to eat well"

Without nutrition knowledge healthy eating is not possible. Accordingly the Foundation supported the printing of a new, reworked edition of the small booklet "Comment bien se nourrir? – Mieux manger pour bien vivre" by the Bureau d'Études et de Recherches pour la Promotion de la Santé (BERPS) in Kangu Mayumbe, the Congo. Three thousand copies have been printed and will be distributed to health professionals. This was initiated by Roger Mabiala Zimuangu and by Dr. Jacques Courtejoie, directors of BERPS. The BERPS is most likely the only producer of educational materials for medical doctors, nurses and midwives in the Congo. Dr. Courtejoie, founder of BERPS, has worked for more than 50 years in the Congo as a medical doctor, and based on his vast experience, educational materials both in French and also in the local languages are produced and distributed. The Foundation is proud to support a team which knows about the local needs and the corresponding deeds. In addition, the activities of BERPS fill a gap in the production and distribution of easily understandable, accessible, inexpensive nutrition and health-educational materials in French. Some of the books are even made available in other Francophone countries of Africa.

The key role education plays for any successful and sustainable development is well known. In view of the many difficulties it is impressive to read the article from Prof. Quilambo and his colleagues from Mozambique about their successes and also challenges in advancing higher education in their country. They underscore the key role of the national universities in delivering the knowledge and skills which are locally needed and they stress the importance of sustainable partnerships. The latter is also addressed by Sir Leszek Borysiewicz, Vice-Chancellor of the University of Cambridge, who draws attention to the establishment of local conditions that eliminate brain drain. As Prof. Pauline Rose and her colleagues point out, education can only lead to "global learning" in the setting of equality: assuring access to education at all levels of education for all strata of the population equally is more than crucial for our future. Similarly, our Council Member Prof. Kraisid Tontisirin discusses the importance of holistic approaches to reduce malnutrition, where knowledge and know-how is of key relevance. Prof. Balinda, the founder of ULK University in Kigali (Rwanda), writes about options and possibilities of private initiatives for delivering high-level education.

Vision

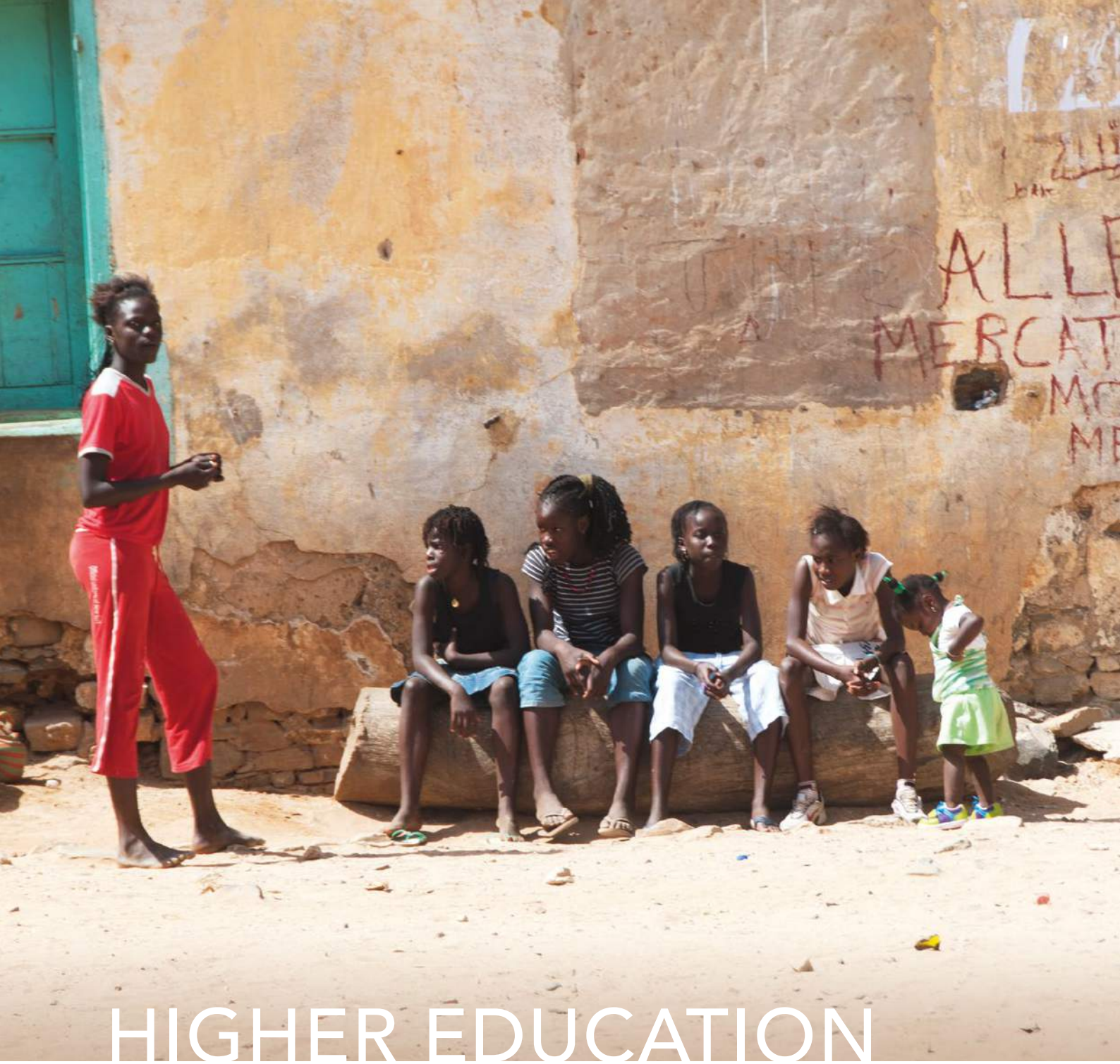
HIGHER EDUCATION: A VIEW FROM MOZAMBIQUE

THE ROLE OF UNIVERSITIES

PROGRESSIVE UNIVERSALISM & EQUALITY

HOLISTIC APPROACHES

CAPACITY BUILDING IN RWANDA



HIGHER EDUCATION

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Higher education and the need for local capacity builnding: A view from Mozambique

Introduction

Over the past 30 years, the training of qualified academic and research staff at the postgraduate level has taken place mostly outside Mozambican borders. In fact, training at the Masters' level in Mozambique only dates back to early 2000. Doctoral education and training programs are still in the emerging stage in this country. Globally, the importance of postgraduate training in general and doctoral education in particular has increased. The demand for high-level skills is perceived to be a particular feature of the knowledge economy and society. The

main argument is linked to the idea that the sources of productivity and competiveness in any economy and society are increasingly dependent on knowledge and information being applied in the production process. While there are sceptics about the role of knowledge in a factor-driven economy, such as the Mozambican one, the increasing demand for knowledge workers (academic staff and researchers) by a growing number of higher education institutions is well established. In this article, we argue that it is high time for Mozambique and particularly Eduardo Mondlane University (UEM) to invest in building postgraduate research and training capacity locally. By building capacity locally, the country and UEM would be better positioned to respond to the global demands of the knowledge economy/society as well as attend to the local pressures of the knowledge system.

Background

When Mozambique gained its independence from Portuguese colonial rule in 1975, after a ten-year, hard-fought armed struggle, it only had one higher education institution, Lourenco Marques University (ULM). In its early years, ULM was called the General University Studies of Mozambique (EGUM) and offered academic programmes in education, medicine, agronomy and veterinary sciences, as well as in civil engineering, mining, electrical and chemical engineering. In 1968, EGUM was elevated to the category of university, adopting the name University of Lourenço Marques (ULM).

ULM extended its academic programmes to include applied mathematics, physics, chemistry, biology and geology, as well as Roman philology, history, geography, economics and metallurgical engineering. Although the Portuguese colonial government tried to spread the idea in the late 1960s and early 1970s that its regime was no longer a racist one, the fact was that access to EGUM (and, subsequently, to ULM) continued to be determined by a colonial and racist ideology.

In the aftermath of Mozambique's independence, on 1 May 1976, the ULM was renamed for the inspiring leader, intellectual and scholar Eduardo Chivambo Mondlane, one of the founding fathers and first President of the Front for the Liberation of Mozambique (FRELIMO). Since then the alma mater of higher education research and training in the country has been Eduardo Mondlane University (UEM).

Expansion of access

The massive exodus of the Portuguese colonialists left the country with very limited capacity. In 1975 the country had only 40 black national higher education students, representing less than 2% of the overall number of students enrolled at ULM.

Up until 1984, UEM remained the sole higher education institution (HEI) in the country. In 1985 and 1986 two new public HEIs came into existence, namely the Higher Pedagogical Institute (ISP) and the Higher Institute for International Relations (ISRI). The former was designed to train teachers and was founded after the closure of UEM's Faculty of Education, and the latter was established to train professional diplomats.

