FOCUS ON AFRICA ISSUE

sightandlife

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Sight and Life

Contents

Nelson Mandela
1918 – 2013

Welcome

Africa – the Time to Score is Now

"Ke Nako" – the cry that I will never forget when the 2010 football World Cup came to Africa. Literally it means "the time is now" or "we are ready", so it was appropriate that this was the theme of the first football World Cup to be hosted by Africa. For South Africa, after years of waiting, much planning, moments of tension, and massive construction and infrastructure development, we were finally ready to host the world's greatest and largest single sporting-event competition. "Ke Nako" we cried out with excitement as we overcame the naysayers from within South Africa and around the world. It makes me think of where Africa is now in relation to nutrition.

> "What we think or what we know or what we believe is in the end of little consequence – the only consequence is what we do."
> *John Ruskin*

This opportunity will not come again

It is an exciting time to be a nutritionist in Africa – a profession that is "IN", working in a continent that has an opportunity to show that it can turn the negative into a positive; that it can deliver. Ke Nako. But I also have a deep-seated fear that we might only continue with the endless talk and eloquent orations of the past few years and not turn the promises and commitments into actions. This opportunity – just as we refer to the 1,000 days window of opportunity – will not come again. We in nutrition in Africa have this one opportunity to turn words into actions. At a recent meeting, I was challenged by Mrs Graça Machel not to lump Africa, especially sub-Saharan Africa, together and to acknowledge that some countries are making good progress towards the Millennium Development Goals, while others are seriously lagging behind. The difference between those moving forward and the laggers lies in true leadership that knows, quoting the words of John Ruskin, that "What we think or what we know or what we believe is in the end of little consequence – the only consequence is what we do."

As nutritionists, we have over the past few years had to engage in advocacy in order to ensure that nutrition was high on the global agenda. Advocacy is so well defined by Tom Arnold of CONCERN as "involving articulating a case with a view to achieving a specific change in a proposed direction" (in the book "The Road to Good Nutrition," reviewed in this edition of *Sight and Life*). We have perhaps spent so much time communicating the message, which we can see through the SUN movement, G8 and G20 commitments, and the 2013 Global Nutrition for Growth Compact has been received, that we have not yet realized that the game has changed. The time has come to move from quoting The Lancet and laboratory research, back into the community – to focus our attention on implementation. Making the known interventions, both nutrition-specific and nutrition-sensitive, happen and be taken to scale.

We have ambassadors championing the political cause. They are being asked to speak at each event. We have heard them! What we need now, using the words of Stuart Gillespie, the CEO of the Transform Nutrition Consortium, is "more mid-level, lateral leadership to facilitate intersectoral action." African nutritionists need to lead from where we stand, roll up our sleeves, get our hands dirty, and make it happen. We will have successes and we will have failures but we can take heart from the great Nelson Mandela that "the greatest glory in living lies not in never falling, but in rising every time we fall."

Sharing our failures

We should start sharing our failures rather than hiding them. Why could we not make a public–private partnership work? Why did the government not release the funds they promised? What made it difficult to work together with the agricultural experts? How come we could not get sufficient community health workers? It is from openly discussing and debating our experiences that we will begin to address critical implementation issues. We will be forced to try new approaches and begin to build the much-needed capacity. Above all, we will LEARN, for leadership and learning are indispensable to each other.

Focus on Africa

This edition of *Sight and Life* focuses on Africa. There is an update on iodine nutrition in Africa that is without doubt a success story but with a reminder that we cannot afford to become complacent. We read about how we cannot separate under- and over-nutrition when we plan interventions. Sadly, we also bid farewell to David Barker, who leaves behind the Barker Hypothesis that has undoubtedly and profoundly influenced both our thinking and our actions. Barker's developmental origins of disease hypothesis is clearly outlined in the article by David Thurnham addressing nutrition in adolescent girls, which reminds us of the increasingly important pre-1,000 days, especially when one considers that 16 million adolescent girls give birth every year.

"This magazine inspires"

The magazine also inspires. We welcome Anna Lartey (or Anna from Ghana as she is known by many of us) as the new President of the IUNS (another Ke Nako). We go to where the real action is in our "Day in the Life" feature, to meet Eusebia who believes her calling is to ensure that 2,500 vulnerable children receive daily school meals. It is thanks to people like Eusebia that the boy on the front cover has a bright future. We hear from one of the global ambassadors for nutrition and SUN lead group member, the President of Tanzania, who shares with us the nutrition momentum in his country. In addition, there are the usual congress reports, news and views together with some suggested African good reads and fun facts. It all adds up to fulfill the Tanzanian proverb "Haba Na Haba, Hujaza Kibaba" – "Little by little, a little becomes a lot."

So as we move beyond the millennium development goals and the post-2015 development agenda comes into place, I hope that Africa will be able to shout the words we heard often during the 2010 Soccer World Cup when a goal was scored – "Laduma," "He scores!"

With warm regards,

Jane Badham
Sight and Life, Africa Office

10 facts about Africa that you might not be aware of:

01. Sudan is Africa's largest country and Seychelles its smallest.

02. 534 million people live in the region, representing 13% of the world's population.

03. There are 55 countries in Africa, if one includes the disputed Sahrawi Republic or West Sahara, of which six are islands (Cape Verde, Sao Tome & Principe, Madagascar, Comoros, Seychelles and Mauritius).

04. Africa is considered home to the world's best marathon runners. Most of them come from East Africa, and especially from the Rift Valley Province of Kenya (visit PLoS One. 2013; 8(6): e66552 to find out what makes them so fast).

05. Africa was home to one of the world's first known empires – Ancient Egypt – and most scientists agree that Africa was the birthplace of humankind some 5 million years ago.

06. Africa is home to the world's longest river (the Nile) and its most notable desert (the Sahara).

07. Over 2,000 different languages are spoken in Africa.

08. Africa covers all four hemispheres.

09. Africa has two megacities – Lagos in Nigeria and Cairo in Egypt.

10. There are fewer people with internet access in the whole of Africa than in New York City alone.

Nelson Mandela: Converting Hope Into Reality

As I was sitting at my desk proof-reading this special African edition of *Sight and Life*, I received the news that the great Nelson Rolihlahla Mandela had died at the age of 95 – a truly amazing age considering the fact that he spent 27 years in jail serving a sentence that included hard labor in a limestone quarry.

Although it came as no real surprise, as he had been ill for some time, the tears immediately started flowing down my cheeks. I am sure all of you will have read or heard many of the eloquent obituaries from global giants, but it has been the memories and stories from ordinary South Africans like myself that over the last few days have touched my heart.

Of the people, for the people

Nelson Mandela was a man of the people, for the people. He gave as much attention to meeting a world leader as he did to stopping by at his dry-cleaners to say thank you. Apart from the famous picture of the moment in history when he walked to freedom – one hand holding Winnie Mandela's and the other punching the air – it is his famous Madiba shirts, his swaying to Africa's great music and, above all, his beaming smile that are engraved on my mind. But there was so much to this icon beyond the images. He was the man who took my beloved country from the brink of civil war into a new era of freedom – *"He converted hope into reality."* He did not seek revenge; he preached reconciliation.

His special passion was undoubtedly children. When he founded the Nelson Mandela Children's Fund (one of three charitable organizations that he started), he donated to it one third of his salary and raised millions to support its work in providing leadership on issues pertaining to children and young people, influencing institutional changes so that children are seen, heard, supported, nurtured and looked after in society. This was Mandela turning his words into actions. As he himself said, *"There can be no keener revelation of a society's soul than the way in which it treats its children."*

Let us be his memorial

But it is the words and the challenge of another South African Nobel laureate and legend, Desmond Tutu, in his obituary to his dear friend and South Africa's true founding father that I want to leave with you: *"I think he wouldn't want something in stone. Ultimately he would want us, South Africans, to be his memorial. He has enabled us to know what we can become. Help us become that kind of nation."*

To honor this great African and global leader and legend, no matter where you are from, take time to reflect on how you can lead from where you stand and contribute to the betterment of the society you live in: turn thoughts and words into action.

Ke Nako. Hamba Kahle (Go well),
Nelson Rolihlahla Mandela. RIP.

Jane Badham

- *For more information on the Nelson Mandela Children's Fund, please visit* ***www.nelsonmandelachildrensfund.com***
- *To find out about more about the Nelson Mandela Centre of Memory and its work of contributing to a just society by convening dialogue around critical social issues, visit* ***www.nelsonmandela.org***
- *To learn about the work of the Mandela Rhodes Foundation that aims to help in building leadership excellence in Africa, visit* ***www.mandelarhodes.org***
- *Mandela's widow Mrs Graça Machel is founder of the The Graça Machel Trust, which provides a platform to embrace, nurture, enable and inspire women and children to soar to the fullest of their potential. It aims to empower new generations to take up the challenges of their times and create caring societies that value social justice. For more information, visit* ***www.gracamacheltrust.org***

Klaus Kraemer, *Sight and Life*

Walking the Talk

In September I had the opportunity to once again participate in the SUN (Scaling Up Nutrition) Movement global gathering in New York. There are few working in the field of public health nutrition who do not know about SUN, as it is much talked about and referenced and has been key in placing nutrition high on the global development agenda. Launched in 2010, with the ambitious goal to mobilize support and accelerate the fight against undernutrition in the most affected countries, global and national stakeholders from all sectors now meet annually on the occasion of the United Nations General Assembly (UNGA) in September to assess progress and share best practices for moving forward. This year's gathering gave me many opportunities to discuss the way forward for the nutrition movement and nutrition in general with some of the leading thinkers in the sector. Nutrition has clearly been raised on the global development agenda. Although we might have the right to bask in this glory, as it has been due to much hard work by many, we now have to rapidly move to the next level. We must accelerate the implementation of what we know works.

> "Nutrition justice – Access to good nutrition is a fundamental human right which, when denied, is a denial of natural justice"

In general, the mood at the gathering was positive – even celebratory – and with good reasons: tackling undernutrition and the concept of "nutrition justice" have become far more central to the international development agenda. Forty-three developing countries, including many of the highest-burden countries, have signed up to SUN at the highest political level; a number of regional and national strategies and plans to improve nutrition have been drafted; a new spirit of fruitful collaboration has emerged; and last, but not least, donor commitments to financing for nutrition have been increasing significantly, particularly during the last two years.

Stunting reduction offset by population growth

Yet in several respects the discussions were also sobering. For example, the nutrition indicators presented in the SUN Progress Report (available on the SUN website) showed that only four out of 41 (less than 10%) of SUN countries (Mauretania, Senegal, Mali, Ghana) are currently meeting the agreed 2012 World Health Assembly average annual rate of reduction in stunting target of 3.9%. And in 26 of 41 countries (63%), the rate is below 2% which indicates that stunting reduction is offset by the population growth rate. Moreover, delegates from many developing countries emphasized that their prospects for success would require a much greater effort in strengthening their (leadership) capacities to develop and execute appropriate nutrition interventions at scale and with increasing access to reliable funding. In many ways the two are inextricably linked. Concerns were also voiced that both donors and countries might be at risk of "talking the talk" rather than "walking the talk". It would seem there is a growing tendency to place less emphasis on nutrition-specific interventions and a greater expectation for other sectors to contribute to addressing undernutrition through "nutrition-sensitive" approaches. The complex and multidimensional issue of stunting and undernutrition must be addressed in a comprehensive way with contributions from all sectors (see my commentary in *Sight and Life* 2013;27(2),12–15). However, the quickest wins can be achieved by taking the evidence-based nutrition-specific interventions to scale. These interventions have been well described, are much discussed and clearly fall in our ambit – not only making their implementation at scale a moral obligation but also creating a significant economic win towards accelerating development.

The clear consensus and main conclusion of the New York gathering was that while the SUN Movement has established a welcome and overdue international focus on nutrition, it has now entered a far more complex and critical stage where it must deliver real and sustainable results to keep the momentum going.

"Walking the talk – Translating values into action and measured achievement"

That this change to "walking the talk" will be done should not be taken for granted. The month after the SUN gathering, on October 16, scores of nations across the globe observed World Food Day. There were, of course, conferences, panels, speeches and editorials. But there were also further grim reminders that, while we have made impressive progress globally in cutting poverty in half and reaching that associated Millennium Development Goal, nearly 850 million people worldwide remain chronically hungry and malnourished, a number that has barely changed since 2000.

Global attention cyclical and short-lived

In addition, the history of international development efforts and new initiatives such as the SUN remind us that global attention to food and nutrition security has been cyclical and short-lived. The images of famine and mass starvation in the food crisis of 1972–74 (a shortfall of grain production that caused a spike in food prices) propelled the international community to address undernutrition and commit to never again neglect agriculture and nutrition. The world solemnly pledged to address the long-term solutions through major investments in food and nutrition security programs, science, technology and capacity-building. Development assistance and financing of food and nutrition programs became the highest priority, rising by 1979 to 18% of all official development assistance (ODA). But as the immediate and most horrific indicators of the crisis declined with global increases in grain production, so did commitment to the food and nutrition sector, which steadily decreased to less than 4% of ODA in 2007. The global trend was mirrored in developing countries themselves, including those most dependent on agriculture for both economic reasons and livelihoods.

"The food crisis of 2008 put food and nutrition security back on the agenda"

The food crisis of 2008 brought food and nutrition security back on the agenda and was an important motivational factor for the establishment of the SUN. Dwindling stockpiles of staple food commodities and skyrocketing food prices triggered rioting and hundreds of deaths in dozens of countries. The number of chronically hungry people in the world rose beyond one billion and undernutrition rates soared. Nutrition made the headlines. What the world had promised never to let happen again, repeated itself some 30 years later. The 2009 G8 summit issued a pledge to reverse the neglect of agriculture, food security and nutrition with "sustained and predictable" funding. It also committed "to act with the scale and urgency needed to achieve sustainable global food (and nutrition) security" and assigned US$22 billion to the sector over 2009–2012. By 2010, the most immediate indicators of the food price crisis had fallen off. The G8's own progress report reviewed at its 2012 summit admitted that only 22% of the pledged amount had been disbursed two years into the three-year initiative. Increasing agricultural yields, however, do not necessarily mean improved nutrition. Quality of food is as important as quantity, and therefore significantly more emphasis needs to be placed on nutrition targets for agriculture.

"Those who do not learn from history are doomed to repeat it"
George Santayana, Philosopher

SUN represents an unprecedented initiative and has generated widespread support and critical momentum. But it has now entered the critical phase where it must show genuine results in order to sustain and expand that momentum. If the disappointing history of so many previous international initiatives is not to be repeated, this will require the matching of words with concrete actions, a continuous building of political will and good faith, and the leveraging of the required material and human resources from donors, philanthropists, recipient country governments, United Nations agencies, civil society, academia, public health nutritionists, and the private sector. A new nutrition 1,000 days window has been opened, and we have to accelerate concrete results in the form of less undernutrition and less stunting TODAY.

Acknowledgments

The conclusions drawn in this commentary benefitted from conversation and exchange with Keith Bezanson, formerly director of the Institute of Development Studies (IDS), who was a co-author of the initial study that led to the SUN initiative.

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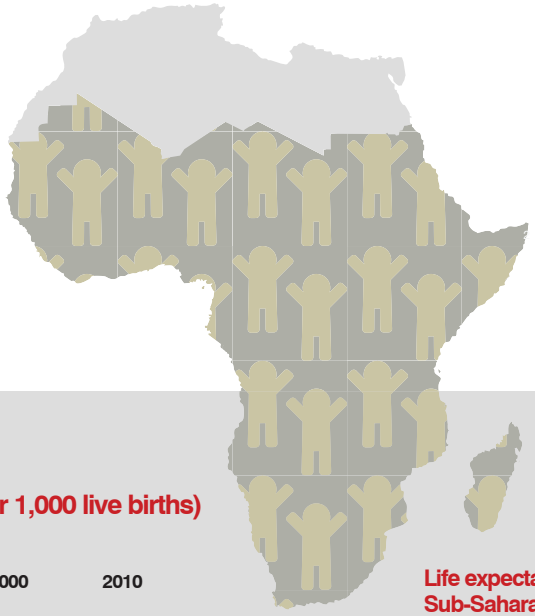
The life of an African child

A new World Bank report has found a sharp decline in the child mortality rate of African countries such as Kenya, Ethiopia and Ghana. To coincide with the Day of the African Child, we take a look at what life is like for children growing up on the world's youngest continent.

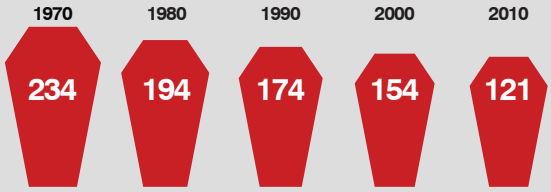


42.6% of Sub-Saharan Africa's total population are children aged up to 14.

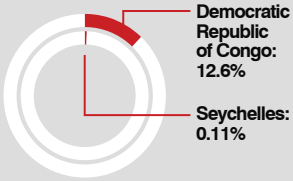
According to U.N. estimates, the number of young people aged 10-19 will increase by 237 million to 416 million between 2012 and 2050.

Surviving childbirth

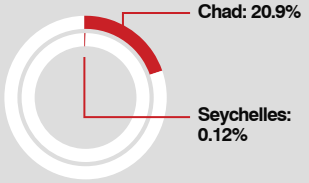
Children dying before age five (per 1,000 live births) in Sub-Saharan Africa[3]



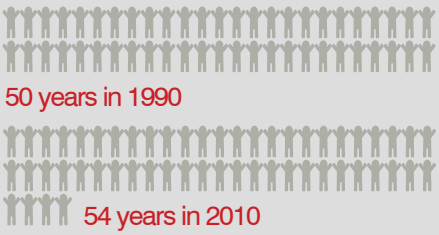
Children dying before age one[4]



Children dying before age five[5]



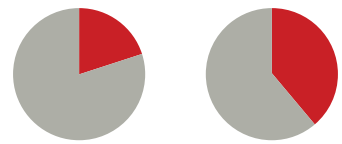
Life expectancy at birth for Sub-Saharan Africa[8]



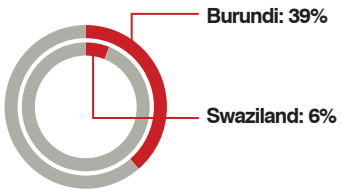
Kenya's infant mortality rate has declined by 7.6% per year.[6]
Infant mortality grew by 21% in Congo Republic during 1990-2009, the biggest increase in Sub-Saharan Africa. The largest decline was recorded in Madagascar, by 60%.[7]

Food and nutrition

Children under five in Sub-Saharan Africa[9]



Underweight children below the age of five[10]

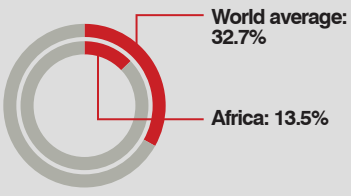


Cassava, rice, yam and millet are among some of the staple diets of a typical African child. Under-nourishment contributes to more than a third of deaths for children under five globally, according to UNICEF. Researchers use stunting, underweight and wasting as the key indicators of nutritional status.

Technology and internet use

Most African children do not have access to computers or the internet.

Internet penetration in Africa[21]



Nigeria and Egypt have the highest internet usage on the continent with 45.0 million users and 21.7 million respectively.[22]

Schools across Africa have a large number of second-hand and refurbished PCs donated by aid groups. Other projects to improve connectivity include the One Laptop per Child (OLPC) project that involves distributing a $175 XO laptop made of tough plastic, with a four-hour battery and built-in Wi-Fi.

In 2008, the XO was introduced to the first 10,000 students in Rwanda. Three years later OLPC has sent a total of 110,000 XO laptops to the country.[23]

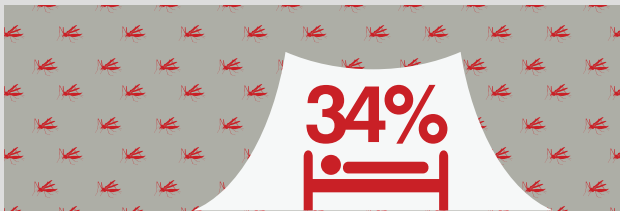
Threat of malaria

18%

Malaria accounted for 18% of deaths in children under five in Africa in 2008.[11]

Between 2000-2009 in Zambia, 41% of children under five slept under insecticide-treated nets to prevent malaria; that was just 1% in Chad and Equatorial Guinea.[12]

In Sub-Saharan Africa, 34% of children under five are sleeping under an insecticide-treated mosquito net.[13]



Living with HIV/Aids

- **HIV/AIDS accounted for 5% of deaths in children under five in Africa in 2008.[14]**
- **In Nigeria, 2.5 million children up to 17 years of age are estimated to have lost one or both of their parents to AIDS as of 2009.[15]**
- **In Sub-Saharan Africa, 15 million children have been orphaned by AIDS, as of 2009.[16]**

Going to school

A quarter of children in Sub-Saharan Africa do not go to school – a total of 32 million primary-school-age children. This is nearly half (45%) of the global out-of-school population.[17]

About 54% of out-of-school children are girls. In Sub-Saharan Africa, almost 12 million girls may never enroll.[18]

Seychelles:

Central African Republic:

Child labor

Sub-Saharan Africa has one of the highest rates of child labor in the world according to United Nations Children Emergency Fund (UNICEF).

Children aged five to 14 involved in labor 2000-2010[20]

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Long-Chain Polyunsaturated Omega-3 Fatty Acids in Food Development

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Key messages

- Fortification of foods with long-chain polyunsaturated omega-3 fatty acids (LC-PUFA), especially docosahexaenoic acid (DHA), is of growing interest because of their role in supporting the physical and mental health development of infants.
- Designing products with these long-chain fatty acids for developing countries is especially challenging as they are highly susceptible to oxidation. Environmental challenges such as heat, oxygen, light and air humidity have to be addressed together with the nutritional needs of the target population.
- In product development, sensory acceptability (fishy taste and smell) remains the main challenge. Smart fortification approaches to commonly consumed food preparations in different parts of the world are needed.
- Application of the newest technologies to treat fish and algal oils, choosing the right formulation (encapsulated powders, oils, emulsions), and optimal protective packaging are the factors required for the successful manufacture of n-3 LC-PUFA, including DHA fortified products, in order for these to become available globally to build children's futures and the future of their communities.

Introduction

The creation of food products for developing countries presents a number of challenges that might not be considered as issues in developed countries. The most important goal is to fill the nutritional gap of people suffering from nutritional deficiencies, bearing in mind that young children have different nutritional requirements from adults.

Choosing the right food is another important factor. New, unknown products may not be accepted by the target population, and the fortification of a locally known and manufactured product might be a better option. By using local foods, there is no need to change dietary habits. Moreover, this solution offers opportunities for the whole community, generates jobs, and strengthens the local economy.

Packaging is a challenge too, where the product must be protected from external factors such as humidity, oxygen, light and heat. Other challenges include storage and distribution, monitoring of quality, product shelf life and household hygiene.

There are many examples of products that consider all these aspects and which are successfully improving nutrition in many parts of the developing world. Today, home fortification with micronutrient powders or small quantities of lipid-based nutritional supplements, for example, is considered a good way to improve the nutritional status of infants and young children. However, there is still scope to include other nutrients such as docosahexaenoic acid (DHA) in products for the developing world.

DHA is a long-chain polyunsaturated omega-3 fatty acid (n-3 LC-PUFA). It is an important component of cell membranes and a fundamental building block in the development and function of nerve cells, including those in the brain and the retina. n-3 LC-PUFA should be accessible to children globally in order to help build the future of individual children and the future of their communities.

The delivery of n-3 LC-PUFA through the diet is limited even in the western world. The main source of it is marine algae, which is why DHA is found chiefly in cold-water sea fish, and therefore not widely available.

"The use of local food obviates the need to change dietary habits while at the same time giving a boost to the local economy"

Lipid-based nutrient supplement (LNS): a promising fortification vehicle for DHA.

DHA product stability

Lipid peroxidation is the most critical parameter affecting the quality and the physical/chemical stability of oils and food preparations containing polyunsaturated fatty acids such as DHA and EPA (eicosapentaenoic acid).

Oxidative degradation is undesirable and leads to loss of shelf-life, functionality and nutritional value as well as lower consumer acceptability. Oxidation of long-chain polyunsaturated fatty acids involves the interaction of PUFA molecules with highly reactive chemical species, such as free radicals and oxygen. This first step is followed by a cascade of chain reactions called the "propagation" phase, which leads to the formation of compounds causing off-flavors (like fishiness, paint-like and rancid odors). The LC-PUFA chemical structure is prone to this process and to avoid it, a deep knowledge of food chemistry, formulation, application, food packaging, sensory science, food technology and processing is required.

The oxidation products responsible for the off-flavors are sensed by the human olfactory system at very low concentration levels. Therefore minimal LC-PUFA oxidation damage may affect consumer acceptability of DHA-fortified products. Many factors can change the speed of reactions including raw material quality, pH and viscosity of ingredients, antioxidants – natural or added – processing, metal ions and enzymes, significant temperature fluctuations, or degree of exposure to light. Therefore packaging materials and technologies play a crucial role in how products containing LC- PUFA interact with the external environment.

Challenges in fortification with DHA

The beneficial health effects of LC-PUFA have given rise to a growing global interest in using highly concentrated DHA sources for fortifying food products. However, the increasing amounts of LC-PUFA levels suggested by authoritative bodies[1] such as WHO, lead to higher risks of undesired fishy flavors in the targeted food applications.

"The most challenging factor is the fishy flavor that might negatively affect the final edible product"

DHA fortification is challenging from a sensory point of view because food companies often wish to fortify with DHA foodstuffs which consumers do not normally associate with fish or fish flavor. In dairy products, breakfast cereals, cereal bars and

A group of women feeding complementary food to their children, Kakuma Refugee Camp, Kenya.

even staple foods, a minimal detectable presence of fishy off-notes leads to a significant drop in consumer acceptance. One strategy to prevent this is to mask the off-notes by using specific tailor-made flavor blends. However this approach leads to higher development costs and expensive consumer studies and cannot be applied to complementary food supplements due to the restricted use of flavors in foods for infants and young children.

Overall, sensory science plays an extremely important role, and highly trained panelists are employed to deliver feedback to formulation and packaging scientists to create improved products.

The importance of antioxidants

Fish or algal oils are highly susceptible to lipid peroxidation, and major efforts have to be taken to produce stable and sensorially acceptable oils for fortification purposes. The use of synthetic antioxidants is prohibited in most countries. Therefore, the production process has to be carefully optimized to remove pro-oxidant compounds such as metals, free fatty acids, colorants, smelly lipid oxidation products and oxygen before vitamin E is added to stabilize the final product. This oil refining process consists of several steps, all of which increase the purity and the stability of the oil. The raw material is obtained by extraction from various fish or algae species. In the first production step, the oil can be cooled down to remove saturated lipids and waxes (winterization). Phospholipids and free fatty acids are removed by treatment with water and caustic soda.The latter forms soap stock from free fatty acids which can easily be removed by filtration. Silica and charcoal treatment removes pro-oxidant metal ions, hydroperoxides, colorants and environmental contaminants. Compared with the dark and odorous raw material, the refined oil only has a slight yellow color and no turbidity. During the deodorization step, volatile lipid oxidation products are removed by steam distillation. The final result is an odor-free oil.

This oil is stabilized with vitamin E, which is one of the most powerful chain-breaking antioxidants, and the LC-PUFA oil is packaged under nitrogen. The combination of refining, stabilization and minimization of residual oxygen in the oil enhances the shelf-life and sensory properties of the oil significantly. Low quality oils cannot be recovered by simply adding antioxidants. The complete process has to be optimized, and the addition of antioxidants in combination with high-quality packaging is the final step to obtain a valuable nutritional ingredient.

The role of formulation

DHA, and more generally LC-PUFA, are contained in oils which are also difficult to apply and distribute uniformly across the food preparation. In many food products, DHA-rich oils may tend

Sensory science plays an important role. Highly trained panelists deliver feedback to formulation and packaging scientists to create improved products.

to physically separate, becoming visually unappealing. For this reason, marine or algal oils must undergo formulation technologies which make dispersible, better-flowing and more oxidation-resistant products.

Different types of food require different types of formulation. For example, powders mix better with other dry ingredients, are more dispersible and more protected from oxidation through encapsulation technology. Liquid emulsions contain fine oil droplets rich in LC-PUFA that can be homogenously dispersed in juices and dairy beverages.

During formulation, the active LC-PUFA molecules are protected against undesirable external influences and are converted at the same time into a suitable form for the desired application. Different formulation methods are available to transform liquid LC-PUFA oils into solid or liquid forms.

Types of formulation

A liquid is obtained when LC-PUFA oil is emulsified in water with suitable stabilizers such as gelatin, milk proteins and emulsifiers e.g., lecithin. An additional drying step removes the water from the emulsion again, and a solid is obtained.[2]

In liquid and solid forms, the active LC-PUFA molecules are encapsulated by the stabilizers and protected from oxygen and moisture. When the LC-PUFA form is applied to the foodstuff, direct contact with the food is strongly reduced or does not occur at all.

Multiple microencapsulation processes minimize oxidation and the presence of surface oil – free unencapsulated oil present at the surface of the formulated dry particle – which remains the main reason for undesirable off-flavors.

> "Packaging needs to guarantee a constant product quality during the entire shelf life"

Packaging

Different product forms as well as different types of fortified food require appropriate packaging materials. Packaging needs to ensure a low oxygen and water permeability, minimize oxidative phenomena and guarantee a constant overall product quality during the entire shelf-life of both product and fortified food preparation. Moreover, packaging materials from renewable sources are required nowadays and are the focus of research and development.

Product development of a lipid-based nutritional supplement with DHA

In recent years, lipid-based nutrient supplements (LNS) have attracted attention for in-home fortification of complementary food for infants and young children aged 6–24 months. LNS typically include vegetable oil, peanut paste, milk powder, soya protein, sugar, vitamin and mineral premix, maltodextrin, stabilizer and emulsifier. Lipids provide the majority of the energy content.

LNS are a promising fortification vehicle for DHA since their production includes only moderate heating and requires a simple mixing device (preferably under nitrogen or vacuum). Further, the paste-like appearance presents only a limited surface for oxidation and is the perfect environment to embed micronutrients. The low water activity of < 0.5 prevents microbiological growth of bacteria, yeast and fungi.[3]

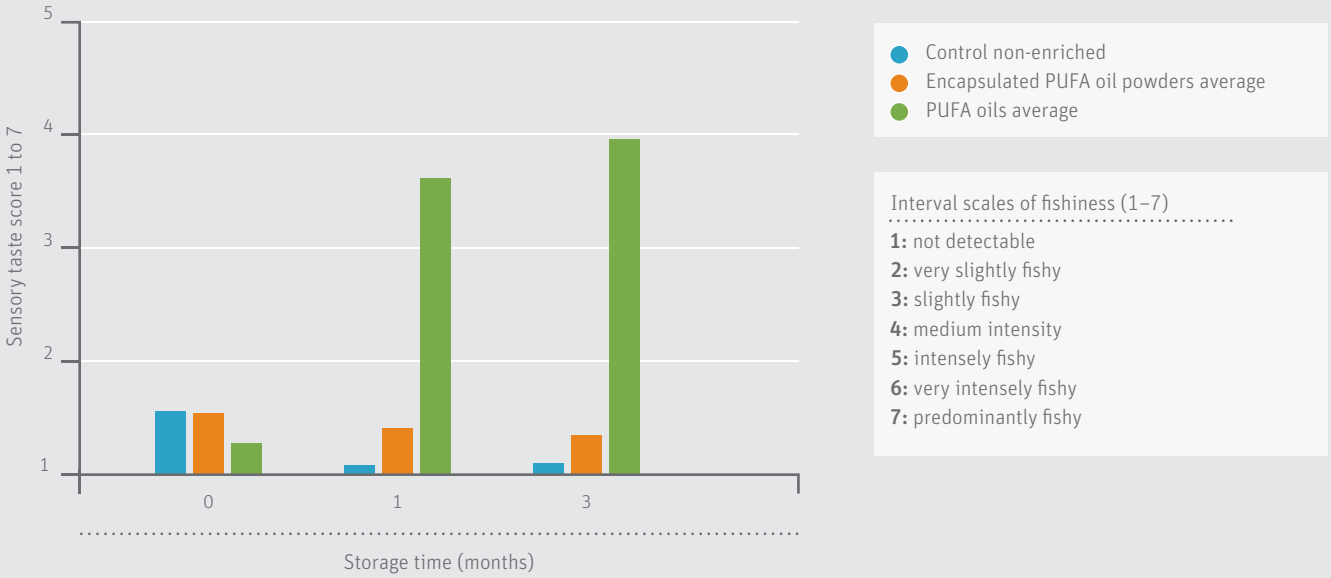
The product can be adapted to different amounts of micronutrients or n-3 LC-PUFA. The easiest approach is to substitute part of the vegetable oil with DHA oil sourced either from fish or algae. Tests were carried out for taste and smell acceptability and chemical stability of DHA in LNS.

The following example shows the laboratory development of a DHA-containing LNS. Sensory tests provide the most useful information because they relate to the consumer acceptance of the food based on smell and taste. The method is very sensitive and provides information on flavor stability.[4]

All samples were given to a trained taste panel. The sensory analysis was performed using an interval scale of fishiness, starting with **1** for *fishiness not detectable* up to **7** for *predominantly fishy*. Taste scores higher than 2 are rated as critical.

In a test with 200 mg DHA sourced from pure fish oil / 100 g LNS or 400 mg DHA / 100 g LNS sourced from encapsulated fish oil, the product performed well in smell and taste immediately after production (see time point 0 in **Figure 1**). After one month

FIGURE 1: Sensory scores of fishiness in DHA fortified LNS stored at 30 °C.



(time point 1 in Figure 1), the products fortified with fish oil turned out to be critical in terms of fishy smell and taste.

LNS enriched with DHA from fish oil or algal oil as an encapsulated powder resulted in products which still showed a pleasant smell and taste profile even after three months at 30 °C storage (time point 3 in Figure 1).

This study showed very clearly the advantages of formulated encapsulated fish oil or algal oil in terms of sensory perception.

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"A man's actions are more important than his ancestry" (Kenya)

Food Fortification in Africa

Progress to date and priorities moving forward

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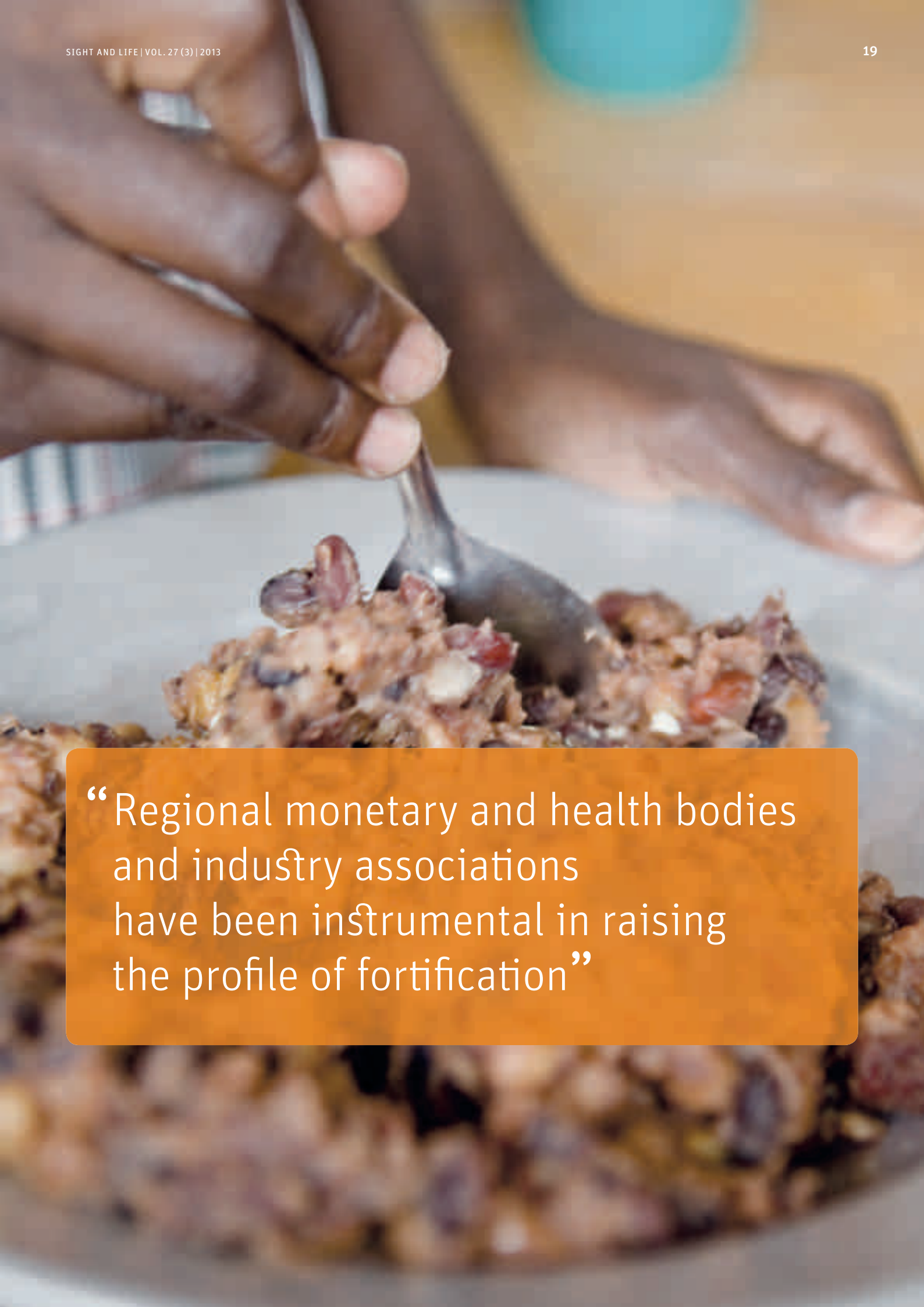
Key messages

- Significant progress in food fortification has been achieved throughout Africa. Support for continued expansion of staple food fortification to more countries and continued capacity building and systems strengthening are required to further bolster food fortification to prevent and control micronutrient deficiencies.
- Multi-stakeholder national fortification alliances have facilitated efforts to coordinate partners, engage consumers, and mobilize political and private-sector will to fortify, and continue to have an important role to play in ensuring the effectiveness and sustainability of fortification programs.
- Harmonization of fortification standards and regulations across sub-regions has facilitated the growth and development of fortification programs by encouraging trade and expanding the size of the fortified food market and increasing the number of people consuming fortified foods.
- Continued efforts to improve the capacity of the food industry and government regulatory bodies are critical to ensure compliance and the production of safe quality foods.
- New low-cost tools are being developed to increase the ease of assessing micronutrient levels in fortified foods, thereby improving program monitoring and effectiveness in an ongoing and sustainable manner.
- Investment in fortification of staples complements other nutrition interventions and enables Africa to continue to make tremendous achievements in development goals. Governments need to translate their commitment to improve nutrition through strong policy and program support, while the private sector has an important role in making available high quality fortified foods that consumers can access.
- Through complementary public-private-civic sector initiatives to fortify staple foods, significant economic and health impacts can be achieved in Africa.

The current status of fortification programs in Africa

Micronutrient deficiencies are responsible for significant public health problems in the developing world, causing premature death, disability, and reduced work capacity.[1] Vitamin A deficiency significantly increases under-five mortality and morbidity, while iron deficiency anemia is responsible for an estimated 20 percent of all maternal mortality in Africa. In addition to public health measures such as nutrition education, deworming, micronutrient supplementation, and dietary diversification, food fortification is an important and proven strategy to reduce and prevent micronutrient deficiencies.[2] The addition of vitamins and minerals to industrially processed staple foods ensures that large population groups have access to essential nutrients without the need to change food consumption behaviors. Universal salt iodization programs began in Africa in the early 1990s and have helped reduce iodine deficiencies.