In the last 40 years the higher education sector has expanded massively. Today the country has about 51 higher education institutions, of which 18 are public and 33 private.

UEM has a student population of approximately 40,000, of which 92.1% are undergraduates and 7.9% are postgraduates, a large majority of whom are nationals. The number of students in the system has increased from fewer than 5,000 in the 1990's to more than 170,000 in 2016.

Mismatch

While the exponential growth in the student population represented a positive development, maintaining the academic staff capacity to meet the growing demand remained a challenge. In 2011, the government commissioned a study to inform its policy on academic staff training for the higher education institutions. Based on mathematical projections, the study found that student growth was at an annual rate of 12%. The study projected that by 2015 there would be 170,398 students in higher education. This projection represented a slowdown in the explosion of the student population growth trend, considering that from 2004 to 2009 the number of students grew almost four times in just six years. By 2020, this projection shows that there will be 304,153 students in this subsystem. For academic staff (lecturers), the numbers indicated a much lower growth trend. In a scenario where student versus teacher ratios was set at 25:1, the study estimated that by 2015, 6,816 teachers would be required to teach in higher education institutions. To our knowledge no follow-up study has been undertaken to monitor and evaluate this evolution. A follow-up study on the needs assessment for academic staff for higher education would therefore be necessary.

UEM and its new vision and mission

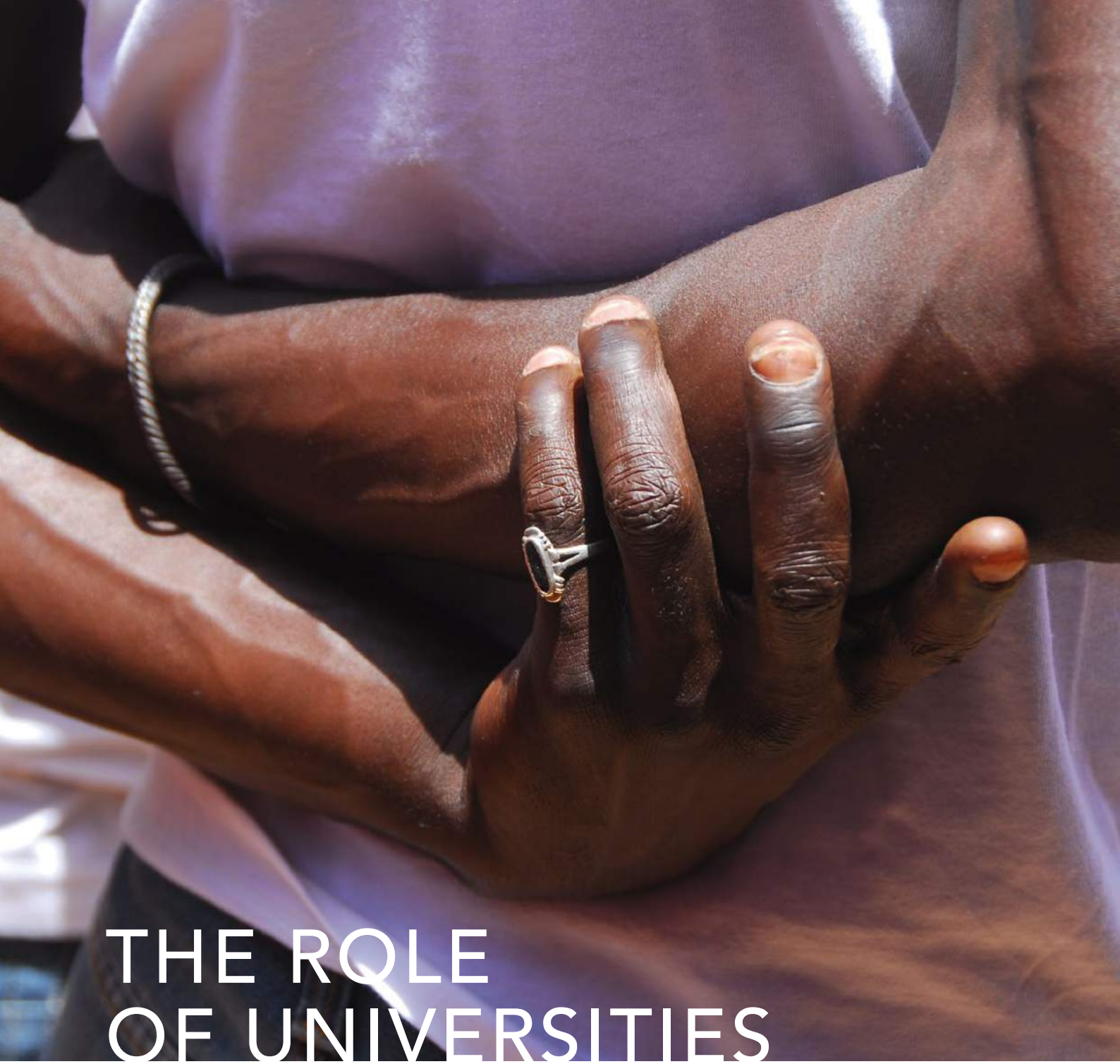
For many years, the postgraduate training of UEM academic staff was undertaken in other countries due to a lack of local capacity. Through bilateral and multilateral agreements, the country sent thousands of Mozambicans to be trained abroad. While most academic staff holding doctoral degrees became successful professionals, a considerable number diverted from their research and training areas as the conditions at home did not allow them to continue the work they had initiated in the northern

universities where they received their training. The lack of institutional conditions under which the students were trained abroad, including laboratories and libraries, at their home university created a great deal of frustration.

Eduardo Mondlane University introduced its postgraduate research and training programmes in the early 2000s to counter some of the adversities mentioned above. Further, the objective of this move was to increase the local capacity of its academic staff and also provide the country with a more qualified cadre in all areas, but more specifically in the government priority areas. Currently, UEM represents the national higher education institution with by far more accumulated capacity in terms of research and training staff. Over 20% of the academic staff of UEM hold a doctoral degree. Nonetheless, given the demands of the country, particularly with the establishment of new public institutions, UEM suffers from what we could call local 'brain drain' whereby a number of UEM academic staff is commissioned either to serve in government or in other public universities. This confronts UEM with the challenge of continually training its academic staff.

In 2013, the current management of UEM adopted a new vision and mission for the institution. The new vision and mission aims at transforming UEM from being a teaching-intensive university into a more research-intensive university. The rationale behind this strategic move is related to the need for UEM to reposition itself in the national and regional context of higher education to meet the challenges of the twenty-first century and beyond. UEM wants to be in the forefront of the process of transforming Mozambique into a knowledge economy and society by offering the best research and training programmes and also by increasing its knowledge alliances with the society at large. In practice, the new vision and mission challenge UEM to increase post-graduate training, extension and internationalization.

In order to respond to these new challenges, UEM needs to adopt a policy which prioritizes establishing domestic and international partnerships that aim at developing research and training programs locally. This approach seems to be more effective for an institution that has developed some of its capacity in the past 40 years mostly abroad, through international cooperation. In so doing UEM will be better placed to respond to the societal demands, particularly in terms of training the cadre for other higher education institutions of Mozambique, while also, and not less importantly, building its home and local capacity.



THE ROLE OF UNIVERSITIES

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The role of universities in tackling Africa's challenges

All around the world, governments and businesses are expressing concern about the shortage of skilled workers and researchers in STEM subjects. This shortage is felt most acutely in the developing world.

By one estimate, Africa needs over two million engineers to address its most basic infrastructural challenges, from sanitation to sustainable cities. How many more doctors and nurses, how many more crop scientists and computer programmers, might the continent require — not to develop its full potential, but simply to cover its essential needs? One obvious solution is for African universities to

focus on recruiting more young women and men into university careers in science and technology. But in Africa, as elsewhere in the world, access to higher education remains one of the great challenges.

In Senegal, fewer than 5% of the country's young people attend universities. The pattern is similar in most of West Africa. In Ethiopia, around 13% of young people enter higher education — better than West Africa, but still far behind the 30% global average for university enrolment. Across the region, the challenge is tremendous.

Research suggests that one way to increase the number of young people — women in particular — entering science in higher education is to focus on the early years.

It is in those early years that the inequalities of opportunity associated with gender and poverty become most deeply embedded. As is shown in another contribution to this Annual Report, by colleagues from the University of Cambridge's Research for Equitable Access and Learning (REAL) Centre, the effects of poverty and gender inequality on future attainment are insidious. One of the most effective ways to tackle inequality gaps in higher education is to address the inequality gaps in early learning.

What, then, might the role of universities in Africa be in developing that pipeline into science and research? Universities must offer today's youth the knowledge and the skills they will need to enter the workforce. And yet, who knows what problems a clinician or an engineer will be faced with in Nigeria or in Rwanda in twenty, thirty or forty years' time? So universities must educate their graduates not just for the jobs that exist today, but for the challenges that will exist in the future.

And we must go even further. Universities — in Africa and elsewhere — must also be incubators of global citizens, and generators of future leadership. Scientific leadership, yes, but also civic leadership. There is no greater task. All universities must rise to this challenge.

Universities are in a unique position to tackle some of the most pressing issues by working closely with governments, NGOs and businesses. The University of Cambridge's collaboration with Nestlé, which aims to make food systems more resilient in the face of climate change, and to improve health and nutrition for people in Africa and elsewhere, is one example of how this can be achieved.

Since 2010, the University of Cambridge has also been working closely with African partners to help build research capacity and to nurture scientific and civic leadership on the continent. The Cambridge-Africa Programme puts the University's resources at the disposal of African scientists and scholars, empowering them to work in Africa, on African problems.

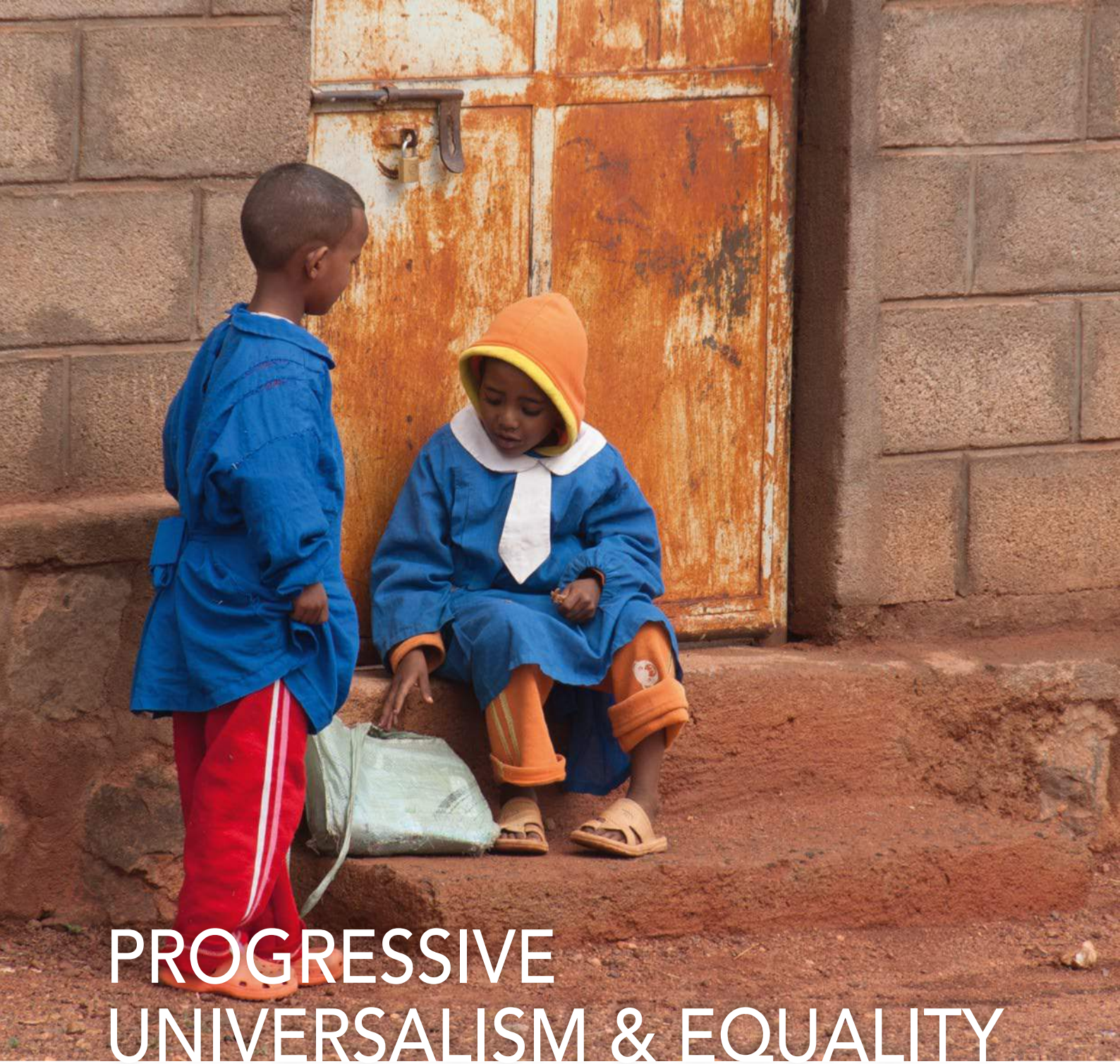
Today the Cambridge-Africa Programme supports researchers in 58 institutions across 26 African countries, offering them access to the expertise, mentorship and resources provided by a network of over 200 Cambridge-based researchers. Through careful matching-up of research interests, the programme facilitates the creation of equitable and sustainable collaborations. The University is helping to train the next generation of world-class researchers by investing in the establishment of dedicated PhD scholarships for African applicants.

The Cambridge-Africa Programme has already had a huge impact on the careers of the young African scientists and scholars who have been part of it. They have enhanced their prospects for promotion, and have inserted themselves into an international network of scientific collaboration. They have gained the skills needed in the lab or in the field, and have acquired some of the indispensable tools required in research management. They have been able to publish in international peer-reviewed journals. These are men and women primed for scientific leadership.

This model of collaboration serves the African researchers' countries of origin. Crucially, it is a model that prevents brain drain. Of the 55 Cambridge-Africa Fellows that have passed through Cambridge since the programme was formally launched, almost all are now working in laboratories and universities in their home countries.

The Cambridge-Africa Programme is about allowing excellent African research to flourish. It is about working together to contribute solutions to the problems faced by people in Africa and beyond. It is about acknowledging that we need excellent African science as much as excellent African science needs us.

http://www.cambridge-africa.cam.ac.uk/



PROGRESSIVE UNIVERSALISM & EQUALITY

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Ben Alcott, PhD
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PROGRESSIVE UNIVERSALISM MUST BE AT THE HEART OF EDUCATION REFORMS TO ACHIEVE A 'LEARNING GENERATION'

As access to education has expanded around the world, concern has turned to a "global learning crisis." It is estimated that 250 million children have not achieved foundation skills in literacy or numeracy, at least half of whom have spent at least four years in school (1). The vast majority of these children live in the poorest countries in the world. This learning crisis is recognised within the Sustainable Development Goals, adopted by world leaders at the United General Assembly in September 2015, with a target set of ensuring that "all girls and boys complete free, equitable and quality primary and

secondary education leading to relevant and effective learning outcomes". In order to inform public policy responses that can turn this learning crisis into a "learning generation", as called for by a recently published report by the International Commission on Financing Global Education Opportunity (2), it is vital to understand who is most likely to miss out on a good quality education. Drawing on our analysis for the Education Commission's report (3), we identify four key lessons:

1. Poverty drives learning inequalities, and interacts with other sources of disadvantage

A wide learning gap between the poorest and richest children is evident across the 34 low- and lower-middle-income countries included in our analysis, even more so once children both in and out of school are taken into account. For example, just one in five of the poorest children in these countries are learning the basics in maths compared with almost one half of the richest. This wealth gap is compounded by gender: an average wealth gap of 27 percentage points widens to 37 percentage points between the poorest girls and the wealthiest boys. However, while disadvantage for the poorest is universal, gender disadvantage varies across country contexts, with poor boys experiencing a similar or worse fate than poor girls in 15 countries in our analysis. It is nevertheless the case that the poorest girls are most likely to be at a disadvantage in those countries which are still struggling to ensure all their children are able to complete primary school. It is therefore vital to implement strategies that reach the poorest students, with a focus on the poorest girls in countries furthest from achieving the sustainable development goals.

2. Learning gaps widen over the life course, and determine future chances of success

In countries in South Asia and East Africa with relevant data, we find that gaps in learning between the rich and poor are very small amongst younger children but widen dramatically over the primary school cycle. In rural India, for example, we estimate that there is less than a 2 percentage-point gap between rich and poor children in their ability to perform basic literacy and numeracy tasks by the age of 7. This gap, however, increases to around 25 percentage points by the age of 11. More specifically, by age 11 only around 7% of poor girls have achieved the basics in comparison to nearly 40% of rich boys. Therefore, it is important to start investing early, particularly more to those in more need.

Moreover, drawing on longitudinal data from Andhra Pradesh in India, we find that those from poor households who had not learned the basics in primary school have next to no chance of eventually progressing to higher education.