Zambia began fortifying sugar with vitamin A in 1998,[3] while in 2002 Nigeria mandated fortification of wheat and maize flour, sugar, and vegetable oil.[4] Soon after, the first regional



"Regional monetary and health bodies and industry associations have been instrumental in raising the profile of fortification"

TABLE 1: Status of fortification of four staple foods in African countries

	Country	Wheat Flour	Vegetable Oil	Sugar	Maize Flour	Year* (In effect)
1	Benin	A, M	A, M			2008
2	Burkina Faso	A, V	S, V			2008
3	Burundi	N	46			NA
4	Cameroon	A,M	A, M			2012
5	Chad					NA
6	Congo	S, V				NA
7	Congo, Dem. Rep.	S, V				NA
8	Cote d'Ivoire	A, M	A, M			2007
9	Ethiopia					NA
10	Ghana	A, M	A, M			2009
11	Guinea	A, M	M			2007
12	Guinea Bissau					NA
13	Kenya	A, M	A, M	S, V	S, M	2013
14	Liberia	A, M	A, M	A, M		2013
15	Madagascar					NA
16	Malawi	A, M	A, M	A, M	S, M	2014
17	Mali	A, M	S, V		S, M	2007
18	Mauritania	A, M	A, M			2010
19	Mozambique	Decree Pending	Decree Pending			NA
20	Niger	A, M	A, M		S, V	
21	Nigeria	A, M	A, M	A, M	S, M	2002
22	Rwanda	A, M	A, M	A, M	S, M	2014
23	Senegal	A, M	A, M			2009
24	South Africa	S, M			S, M	2003
25	Southern Sudan				118	NA
26	Tanzania	A, M	S, M	S, M	S, M	2012
27	Uganda	A, M	A, M		S,M (size criterion)	2013
28	Zambia	S, V		A, M	S, V	1998

A: All; S: Some; M: Mandatory; V: Voluntary

*Year: May vary by vehicle; indicates year of first legislation/regulation.

NA: Not applicable (No fortification legislation/regulation)

Sources: Flour Fortification Initiative[5] Hess et al.[6] Hurrell et al.[7] Sablah et al.[8] Wirth et al.[9] Nyumuah et al.[10]

public-private sector dialogue on food fortification in the Economic Community of West African States (ECOWAS) coincided with the launch in 2002 of wheat and maize flour fortification in South Africa. By 2006, the ECOWAS Assembly of Health Ministers had passed a resolution calling for food fortification throughout West Africa, where significant progress has been made especially in the West Africa Economic Monetary Union (UEMOA) countries.

The introduction of an integrated, effectively functioning fortification program is a complex undertaking that requires the engagement of ministries of health and commerce, food safety and regulatory bodies, customs and border control agencies, the private sector, international development organizations, donors, and civil society. Strategies for successful fortification build upon population-based assessment of fortification food vehicles; industry assessments; political advocacy; establishing national and regional legal frameworks and standards; capacity building of industry and food regulatory agencies in production, quality assurance, and quality control; public awareness building and engagement of consumers; and monitoring and evaluation of activities. In pulling together the many stakeholders and sectors, regional monetary and health bodies and industry

associations have been instrumental in raising the profile of fortification and serving as a platform through which political will and public-private sector dialogue and collaboration have been engendered.

Moving the fortification agenda forward

Two regional organizations have played catalytic roles in moving the fortification agenda forward in Africa. UEMOA has served this role in West Africa, while in East, Central and Southern Africa (ECSA) it has been the ECSA Health Community. UEMOA-wide wheat flour and cooking oil fortification standards now exist in the eight UEMOA countries with efforts under way to harmonize them across all 15 ECOWAS countries to expand access to and the market for fortified staples. Similarly, fortification is being scaled up in ECSA countries. Consequently, more than 70 percent of the population of African countries with mandatory fortification legislation is now estimated to be regularly consuming at least one fortified food staple daily. Thus, through a multi-sector, multi-pronged approach, food fortification has been initiated and scaled up in Africa. **Table 1** illustrates the enormous success achieved to date on food fortification in Africa.

Food fortification priorities for the African region

Given the progress achieved to date in food fortification in Africa, it is essential to sustain safe and quality production of fortified foods as well as maintain high coverage to ensure that the impact of fortification on nutrition, health, and economic development are realized. The enactment of a law or policy directive alone is insufficient to ensure that the intended results continue to be realized over time. Impact is an outcome dependent upon how a program is designed, structured, implemented, and monitored. The impact of a fortification program depends on the consumption levels of the chosen food vehicle; percentage of households that consume it; frequency and quantities of the food consumed; market and industrial structure; fortification compounds and levels; fortification addition methods and rates; and knowledge, equipment, motivation, and quality assurance and quality control capacities of the food producers and public food control inspectors. Fortification program design, monitoring and evaluation, therefore, are not a one-time activity, but rather an ongoing process that requires ongoing support.

Consequently, continued support for food fortification is required to ensure scale-up throughout Africa. To achieve this, a number of priority activities are required, including harmonized fortification standards, strengthened quality management systems and capacities, coordinated leadership and oversight of fortification programs, fortification coverage assessments, fortification branding, and continued advocacy. This paper will discuss each of these priorities.

Harmonization of food fortification standards in Africa

Food fortification standards have been developed at both the national and regional levels in Africa. As evident from **Table 1**, countries across Africa have mandatory food fortification legislation. Standards ensure consistency across an industry, and ensure that fortification levels meet international recommendations and micronutrient requirements of the population at safe levels based on evidence. These standards can therefore serve as the basis for quality control and monitoring of industry practices. UEMOA fortification standards for wheat flour have been aligned with the World Health Organization interim consensus statement on flour fortification. Furthermore, wheat flour and cooking oil fortification standards have been harmonized across the eight UEMOA countries, with an additional four ECOWAS (non-UEMOA) countries also adopting these standards. In addition to assuring product consistency, harmonized standards also play an important role in facilitating intra-regional trade. And for countries without large-scale food industries, harmonized standards serve as an important means of ensuring imported staple foods are fortified to safe and appropriate regional standards. Moreover, these provide a foundation for future industry that may arise in these countries.

> "Harmonized equivalent standards help ensure that adequate fortification is being achieved across countries"

Harmonized fortification standards across all fifteen ECOWAS countries, as well as within the Central African Economic and Monetary Community (CEMAC), Southern African Development Community (SADC), and East African Community (EAC) blocks, is thus needed to improve regional trade, ensure quality and consistency, and expand coverage across the region. Efforts are already underway to assess the standards and regulatory framework between the UEMOA and non-UEMOA ECOWAS blocks to identify avenues for harmonization. Following this initial work, requirements for a regional set of equivalent standards for flour and vegetable oil fortification that are effectively aligned with WHO guidelines is needed. Since there are numerous forms of vitamins and minerals, equivalent standards better ensure that adequate fortification of foods is being achieved across countries, even when individual countries mandate different forms of a particular micronutrient. **Table 2** illustrates the various forms of iron that are mandated in different country flour fortification laws. Effective harmonized equivalent standards on salt iodization are also needed in the region. Finally, harmonization will also support advocacy efforts for fortification legislation in countries without mandatory fortification.

TABLE 2: Micronutrient levels in fortified wheat flour in selected countries in Africa

Country | Region	Micronutrients (ppm)				
	Iron	Folic acid	Zinc	Vitamin B_{12}	Vitamin A
UEMOA zone	60 (FF)	2.6	55	0.02	0
ECOWAS countries					
Ghana	58.5 (FF)	2.08	28.3	0.01	2
Guinea	60 (FF)	2.6	55	0.02	0
Liberia	60 (FF)	2.6	55	0.02	0
Nigeria	40.7 (EI)	0	0	0	9
Other countries					
Cameroon	60 (FF)	5	100	0.04	0
Mozambique	40 (FS + NaFeEDTA)	2	30	0.02	0
Tanzania	40 (NaFeEDTA)	3.0	40	0.015	2 (optional)

FF: Ferrous fumarate; FS: Ferrous sulfate; EI: Electrolytic iron; NaFeEDTA: Ferric sodium ethylenediaminetetraacetate

Strengthening of quality management systems

While legislation requires foods to be fortified, it does not guarantee quality fortified foods. Thus, continuous production and monitoring of quality fortified foods is essential. Capacity building of both the food industry and food regulatory bodies in quality management systems thus remains a priority. Internal quality assurance of overall food fortification operations and internal quality control of food product compliance with fortification specifications is the responsibility of the food industry. External quality enforcement to confirm compliance by the industry is carried out by government regulatory bodies and border control. Both internal and external quality control and assurance are essential for safe food fortification and capacities of personnel need continuous reinforcement, especially when fortification has been recently launched and is relatively new in-country. These agencies also require capacity building on Hazard Analysis and Critical Control Points (HACCP) systems where possible, to ensure maximum safety and quality of fortified foods. HACCP plans must also be incorporated with quality control analytical procedures for micronutrient analysis of fortified foods, sampling plans, and record-keeping procedures, premix storage and handling procedures, fortification equipment maintenance procedures, and sanitation standard operating procedures (SSOPs). In addition to training and safety procedures, periodic independent reference laboratory sampling and analysis of fortified food micronutrient levels must also be carried out.

> "Capacity in quality management systems remains a priority"

Food standards laboratories must also be equipped with analytical tools and standard methodologies for determining the levels of micronutrients in fortified foods. Those external regulatory laboratories that have analytical equipment must be continuously trained on efficient monitoring systems and coordination with standard enforcement agencies for compliance. Rapid quantitative and qualitative mechanisms for monitoring micronutrient levels in fortified foods must also be assured at entry points (ports and borders) for imported foods.

> "The focus of food safety and control activities on individual plants has resulted in fortification programs with insufficient systematic oversight"

In addition to quality management capacity, systems, and tools, coordinated quality management is also important. Quantitative analysis of the micronutrient content of fortified foods remains a public sector activity most commonly conducted on a food-plant-specific basis. This focus on individual plants, without the stewardship of a single agency charged with overseeing the effective functioning of the fortification program, has resulted in fortification programs with insufficient systematic oversight.[4,10,11,12] Moreover, public oversight tends to concentrate on food safety issues. As a result, fortification is not examined from a perspective of national-level performance, where common weaknesses or obstacles are identified and thereby more effectively and systematically addressed through coordinated efforts of the public and private sector. Empowering a

single agency with enforcing fortification standards prevents fragmented control or control by multiple competing agencies, which risks duplicating some activities while neglecting others.

Fortification coordination and oversight

Fortification clearly requires coordination and partnership across the public and private sectors, as well as engagement of civil society and consumers. While coordination is often strong during program launch, it is equally important that it be maintained on an ongoing basis. Once a fortification program is agreed and starts rolling out, often there is inadequate attention given to the issue of governance. Implementation becomes the purview of individual food manufacturers and processors as well as the food safety and control inspectors of the government bureau of standards or the food and drug control agency. There is often insufficient discussion of roles and responsibilities for oversight of the fortification program and for ensuring that the fortification program is functioning well and achieving intended impacts. Thus, it is important for clearly defined functions and responsibilities for national fortification alliances, which should serve this coordination role. In order for these alliances to assume this role, a budget may be required which could be financed through government contributions as well as industry user fees for services provided by the alliance (e.g. use of the fortification logo).

Monitoring coverage trends and impact of fortified foods in Africa

The impact of food fortification occurs among populations with regular access to sufficient quantities of foods adequately fortified to meet targeted nutritional needs. It is therefore important to monitor the coverage of the fortification program over time among target populations. Data collection systems – such as baseline and endline surveys and trend analysis using various fortification monitoring and surveillance tools including household consumption and expenditure surveys (HCES) as well as fortification rapid assessment tool (FRAT) – should be designed to capture the degree to which fortified food staples plausibly contribute to improving the vitamin and mineral status of vulnerable population groups in order to correlate population coverage and nutritional impact of food fortification.[6,13,14] New tools, such as the Fortification Monitoring and Surveillance Tool, are being developed to support ongoing monitoring of coverage of fortified foods and adequacy of micronutrient levels in fortified food.[15]

Data on the production and importation of fortified foods relative to per-capita consumption are used to estimate coverage levels and validate population-based fortified food coverage surveys. Sustained high coverage of adequately fortified foods, combined with declining trends in the prevalence of target micronutrient deficiencies, indicate food fortification may be contributing to the improved micronutrient status of the population. Trend analysis in coverage and impact on micronutrient status must be consistently conducted in all food fortification programs, especially in nascent fortification programs.

Logic models are often developed during program inception to identify pathways, activities, and indicators to achieve and measure fortification. These logic models (logframes or program impact pathways) can also serve as monitoring tools for regular program assessment. This is especially important for newer programs that are likely to encounter challenges. Multi-stakeholder national fortification alliances serve as important platforms for regular review of logic models. The quantity of fortified food produced and imported may be used as a proxy to determine the potential reach of fortified foods in specific countries. The quantity of micronutrient premix used by industries will be proportional to the quantity of fortified food produced in country. There are, thus, many data sources that can contribute to determining the impact of a food fortification program in Africa.

Branding of fortified foods

For new fortification programs, consumer awareness must be built around the importance of food fortification. In West Africa, a *"Caravane de l'Intégration"* was launched employing a multichannel communication strategy of radio and television spots and interviews, and a caravan of vehicles and shows promoting fortified foods and iodized salt in 92 cities and villages in 12 countries over a 90-day period in 2010. This effort was supported by the *Africable* television and media organization as well as the UEMOA Commission with support from Helen Keller International and the United States Agency for International Development (USAID) and was linked to the 50th anniversary of independence for many African countries.

In addition to the communications campaign, a fortification logo called ENRICHI was developed to visibly identify foods that have been fortified in compliance with UEMOA standards. This form of branding has the additional benefit of facilitating trade and promoting wider coverage of fortified foods across sub-regions in Africa. While there is a single ENRICHI logo, stewardship of the logo has not yet been clarified. UEMOA, industry associations, and national fortification alliances are currently discussing issues around use, copyright/trademark, and control over the logo. Importantly, countries must determine which national body is best suited to control use of the logo. Given the implicit nutritious value that a fortification logo conveys, issues over which types of fortified foods it may appear on also need to be addressed: fortified staple foods (e.g., wheat flour and cooking oil) vs. condiments (e.g.,

bouillon cubes) vs. processed snack foods (e.g., crisps). National fortification alliances are best placed to control use of the logo at the country level and guidance will need to be developed on logo stewardship.

"Fortifying food with micronutrients is one of the most cost-effective strategies to improve nutrition"

Cost-benefit analysis and advocacy for continued investment in fortification

Sustainable food fortification in Africa must ensure understanding and support by political authorities, industry, and consumers. The technology for fortifying food with micronutrients is simple, economical, and one of the most cost-effective strategies to control micronutrient deficiencies, improve nutrition, and, as the Copenhagen Consensus found, promote economic development.[16] Thus, the benefits can be easily communicated to achieve government buy-in and ownership. Cost-benefit analysis is useful for advocacy efforts to convince government of the importance in investing in and supporting food fortification, as well as for justifying continued investment by government and industry in fortification.

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Nutrition of Adolescent Girls in Low- and Middle-Income Countries

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in combination with dietary diversity, will help combat malnutrition, may benefit adolescent growth and build a healthier workforce to reduce poverty in the future.

Key messages

- Adolescence is a time of dramatic physical changes.
- Many children in low- and middle-income countries enter adolescence thin, stunted and anemic, and often display other micronutrient deficiencies.
- Adolescence is a time of opportunity for catch-up growth.
- Many African and South Asian cultures support the idea of early marriage of girls.
- Many adolescent girls become pregnant before they achieve adult weights and heights.
- Early marriage increases the risks of maternal mortality, complications in pregnancy and impaired fetal development (small-for-gestational-age) and may prevent any further maternal height gain.
- Early marriage, low education, poor diet and poverty are strongly linked.
- Promoting secondary education for girls may delay early marriage. School feeding with nutritious food will attract adolescent girls into secondary education and help keep them there.
- Efforts to promote food fortification with micronutrients,

Adolescence during the teenage years of 13 to 19 is a time of dramatic change. The process of physically developing from a child to an adult is called puberty, but the chronological age provides only a rough marker of the stage of puberty. Before puberty, children in developed countries grow approximately 50–70 mm a year and gain around 2.5 kg a year. Adolescence is the only time in life besides the critical window of the first 1,000 days (–9 to 24 months) when the velocity of growth actually increases. Nearly 45% of maximum skeletal mass and 15% of adult height are gained during adolescence.[1] Children in the developing world also undergo the same changes, although many enter adolescence thin and stunted through malnutrition and infections during infancy and childhood, which may delay or extend the period of pubertal changes, thus enabling more time for growth to catch up.[2] However, for many girls the opportunity to benefit from the altered physiological state is curtailed by early pregnancy. Recommended nutrient intakes (RNI)[3–6] are targeted at healthy, normally developing adolescent children living in clean environments. Are the RNI adequate for malnourished children entering adolescence? Do the RNI need to be modified for girls who marry and become pregnant before they have reached physical maturity themselves? This commentary will address some of the problems posed by malnutrition and early marriage in low- and middle-income countries in South Asia and Africa.

Adolescence and marriage

In much of the developing world, and particularly in Africa and South Asia,[7] marriage for girls, before or very shortly after puberty, is commonplace. Marriage in early adolescence shortens the transitional period between childhood and adulthood

"Many children in low- and middle-income countries enter adolescence thin, stunted and anemic, and often also display other micronutrient deficiencies."

TABLE 1: The ten countries with the highest rates of child marriage

Country	Proportion of marriages where the women are less than 18 years of age
Niger	75%
Chad and Central African Republic	Both 68%
Bangladesh	66%
Guinea	63%
Mozambique	56%
Mali	55%
Burkina Faso and South Sudan	Both 52%
Malawi	50%

Source: World Health Organization[7]

when there are major pubertal and biological changes including changes to the sex organs, height, weight, and muscle mass. The physical alterations marked by the onset of puberty occur at a time which is also a period of preparation for adult roles.[8] Therefore, early marriage can have long-term consequences on the growth and health of mothers and their infants, as many women have not achieved their full adult weight and height status at the time of the birth of their first child.[9] Once they have left adolescence, the opportunities to make good any deficit in height are reduced. Furthermore, in a malnourished mother there are health implications for her newborn infant.[10]

"Poverty is one of the underlying factors for the perpetuation of early marriage"

Some of the characteristics of early marriage are described in an analysis of data from the Nigerian Demographic and Health Survey (2008).[11] The analysis reported that although the majority of women married between 15 to 19 years (43%), there was a sizable minority of 27% who married under 15 years.[12] Early marriage was more common in the north than the south of the country, in rural than in urban areas, in women with poorer educational attainment and in Muslim than in Christian girls.[12] Marriages below 15 years tended to be associated with poverty and illiteracy, a feature also reported in other parts of the world such as Nepal,[10] Lebanon,[12] Bangladesh[9,13] etc. Even in the USA, adolescents who bear children are likely to have been reared in poverty.[14] Poverty is one of the underlying factors for the perpetuation of early marriage, as marriage of children is often seen as a strategy for economic survival. In severe poverty, a young girl in a family may be regarded as an economic burden and her marriage to an older man as a means of survival.[12] The perception of poor rural mothers regarding female children was succinctly expressed by one Punjabi mother: "God should give daughters to rich families only."[15]

"Approximately 50% of adult body weight and 15% of final adult height is attained during adolescence"

In any setting, marriage is regarded as a moment of celebration and a landmark of adulthood, but the practice of early marriage may be far from a celebration. However, the imposition of a marriage partner on a female child means that her childhood is cut short. Traditional attitudes in African and South Asian societies support the idea that girls should marry early. Parents and family heads make marital choices for their daughters and sons without due consideration for the implications of such decisions. Early marriage may be a family-building exercise, an economic or bargaining arrangement, or a means of protecting a girl from undesirable sexual advances.[12] There are reports from HIV/AIDS researchers in East Africa that marriage is seen as an option for orphaned girls by caregivers who find it hard to provide for them.[12]

Adolescent pregnancy

Adolescent pregnancy is a worldwide concern, particularly in areas of poverty and social disadvantage. Nearly two thirds of women in sub-Saharan Africa and in several countries of South Asia have their first child before the age of 20 years.[9] The decision to marry very young girls fails to take account of the health risks. The World Health Organization (WHO) reports that complications of pregnancy and childbirth are the leading cause of death in young women between 15 to 19 years. Of the 16 million adolescent girls who give birth every year, UNICEF estimates 50,000 die, almost all in low- and middle-income countries. Of the 10 countries with highest rates of child marriage (i.e., before 18 years), nine are in Africa, and Niger tops the list with 75% (**Table 1**). In Bangladesh, the rate was 66%, but in absolute numbers, India has the most child brides because of the size of its population. In 47% of all marriages in India, the bride is a child.[7] In the Nigerian Health Survey, 40% of those with a low body mass index (BMI), indicating undernutrition, were less than 15 years at the time of their marriage. Statistically, the Nigerian data suggested that having an additional year of schooling delayed marriage by on average six months.[12] However, Nigerian

TABLE 2: Background characteristics of young gravidae growing and not growing, and mature women based on knee height measurements and infant birth weights[14]

Maternal characteristics	Growers *n* = 155		Non-growers *n* = 181		Mature *n* = 333	
	mean	SE	mean	SE	mean	SE
Age (years)	15.8	0.2	16.0	0.2	22.7	0.1
Pregnancy weight (kg)	58.9	1.0	59.3	1.0	60.9	0.7
Height (cm)	161	0.5	160	0.5	162	0.3
Body mass index (kg/m²)	22.9	0.4	23.1	0.3	23.3	0.3
Weight gain (kg)	15.3 [a ##]	0.6	13.0 [b]	0.5	14.1 [b]	0.4
Black (%)	58.7		64.1		62.2	
Primiparous (%)	50 [a]		58 [b]		34.2 [b]	
Smoking (%)	24.5 [a]		19.9 [a]		39.2 [b]	
Inadequate weight gain (%)	20.0		27.8		27.4	
Infant birth weight[#] (g)	3053 [a]	39.5	3211 [b]	36.4	3148 [b]	26.4

[#]Data adjusted for black ethnicity, parity, pre-pregnancy body mass index, gestational weight gain, cigarettes per day, Medicaid status and length of gestation.