3. Progress in both access and learning is possible

Concern is often raised that increasing the numbers of children in school has been at the expense of quality. However, this is not inevitable. Of the 25 low- and lower-middle-income countries with available data on both access to school and learning over time, we find that 15 have succeeded in increasing the proportion of poor school-age children who are both in school and learning. Moreover, seven of these countries have achieved this progress while also narrowing learning inequalities. Countries such as Kenya, Guatemala and Nicaragua now not only have more children in schools but also have a larger proportion who are learning, with the proportion of children from poor families who are learning catching up with those of rich families. We need to learn from the experiences of such countries.

4. Educational inequality narrows when poor children receive the same quality of education as rich children

We find that educational quality has an important role to play in narrowing inequalities. Drawing on data from Kenya, Tanzania and Uganda, we show that when children from poor families have the same opportunities as children from rich families in terms of educational quality, inequalities in learning between these children are far narrower. We find a gap in learning inequalities between 20 to 25 percentage points when we compare poor and rich children across all government schools. But for poor and rich children within the same schools and so receiving the same quality of education, the learning gap is around 10 percentage points. And the gap is even narrower for children within the same classroom: only around a 5 percentage point difference (Figure 1).

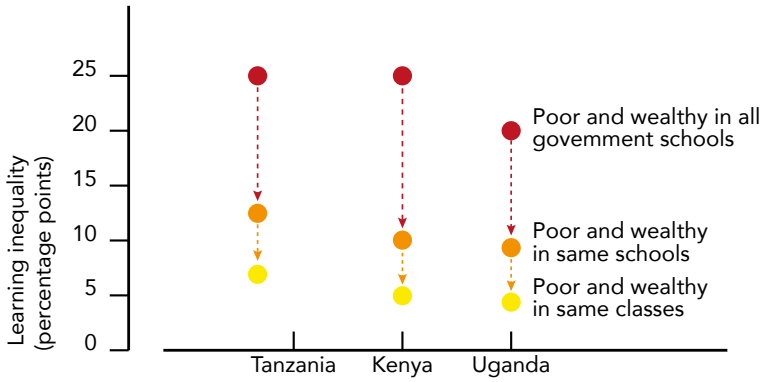

Figure 1:
Learning gaps are far narrower among poorer children who get similar schooling opportunities as rich children (Source: Uwezo data, Tanzania, Kenya and Uganda)

HOLISTIC APPROACHES

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HOLISTIC APPROACHES TO REDUCE MALNUTRITION

Malnutrition, whether under- or over-nutrition or a combination of both — "the double burden of malnutrition" — and its consequences have been a major global and national concern as it is a fundamental contributing factor to morbidity and mortality in both developing and developed countries. The ecological causes of malnutrition are very complex and related to inequality, poverty, food insecurity, poor education and inaccessibility to basic health services. Alleviation or elimination of all forms of malnutrition will require holistic approaches involving multiple stakeholders and strategies at both macro- and micro-levels.

Nutrition is a link between food and health, regarding the fulfillment of energy, protein, vitamin, mineral and phytonutrient requirements from food in human life course.

ULTIMATE GOALS

Good nutrition and well-being for all

- Supplementation with food/micronutrients
- Food fortification
- Food regulation
- Food and Nutrition education/ communication
- Right to food (and nutrition)
- Food based approach: ensuring food security/consumption of safe and nutritious food
- Public health measures: basic services, immunization, sanitation, water supply, deworming
- Community based (integrated) approaches
- Others: M&E, R&D, Capacity Building (CB)

In operation, the meaning of "nutrition" is a link between food and health with regard to fulfilling the needs for energy, protein, vitamins, minerals and other phytonutrients from foods to provide people with good nutrition and well-being. Therefore, human-centred development should be emphasized so that agriculture and food systems as well as education and health systems are oriented towards providing good nutrition for all. People in general should have essential nutrition literacy, meaning both knowledge and practices which lead to food and nutrition security.

The Food and Agriculture Organization of the United Nations (FAO) and other international agencies in 2012 defined "food and nutrition security" to mean that all people at all times have physical, social and economic access to food which is safe and can be consumed in sufficient quantity and quality to meet their dietary needs and food preferences, along with an environment of adequate sanitation, health services and care, allowing for a healthy and active life.

To reduce malnutrition there are many strategies to be implemented separately or together, including supplementation with food and/or micronutrients, food fortification, food regulation, ensuring the right to food and nutrition, evidence-based food and nutrition education and communication, ensuring food security, public health measures such as universal health services and ensuring clean water and sanitation and community-based programs integrating many strategies with maximum participation. In

MINIMUM BASIC SERVICES
(Health, Education, Agr. Extension)

SUPPORTIVE SYSTEM
Training
Funding
Problem Solving
Supervision

FACILITATORS

Interface
(service providers and community leaders)
Plan/goals
Implementation
Monitoring/evaluation

Community Leaders
Family
Individual

VOLUNTEERS
(1:10 households)

BASIC MINIMUM NEEDS INDICATORS
(Including nutrition)

Menus (Activities):

- Antenatal Cares (ANC)
- Growth Monitoring and Promotion (GMP)
- Food production
- Food and nutrition education
- Food sanitation & safety
- School lunch and milk
- Program since 1992
- Other activities

addition, the successful approach will also require research and development, capacity building and monitoring and evaluation for further improvement and fine-tuning of the program.

At a national level, nutrition objectives, goals and strategies with specific indicators should be core elements of the policy and strategy of relevant sectors such as agriculture, food, health, education and local administration. There should also be mechanisms or forums for holistic integration of those goals and strategies to derive national plans of action. Institutional arrangement or strengthening should also be managed to streamline efforts so that those strategies and actions will be implemented successfully at the community level. National mechanisms used vary from country to country, and could mean rural development, poverty alleviation or social improvement programs.

At the community level, sound nutrition goals and strategies from the national commitments must be integrated and implemented at the district level and below to include basic health and other social services, mass mobilization through volunteers with maximum participation, and mutual efforts to reduce malnutrition and achieve nutrition and related indicators. Examples of success stories to reduce malnutrition can be found in many countries, such as the Zero Hunger program in Brazil, the Poverty Alleviation Plan in Thailand and the Rural Development Scheme in China.

In conclusion, it is quite clear that holistic approaches with nutrition goals and strategies as integral parts of national policy and strategy in related sectors and implemented at the community or local level are effective in reducing malnutrition. These approaches should certainly be expected to reduce over-nutrition and related non-communicable diseases. Effective management systems in planning, implementing and evaluating involved multi-level strategies with multiple stakeholders, particularly people at the local level, are essential for any successful implementation.

CAPACITY-BUILDING IN RWANDA

Prof. Dr. Rwigamba Balinda
Founder and President
Kigali Independent University (ULK)
Kigali
Rwanda

The establishment of Kigali Independent University (ULK) and its contribution towards capacity-building in Rwanda

Following the genocide perpetrated against the Tutsi in 1994, the government of Rwanda focused on prioritizing reconciliation and unity, rehabilitation, and capacity-building activities. Many teaching staff were killed during the genocide and many others fled the country, fearing the punishment for being involved in genocide. Therefore, there was a pressing need for training a new workforce, armed with the needed skills and competencies to rebuild the country.

With a humble start and limited resources, yet with a strong determination to contribute towards the socio-economic development of my country, Kigali Independent University (Université Libre de Kigali, ULK) was established as a private chartered University on 15 March 1996.

The underlying motivation of ULK has been, in addition to providing a solid scientific knowledge to students, to rehabilitate them from post-genocide trauma, instill in them strong ethical values (such as integrity, love, forgiveness, tolerance, unity, justice, humility, and complementarity) as well as Rwandan cultural aspects and to provide them with a civic education. This has been done through our philosophy of education (including aspects such as the University culture, motto, signboards, and regulations) and through my course of "Ethics, Rwandan Culture and Civic Education" taught to all our incoming students.

The main mission of ULK has three components: (1) providing our students with solid and holistic scientific knowledge, thereby enabling them to become actors and organizers of a complete development of the nation; (2) promoting research in order to meet the community's needs in addressing development challenges at the regional and the national level; and (3) engaging in social responsibility.

As far as the social mission is concerned, Rwigamba Balinda's Foundation was established to assist students deprived of financial capacities. Since its creation in 2001, the foundation has provided financial aid to a total of 2,882 students and helped them complete their studies.

The motto of ULK is "Science and Conscience". Its fundamental values are integrity, humility, determination, and excellence. Its philosophy is based on four fundamental principles: to have faith in God, to know one's mission on earth, to live by ethical values, and to have positive thoughts. Ultimately, the vision of ULK is to stand out as an excellent university at the heart of Africa with highly motivated students and highly qualified personnel endowed with ethical values. ULK has been striving to be a University of Excellence, which has been confirmed by being ranked the second-best University and the top private University in Rwanda.

In terms of financing, ULK has never benefited from any financial support whatsoever since its inception in 1996. It chiefly operates thanks to the financial contribution of its Founder, bank loans, and modest tuition fees (approximately RWF 400,000 [USD 500] per year).

ULK has put in place state-of-the-art infrastructure and equipment. The physical library counts 109,092 volumes and the digital library boasts 500 computers and access to a total of 1,326 different publishers of e-books and e-journals. Kigali Independent University has also embraced ICT to streamline its management, teaching and learning, as well as energize research and support skills development.

From its inception in 1996, ULK has produced 29,630 graduates (both undergraduates and postgraduates) comprising 16,100 females (54%) and 13,530 males (46%). They hold very important key positions in government, the private sector and in civil society sectors and many also created their own jobs.

Many countries across the world are focused on achieving sustainable development goals with specific key areas including poverty eradication, zero hunger, good health and well-being, quality education, and gender equality. ULK in its strategic plan has started its next important project: building the ULK Hospital (both a specialty and a general hospital) and School of Medicine and Health Sciences, in order to continue contributing towards the good health and well-being of our society. To date, ULK has recorded very good progress through completion of the raft foundation of three blocks of the project. The hospital will train the next generation of Rwandan healthcare professionals and provide world-class health services to many people currently unable to afford medical treatment abroad because of limited economic resources.


STOP
UNIVERSITY
OF
ZIMBABWE

Profile of a Nutrition Institute

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The Department of Food Nutrition and Family Sciences University of Zimbabwe

Introduction

The Department of Food, Nutrition and Family Sciences (DFNFS) is part of the Faculty of Science of the University of Zimbabwe. DFNFS is viewed as one of the leading training institutions in Zimbabwe, with a strong focus on teaching and research. It is a dynamic department, with staff members who are passionate about teaching and who engage in innovative research relevant to the nation. It constantly seeks to improve existing techniques by which new products are developed, processed, packaged, stored and transported and to develop innovative ways of addressing the current nutrition problems in Zimbabwe as it works hand-in-hand with the relevant stakeholders, especially the Ministry of Health and Child Care. The mission of the Department is to be a nationally and internationally competitive centre of excellence in Food Science and Nutrition, and to supply the Zimbabwean community, through visionary education and innovative research, with cutting-edge technology, knowledge and environmentally-friendly food products and practices; research-based evidence to help solve nutrition problems; as well as well-trained role players in the field of nutrition and food sciences.

Undergraduate programmes

Teaching staff consists of experts in food science and nutrition with a staff complement of twelve lecturers. The department offers two undergraduate degrees: a BSc Hons in Food Science and Technology as well as a BSc Hons in Nutrition Science, both of which are four-year programmes, including a one-year internship.

ZIMBABWE

AREA

Total:	390,757 km^2
Agricultural land:	42.5%
Arable land:	10.9%

POPULATION

Total:	14,546,961 (est.)
Urban population:	32.4% (2015)
Under age 15:	37.8%
Median age:	20.6 years (male 20.5 years / female 20.8 years)
Net migration rate (per 1000):	0 (2016 est.)
Rate of urbanization:	2.3% annual rate of change (2010-2015 est.)

POPULATION GROWTH RATE

Total:	2.2% (2016 est.)
Urban areas:	2.6% (1990-2012 est.)
Total fertility rate:	3.5 children born/ woman (2016 est.)

GDP (per capita, PPP): $2,000 (2016 est.)

LIFE EXPECTANCY AT BIRTH

Total: 58 years Male: 57.3 years / Female: 58.7 years

MORTALITY RATES

Births attended by skilled health personnel*:	47.5% (2008-2012)
Neonatal mortality rate (2012):	39/1000
Infant mortality rate (at birth):	25.9/1000
Infant mortality rate (under 1):	56/1000 (2012)
Under-five mortality rate (2012):	90/1000
Under-five mortality rate, rank:	22
Maternal mortality rate (2015 est.):	443/100,000 live births
Life expectancy at birth (2016 est.):	58 years

INFANT AND YOUNG CHILD FEEDING

Six-month exclusive breastfeeding rate (2008-2012):	31.4%
Early initiation of breastfeeding (2007-2011):	65.2%
Timely complimentary feeding rate (6-9 months)	86%
Children who are still breastfeeding at 12-23 months:	19.5%

KEY NUTRITIONAL ANTHROPOMETRY

Low birth weight (2008-2012):	11%
Underweight (moderate and severe, 2008-2012):	9.7%
Stunting (moderate & severe) in children < 5 years:	32% (2008-2012)
Prevalence of wasting (moderate and severe):	3% (2008-2012)

MICRONUTRIENT DEFICIENCIES

Percentage of households consuming iodized salt (2008-2012):	94%
Vitamin A supplementation (full coverage, 2012):	61%

OTHER PARAMETERS

Median age at first birth among women 25-29 (2010/11 est.):	20.5 years
Birth registration (%, urban / rural):	66.2% / 42.7%
Total adult literacy rate:	86.5%
% of population using improved sanitation facilities, 2015, total:	36.8%
% of population using improved sanitation facilities, 2015, urban:	49.3%
% of population using improved sanitation facilities, 2015, rural:	30.8%
% of population using improved drinking-water sources, 2015 est., total:	76.9%
Immunization coverage (%) 2012, BCG:	99%
Immunization coverage (%) 2012, DTP1:	95%
Immunization coverage (%) 2012, DTP3:	89%
Antenatal care coverage (%), at least four visits (2008-2012):	64.8%
Delivery care coverage (%), skilled attendant at birth:	66.2%
Physician density (2011):	0.08/1,000
Adult HIV prevalence (%) 2012:	14.7%
Obesity (adult prevalence rate 2014):	8.4%

After completion of the programme, graduates have a strong foundation in basic science; a sound understanding of nutrient functions, sources, and requirements, and of nutrition in disease processes and across the life cycle; as well as knowledge in related areas such as food science and public health. The graduates are expected to provide scientific services in the areas of food technology and public-health nutrition. They also acquire diagnostic skills in identifying community and individual nutrition problems, and in data analysis as well as basic research skills. DFNFS has trained over one thousand food scientists and nutritionists since its inception in 1994 and the graduates have been absorbed in various sectors locally and internationally including the food industry, NGOs, government departments, academic institutions and research institutions.

Research and post-graduate programmes

The department conducts research in various areas in food product development as well as in public health nutrition. Current research projects include:

An investigation on novel post-harvest technologies for reducing contamination of grain by harmful fungi, thus reducing aflatoxin exposure to humans, focusing mainly on women and children under five years, who are the most vulnerable group. The research is also looking at women and children's dietary diversity and nutritional status, and their relationship with aflatoxin exposure. The communities in which the study is being conducted are being trained in nutrition and health risks associated with consumption of food contaminated with aflatoxins including the mitigation strategies that can reduce aflatoxin contamination of food and food crops.

An investigation of childhood obesity is aimed at establishing the nutritional status of pre-school children in parts of Zimbabwe. Results of the research will help in finding ways of reducing obesity among children.

The development of food products from the *Parinari curatellifolia* fruit is aimed at addressing food shortages among communities especially during periods of drought. The initiative will allow communities to prepare food from the fruit and from locally grown cereals.

The development and commercialization of baobab-flavoured yoghurt is set to sustainably utilize wild fruit in food product development. The process will increase the variety of yoghurt products available on the market.

Through investigations within these research topics, we are also training master of philosophy and doctor of philosophy students.

In the past, the department has been involved in research into the food safety of street vendors' foods; Vitamin-A trial research for reducing infant mortality, maternal HIV infection and mother to child transmission; facilitating the effective production and marketing of processed food products by small-scale producers in rural communities in Zimbabwe; and other projects.

Short courses

The department also offers various short courses in the field of nutrition and food science such as sports nutrition, nutrition in the life cycle, food safety and food inspection.

Community service

The department is very visible in the community, offering consultation services on national nutrition and health days and consulting services to the food industry, and it also represents the university on various boards and committees such as Zimbabwe Nutrition Association, Nutrition Action Zimbabwe, Nutrition Cluster, Food Fortification taskforce, and the Standards Association.

Future prospects

The department endeavours to build a standalone, well-equipped unit with spacious teaching and laboratory space including a pilot plant and a research kitchen. Currently, we are working on introducing a BSc degree in Dietetics and MSc degrees in Nutrition and Food Science.