[##]Different superscripts across the rows indicate differences between the means ($P < 0.05$).

Data from reference[14] with permission.

women who are educated to higher than secondary level have an average of 2.9 children, while women with no education have 7.3 children.[11] Education makes a huge difference to family size and the age of women at the first pregnancy.

Adolescence is a period of rapid growth and development. Approximately 50% of adult body weight and 15% of final adult height is attained during adolescence together with changes in body shape and composition.[1,2] In many South Asian[9] and African[16] countries there is evidence that chronic undernutrition can delay physical maturation and extend the adolescent growth period beyond 20 years of age. A study in rural Bangladesh of 1,483 unmarried teenagers (10–17 years) showed that stunting (height-for-age < third centile) was 48% in both boys and girls and thinness (< fifth centile) was 75% in boys and 59% in girls.[17] Adverse environmental conditions, low socioeconomic status and poor diets explain the suboptimal growth of the teenagers.[9] Interestingly, for boys and girls the percentage of thinness in Bangladeshi adolescents fell from 95% at age 10 to 12% at 17 years, but the prevalence of stunting rose from 34% at age 10 to 65% at 17 years.[17] That is, weight accumulated in the Bangladeshi teenagers at the expense of height as they progressed through adolescence.

Competition for nutrients

Conventionally, it has been accepted that growth is largely completed by the time adolescent girls become pregnant, because pregnancy occurs subsequent to menarche when growth drops to a nadir and pregnancy competes for nutritional resources.[9] In American studies, height growth of 5–7.5 cm does occur after menarche but tends to be inversely related to the starting time of the menses.[1] Height growth is difficult to measure in pregnancy because of the effects of the weight of the fetus on maternal stature. However, growth can be measured during pregnancy using knee height measurements, a body segment less susceptible to "shrinkage".[14] Workers in New Jersey, USA, who studied adolescent mothers who had their first pregnancy between the ages of 12 to 15 years, found in slightly more than half of the girls that height growth continued (Table 2).[18] However, even though the pre-pregnant nutritional status was relatively good, there was evidence of competition between the growing mothers and their infants for nutrients, as infants of growing adolescents (< 18 years) weighed less than those of non-growing adolescents or of mature controls (aged 19–29 years).[14,18] How much more competition for nutrients is there in young mothers who enter pregnancy grossly malnourished, such as those studied in Bangladesh?[17]

> "Pregnancy during adolescence increases adverse birth outcomes, poor fetal growth, and infant and maternal health and mortality"

Pregnancy during adolescence has been shown to increase the risk of adverse birth outcomes, poor fetal growth, and infant and maternal mortality. To investigate this problem – since

TABLE 3: Dietary reference intakes (DRI) for healthy, well-nourished adolescents

Nutrient	Boys		Girls		Pregnancy
	9–13 years	14–18 years	9–13 years	14–18 years	Third trimester
Calcium mg	1,300		1,300		1,200
Phosphorus mg	1,250		1,250		
Magnesium mg	240	410	240	360	270
Vitamin D µg	5		5		5
Fluoride mg	2	3	2	3	
Thiamine mg	0.9	1.2	0.9	1.0	1.4
Riboflavin mg	0.9	1.3	0.9	1.0	1.4
Niacin mg	12	16	12	14	18
Pyridoxine mg	1.0	1.3	1.0	1.2	1.9
Folate µg	300	400	300	400	600
Vitamin B_{12} µg	1.8	2.4	1.8	2.4	2.6
Vitamin C mg	45	75	45	65	55
Selenium µg	40	55	40	55	30
Iodine µg	150		150		200
Vitamin A µg	600		600		800
Vitamin E mg	10		7.5		

Source [3,5,6,42]

many of these young women are not fully grown themselves – studies were conducted in Nepal to compare the offspring of the very young against older primiparae.[10] The overall nutritional status of women in this population was poor, with both stunting (an average height of 150.5 cm) and thinness (an average BMI of 19.3 kg/m²), and the women were reported to suffer multiple micronutrient deficiencies during pregnancy.[19] Young maternal age was associated with an increased risk of preterm delivery among primiparae (OR = 2.07; 95% CI = 1.26–3.38) that occurred at an age cut-off of ≤ 18 years relative to those 19–25 years. However, young maternal age (≤ 18 years) was not associated with intrauterine growth retardation for the first live-born infant, but it was for the second.[10] In general, each year of increasing maternal age among primiparae was associated with increases in birth length (0.07 cm; 95% CI = –0.01–0.16), head (0.05 cm; 95% CI = 0.01–0.09) and chest circumference (0.07 cm; 95% CI = 0.01–0.12), but not weight (9.0 g; 95% CI = –2.1–21.8) of their offspring.[10] That is, the later the adolescent girl marries and has her first pregnancy, the more likely she is to give birth to a more mature infant.

It is interesting to compare the offspring of the American adolescent mothers[14] with those from the Nepali mothers.[10] Mean (standard deviation [SD]) birth weight of the Nepali infants was 2573 [417] g, 63% were small-for-gestational-age, and there were 18% preterm deliveries (< 37 weeks).[10] In comparison, mean birth weights of the American infants were > 3000 g in both teenage mothers who were still growing compared to non-growers (**Table 2**), and the mean gestation was 39 weeks. Maternal weights of the Nepali and American women were 44.6 and 58.9 kg, and BMIs were 19.6 and 22.9 kg/m² respectively. Birth weights of the Nepali infants were almost 20% lower than those of the American infants, but there is no data on the proportion of Nepali mothers who were still growing, or on whether birth weights in the growers were even lower. The knee-height measurements on the American mothers revealed evidence of probable competition for nutrients even in the relatively well-nourished adolescents. However, even without growth data on the Nepali mothers, poor maternal nutritional status and adverse birth outcomes are clearly associated.

Dietary reference intakes (DRI) for adolescence

The DRI for adolescent boys and unmarried girls and for pregnancy are shown in **Tables 3–5**. There are no specific recommendations for adolescent, pregnant girls. For most nutrients, there is an increase in the DRI over the 9–18 year period (**Table 3**) to match the increase in size, but for iron and zinc, bioavailability is the main factor of concern (**Tables 4 and 5**). The DRI are principally intended for healthy youngsters living in clean environments and eating nutrient-rich food. Unfortunately, in low- and middle-income countries, foods eaten are often nutrient-poor; principally unrefined cereals with little meat/fish. Minerals are often poorly bioavailable, hence anemia

TABLE 4: Dietary reference intakes of iron for healthy, well-nourished adolescents

Gender	Age group	Bioavailability iron (mg/day)			
		15%	12%	10%	5%
Females	Premenarche	9.3	11.7	14.0	28.0
	11–14 years	21.8	27.7	32.7	65.4
	15–17 years	20.7	25.8	31.0	62.0
	Pregnant	It is recommended that iron supplements in tablet form are given to all pregnant women because of the difficulties in assessing iron status in pregnancy.##			
Males	11–14 years	9.7	12.2	14.6	29.2
	15–17 years	12.5	15.7	18.8	37.6

#Source reference[6]

##In non-anemic pregnant women, daily supplements of 100 mg of iron (e.g., as ferrous sulfate) given during the second half of pregnancy are adequate. In anemic women higher doses are usually required.

is common, and poor iron status is often also impaired by red cell destruction through malaria and blocked absorption and utilization due to other infections.[20] Fortunately, by the time children reach adolescence they have acquired immunity to most of their environmental pathogens, so levels of inflammation are lower than in childhood[21,22] and although adolescents may carry malaria parasites, the frequency of symptomatic malaria is also low.[23]

"The DRI for pregnancy may be insufficient"

Improved immunological status of adolescence, however, does not improve food quality, and although the adolescent youngster can compete more effectively than younger children for her share of the available family food, she needs sufficient calories, meat/fish and a variety of foods. Food diversity and meat increase the chances that the food eaten will provide all the necessary nutrients for her growing body. Teenage pregnancy increases these needs still more, and the DRI outlined in **Tables 3–5** for pregnancy may be insufficient, as they presuppose the mother has already achieved an adequate weight and height for age.

Micronutrients and weight and height growth

Unfortunately the poor diets in many low- and middle-income countries are due to poverty, so increasing food diversity and the intake of meat/fish is unlikely to happen for many years. Food fortification may help to improve diet in the short term. The fortification of milk products in Indonesia was recently shown to reduce the prevalence of stunting in children aged 6–59 months.[24,25] In South Africa, the mandatory fortification of flour with vitamin A, a number of B-vitamins, iron and zinc has recently been enacted to increase nutrient intakes by about 30% for persons over 10 years.[26] This may help to address the nutrient needs of South African adolescents; however, the effect of fortification on stunting in Indonesian children was very small, and fortification with a cocktail of popular micronutrients

TABLE 5: Dietary reference intakes of zinc for healthy, well-nourished adolescents living in a clean environment #

Gender	Developmental stage	Bioavailability		
		High (mg)	Moderate (mg)	Low (mg)
Adolescent females	10 to 18 years	4.3	7.2	14.4
Pregnancy	First trimester	3.4	5.5	11.0
	Second trimester	4.2	7.0	14.0
	Third trimester	6.0	10.0	20.0
Males	10 to 18 years	5.1	8.6	17.1

Source reference[6]

TABLE 6: Percentage of all women[#] aged 15–49 years with anemia in African countries from the Demographic and Health Surveys 2003–9

Country and year of survey	Any anemia (%)	Mild anemia (%)	Moderate anemia (%)	Severe anemia (%)
Non-pregnant	< 120 g/L	100–119 g/L	Both	Both
Pregnant	< 110 g/L	100–109 g/L	70–99 g/L	< 70 g/L
Benin[##] 2006	61.3	42.1	18.2	1.1
Burkina Faso 2003	53.7	37.8	14.7	1.1
Congo DR 2007	52.9	35.4	16.4	1.1
Ethiopia 2005	26.6	17.4	7.9	1.3
Ghana 2008	58.7	38.8	17.9	2.0
Guinea 2005	53.3	35.3	16.5	1.5
Madagascar 2003–4	46.0	34.6	8.5	2.9
Malawi 2004	44.3	32.0	10.6	1.7
Mali 2006	60.7	41.2	17.5	2.0
Niger 2006	45.8	31.8	12.5	1.5
Rwanda 2005	32.8	19.2	10.9	2.7
Senegal 2005	59.1	37.4	18.8	2.9
Sierra Leone 2008	45.2	33.5	11.0	0.7
Tanzania 2004–5	48.4	32.6	14.5	1.2
Uganda 2006	41.9	30.6	10.7	0.6
Zimbabwe 2005–6	37.8	27.3	9.4	1.0

[#]Data on both pregnant and non-pregnant women were collected and anemia was defined using the appropriate cut-off.

[##]Surveys in Chad, Kenya, Liberia, Mozambique, Namibia, Nigeria, Zambia, and South Africa did not collect hemoglobin data in women.

may only have a small effect on height growth in South Africa.[25] However, as discussed previously when describing the nutritional needs of children 2–5 years of age,[25] there may only be a finite number of effects on nutritional status when only a limited number of nutrients are added to a diet. A great many children in developing countries are thin and stunted when they enter their teenage years.[10,13,17,25]

To take full advantage of the physiological opportunities to grow, nutrient intake should be adequate and balanced, and should contain all the nutrients necessary. Golden has pointed out that building tissues requires not only the basic components of protein, carbohydrate and fat but also the micronutrients that have important roles in tissue synthesis.[27] To build skeletal tissue, cartilage must be synthesized, followed by ossification with calcium and phosphorus. Cartilage is predominantly derived from carbohydrate with a small amount of highly sulfated protein. The sulfur is derived from the amino acids methionine and cysteine and, if the sulfur is in short supply, the amino acids will be used preferentially to synthesize lean tissue. Even the non-essential amino acid glycine may become essential for bone matrix formation in some circumstances.[28] Other nutrients are also potentially needed to build skeletal tissue: magnesium, vitamins C, D and K, zinc, and copper.

An adolescent teenager is better able to claim his or her food allocation at the dining table than infants or children but if food quality is poor – for example, contains an excess of oil and/or minimal good quality protein – then lean tissue and fat deposits may be accumulated at the expense of cartilage and bone.[27] That is, teenagers will gain weight but remain stunted, as was observed in Bangladesh, where weight gain almost normalized between the ages of 10 and 17 but stunting increased from 34% to 65% for both boys and girls.[17] The high prevalence of obesity in South Africa[29] may be another example where people are eating a relatively energy-rich but micronutrient-poor[26] diet that stimulates weight increase more than height growth.

Nutritional requirements of pregnant adolescent mothers

Teenagers are better adapted immunologically to their environment than infants and young children i.e. less susceptible to infectious diseases and diarrhea. That is, illness frequency in adolescence is low, so the nutrient amounts recommended by the National Institutes of Health and the WHO will be appropriate for many teenagers in developing countries. The recommended nutrient intakes (RNI) are intended to provide the needs of 97.5% of the population i.e. they may not be adequate for the 1–2% of people at the extremes of the population profile.

Stunting is defined as < 2 SD below the median of height-for-age based on WHO growth standards.[30] The median and third centile for heights of American teenagers are ~163 and 151 cm respectively at 18 years.[31] The mean height of the American teenage mothers (Table 2) was 161 cm, while that of the Nepali teenage mothers was only 151 cm; that is, 50% of the adolescent Nepali mothers were below the third centile. The DRI outlined in Tables 3–5 are intended to cover the needs of most American teenagers and may also be satisfactory for half of Nepali adolescent girls, – i.e., those who are not stunted and pregnant. However, they may not be adequate for the 50% of Nepali adolescent mothers with heights below 151 cm. Likewise, the DRI may be inadequate for potentially more unmarried teenage children in Bangladesh where 65% had heights below the third centile at 17 years,[17] and similar situations will be present in other low- and middle-income countries where stunting is a problem.

Furthermore, there is evidence that the period of growth in adolescence in low- and middle-income countries may be extended. Longitudinal growth data from rural Gambia suggests that an extended pubertal growth phase allows very considerable height recovery especially in girls.[16] Therefore many more adolescent girls in low- and middle-income countries than in the American study may have the potential to continue growing during pregnancy, but this may be restricted by inadequate diets. Thus adolescent mothers in low- and middle-income countries need food to provide the nutritional requirements for (1) normal health and development, but it needs to have the quality to (2) meet the specific needs to enable catch-up growth, and (3) have sufficient nutrient density to meet the needs of the fetus. Inadequate nutrition will have repercussions on both mothers and infants.[10,14]

Micronutrient deficiencies in adolescent children in low- and middle-income countries

As in many other regions of the world, adolescent girls in Myanmar enter adolescence thin and stunted. In our recent studies on 1,269 adolescent schoolgirls aged 13 to 18 years in the delta region of the Ayeyarwady Division in Myanmar, we found 21% stunting (< –2 height-for-age z scores) and 11% thinness (< –2 BMI-for-age z scores).[32] In addition, 59% had anemia, which was predominantly microcytic. Further analysis of the anemic subgroup showed that one third of the anemia was iron-deficient and that low vitamin A status (< 1.05 µmol/L) was a significant predictor of iron deficiency anemia. There was little evidence of vitamin A deficiency (1.8% < 0.7 µmol/L) or subclinical inflammation.[21]

In another study of 1,483 healthy and unmarried adolescent children in Bangladesh, virtually every child was anemic (98%). B-vitamin deficiencies may be responsible for angular stomatitis (46%), glossitis (27%) and pallor (38%), while dental caries was found in 11% of children, and there was evidence of iodine (3.2%) and vitamin A (2.1%) deficiencies.[17] Anemia is a major problem that affects all people in these regions but especially women and children.[33] Importantly, studies have shown that preconceptional anemia is a significant predictor of poor pregnancy outcome.[34] These examples illustrate some of the typical deficiency problems found in low- and middle-income countries.

Iron deficiency and anemia

Anemia is a global problem,[33] and the prevalence of anemia in Africa, where malaria is also a problem, is the highest in the world.[35] Some prevalence data for anemia in women from recent

TABLE 7: Iron status in adolescent schoolgirls in Western Kenya; baseline data in the four treatment groups[#]

Group characteristics	Treatment groups			
	Iron	Iron and vitamin A	Vitamin A	Placebo
	n = 70	*n* = 68	*n* = 70	*n* = 71
Age (mean, SD)	13.8 (1.3)	13.8 (1.3)	13.9 (1.2)	13.8 (1.3)
Menstruating (%)	44.3	48.5	50	43.7
Hemoglobin[##] g/L (mean, SD)	126 (20)	128 (19)	128 (14)	131 (15)
Hb < 120 g/L (%)	35.5	31	28.8	26.6
Ferritin µg/L (geom. mean, SD)	13.0 (7.9)	12.3 (7.2)	13.9 (7.8)	12.8 (7.8)
Ferritin < 12 µg/L[###] (%)	40.4	44.2	44.7	40.4
Any malaria (%)	27.3	31.4	17.3	25.5
Height cm (mean, SD)	156.0 (9.1)	156.9 (7.8)	157.1 (7.8)	158.0 (7.8)

[#]Source reference[23] (with permission).

[##]On first examination all girls selected for intervention trial were anemic (hemoglobin < 120 g/L). Figures in table were those obtained at enrollment.

[###]In children over five years of age it is usual to use the cut-off of 15 µg/L to define iron deficiency. The authors indicated they used 12 µg/L. If this was not a typing error then the prevalence of iron deficiency should be more than the figures indicate.

Demographic and Health Surveys are shown in **Table 6**.[36] Unfortunately prevalence data specifically for adolescent girls was not available from this reference.

Some data from an intervention study in schoolgirls in western Kenya illustrates the raised demand for iron following menarche.[23] A survey of 1,615 girls aged 12 to 18 years was conducted during a six week period in April–May 1998. Three hundred and fifty girls, or 21.9% of the total, were found to have mild to moderate anemia (70–120 g hemoglobin/L). Of these 350 girls, 279 non-pregnant girls were enrolled for a randomized vitamin A and/or iron treatment study. Treatment groups were comparable (**Table 7**); mean age was 13.8 years, approximately half the girls had passed menarche, and approximately one third of the girls (30.5%) were still anemic at the start of treatment. At baseline, hemoglobin in menstruating girls was 6.4 g/L lower than in those not yet menstruating, a quarter of the girls had a malaria parasitemia and a third of these had high parasite densities (> 500 parasites/mm^3), but only one presented with symptomatic malaria. The prevalence of stunting was only 4%, and only 7% of the girls were at risk of vitamin A deficiency at enrolment. Following a 5-month intervention, the iron supplement had a clear effect in menstruating girls but not in those not yet menstruating ($P < 0.002$) or not anemic at baseline (**Table 8**).