INSTITUTE OF FOOD, NUTRITION
AND FAMILY SCIENCES


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MAIN LIBRARY


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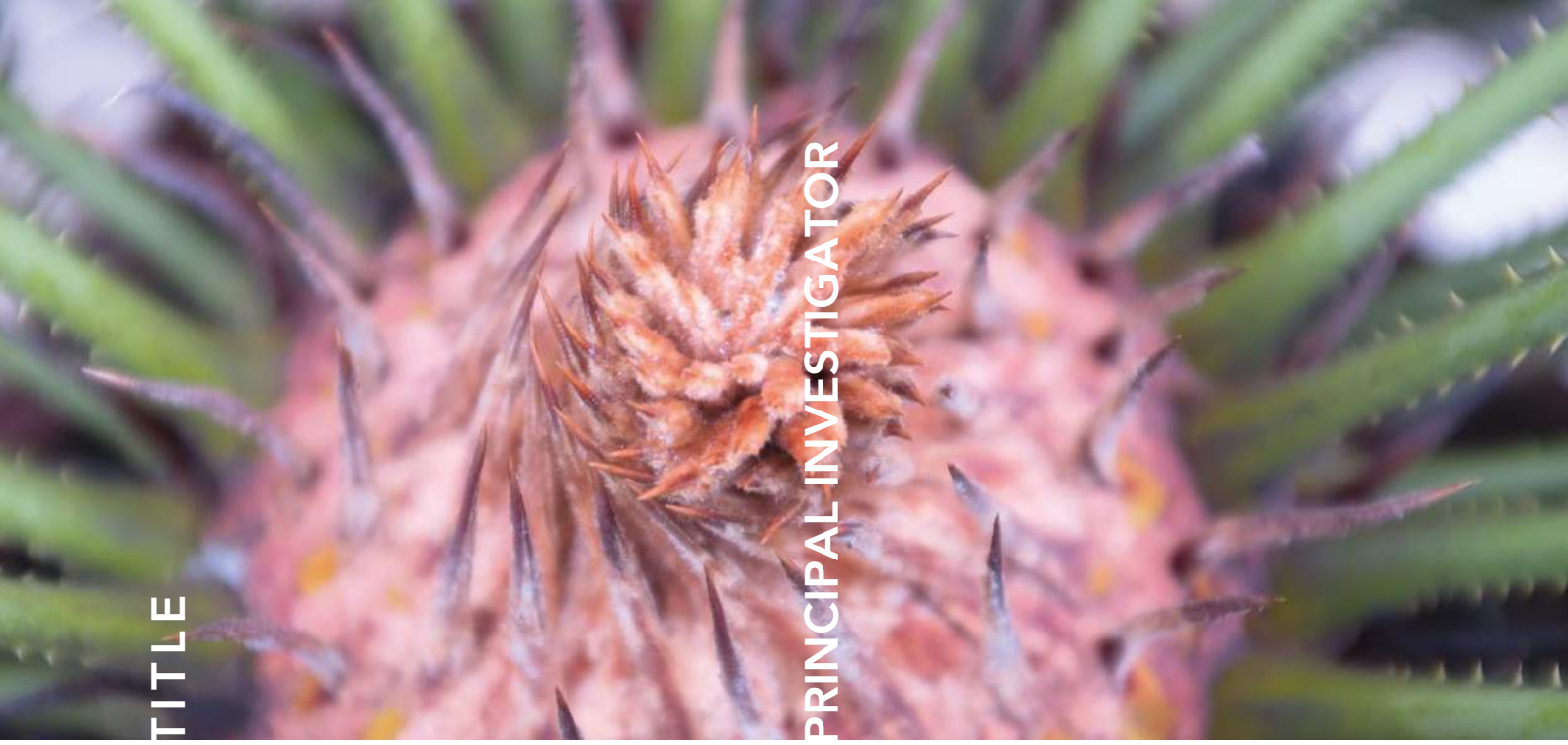
Ongoing Projects

	TITLE	PRINCIPAL INVESTIGATOR
MICRONUTRIENTS		
1	2011 / Effect of soybean supplementation, parasite control and nutrition education on iron status of adolescent girls in rural China	Lei Li Medical College of Xiamen University, Siming District, Xiamen, China
2	2014 / Minimizing the negative effect of iron supplementation and fortification on gut microbiota using local resources	Siti Helmyati Gadjah Mada University, School of Health and Nutrition, Faculty of Medicine, Yogyakarta, Indonesia
3	2015 / The effect of mixed green leafy vegetables powder on vitamin A and anemia status of Ghanaian schoolchildren	Godfred Egbi University of Ghana, Noguchi Memorial Institute for Medical Research, Legon, Ghana
4	2015 / Nutrition promotion for improving iodine status of children in an iodine-endemic area in West Java, Indonesia	Leily Amalia Furkon Bogor Agricultural University, Bogor, Indonesia
INFANT AND CHILD NUTRITION		
5	2007 / Improving nutritional status of children aged 6-18 months in a semi-arid area in Kenya: The potential of amaranth seed flour	Alice Mboganie Mwangi University of Nairobi, Applied Nutrition Programme, Uthiru-Nairobi, Kenya
6	2008 / Nutrition, anaemia, growth and oxygen weaning in low-birth-weight oxygen-dependent infants in a Kangaroo Clinic	Nathalie Charpak The Kangaroo Foundation, Bogota, Colombia
7	2010 / Effect of fish meal and Vitamin C on the iron status of Ghanaian children consuming cowpea-based food	Godfred Egbi University of Ghana, Noguchi Memorial Institute for Medical Research, Legon, Ghana
8	2010 / Intensive nutrition and hygiene education for improving nutrient intake of children (6-11 months)	Dwi Nastiti Iswarawanti SEAMEO Regional Center for Food and Nutrition, Jakarta, Indonesia
9	2010 / Testing the efficacy of an audio program and discussion guide in promoting exclusive breastfeeding in Cameroon, Africa	Susanne Montgomery Loma Linda University, School of Public Health, Loma Linda, California, USA

INFANT AND CHILD NUTRITION

	TITLE	PRINCIPAL INVESTIGATOR
10	2010 / Efficacy of combined selenium and iron supplementation on micronutrient status of school children	Nguyen Van Nhien National Institute for Food Control, Hanoi, Vietnam
11	2011 / Effect of hookworm elimination and vitamin A intervention on anaemic status of pre-school children in Sichuan, China (resubmission)	Ke Chen Chengdu Maternal and Children's Health Care Hospital, Chengdu, Sichuan, China
12	2012 / Food-based approaches to reduce childhood nutrients-energy malnutrition in Bangang community, Cameroon	Marie Modestine Kana Sop University of Douala, Faculty of Science, Douala, Cameroon
13	2012 / Drama for behaviour-change communication on breastfeeding and complementary feeding practices in rural areas of Osun State, Nigeria	Beatrice Olubukola Ogunba Obafemi Awolowo University, Department of Family, Nutrition and Consumer Sciences, Ile ife, Nigeria
14	2013 / Infant and young-child feeding and care practices of caregivers in the Province of Albay, Philippines	Joyce Louise Cruz Ignacio University of The Philippines Los Banos, College of Economics and Management, Laguna, Philippines
15	2013 / Formulation and characterization of infant flours using spirulina powder in replacement of multivitamin-mineral complex	Evariste Mitchikpe University of Abomey Calavi, Department of Nutrition and Food Sciences, Cotonou, Benin
16	2014 / Effects of feeding style and fiber content of complementary foods on the appetite of Ethiopian infants	Kaleab Baye Addis Ababa University, Center for Food Science and Nutrition, Addis Ababa, Ethiopia
17	2014 / Effect of personalized nutritional counselling on child growth and feeding practices in Burkina Faso	Yassinme Elysee Somasse Polytechnic University of Bobo-Dioulasso, Department of Public Health, Bobo-Dioulasso, Burkina Faso



	TITLE	PRINCIPAL INVESTIGATOR
MATERNAL NUTRITION	18 2008 / The development of new norms for indicators of iodine status during pregnancy and its impact on the prevalence of mental retardation in children	Chen Zupei Tianjin Medical University, Institute of Endocrinology, Tianjin, China
	19 2009 / Impact of daily consumption of vitamin-A-fortified oil on breast milk vitamin-A concentration and vitamin-A status of lactating Moroccan women	Najat Mokhtar Ibn Tofail University, Nutrition Unit, Kenitra, Morocco
	20 2010 / Urinary iodine concentration of pregnant women in Zambia as an indicator of their iodine nutrition status	Cyprian Katongo Copperbelt University, School of Mathematics and Natural Sciences, Kitwe, Zambia
	21 2010 / Pre-conceptional vs gestational food supplements and pregnancy outcomes in rural Vietnam	Tu Ngu National Institute of Nutrition, Department of Applied Nutrition and Nutritional Surveillance at the National Institute of Nutrition, Hanoi, Vietnam
	22 2013 / Impact of pre-pregnancy micronutrient supplementation on infant growth and development	Phuong Hong Nguyen Thainguyen Medical School, Thainguyen, Vietnam
	23 2016 / Improving child growth and development through nutrition and psychosocial intervention in early childhood education (PAUD) setting in rural areas	Ali Khomsan Bogor Agricultural University, Department of Community Nutrition, Bogor, Indonesia
CHILD BEHAVIOURAL DEVELOPMENT	24 2012 / Maternal zinc nutrition: Its influence on human health and development in Peruvian children	Nelly Zavaleta Instituto de Investigacion Nutricional, Lima, Peru
	25 2013 / Food-based intervention and psychosocial stimulation to improve child growth and development: First follow-up study	Umi Fahmida University of Indonesia, SEAMEO RECFON, Jakarta, Indonesia

IMMUNE DEFENSE AND INFECTION

26 2011 / Exploration of Myanmar rural caregivers' concepts on childhood diarrheal disease (6 -24 months) and its management related to ORS use and feeding

Khaing Mar Zaw
University of Indonesia, SEAMEO RECFON, Jakarta, Indonesia

EPIDEMIOLOGIC TRANSITION

27 2009 / A pilot study of school-based peer education and obesity-related behaviours in adolescents in Beijing, China

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

BONE HEALTH

28 2016 / Daily consumption of dried bean curd and nutrition education on bone health of postmenopausal women in China

Lei Li
School of Public Health, Xiamen University, Xiamen, Fujian Province, China

TITLE

PRINCIPAL INVESTIGATOR

FORGOTTEN CROPS / AGRICULTURE

	TITLE	PRINCIPAL INVESTIGATOR
29	2014 / The efficacy of biofortified pearl millet in a randomized controlled trial with children <2y in rural Eastern Kenya	Mueni Hellen Ndiku & Sabaté Joan University of Eastern Africa, Baraton School of Science and Technology, Eldoret, Kenya Loma Linda University, School of Public Health, Loma Linda, California, USA
30	2014 / Promoting food sovereignty through a cooperative model for sustainable organic farming in the Mayan Region, Mexico	Cristina Osorio-Vazquez Universidad Intercultural Maya de Quintana Roo, Quintana Roo, Mexico

OTHER RESEARCH AREAS

31	2008 / Causes and control of food insecurity: A pilot model in the Northwest of Iran	Saeed Dastgiri Tabriz University of Medical Sciences, Faculty of Medicine, Tabriz, Iran
32	2011 / Effectiveness of nutrition package in improving growth of rural children (6-23 months): A cluster randomised trial	Kissa B.M. Kulwa Sokoine University of Agriculture, Department of Food Science and Technology, Morogoro, Tanzania
33	2012 / Prenatal and young-child nutritional supplementation and early childhood body composition, growth and development	Momodou K Darboe MRC International Nutrition Group, Banjul, Gambia
34	2012 / Consumer acceptability of spirulina in Zimbabwe, and effect of cooking on spirulina provitamin A carotenoids	Tawanda Muzhingi Tufts University, Avondale, Harare, Zimbabwe
35	2012 / Effect of nutrient-dense complementary food on catch-up growth of Indonesian moderately stunted children	Duma Octavia Fransisca University of Indonesia, SEAMEO RECFON, Jakarta, Indonesia
36	2013 / Child-centered counseling and home-based food production to improve dietary adequacy and growth of young children in southwestern Ethiopia	Abebe Gebremariam Jimma University, Department of Population And Family Health, Jimma, Ethiopia

OTHER RESEARCH AREAS

	TITLE	PRINCIPAL INVESTIGATOR
37	2013 / Assess the impact of public health services distribution of vitamin A in the under-five children in remote rural Zambia	Frederick D Kaona University of Zambia, Mwengu Social and Health Research Center, Ndola, Zambia
38	2013 / Behavior change and nutrition associated with integrated maternal/child health, nutrition and agriculture program	Manolo Mazariegos Institute of Nutrition of Central America and Panama (INCAP), Guatemala City, Guatemala
39	2013 / Healthy kitchens, healthy children: A school-based cluster randomized controlled trial	Nadine Sahyoun & Hala Ghattas University of Maryland, Department of Nutrition and Food Science, College Park, Maryland, USA and American University of Beirut, Center for Research on Population and Health, Beirut, Lebanon
40	2013 / Nutrition and food security: Impact of soil fertility and productivity of home gardens on family nutrition (resubmission)	U R Sangakkara †, continued by Janaki Mohotti University of Peradeniya, Faculty of Agriculture, Peradeniya, Sri Lanka
41	2013 / Study on effects of excess iodine and the tolerable upper intake level of iodine for children (Pilot study)	Wanqi Zhang Tianjiin Medical University, Public Health College, Tianjin, China
42	2014 / Nutrition gap map: A comprehensive mapping, quality assessment and summary of nutrition-relevant systematic reviews	Zulfiqar Ahmed Bhutta Aga Khan University Hospital, Center of Excellence in Women and Child Health, Karachi, Pakistan
43	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
44	2015 / Participatory prototyping complex agro-ecosystem designs to produce diverse food products in East Java, Indonesia	Uma Khumairoh University of Brawijaya, Faculty of Agriculture, Malang, East Java, Indonesia
45	2015 / Removing inorganic arsenic from rice	Andrew A. Meharg & Habibur Rhaman Queens University Belfast, Plant and Soil Science, Belfast, Northern Ireland & Bangladesh Agricultural University (BAU), Mymensingh, Bangladesh

TITLE

PRINCIPAL INVESTIGATOR

OTHER RESEARCH AREAS

46 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 School of Public Health and Health Systems, Waterloo, Canada
47 2015 / Maternal folate supplementation and epigenetic changes in the offspring	Phuong Hong Nguyen Thainguyen Medical School, Thainguyen, Vietnam
48 2015 / Analysis of global variations on child growth and validity of the universality of the WHO 2006 growth standard	P. Rannan-Eliya Ravindra University Colombo, Institute for Health Policy, Colombo 2, Sri Lanka
49 2015 / Prevalence of hypoplasia-associated severe early childhood caries and deciduous molar hypomineralization amongst 3-to-6- year-old anganwadi children	Bulani Mahima Bharatkumar Dr. D.Y. Patil Dental College and Hospital, Pune, Maharashtra, India
50 2015 / Effect of vitamin B12 supplementation during pregnancy and 6 month postpartum to improve B12 status and child development	Towfida Jahan Siddiqua ICDDR, B, Nutritional Biochemistry Lab, Laboratory Sciences Division, Dhaka, Bangladesh
51 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
52 2016 / Risk factors and associated cost of preventing childhood stunting: A case study of Buhweju district, Uganda	John Bukusuba (Mukisa) Makerere University, School of Food Technology, Nutrition and Bioengineering, Kampala, Uganda
53 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, College of Engineering and Technology, Dar es Salaam, Tanzania
54 2016 / Viral contamination of vegetables eaten raw: Sanitary impacts on Usme vulnerable population (Bogota)	Carlos Arthuro Guerrero-Fonseca Universidad Nacional de Colombia, Molecular Biology Virus Laboratory, Faculty of Medicine, Bogota, Colombia

Publications

Chen K, Xie HM, Tian W, Zheng X, Jiang AC. Effect of single-dose albendazole and vitamin A supplementation on the iron status of pre-school children in Sichuan, China. Br J Nutr 2016;1-9 (doi:10.1017/S0007114516000350).

Chen W, Li X, Guo X, Shen J, Tan L, Lin L, Wu Y, Wang W, Wang W, Bian J, Zhang W. Urinary iodine excretion (UIE) estimated by iodine/creatinine ratio from spot urine in Chinese school-age children. Clin Endocrinol 2016;1-6 (doi: 10.1111/cen.13282) [Epub ahead of print].

Chen W, Li X, Wu Y, Bian J, Shen J, Jiang W, Tan L, Wang X, Wang W, Pearce EN, Zimmermann MB, Carriquiry AL, Zhang W. Associations between iodine intake, thyroid volume, and goiter rate in school-aged Chinese children from areas with high iodine drinking water concentrations. Am J Clin Nutr 2016;1-6 (doi: 10.3945/ajcn.116.139725) [Epub ahead of print].

Chen W, Wu Y, Lin L, Tan L, Shen J, Pearce EN, Guo X, Wang W, Bian J, Jiang W, Zhang W. 24-hour urine samples are more reproducible than spot urine samples for evaluation of iodine status in school-age children. J Nutr 2016;146:142-6.

Di Maria SA. Caractérisation de la fraction fibre d'aliments de complément à base de céréales et de légumineuses destinés à de jeunes enfants Ethiopiens. Master en Biologie santé 2016 (Supervision par Mouquet-River C, Verniere Ch et Baye K), Université de Montpellier, Institut de Recherche pour le Développement IRD, Montpellier, France 2016.

Doak CM, Campos Ponce M, Vossenaar M, Solomons NW. The stunted child with an overweight mother as a growing public health concern in resource-poor environments: a case study from Guatemala. Ann Hum Biol 2016;43:122-30.