> "Iron supplementation benefits adolescent girls who are menstruating"

The authors concluded that iron supplementation benefits adolescent girls who are menstruating, and that the lack of an effect in non-menstruating girls is because their anemia may be due to malaria or other parasitic infections. In older (menstruating) girls, the effects of malaria on hemoglobin may be lower, as acquired immunity to malaria increases with age. There was no effect of vitamin A on hemoglobin concentrations but, as baseline concentrations of retinol binding protein indicated very little risk of vitamin A deficiency, it is not surprising. The principal effects in this study are based on the response of the hemoglobin concentrations to the supplements. Iron deficiency per se should be based on low ferritin concentrations that indicate iron stores. Unfortunately post-treatment ferritin data were not available, as more than 80% of the blood was lost in transport. However, baseline data did suggest that there were more than 40% of iron deficient girls in all groups (**Table 7**). As there was approximately a third less anemia than iron deficiency, the data suggest that iron intake of the girls was marginally adequate; sufficient to enable some hemoglobin synthesis but little iron storage. However, menstruation posed an extra challenge for the Kenyan girls, and pregnancy would increase the demand for iron still further, justifying the recommendations for iron supplements during pregnancy (**Table 4**) to boost their own iron status and that of the fetus.

Vitamin D and calcium deficiencies

In South Africa, the physiological opportunities for growth of adolescents appears better than in many other African countries. In Niger, Senegal and Mali, where Demographic and Health Surveys (DHS) found over 60% anemia in women, median ages of first marriage were 15.5, 19.3 and 16.6 years respectively, while in South Africa the median age of first marriage was later at 24.2 years.[37] In 2003, the mean height of adolescent girls in both urban and rural provinces of South Africa was 1.58 m (SD < 0.11), with increases in mean height of about 4 cm between the ages of 15 and 19 years. Undoubtedly, some adolescent girls are

TABLE 8: Effect of iron supplementation on hemoglobin concentrations at five months; data are stratified by iron status and menstrual status in adolescent schoolgirls in western Kenya[#]

Hemoglobin concentration g/L	Iron deficient at baseline $n = 80$		Iron replete at baseline $n = 109$	
Difference in means[##] (95% CI)	1.34 (0.79, 1.88)	$P < 0.0001$	−0.20 (−0.59, 0.18)	$P = 0.30$
	Menstruating at baseline $n = 149$		**Not menstruating at baseline** $n = 130$	
Difference in means (95% CI)	1.07 (0.60, 1.55)	$P < 0.0001$	0.10 (−0.28, 0.49)	P −0.59

[#]Source reference[23] (with permission). Treatment was 120 mg elemental iron in the form of two tablets of ferrous sulfate given once weekly.

[##]Difference in means between iron and placebo obtained by repeated measures linear regression analysis using a polynomial function of time, adjusted for baseline hemoglobin concentrations, the effect of vitamin A, within-subject correlation and confounding by school.

stunted, but catch-up growth is taking place as the velocity of mean growth between 15 to 19 years crosses the 25th centile of the American growth charts.[31]

Although stunting may be less of a problem in South Africa, unfortunately obesity is much more of a problem in men and especially in women.[29] In the 1998 DHS, 56.6% of women were overweight and 42% had abdominal obesity. Neither the 1998 nor the 2003 DHS collected blood samples, but dietary information was obtained in 2003.[26] The dietary data indicated that intakes of calcium, folate, magnesium, vitamin E, thiamin, niacin, and iron were less than two thirds of the recommended daily allowance (RDA). While this does not necessarily indicate deficiencies of these nutrients, there is some concern over calcium, as estimates suggested that more than 60% of the population was getting less than a third of the RDA. The micronutrients which were least deficient were vitamins A, B_6, B_{12} and C.[26] Since the 2003 survey, mandatory fortification of both maize and wheat flour with vitamin A, thiamin, niacin, vitamin B_6, riboflavin, folic acid, iron, and zinc was introduced to increase dietary intakes of the nutrients by persons over 10 years by approximately 20–30%.

The concern over calcium is expressed in a number of publications.[38–40] The South African RDA for calcium for females 14 to 18 years is 1,300 mg/day,[26] so to get less than a third of the RDA means < 430 mg daily. Typical dietary calcium intakes in Africa are about 200 mg daily.[40] Nutritional rickets has been reported in Nigerian children to result from dietary calcium deficiency.[38,40] Calcium carbonate (400 mg) or ground fish (638 mg) supplements given for 18 months increased bone density of the distal and proximal third of the radius and ulna over time ($P < 0.04$).[40] Vitamin D deficiency and low calcium intakes contribute to the etiology of rickets. It is now recognized that vitamin D deficiency in the pregnant mother predisposes to the development of rickets in the breastfed infant, and that cultural and social factors are important in the pathogenesis of the disease in the adolescent growth spurt.[38] Fracture rates in South African adolescents are inversely related to maternal bone mass.[39]

Many other nutrient deficiencies are found in adolescent children in South Asia and Africa. Vitamin A deficiency has been widespread, but supplementation and fortification programs are successfully addressing this problem in many countries. Riboflavin deficiency is widespread in areas where dairy products are not consumed. There is concern that zinc deficiency is widespread because of antagonism between dietary zinc and phytate, but zinc status is not easily measured, so accurate data are not available. Riboflavin and zinc, however, are both essential nutrients for growth, so deficiencies need to be addressed in any attempt to support growth. Other deficiencies such as thiamin (vitamin B_1) are rarer but can occur without warning and with devastating effects.[41] The fundamental problem precipitating many if not all of these deficiency diseases is poverty and its ramifications: monotonous diets, lack of dietary diversity, seasonal shortages, low education, unsanitary living conditions, and high levels of endemic infections. Reducing poverty requires many things, but improving the health and stature of the workforce will be one step in the right direction.

Conclusions

Many children in low- and middle-income countries enter adolescence stunted and thin. Many are also anemic, and there is also a wide variety of other micronutrient deficiencies. Adolescence is an opportunity for catch-up growth, but poor diets and the physical demands of early marriage and pregnancy antagonize opportunities for growth. The number of years of secondary education is inversely proportional to the age of marriage, so female education needs to be actively encouraged in order to increase the age of marriage. Micronutrient fortification of dietary staple foods will improve dietary quality. However, bone growth is particularly demanding of nutrient quality, and protein quality and dietary diversity need also to be promoted to ensure bone growth is possible and that the extra energy and nutrients are not simply diverted to lean tissue synthesis and fat deposition.

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Opinion: Adolescent Pregnancy

Its impact on the growth and nutritional status of young mothers: What does the evidence say?

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Adolescent health and nutritional well-being are increasingly receiving global attention. The article by David Thurnham in the current issue of *Sight and Life* describes the nutritional status and requirements of adolescent women in low- and middle-income countries. Evidently, a large proportion of adolescents in developing countries are undernourished. Reduced productivity, poor school performance, and adverse reproductive outcomes are well-known consequences of malnutrition in this age group.[1] Importantly, in many developing regions of the world, premature childbearing due to early marriage is common, with potentially adverse consequences to both the health and life of the mother and infant. Poor pre-pregnancy nutritional status, coupled with inadequate intakes of nutrients during pregnancy, may aggravate the depletion of maternal nutritional reserves, resulting in a deprived nutritional status of the pregnant adolescent mothers and the fetus.

> "Data on the consequences of premature childbearing in developing countries is sparse"

Childbearing during adolescence hampers growth

While the birth outcomes of adolescent pregnancy have been well researched, data on the consequences of premature childbearing on the growth and nutritional status of young mothers in developing countries is sparse. Previously, it was believed that growth was largely completed by the time adolescent girls become pregnant, and thus, the majority of pregnant teenagers did not grow or did so only marginally during pregnancy. This was based on the notion that pregnancy occurs subsequent to menarche, when growth rate drops to a nadir.[2] However, available evidence from developing countries has shown that pregnant girls do not gain in height during pregnancy and lactation, and lose weight, body mass index and MUAC (mid-upper arm circumference) by six months postpartum. In particular, a study[3] was conducted in rural Bangladesh, where 49% of adolescent girls were stunted and 40% underweight, and where ~25% of pregnancies occur among adolescents. Childbearing during adolescence was found to hamper post-menarcheal linear and ponderal growth of young girls during a potential window of opportunity for catch-up growth in an undernourished population. It was concluded that the cessation of linear growth in adolescents due to an early pregnancy might result in an overall loss of between 0.6 and 2.7 cm in attained height in rural Bangladeshi women, which may contribute to stunting and increased obstetric risk. The depletion of maternal fat stores and lean body mass during pregnancy and an early stage of lactation, especially among adolescents who become pregnant at an earlier gynecological age, may exacerbate the outcome of future pregnancies and increase the risk of maternal morbidity and mortality.

Targeted nutrition interventions

This research, along with evidence provided from other studies, has a few crucial implications. Firstly, nutrition interventions currently in place in low- and middle-income countries that provide food supplements to pregnant women need to be informed regarding the need to identify and target adolescent pregnant and lactating girls. Nutrition interventions prior to

and during pregnancy may help reduce the depletion of maternal energy reserves and lean body mass during pregnancy and lactation. Interventions will also need to be targeted earlier in the life cycle in order to impact maternal and fetal outcomes. Post-menarcheal married nulligravid and unmarried adolescents who are undernourished may be identified and targeted for food supplementation programs.

Secondly, family planning programs in developing countries should preferentially target adolescent married girls. Innovative strategies such as targeting a newly-wed bride and groom to delay their first pregnancy can be an important way of reducing premature pregnancy. Lastly, the negative consequences of adolescent pregnancy on the growth and nutritional status of adolescent mothers should ultimately inform policy and educational efforts to delay age of marriage and the prevalence of adolescent pregnancy in developing countries.

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"If you are building something and a nail breaks, should you stop building altogether, or should you change the nail?" (Rwanda)

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Towards Sustainable Nutrition for All

Tackling the double burden of malnutrition in Africa

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Key messages

- The double burden of malnutrition (DBM) affects a growing number of African countries.
- Obesity is increasing faster than many African countries can reduce child stunting and hidden hunger.
- Health systems in many African countries will not be able to manage the chronic disease burden.
- Coordinated cross-sector policies can facilitate the prevention and management of the DBM in Africa.

Introduction

Over two decades have passed since world leaders were introduced to the "new paradigm" of the double burden of malnutrition (DBM) at the 1992 International Conference on Nutrition.[1] The double was required to describe the paradox of malnutrition coexisting as undernutrition and overweight/obesity in the same population. As used in this paper, undernutrition includes issues of underweight (low weight-for-age in children; BMI < 18.5 in adults), stunting (low height-for-age), wasting (low weight-for height) and micronutrient deficiencies. Adult overweight/obesity is defined as BMI ≥ 25.0 kg/m² and child overweight/obesity uses the WHO/UNICEF definition of weight-for-height ≥ +2 standard deviations above median.

Globally, the overweight/obesity prevalence in low- and middle-income countries (LMICs) has tripled in 20 years.[2] Stimulated by broad social and environmental factors, obesity is increasing faster than many African countries can reduce child stunting and micronutrient deficiencies. Overweight/obesity affects more than one quarter of the adult population in sub-Saharan Africa,[2] yet the child stunting (defined as ≤ 2 standard deviations below the mean height-for-age) prevalence remains the highest in the world.[3] The DBM is particularly salient in African countries where undernutrition and overweight/obesity coexist as issues of public health importance.

The nutrition landscape varies across African countries due to diversity in cultures, economies, governance, and development priorities. Thus, this article begins with an overview of the distribution of undernutrition and overweight/obesity on the African continent. It then describes the drivers of the DBM. Finally, suggested intervention strategies, frameworks, and policy options to address the DBM in Africa are discussed.

The coexistence of undernutrition and overweight/obesity in Africa

Priority nutrition concerns vary across African countries. Some regions experience primarily undernutrition, others primarily overweight/obesity, and still others show evidence of the DBM (**Figure 1**). Demographic Health Survey (DHS) data from Eastern, Middle, Southern, and Western Africa revealed country variance in maternal underweight between 2.0–35.8% and maternal obesity between 0.7–27.3%.[4] Six out of 13 surveyed African region countries had high levels of both child stunting and women's obesity in 2010.[5]

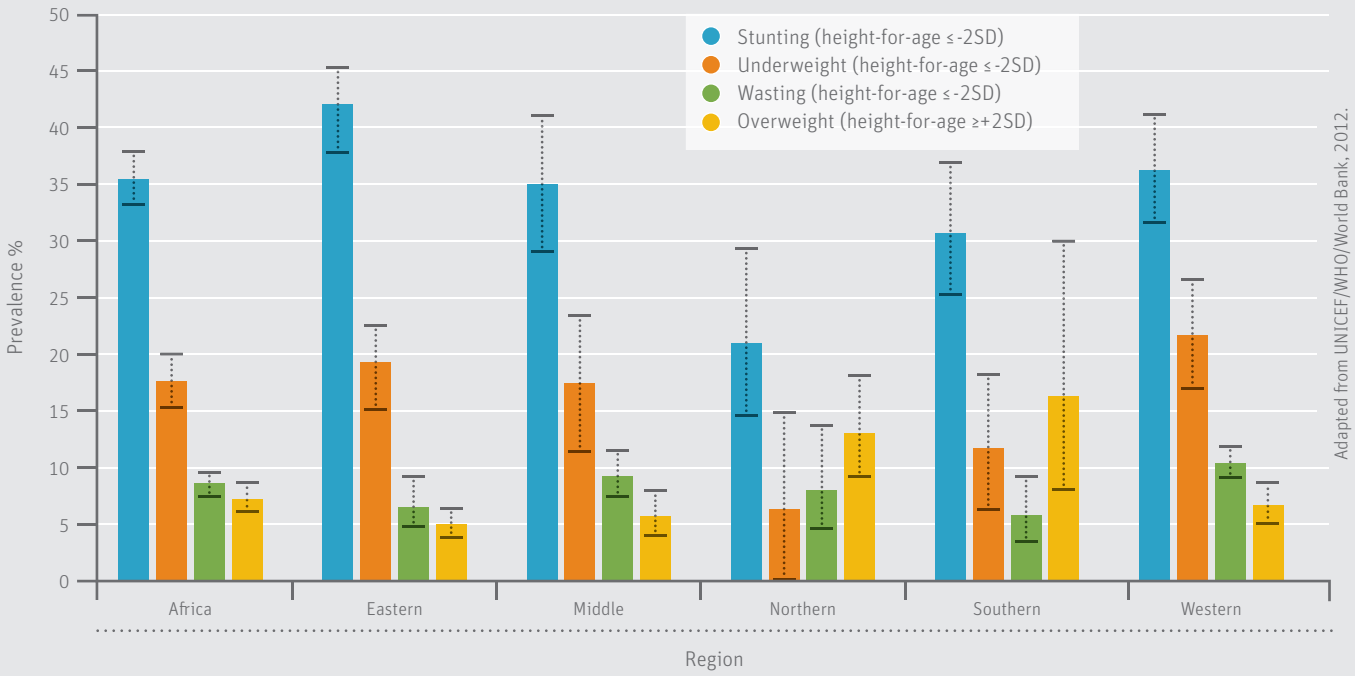
Widespread undernutrition has not receded in Africa: 22 of the 34 countries with 90% of the global burden of stunting are in Africa (**Table 1**).[6] Though exceptions such as Algeria, Ghana, and Rwanda exist, the majority of African countries have low probability (< 12%) of achieving the Millennium Development Goal 1 (MDG 1) to halve the number of underweight children by 2015.[7] East Africa has the highest prevalence of stunting by UN sub-region (42%) and Central Africa has the highest prevalence of severe wasting (5.6%).[3] In Africa, deficiencies of vitamin A in children and iodine in the population exceed 40%, while iron deficiency anemia affects more than 20% of children and pregnant women.[3]

Maternal and child overweight/obesity in Africa also varies by country and region. However, the burden of obesity is highest in northern and southern Africa, where adult overweight exceeds 40% in some countries.[5] In 2011, more than 7% of African pre-

"Widespread undernutrition has not receded in Africa"

Early-life nutrition sets the trajectory for growth and long-term health: prevention of the DBM in the primary education sector in Africa.

FIGURE 1: Prevalence of malnutrition in children under five years of age in Africa by United Nations region, 2011.



school children were overweight, ranging from 6.4% in Western Africa to 17.0% in Northern Africa.[8] If secular trends continue, adult overweight/obesity in sub-Saharan Africa will exceed 28% by 2030.[9]

"There is a correlation between the DBM and nutrition transition"

The distribution of the double burden of malnutrition

Broad social and environmental factors have triggered the nutrition transition in Africa.[3,10,11] The nutrition transition describes predictable population changes to diet – including consumption of sugar and sweetened beverages, processed foods, edible oils, salt and animal-source foods – and physical activity that are associated with rising global obesity prevalence.[11] At the same time, one sees a decrease in intake of fruit and vegetables and high-fiber foods. The nutrition transition proceeds through the phases of receding famine, degenerative disease, and behavior and lifestyle change.[12] The extent to which the DBM exists at the country, community, household, or individual level largely corresponds with the pace of and exposure to the nutrition transition in the population.[13]

In many African countries, the DBM first appears at the country level along the urban/rural divide. Changing dietary patterns and increasing obesity have accompanied the rapid urbanization taking place across Africa and in other developing countries.[14,15] As famine recedes, underweight and micronutrient deficiencies remain significant public health concerns for children and adults, but sufficient calories are available such that obesity and cardiometabolic risk factors begin to emerge in adults.[13] DHS data from Africa supports urbanization as a driver of the nutrition transition: female overweight significantly exceeded underweight in urban areas in 18 out of 21 African countries, and underweight significantly exceeded overweight in rural areas in 7 out of the same 21 countries.[14] Though obesity in urban areas generally exceeds that in rural areas, the trend is changing. The relative annual percentage change in overweight/obesity in urban women is higher than in rural women in West, East, and Southern Africa, but the opposite is now true in Central Africa.[16]

At the community level, the distribution of the DBM can mirror the distribution of wealth. Large socioeconomic inequalities in malnutrition exist such that the poor in almost all low and/or middle income countries (LMICs) are most affected by stunting,[3] and obesity has generally been associated with wealth. However, recent studies demonstrate a shift in this pattern, as the poor in LMICs increasingly experience both maternal and child obesity and increased degenerative disease risk.[8,17,18]

Where the nutrition transition proceeds more rapidly, the DBM can be found within households. Undernourished child-overweight/obese mother pairs in Africa were first described in Benin, Egypt, and South Africa and have since been observed in a growing number of African countries.[13,19–21] The coexistence

TABLE 1: The 22 African countries (of 34 total countries) with 90% of the global burden of stunting

Country*	Stunting Prevalence
Egypt	30.7
Sudan	37.9
Ethiopia	44.2
Uganda	38.7
Kenya	35.2
Rwanda	44.3
Tanzania	42.5
Madagascar	52.8
Malawi	47.8
Mozambique	43.7
South Africa	23.9
Zambia	45.8
Angola	29.2
Democratic Republic of Congo	43.4
Cameroon	43.4
Nigeria	41.0
Ghana	28.6
Niger	54.8
Mali	27.8
Chad	38.8
Burkina Faso	35.1
Cote d'Ivoire	39.0

Adapted from Black et al, 2013.[3]

*Countries in bold are committed Scaling Up Nutrition (SUN) countries.

of the DBM at the household level is particularly significant in Africa, where emergency and non-emergency aid programs often implicitly utilize child undernutrition as an indicator of household food insecurity and dietary inadequacy.[19] The existence of double burden households in Africa warrants the reconsideration of food baskets and nutrition education to avoid exacerbating maternal overnutrition when targeting aid to undernourished children.

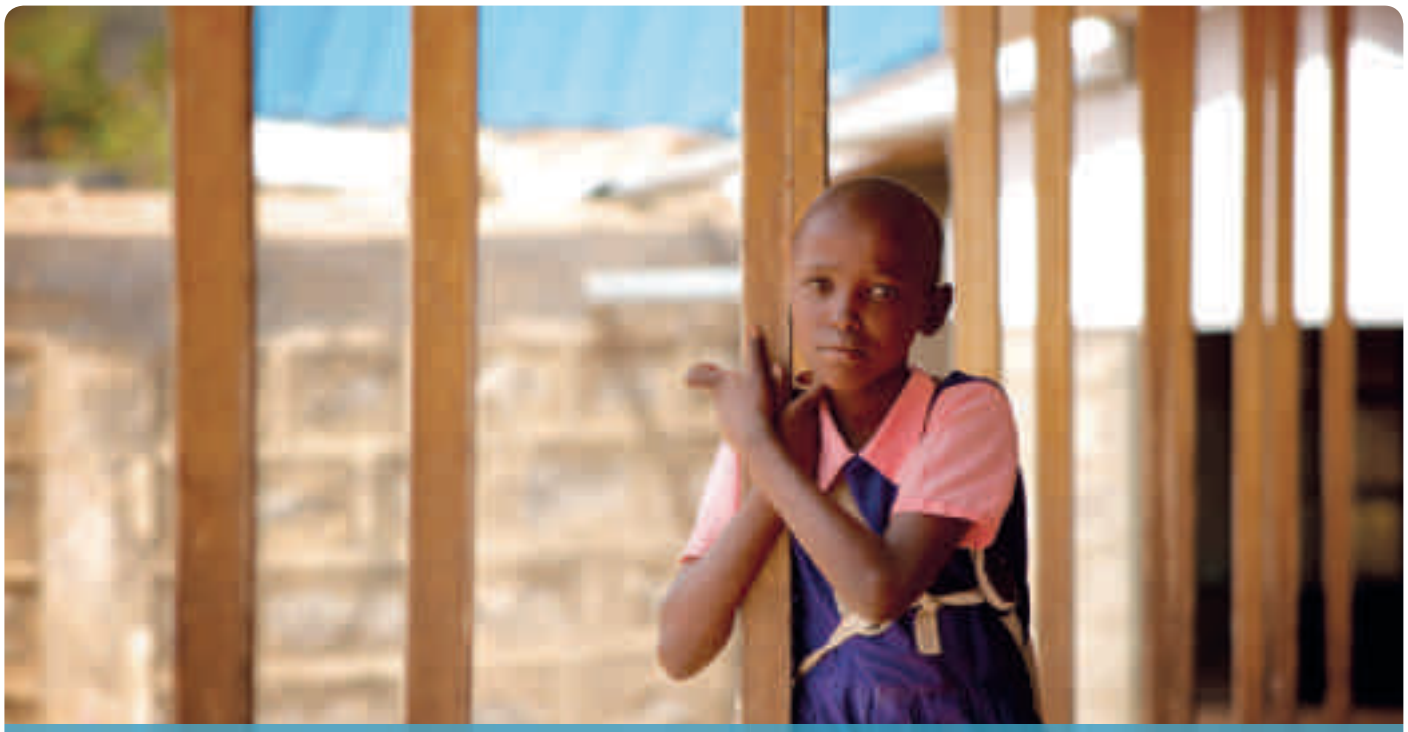
Even at the individual level, the DBM can be found as the coexistence of obesity and micronutrient deficiency. Except in cases of extreme food insecurity, diets of the poor are energy-dense, providing sufficient macronutrients but lacking micronutrients.[22] Concurrent stunting and overweight/obesity is another manifestation of the DBM in individuals. The prevalence of the double-burden individual in Africa will grow as continued urbanization pulls more stunted individuals from rural to urban areas, increasing their exposure to the obesogenic environment.[1] In northern and southern Africa the double-burden individual can be found earlier in the life course in the form of stunted, obese children.[13] The significant long-term consequences of childhood obesity may signal the urgency of moving towards the behavior-change phase of the nutrition transition.

"Women are most affected by the DBM"

Maternal and infant nutrition: an essential component of strategies against the DBM

A life-course model, including the developmental origins of health and disease (DOHaD) paradigm, demonstrates the importance of addressing maternal, infant, and young child undernutrition in Africa.[23,24] Women are most affected by the DBM and the consequences are intergenerational.[22] Early-life nutrition sets the trajectory for growth and long-term health.[25] Thus, the DBM can be seen as both a consequence of early-life undernutrition and a cause of later-life non-communicable diseases (NCDs) within populations.[1] Maternal nutritional imbalance alters the in utero nutritional environment and causes permanent changes to the structure, function, and metabolism of fetal tissues.[25] Rapid dietary, social, and economic changes in African countries amplify the mismatch between a nutrient-scarce prenatal environment and obesogenic postnatal environment and will likely contribute to rising DBM in Africa.[22]

The long-term adverse effects of fetal malnutrition provide a compelling argument for prioritizing the nutritional status of women and adolescent girls in DBM prevention efforts. Maternal overweight has increased faster than maternal underweight has decreased in Africa. In 2008, more than 10% of adult women were underweight and more than 40% were overweight/obese.[3] Malnutrition in pregnancy is associated with a host of adverse maternal and infant outcomes, including gestational diabetes, pre-eclampsia, and preterm birth with overnutrition; small for gestational age (SGA), low birth weight (LBW), and neonatal death with undernutrition.[3,4] Poor reproductive health coverage in Africa may result in increasing adverse birth outcomes as a result of unmonitored gestational diabetes and pre-eclampsia.[26–28] Additionally, LBW infants tend to have greater adult lean mass and human capital when they experience rapid weight gains still in the first one thousand days of life.[29] However, stunting patterns in Africa indicate that these early weight gains are not achieved at a population level.[30] The later-life weight gains that these individuals may experience are associated with adverse cardiovascular consequences.[29] Without significant investments in the health services sector, primary prevention will be key DBM management strategy in Africa.



Primary prevention of the DBM in Africa will require nutrition actions in multiple sectors. In addition to school feeding, programs in the education sector can offer instruction in nutrition, hygiene, sex, and physical education to promote healthy lifestyles.

Frameworks for comprehensive strategies against the DBM

Though known interventions exist for undernutrition and overweight/obesity independently, clear, evidence-based recommendations for the prevention of DBM have not yet emerged. The 2012 World Health Assembly (WHA) endorsed the Comprehensive Implementation Plan on Maternal, Infant, and Young Child Nutrition.[31] The WHA set both undernutrition and overweight/obesity targets for 2025 and supported Member States in "developing, or, where necessary, strengthening nutrition policies so that they comprehensively address the double burden of malnutrition."[5] However, few programmatic and policy examples addressing the prevention and reduction of the DBM exist.

> "Innovative strategies will be required to counter the DBM"

The 2013 Lancet nutrition series highlighted that 90% coverage of ten nutrition-specific interventions can reduce stunting by 20%.[6] These results cannot be achieved without scaling up nutrition-specific interventions addressing undernutrition in Africa. However, many African countries will still fall short of the WHA targets for stunting, and the challenges of overweight/obesity and hidden hunger will remain. Current global trends indicate that economic growth will be necessary to reduce undernutrition but insufficient to address the DBM. Increasing per-capita GDP will result in proportionately larger increases in women's overweight/obesity than reductions in child stunting.[32,33]

Thus, new and innovative strategies will be required to counter the rise of the DBM in Africa. Collaboration across sectors, accompanied by an effective coordination mechanism, should join the efforts of those within and outside the nutrition community to address the DBM. Improving country-level capacity to coordinate nutrition actions is critical. Countries with both child stunting and women's obesity rarely implement comprehensive interventions, and in 2010 only one quarter of countries with the DBM had coordination mechanisms to address both problems.[5]

With few peer-reviewed interventions, many of the existing DBM frameworks come from multilateral institutions and civil society organizations.[1,5,34,35,42] These frameworks emphasize the importance of addressing nutrition throughout the lifecycle and extend beyond the health systems sector. Shrimpton and Rokx describe a policy framework for addressing the DBM based on the four pillars of food security, food safety, nutrition, and healthy lifestyles.[1] The pillars were agreed upon on the basis of the experience of national nutrition plan implementation following ICN1.[45] Strategies to address the DBM link the policy, programming, training, communication, and advocacy efforts against overweight/obesity and undernutrition through coor-

TABLE 2: Priority actions in a multi-sector DBM strategy

	Nutrition Policy Pillars			
	Food security	Food safety	Healthy lifestyles	Nutrition
Health		> Food safety and hygiene regulations > Food inspections > Food standards	> Promoting healthy diets > Limit availability of inappropriate foods > Promotion of exercise > Infection control > Family planning	> Micronutrient supplementation (multiple micronutrient and supplementation in pregnancy; childhood vitamin A supplementation; preventive zinc supplementation) > Management of SAM > Dietary guidelines > Baby Friendly Hospitals > Breast- and complementary feeding promotion
Public Works / Urban Development	> Ruralro ads > Irrigation	> Water and sanitation improvements	> Urban bike lanes > Pedestrian walkways > Road safety	> Smoke-free home environments
Agriculture	> Sustainable intensification of production > Promotion of home gardens > Food and agriculture policies to promote availability, affordability, diversity, and quality	> Regulations to improve food safety in processing, transport, and storage		> Biofortification to improve nutrient density > Nutrition-oriented agriculture research > Nutrient-preserving processing, transport, and storage > Nutrition-promoting farming systems, agronomic practices, and crops
Education	> Promotion of school gardens > School meals	> Hygiene education	> Physical exercise > Life skills and sex education > Gender equity	> Nutrition education > Anemia control
Industry / Trade / Commerce	Food availability (manufacture and marketing)	> Food standards > Food safety regulations		> Food fortification, especially with folic acid > Locally available fruits and vegetables > Product reformulation to reduce saturated, and trans-fat sodium, and sugar content
Public Information			> Marketing of food to children	> Code of marketing of breast milk substitutes > Nutrition information campaigns > Nutrition labeling
Finance/Economy	> Food subsidies			> Food taxes

Source: Adapted from Shrimpton and Rokx, 2012,[1] FAO. The double burden of malnutrition, 2013.[13]

dinated, cross-sector policies in ministries such as education, health, agriculture, public works/urban development, and commerce (Table 2).[1,36]

The role of the nutrition environment is widely discussed with respect to overweight/obesity, but nutrition-sensitive interventions and policies can be utilized to address environmental aspects of both features of the DBM in a variety of settings.[32,34] For example, the Nutrition Friendly Schools Initiative (NFSI), a UNICEF/WHO joint project, aims to "help build an enabling environment for the overall health and nutritional well-being of children."[37] The NFSI includes five essential components specifically designed to engage stakeholders at the individual, school, community, and national levels to prevent the DBM.[37] Pilot-tested in West Africa, early process evaluations have just been released.[38] Despite resource and capacity limitations, the strategy appears to have potential to improve child health and nutrition.

"Leveraging the relationship between agriculture and nutrition is also key"

DBM frameworks also describe the importance of leveraging the relationship between nutrition and agriculture to sustainably address the DBM.[34] Improved targeting, evaluation, goal-setting, and gender sensitivity can help food system interventions to address the underlying, distal causes of the DBM.[33] Nutritious food is already inaccessible for many Africans, and demand will only increase. African fertility rates are twice as high as any other region (5.4 children per woman) and even modest projections predict that the population of the continent will more than double by 2050.[39] Research to improve the production and nutrient density of fruits and vegetables through smallholder diversification and biofortification is cost-effective and contributes to sustainable solutions.[40] Poor dietary diversity is increasingly rooted in poverty, and intensified agricultural production can avert increases in food insecurity in the wake of population growth. Food systems strategies present an opportunity to improve the quality of foods consumed by the poor and are protective against the DBM at the household level.[22,34,41]

These frameworks note that comprehensive DBM strategies also include private-sector engagement to promote an enabling nutrition environment through actions such as: nutrition labeling regulations; reductions in ultra-processed food availability; reformulation of foods to lower saturated fat, salt, and sugar content; and widespread fortification.[1] Smallholder-friendly supply chain improvements, in the form of food safety standards, transportation and marketing systems, and storage and processing facilities,

The double burden of malnutrition (DBM) affects a growing number of African countries.

also have the potential to align economic goals of farmers and processors with those of nutritionists.[41] These strategies, however, involve significant cooperation and technological advances that can only be achieved through strong political commitment. Nutrition education and behavior-change communication initiatives addressing the asymmetry of knowledge regarding healthy foods and physical activity are also necessary to create consumer demand.[34] Ultimately, high-level political support is essential to unite actors, enforce regulations, and allocate funding to the creation of a nutrition-promoting environment.[32,34]

The Scaling Up Nutrition (SUN) movement has generated momentum and united governments and stakeholders to reduce hunger and malnutrition through coordinated efforts.[43] The majority of the 43 SUN countries are in Africa, and promisingly, many are the same African countries with high burdens of child stunting (Table 1). SUN offers a strategy that incorporates nutrition-specific and nutrition-sensitive approaches to reduce malnutrition. Though primarily focused on undernutrition, continued and strengthened SUN efforts provide an excellent opportunity to address the DBM across the life-course.[1]

Conclusion – Dropping the *double* in the double burden?

The momentum behind scaling up programs tackling maternal and child undernutrition in Africa is promising, but rising overweight/obesity and NCDs add to the complexity of creating effective nutrition policies and programs in Africa. As govern-

ments commit to prioritizing nutrition, the notion of dropping the *double* in the double burden[44] may help to advance a unified nutrition agenda addressing malnutrition in all forms.

In the face of resource scarcity, ignoring the connections between undernutrition and overweight/obesity represents a missed opportunity for the public health nutrition community. Global recommendations for strategies against the DBM, adaptable to country-specific trends in urbanization, population growth, climate change, gender, and economic development are needed. Coordinated policy and programmatic actions extending beyond the health sector can be utilized to address underlying causes of malnutrition and prevent the DBM. These strategies are necessary to improve maternal, infant, and young child nutrition and health in Africa, avoid a significant loss of human capital, and prevent a burgeoning epidemic of overburdened health systems.

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"If the rabbit is your enemy, admit that he can sprint fast" (Mali)

The African Nutrition Leadership Programme

Alumni share with us what inspires them about their continent

During its 12 years of existence, the African Nutrition Leadership Programme (ANLP) has trained and networked 273 people from 33 African countries working in a diverse range of nutrition fields. *Sight and Life* asked them to share some of their favorite books and inspirations with our readers.

My best African read …

- *Things Fall Apart* | Chinua Achebe (the undisputed favourite and a must read)
- *Mugasha: Epic of the Bahaya* | Nyambura Mpesha
- *Half of a Yellow Sun* | Chimamanda Adichie Ngozi
- *Purple Hibiscus* | Chimamanda Adichie Ngozi
- *The New Harvest: Agricultural Innovation in Africa* | Calestous Juma
- *Whispering Acacias* | Karen Monadjem
- *Africa Must Unite* | Osagyefo Kwame Nkrumah
- *The Challenge for Africa* | Wangari Maathai
- *Beauty's Gift* | Sindiwe Magona
- *Edible Bones* | Unoma N Azuah
- *21 Yaks and a Speedo* | Lewis Pugh
- *The Arrow Path* | Francis Serlomey
- *The African Child* | Camara Laye
- *The Boy Who Harnessed the Wind* | William Kamkwamba
- *Dead Aid* | Dambisa Moyo
- *The Long Walk to Freedom* | Nelson Mandela
- *Les Bimanes* | Sévérin Cécile Abéga
- *Le Manda* | Ousmane Sembène
- *Le Pain Nu* | Mohammed Choukri

Why I love Africa …

- "The warmth, vibrancy, and color of the place, along with the cultural diversity/richness of its people, clothes, food, natural resources and music (the number 1 reason!)."
- "The friendly social interaction."
- "Africa is my home – home sweet home, no place like home."
- I cherish the sense of freedom and opportunity one has here."
- "The many challenges offer even greater opportunities."
- "Her people – they have warmth in their eyes, smiles on their lips and the drive in their hearts to live life despite their hardships and pain."
- "The big five (lion, leopard, rhino, elephant, buffalo)."
- "The 'warm' Sun that underlies the character and nature of the African people."
- "The sense of community."
- "The sunsets and sunrises."

To find out more about the African Nutrition Leadership Programme, please visit:
www.africannutritionleadership.org.

Iodine Nutrition in Africa: an Update for 2014

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Included as an insert to this issue of *Sight and Life* is the current issue of the Iodine Deficiency Disorders (IDD) Newsletter. The IDD Newsletter has been published for over 25 years and it is the central "meeting place" of the global iodine community. The focus of the latest issue is on iodine nutrition in Africa and highlights the successes and challenges to salt iodization programs on the continent. To subscribe to the quarterly electronic IDD Newsletter visit **www.iccidd.org.**

Introduction

The elimination of iodine deficiency and its serious consequences, called the iodine deficiency disorders (IDD), are among the health priorities of most countries in the world. These IDDs include impaired mental development, adverse effects on growth, infant mortality, hypothyroidism, reproductive failure, and endemic goitre,[1] which may lead to decreased educability, apathy, and reduced work capacity and may ultimately result in impaired social and economic development.[2]

Salt iodization programs in approximately 150 countries have markedly improved the global iodine nutritional status over the past decade. This is reflected in the decrease in the number of iodine-deficient countries worldwide from 54 in 2003 to 47 in 2007 and then to 32 in 2011.[3] Despite remarkable progress, the successes have been regionally variable, with some regions showing little progress. Against the background of a general global improvement in iodine status and a marked improvement in four of the six WHO regions since 2003, the trend in Africa indicated a small decrease in the proportion of school-age children (SAC) with insufficient iodine intake as judged by urinary iodine concentration (UIC) below 100 µg/L, while the number of African SAC with insufficient iodine intake remained the same between 2007 and 2011.

The regional burden of iodine deficiency in Africa compared to other regions is further emphasized by the finding that seven of the top 10 iodine-deficient countries with the greatest numbers of SAC with insufficient iodine intake in 2011 are from Africa.[3] These countries, ranked by the number of deficient SAC, were: Ethiopia, Sudan, Algeria, Angola, Mozambique, Ghana, and Morocco. In terms of proportion of the population with insufficient iodine intake, Africa is ranked second with 40%, behind Europe with 44%. When the proportions are calculated in terms of numbers of the total population with a UIC of less than 100 µg/L, 321.1 million African people had an insufficient iodine intake, compared to the 393.3 million in Europe and the 541.3 million in Southeast Asia.

Because of the large number of countries included in each of the six WHO regions, the regional statistics in a global review do not uncover the variation in iodine status and trend over time within the various countries of the regions. This review aims to unpack the available data of 54 countries on the African continent to achieve a more in-depth view of the iodine nutrition status in African countries. The countries counted to the African continent include all countries of the WHO African Region, plus eight countries of the WHO Eastern Mediterranean Region.

Data sources

Currently the most up-to-date global dataset summarizing survey data related to the assessment of the iodine nutrition status

> “Seven of the top 10 iodine-deficient countries in 2011 were in Africa”

A knapsack sprayer in use in Ethiopia.

Dr Vincent Assey training small-scale salt producers to use knapsack sprayers to iodize salt. This technology has helped ensure that almost all salt from salt-producing areas in Ethiopia is iodized. It has been used in Tanzania for the past ten years, maintaining coverage of iodized salt at over 80 percent.

in countries is managed and frequently updated by the Human Nutrition Laboratory of the ETH in Zurich, Switzerland. The updated version as of September 2013 was used for this review. The original dataset was developed using country data on UIC compiled in the WHO Vitamin and Mineral Nutrition Information System Micronutrient Database as well as an extensive search strategy in PubMed, Current Contents Connect, and ISI Web of Science. Additional information was generated by contacting iodine scientists around the world through the ICCIDD Global Network and through agencies such as WHO and UNICEF and their regional offices. Specific criteria were applied for inclusion of data in the dataset for the time period 1993–2013. Preference was given to data from national surveys and in the absence of national data, sub-national data was used.[3]

The median UIC was used for the classification of iodine status of populations as follows: moderate iodine deficiency (20–49 µg/L), mild iodine deficiency (50–99 µg/L), optimal iodine nutrition (100–299 µg/L), and risk of adverse health consequences (IIH, autoimmune thyroid disease) (≥ 300 µg/L).[1,4] The available UIC data of African populations in 2007[5] and in 2013 was used to assess the iodine status and to track changes in iodine status over time.

The countries' household coverage of iodized salt was obtained from UNICEF's Child Info Database.[6,7] Data on population sizes of African countries was obtained from the UN Population Division.[8] Nigeria has the biggest population in Africa (158 million), followed by Ethiopia (83 million), Egypt (81 million), Democratic Republic of the Congo (66 million), South Africa (50 million), Tanzania (45 million), Kenya (41 million), North Sudan (36 million), Algeria (36 million), Uganda (33 million), and Morocco (32 million). The other 43 countries have populations smaller than 30 million. Salt iodization programs in these 11 countries therefore have the biggest impact on the overall iodine status of the continent and should thus be well managed.