Fahmida U, Santika O, Kolopaking R, Ferguson E. Complementary feeding recommendations based on locally available foods in Indonesia. Food and Nutrition Bulletin 2014;35:S174-9.

Hlaing LM, Fahmida U, Htet MK, Utomo B, Firmansyah A, Ferguson EL. Local food-based complementary feeding recommendations developed by the linear programming approach to improve the intake of problem nutrients among 12-23-month-old Myanmar children. Br J Nutr 2016;S16-26.

Kahsay M. Effect of fiber content and responsive feeding style on intake of infants aged 9-11 months in West Gojam, Ethiopia. MSc thesis in Food Science and Nutrition (Supervisors Baye K, Mouquet-Rivier C), Addis Ababa University, Center for Food Science and Nutrition, Addis Ababa, Ethiopia 2016;80pp.

Mananga MJ. Influence de l'état et de l'intervention nutritionnels sur la prévalence de l'anémie chez les enfants de moins de 24 mois dans la communauté rurale de Bangang (Ouest-Cameroun). PhD thesis in biochemistry (directed by Kana Sop MM); Unité de Formation Doctorale de Chimie-Biochimie, Université de Douala, Faculté des Sciences, Douala, Cameroun 2016.

Mengesha S. The effect of high fiber and low fiber complementary food on simulated gastrointestinal digestion viscosity: implication to appetite regulation. MSc thesis in Food Science and Nutrition (Supervisor Baye K), Addis Ababa University, Center for Food Science and Nutrition, Addis Ababa, Ethiopia 2016;63pp.

Nolla NP. Statut nutritionnel et pratiques alimentaires chez les enfants âgés de 5 ans au plus dans le groupement Bangang, Ouest-Cameroun. PhD thesis in biochemistry (directed by Kana Sop MM); Unité de Formation Doctorale de Chimie-Biochimie, Université de Douala, Faculté des Sciences, Douala, Cameroun 2016.

Osorio Vazquez MC, Bressers H Th.A., Franco Garcia ML, De Boer C, Reyes Maya OI. Elements of success in cooperatives conformed by Maya women in the Yucatan Peninsula, Mexico. International Journal of Research and Education (IJRE) 2016;1:1-2.

Tariku A. Effect of feeding style on intake of complementary foods appetite and nutritional status of infants aged 9-11 months in West Gojam Ethiopia. MSc thesis (2-year program) in Food Science and Nutrition (Supervisors Baye K, Mouquet-Rivier C), Addis Ababa University, Center for Food Science and Nutrition, Addis Ababa, Ethiopia 2016;87pp.

Abstracts 2016

Gonzalez Casanova I, Nguyen Ph, Young MF, Ford ND, Nguyen H, Pham H, Truong TV, Truong SV, Ramakrishnan U. Ultrasound measurements during the third trimester predict height and stunting at 1 y of age among Vietnamese children. Experimental Biology 2016;6156.

Gonzalez-Casanova I, Nguyen Ph, Pham H, Nguyen S, Truong TV, Martorell R, Ramakrishnan U. Effects of preconception supplementation with multiple micronutrients or iron and folic acid compared to folic acid only on offspring linear growth during the first two years of life: a randomized controlled trial in Vietnam. Micronutrient Forum 2016;0268.

Nguyen Ph, DiGirolamo A, Gonzalez-Casanova I, Truong TV, Pham H, Nguyen S, Martorell R, Ramakrishnan U. Effects of weekly supplementation with multiple micronutrients or iron and folic acid before conception on offspring development at 2 years of age in Vietnam. Micronutrient Forum 2016;0267.

Nguyen Ph, Gonzalez Casanova I, DiGirolamo A, Pham H, Truong TV, Truong SV, Martorell R, Ramakrishnan U. Influences of early child nutritional status and home environment on child development in Vietnam. Experimental Biology 2016;6147.

Nguyen Ph, Young MF, Addo YO, Nguyen H, Pham H, Truong TV, Truong SV, Martorell R, Ramakrishnan U. The influence of maternal nutrition on fetal size based on ultrasound measurements throughout pregnancy. Experimental Biology 2016;5565.

Young MF, Nguyen Ph, Yaw Addo O, Pham H, Truong VT, Nguyen S, Martorell R, Ramakrishnan U. The importance of timing of gestational weight gain for infant birth size in Vietnam. Experimental Biology 2016;5629.

The publications are available free of charge upon request.

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

The Foundation

GUIDELINES FOR GRANT APPLICATIONS TO THE NESTLÉ FOUNDATION

Purpose

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

The Foundation expects research proposals to be primarily the initiative of local researchers from the developing countries. However, the Foundation will be inclined to consider favourably those applications made jointly by scientists from developed countries

with those from developing countries provided it is clear that the initiative will result in capacity building and human-resource development in the latter and that the bulk of the budget is spent in the developing country.

Current Policy

Sustainable improvement in human nutrition is one of the major issues in the portfolio of the Foundation. During more than 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.

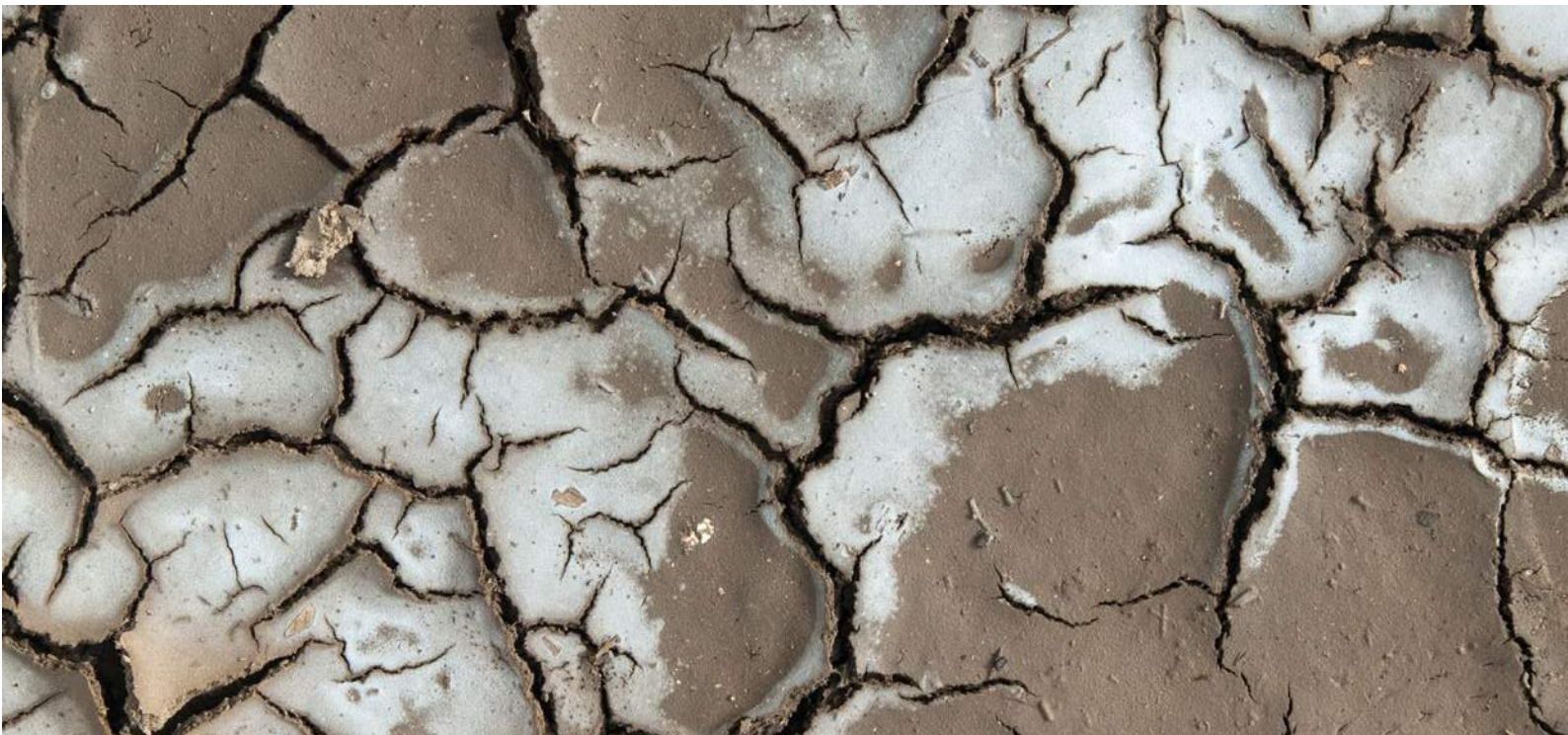
How to Apply

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 a specific expertise in different fields of nutrition. The Council is self-constituting and operates independently. The Foundation is directed jointly by the Director and the President of the Foundation.

The Council Members

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