Coverage of iodized household salt

According to UNICEF, the household coverage of iodized salt by country varies from one extreme to the other on the African continent.[6,7] Countries with successful iodized salt programs achieving a household coverage of more than 90% are: Burundi, Kenya, Nigeria, Uganda, Tunisia, Namibia, Zimbabwe, and Libya. The challenge, of course, is for countries to sustain this excellent level of household coverage and not to allow their programs to weaken over time. Countries with promising household coverage rates of between 80 and 90% are: Rwanda, Sao Tome & Principe, Cote d'Ivoire, Lesotho, Comoros, the Congo Brazaville, and Tanzania.

TABLE 1: Iodine status of African countries in 2007 and 2013

Iodine status	Median urinary iodine concentration (µg/L)	Countries, *n* (%)[1]	
		2007	2013
Moderate ID	20 – 49	4 (10%)	6 (14%)
Mild ID	50 – 99	11 (28%)	5 (11%)
Adequate iodine nutrition	100 – 299	22 (55%)	30 (68%)
Excessive	> 300	3 (8%)	3 (7%)
Countries with data		40 (100%)	44 (100%)
No data		13	10
Countries in region		53	54[2]

[1] Percentages (%) refers to number of countries in each category out of the total number of countries with data.

[2] Sudan has been divided into North and South Sudan since 2007.

At the other end of the scale, 20 African countries (40%), with household coverage rates reported, had household coverage rates of less than 50%. These 20 countries represent 325.6 million people, or 31.9% of the population on the African continent. Low coverage rates of less than 50% are an indication of weak salt iodization programs seriously in need of corrective action.

The household coverage rates in the UNICEF Child Info Database are mostly based on iodine measurements using rapid test kits. Therefore these results are indicative of household salt containing any amount of iodine, not necessarily of salt containing more than 15 ppm of iodine. The advantages of this method are its low cost and the fact that the result is immediately available. However, recent national surveys tend to use quantitative measurements for the iodine content of salt, such as the titration or an equivalent method, allowing more accurate planning and decision-making in the design and implementation of salt iodization programs.

Iodine status

Of the 40 African countries that had UIC data available in 2007, 15 countries (38%) were iodine deficient, while 22 countries (55%) had adequate iodine nutrition, and three countries (8%) had excessive iodine intakes. No UIC data was available for 13 African countries in 2007.

In Africa, the largest burden of iodine deficiency in 2007, because of large population sizes, was in Ethiopia, Sudan, Algeria, Morocco, Ghana, and Mozambique. Countries with fairly large population sizes ranging between 5 and 20 million people that had no UIC data available in 2007 included Madagascar, Angola, Malawi, Somalia, and Sierra Leone.

Iodine status in 2013

Overall, considerable improvements in available data and iodine status of African countries had been achieved in the 2007–2013 period. During this period, iodine data was reported for four countries that previously had no UIC data available (Angola, Malawi, Somalia, and Sierra Leone). All surveys were national, except for Angola. Therefore, iodine data was available for 44 out of the 54 African countries in 2013, covering 96% of the African population. Recent surveys, carried out from 2003 to 2013, are available in 27 countries; 25 of them were nationally representative. In 17 countries the data is more than 10 years old (1993–2002). Accelerated effort to obtain updated information on iodine nutrition is urgently needed in these countries. Data is entirely lacking for 10 countries, although the majority of them are small countries (< 1 million inhabitants). Madagascar and Libya are two populated countries without data, but national UIC surveys are planned, and new data should be available in the next year or two. New national surveys are underway in Tunisia and Djibouti as well as data from a recently conducted national survey in Ghana.

Notable shifts occurred in the iodine status of many countries on the African continent. **Table 1** shows that the number of iodine deficient countries decreased from 15 in 2007 to 11 in 2013, with an improvement in Senegal, Cape Verde, Cameroon, Mauritania, and Zambia. A regional survey carried out in the central Bie province of Angola in 2006 indicated very low iodine status (median UIC 29 µg/L) and Angola has therefore been added to the list of iodine-deficient countries. At the same time, the number of countries with documented iodine sufficiency (median UIC between 100–299 µg/L) increased from 22 to 30 since 2007.

Three African countries have excessive iodine intakes (UIC > 300 µg/L), exposing the populations to risk of adverse health events. In 2007 the Democratic Republic of the Congo, Liberia and Uganda had median UICs exceeding 300 µg/L, indicating excessive iodine intakes. Since then, new surveys showed that the former two countries had solved their problem by 2013, while

Even in small communities, salt iodization can be easily carried out with a knapsack sprayer. This image is from Pemba island in Zanzibar. This approach has increased the availability of iodized salt from 1 percent in 2001 to 73 percent in 2010 and raised the median UIC from 53 µg/L to 134 µg/L.

no new data is available for Uganda and therefore the country is still considered to have an excessive iodine status. However, in Benin the median UIC increased to 318 µg/L, and UIC data reported for the first time for Somalia also indicated excessive iodine intake (median UIC = 417 µg/L). There is reason to believe that, because the household coverage of iodized salt in Somalia is very low, another factor, such as a high concentration of iodine in the drinking water, is responsible for the high UIC in Somalia. Despite the improvements in iodine status between 2007 and 2013, a significant burden of iodine deficiency still remains in Africa. It should be noted that 11 countries are still iodine-deficient in 2013, six countries are moderately iodine-deficient with median UIC < 50 µg/L, and five countries have mild iodine deficiency with median UIC of 59–99 µg/L. The proportion of individuals with UIC values below 100 µg/L exceeded 80% in five of the six moderately iodine-deficient countries, indicating widespread iodine deficiency. In Ghana, the sixth country, which was also moderately deficient, 71% of people had UIC values below 100 µg/L.

As in 2007, the largest burden of iodine deficiency in 2013 (because of large populations) is still in Ethiopia, Algeria, Sudan, Morocco, Angola, Ghana, and Mozambique. CIDA has identified five countries (Ethiopia, Ghana, Sudan, Tanzania, and Bangladesh), four of which are situated in Africa, for extensive activities to improve iodized salt coverage and strengthen the iodine programs.

"Several studies have demonstrated that pregnant women are another vulnerable group exposed to iodine deficiency"

School-aged children have traditionally been used as a proxy of the iodine status in the general population. In recent years, however, several studies have demonstrated that pregnant women in most populations are another extremely vulnerable group exposed to iodine deficiency and that the iodine status of children does not necessarily reflect the iodine status of pregnant women.[9] A typical example is Tanzania's 2010 Demographic Survey report on women of reproductive age, where the overall median UIC was 160 µg/L.[10] In-depth data analysis segregating pregnant, lactating and non-pregnant women indicated median of UIC 136, 113 and 194 µg/L, respectively.[10] The iodine status of non-pregnant women in 2010 was not very different compared

with 204 µg/L in schoolchildren in 2004,[11] but was very different from that of pregnant and lactating women. It therefore appears critically important that the iodine status of pregnant women should be assessed, in addition to that of children. Currently data on the iodine status of pregnant women is limited, and organizers of new surveys should consider also collecting data on the iodine status of this vulnerable group.

Conclusions

The main finding of this review is a steady improvement of the iodine status on the African continent, as a result of successful national salt iodization programs. Adequate iodine status has been documented in 30 of the 54 African countries; a notable increase from 22 countries in 2007. However, iodine deficiency is still present in 11 countries. Concerted actions are needed to speed up the implementation and improve the coverage of iodized salt on the African continent.

For actions in countries to succeed sustainably in the delivery of adequately iodized salt to consumers and the food industry, certain universal measures need to be taken. These include careful day-to-day monitoring of the quality of iodized salt at the point of production complemented by external quality assurance. Invariably, small producers pose challenges to complying with the legal requirements regarding the iodine content of salt, but this needs to be addressed within countries in a tailor-made fashion. In most countries, the low socio-economic sector of the population and those living in rural or remote areas are usually vulnerable to exposure to under- or non-iodized salt. To solve these kinds of challenges, specific strategies need to be formulated for the distinctive circumstances of individual countries.

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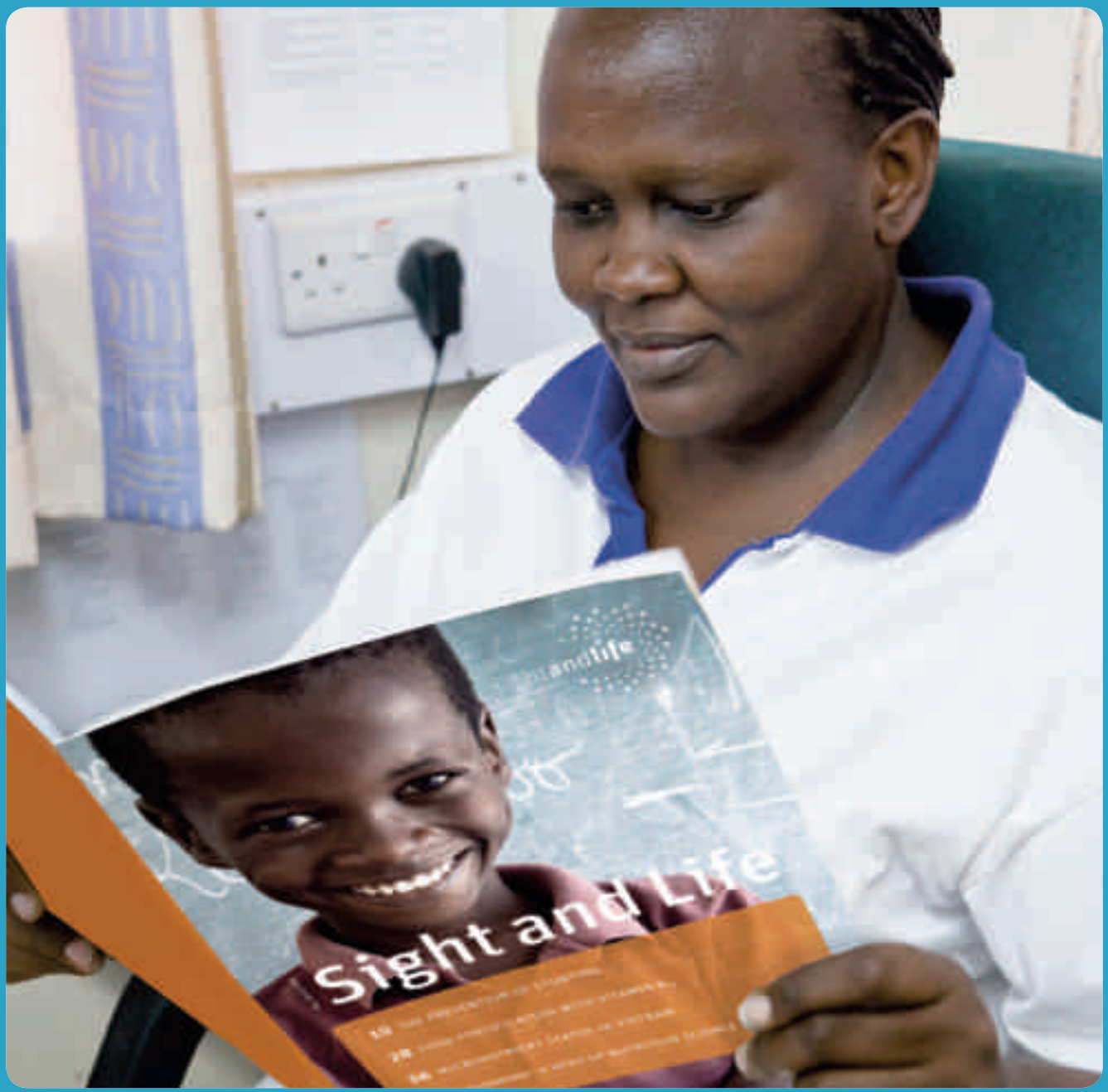
Sight and Life 2013 Readership Survey Results and Competition



2013 Readership Survey Results

Some months ago, *Sight and Life* invited you to participate in a readership survey to let us know how we're doing. Seven hundred and seventy readers replied. This represents a great effort by our readers. Our sincere thanks to you all!

The survey reveals that the *Sight and Life* magazine is well regarded by our readers. The mean rank for all sections of the magazine is favorable or even better. The most popular sections are the scientific/technical articles, the news section, and the infographics. The quality of the writing, the photographs, and the diversity of topics received a particularly high rating. This is a clear improvement compared to our survey of 2009, in which 66% of respondents requested more visual elements to accompany the articles, and 52% called for more photographs in general.

Areas that are repeatedly named by over 80% of respondents as being important are Food Fortification/Supplementation, Malnutrition, Economic Impact (Education/Burden of Disease), and Implementation and Program Research. However, reflecting the worldwide rise in the prevalence of obesity and the increase of the economic burden of disease, survey respondents would like to see more contributions addressing these topics.

In total, we received more than 200 personal comments. Here are just a few examples:

- **"Just to say thanks for your great support, given free to everyone in need."**
- **"Keep up the good work. I read most articles in most issues, and I nearly always enjoy and appreciate them."**
- **"You are doing a fantastic and useful job. You need to continue."**

We're always happy to hear from our readers, and we warmly encourage your input into *Sight and Life*, so please do feel free to write to us. Please also let us know about events being hosted in your part of the world and interesting research/projects and programs that you might be involved with.

Results of the *Sight and Life* 2013 Readership Survey can be found overleaf

"First 1,000 Days of Life" Competition

Inspired by your requests to be more involved with *Sight and Life*, we are delighted to announce "The First 1,000 Days of Life" Photo/Video/Infographic/Drawing Competition. We would like to see "The First 1,000 Days of Life" through your eyes!

The First 1,000 Days window, which runs from the onset of a woman's pregnancy through to her child's second birthday, offers a unique window of opportunity to shape healthier futures. Clean water, good hygiene and sanitation, good care and the right nutrition during this period can have a profoundly positive impact on a child's cognitive and physical development and future life.

There are four categories of submission:

1. **Photographs** (color or black and white photographs; digital);
2. **Videos** (maximum length 90 sec);
3. **Infographics** (digital); and
4. **Drawings** (scan or hard copy).

Each entrant may submit up to three contributions for each category. For each category, the following awards will be given:

1st prize › **iPad**
2nd prize › **Digital camera**
3rd prize › **Book prize**

Key dates

The competition will open on **1 January 2014.**
The deadline for entries is **31 July 2014.**

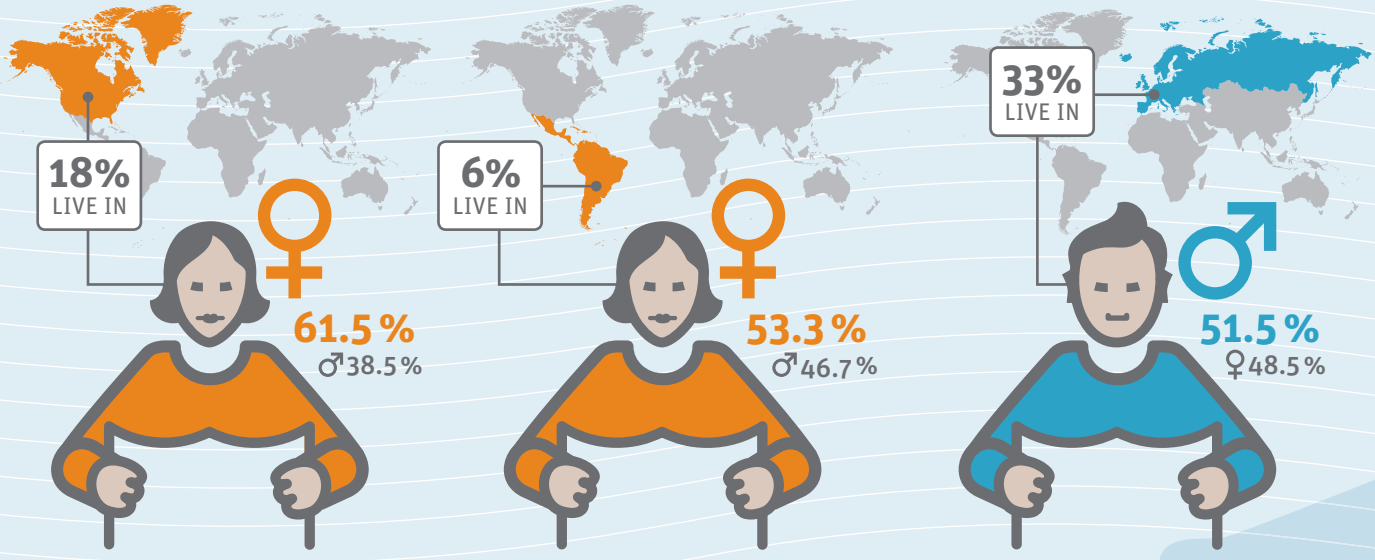
Winners will be contacted individually by email (please provide your email address with your submission).

The announcement of winners will take place in the final quarter of 2014. Names of winners will be listed in *Sight and Life* magazine and posted on the *Sight and Life* website. **Winning submissions will be published in issue 1/2015 of *Sight and Life* magazine.**

How do I enter the competition?

To take part in the competition, please send an email to **info@sightandlife.org** with the subject line "Competition 2014" and include in the body of the email:

- **Your full contact information;**
- **Your current job title;**
- **Why you would like to be involved; and**
- **Up to three examples of work for each category you are entering.**



NORTH AMERICA

Mean Age
30 to <40 years

Bachelor's degree or higher

Works for a Private Sector Company

Knows the magazine for less than 1 year

Main interest
1) Clinical Studies
2) Nutrition
3) Food Safety

LATIN AMERICA & CARIBBEAN

Mean Age
30 to <40 years

Master's degree

Works for a Private Sector Company

Knows the magazine for less than 1 year

Main interest
1) Communication | Journalism
2) Food Safety
3) Nutrition | Clinical Studies

EUROPE

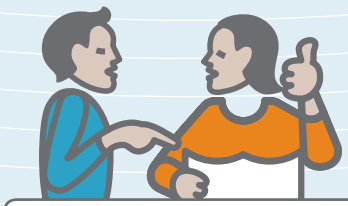
Mean Age
40 to <50 years

Master's degree or higher

Works for a Private Sector Company

Knows the magazine for less than 1 year

Main interest
1) Nutrition
2) Communication | Journalism
3) Food Safety

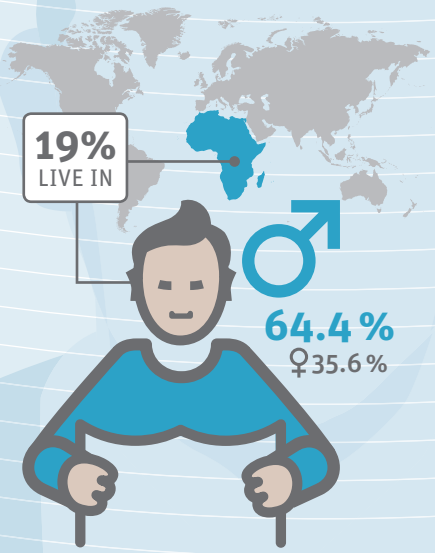


How did you get to know the magazine?

Sight and Life website	20.5
Colleagues | Friends	34.8
Conference | Meetings	12.7
Library	1.9
Internet search machines	4.0
Programs	3.3
School	0.2
University	4.5
Other	18.2

What is your opinion of the magazine's:

Answer Options	Good-Excellent	Fair	Poor
Quality of writing	97	3	0
Diversity of Topics	96	4	0
Quality of photographs	96	4	0
Magazine structure | Outline	95	5	0
Quality of tables and figures	95	5	0
Style of writing	94	6	0
Amount of visual elements	93	7	0



AFRICA

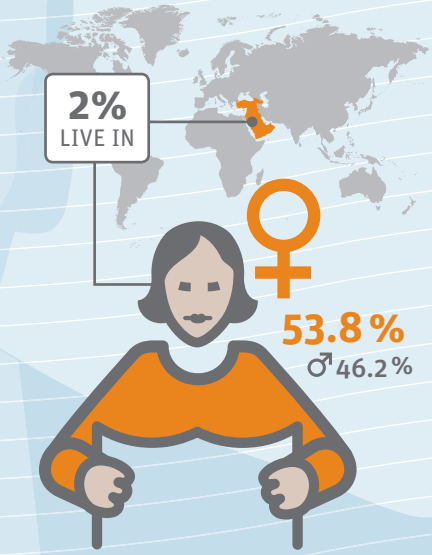
Mean Age
30 to <50 years

Bachelor's degree or higher

Works for an Educational Institute

Knows the magazine for more than 5 years

Main interest
1) Clinical Studies
2) Nutrition
3) Education | Teaching



MIDDLE EAST

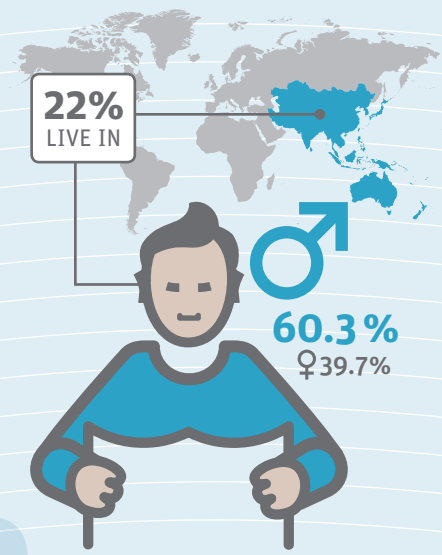
Mean Age
40 to <50 years

Doctoral degree

Works for a Governmental Organization

Knows the magazine for more than 5 years

Main interest
1) Nutrition
2) Clinical Studies
3) Education | Teaching



ASIA AND PACIFIC

Mean Age
40 to <50 years

Master's degree

Works for a NGO

Knows the magazine for more than 5 years

Main interest
1) Communication | Journalism
2) Clinical Studies
3) Nutrition

In future editions of the magazine, what content areas as they relate to nutrition would be most appealing to you?

Food Fortification | Supplementation	**92**
Malnutrition	**92**
Economic impact (Education | Burden of disease)	**83**
Implementation and program research	**82**

63% use the content of the *Sight and Life* magazine as a reference for teaching or other activities. The majority felt that the content is objective and impartial **77%**, neither too simplistic nor too scientific **81%** and **90%** felt that the length of the magazine is just about right.

A Day in the Life of Eusebia Nono Khotle

A heart that sings

Jane Badham
Sight and Life, Johannesburg,
Republic of South Africa

As I drive out to Ivory Park, as I do a number of times a year to visit three *Sight and Life*-supported projects (a crèche and two primary schools), I always find myself thinking of just how blessed I am: I have a lovely house and garden; when I turn on the tap I get water; I have a choice of shops for my groceries; I have my own car to get me around, I have rewarding work … Yet I always look forward to these visits, and especially to seeing the ever-smiling face of Eusebia, who is the Catering Supervisor at the Ebomeni Primary School.

Eusebia, who earns just a small stipend, not only ensures that some 2,500 children get at least two meals a day; she is also a respected and much-loved mother figure to many of them. "These are all my children – I know them all, and I know which ones need special care," she says, as she stretches her arms wide across the sand patch where hundreds of children are lining up to receive their breakfast. Then she notices one child standing to the side, and a quick conversation reveals that he did not have a lunch bowl and so couldn't join the queue. In a flash, she dashes back into the kitchen and comes out with an empty margarine tub that is thrust into his hands. She gives him a pat on his back, and he beams up at her and runs off to join his friends in the meal line.

As we then sit together in the sun on the steps of 'her' kitchen (once a container and now bricks and mortar, complete with storeroom, washing area and deep freeze) before the lunch meal rush, I ask her what makes her get up each morning. She says that having lived in Ivory Park for many years among the orphans and the needy, and knowing that many of the children come to school on an empty stomach and that she can make a difference, makes getting out of bed (even at 5 a.m.) easy. Her morning does indeed start at 5 a.m., as before getting to school at 7 a.m. to begin preparing the breakfast for the children, she has to sort out her husband, two of her three children that still live with her, and a few other family members who make up her household. She leaves the school at about two in the afternoon to head home and start preparing dinner for her own family before going to church for her great love and relaxation – choir practice. Finally home at about 8 p.m., Eusebia heads to bed with a song on her lips and happiness in her heart.

> "It's painful when kids tell you they have no food at home"

As we talk, in the kitchen there is a team of ladies busily preparing the meal. Most of them are the caregivers of the most needy children at the school. They have been especially sought out to volunteer for one year, as this means Eusebia can also ensure that they get a meal and always "a little something, like half a cabbage, to take home for the family dinner." She adds: "It's painful when kids come and tell you that they have no food at home; children should not have to go to bed without food." Eusebia also collects old clothes and shoes so that she can make up parcels for some of the most needy children, and she ensures that when the school closes for the holidays, the most vulnerable get a food parcel to take with them. As the African sun shines down on us, she talks about how powerful community spirit can be: when a child's parent dies (and that is not uncommon in this community), all the kids in the class will find a way to give even US 20c to help the family.

When asked, Eusebia says that her biggest challenge is when the delivery of food (provided by the government as part of a national school feeding scheme) fails to arrive, or when the cooking gas runs out before the next tank has been delivered. "But

“These are all my children”

we always make a plan," she beams, and explains how nicely she works with the school's Coordinator, Mrs Leshabane, and the Deputy Principal, Mrs Moloisi, who oversees the feeding. "I don't do it alone," she observes. The school also has a community food garden that sometimes provides the kitchen with cabbage, spinach and beetroot. I ask what meal the children like most, and there is no hesitation when she says: "When we have the meal with rice, vegetables and fish – then no children skip lunch!"

> "Even the headmaster and teachers come to get lunch from us"

As the large pots of food are brought out by the volunteers, I know it is almost lunch time, so I ask her one last question about what she loves most about her work. "I love to work with people – the children, teachers and community," she answers. Proudly, Eusebia goes on to tell me that firstly no child has ever been sick as a result of the food served at school. "Even the headmaster and teachers come to get lunch from us." Secondly, and unprompted, she tells me that since *Sight and Life* has been providing the micronutrient powder that is added to the lunch meal, "fewer kids are sick: it is definitely helping to keep 'my' children healthy and strong." At that, the school horn blows, and from all corners of the school, children with their lunch boxes rush towards us.

Despite what to an outsider might look like chaos as the meal is served (there is in fact a strict order – the youngest first and then two lines for the others), Eusebia has her eyes wide open. Towards the end of the meal service, she goes up to a little girl with her empty bowl outstretched and asks her, "Thandi, why are you coming back a second time?" The answer comes: "My mother asked me to bring food for my little sister as today there is no food at home." As I drive back to my comfortable office and home, only some 35 minutes away, I feel humbled and inspired, and am reminded of an African proverb that, to me, sums up Eusebia's commitment to her community: "A leopard is chasing us, and you are asking me, 'Is it male or female ?'" For Eusebia, there are just some 2,500 children that must be fed breakfast and lunch each day, and it is her duty to ensure it happens today and tomorrow and the day after ...

Ivory Park

Ivory Park is a township in Gauteng, South Africa (between Johannesburg and Pretoria) that, depending on who you speak to, has a population of anywhere between 40,000 and 100,000 people. Most of its residents live in poverty. Child-headed households are not uncommon, and many homes have no access to basic facilities such as clean water, sewerage, electricity and refuse removal. Shanty houses sit side beside brick structures, and most of the roads are pot-holed. Yet Ivory Park has an amazing buzz, and many of the streets are lined with small entrepreneurs selling air time, haircuts, tailoring services, fast foods, fresh produce (including live chickens) and door frames. Ivory Park has two libraries, two community halls, a police station, seven clinics and a shopping complex as well as two schools.

Promoting partnerships and capacity building.

Sight and Life is a humanitarian nutrition think tank of DSM

DSM

David Barker

29 June 1938 – 27 August 2013

Caroline Fall and Clive Osmond
MRC Lifecourse Epidemiology Unit,
University of Southampton, UK

Professor David JP Barker, originator of the "fetal origins of adult disease" hypothesis (Barker hypothesis), died after a sudden illness on August 27, 2013.

He was known for his revolutionary theory that chronic diseases such as coronary heart disease, stroke, type 2 diabetes and cancer – some of the commonest diseases of our time – are caused by nutrition and other environmental factors during fetal life and infancy. He proposed that the prevention of these diseases lay in the care and nutrition of young women. His work opened up a new field of science, the Developmental Origins of Health and Disease (DOHaD), which has shown that plasticity during early development enables the environment to permanently program the body's metabolism, and thus determine the pathologies of later life. His ideas had a major influence on science, from embryology to public health, and set the stage for the global "First 1,000 Days" campaign, which seeks optimal nutrition for women in pregnancy and for children in the first two postnatal years in order to maximize human capital and health.

The origins of disease lie in childhood

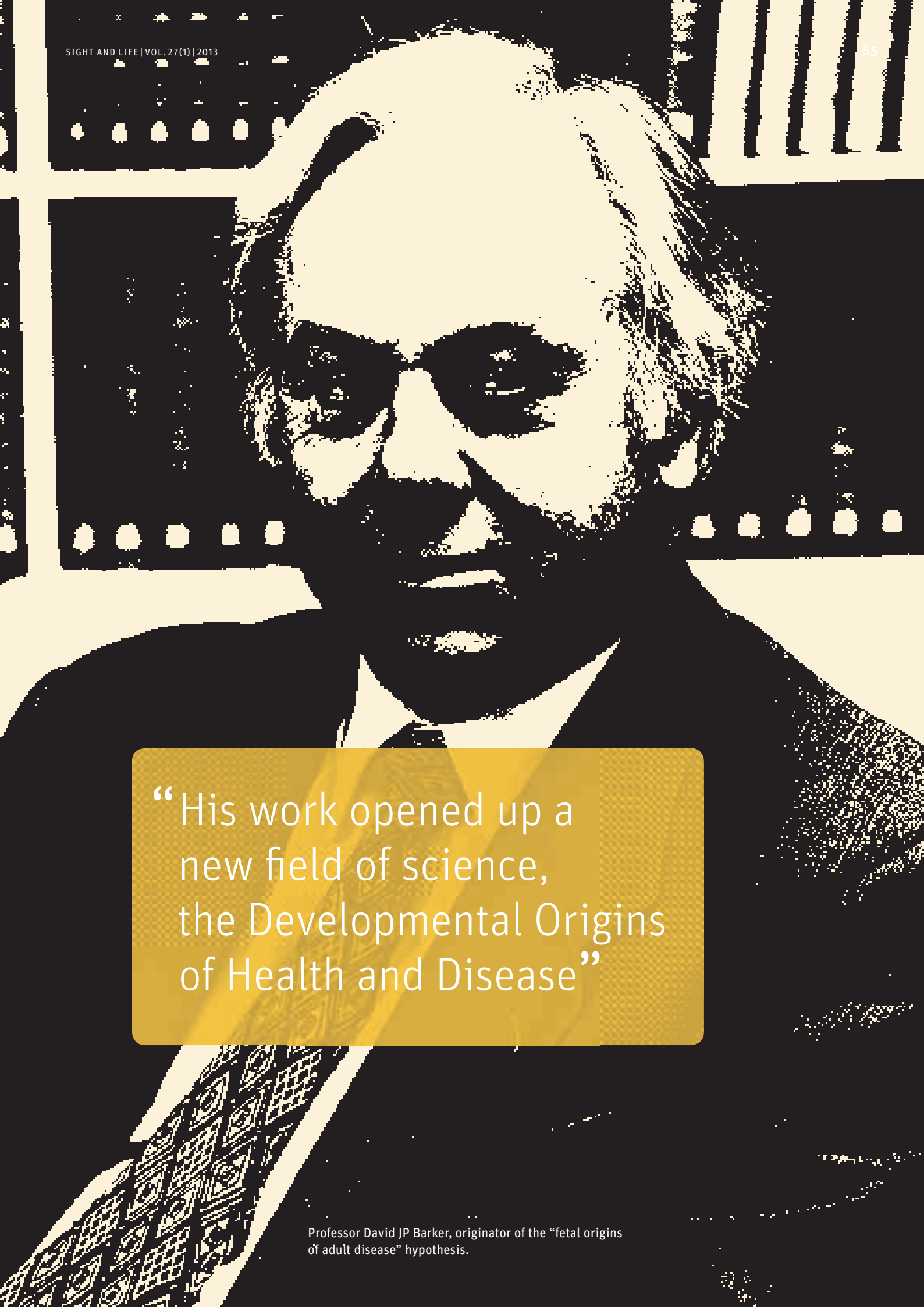
David's ideas can be traced back to the 1960s and his PhD thesis on "Prenatal influences and subnormal intelligence." They continued to evolve after he joined the University of Southampton in 1972, and later as Professor and Director of the Medical Research Council (MRC) Environmental Epidemiology Unit. He studied autoimmune thyroid disease, bone disease (Paget's and Perthes'), appendicitis, gall bladder disease and stomach cancer, and neurological diseases like multiple sclerosis. He repeatedly concluded that their origins lay in childhood. To take one example, he related the emergence and decline of appendicitis in the twentieth century to reductions in household crowding and the introduction of bathrooms into people's homes. His research suggested that with improving hygiene, gastrointestinal infections during infancy were reduced, leaving older children vulnerable to infection, and to appendicitis. As hygiene improved further, exposure to later infection also became rare, and appendicitis began to disappear. He noted the "epidemic" nature of many human diseases, from almost forgotten afflictions such as bladder stones, to the modern problems of cancer and coronary heart disease, and attributed them to waves of environmental and behavioral change in human history.

Link between neonatal mortality and heart disease

When the MRC Unit made detailed maps of disease-specific mortality (Atlas of Mortality for Selected Diseases in England and Wales, 1968–1978) David saw that places where infant mortality was highest at the turn of the twentieth century had more cardiovascular deaths in the 1970s. He went on to confirm geographical correlations within the UK between neonatal mortality and coronary heart disease 60–70 years later. These insights were a turning point, and David wondered for the first time if intrauterine undernutrition was a risk factor for later coronary heart disease. Over the next 10 years he built more evidence for this. With Nick Hales in Cambridge, he showed that people of lower birth and infant weight had more cardiovascular disease, hypertension and diabetes in middle age. With Johan Eriksson in Helsinki, he related patterns of childhood growth to these diseases. With Caroline Fall and colleagues in India, he showed the same relationships in developing populations. With Tessa Roseboom in Amsterdam, he showed that exposure of mothers to the Dutch Famine in 1944–1945 left a legacy of diabetes and heart disease in their children.

Bringing together fetal physiology and epidemiology

This mainly observational evidence was insufficient to prove a causal link between early-life nutrition and later disease, and the Barker hypothesis was viewed with skepticism for many years. This could have killed off the DOHaD concept, but David was tenacious in pursuing it further. He set up collaborations with physiologists such as Jeffrey Robinson in Adelaide, John Challis in Toronto, Peter Gluckman and Jane Harding in Auckland, and Mark Hanson in the UK, who were studying fetal development in animals. He organized meetings that linked together the hitherto separate worlds of fetal physiology and epidemiology, the forerunners of the Society for Developmental Origins of Health and Disease, and of the international DOHaD conferences. It was fetal physiology and work in animal models that provided the first proof that early life exposures (nutritional, infective, biochemical) had lifelong effects, influencing every system in the body. They could alter body composition, the structure of tissues and the setting of hormonal axes, and were capable of producing



> "His work opened up a new field of science, the Developmental Origins of Health and Disease"

Professor David JP Barker, originator of the "fetal origins of adult disease" hypothesis.

adult disease. Increasing understanding of fetal physiology and epigenetics provided plausible mechanisms for these processes. There is a long way to go before we understand the full relevance of the Barker hypothesis to human health, or know what to do to ensure the best start in life for a human embryo and fetus. Thanks to David's remarkable insights, his inspiring articulation of them, and his determined efforts to convince the scientific world of their importance, a large number of people are working on this, in diverse research from unlocking the secrets of placentation to intervention trials in pregnant women.

A forthright speaker and inspiring leader

A few weeks before his death, David spoke with typical clarity and conviction at a function in Southampton to celebrate the centenary of the MRC: "If you want to know how much heart disease or stroke there is in any city, any town, any rural village, do not count the hamburger outlets, the tobacconists, the playgrounds. Ask instead how many mothers died in childbirth seventy years ago? How many babies died soon after birth? Without any exception, across this land that is the best predictor of cardiovascular disease. In those days mothers died in childbirth because they were frail and badly nourished; their babies died because they were small and lacked the vitality to adjust to the new world into which they were born. In this way the poor health of poor people is a legacy of 100 years of poor nutritional flow. How do we build stronger people? By improving the nutrition of babies in the womb. The next generation does not have to suffer from heart disease, osteoporosis and breast cancer. These are not mandated by the human genome. They did not exist a hundred years ago. They are unnecessary diseases. We could readily prevent them had we the will do so."

"The next generation does not have to suffer from heart disease, osteoporosis and breast cancer. We could readily prevent them had we the will to do so."

David was an inspiring leader and will be deeply missed by his close colleagues, as well as by the global DOHaD fraternity. He was enormous fun and a brilliant raconteur. He was also a deeply private, thoughtful and caring man, for whom family life was central. He and his wife Jan created a unique environment at their home in Hampshire, England, which housed four generations, had a small stretch of river where he enjoyed fishing (and thinking), and became a center for scientific work with visitors from around the world. David is survived by Jan, eight children and 13 grandchildren.

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Sharing knowledge for improved nutrition.

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Joining Cultures Through Nutrition

International Nutrition Congress 2013

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Robert Ackatia-Armah
Program in International and Community Nutrition,
University of California, Davis, USA

Introduction

The twentieth International Congress on Nutrition (ICN) was organized by the Spanish Society of Nutrition (SEN) under the auspices of the International Union of Nutritional Sciences (IUNS). The ICN is the biggest event organized every four years by an adhering body of the IUNS in a different region of the world. This year's event took place September 15 – 20 at the Granada Congress Center, Spain, and attracted over 6,200 delegates from over 120 countries.

In total, the scientific program comprised six plenary lectures, 32 special lectures, four debates, 90 parallel symposia, 38 sponsored symposia and 16 satellite symposia. There were 193 oral communications and over 3,000 poster presentations. For many conference delegates, this was the first time they had not physically put up their posters because they were delivered as e-posters via screens. This new and innovative approach worked very well and is no doubt the way of the future.

Despite the European financial crisis that affected Spain, the congress received financial assistance from a number of international agencies, national and local institutions as well as nutrition and food companies and other industrial partners. The overarching theme was "Joining Cultures through Nutrition" and included eight thematic areas:

- Advances in Nutrition Research;
- Nutrition through Life Course;
- Public Health Nutrition and Environment;
- Nutrition and Management of Diseases;
- Nutrients and Nutritional Assessment;
- Functional Foods and Bioactive Compounds;
- Food Culture Practices and Nutritional Education; and
- Agriculture, Food Science and Safety.

Topics presented and discussed were wide-ranging, and the scientific committee ensured the inclusion of sessions from nutrition-related scientific knowledge to its applications.

> "The Scaling Up Nutrition movement has been able to galvanize national leaders to prioritize efforts to address malnutrition"

The focus of this report will primarily be the Scaling Up Nutrition (SUN) movement and its pride of place within the congress. SUN is a unique movement whose aim is to ensure that nutrition is central in countries' development plans. It has created the opportunity to unite governments, civil society organizations, the United Nations, donors, businesses and academia in the drive to improve nutrition. Since its formation, SUN has been able to galvanize national leaders to prioritize efforts to address malnutrition. To date, 43 countries have joined the SUN, and efforts in-country are being put into the right policies and into building synergies to mobilize resources to implement programs.

Dr David Nabarro, Special Representative of the UN Secretary-General for Food Security and Nutrition and SUN movement Coordinator (extreme left) speaking on behalf of SUN at the 20th ICN in Granada.

Four key events relating to the SUN movement were given prominence.

World Bank-funded satellite symposium – costing the SUN movement

The first session of this symposium, "Costing and Developing Scale-up Plans," gave an overview of SUN costing and explored key aspects of the why, what and how of the costing of country plans, using examples from Nigeria and Togo. The second session placed emphasis on future considerations for costing and financing nutrition. A moderated panel discussion addressed costing considerations and issues for nutrition-sensitive interventions; implications for national scale-up plans; fiscal space analyses in Nigeria and what this means for nutrition; and a new catalytic financing facility for nutrition that is currently being developed. These are new but critical issues that the nutrition community needs to address if we are to succeed in scaling up nutrition interventions.

The foyer of the Granada Conference Center.

IUNS taskforce – scaling up prevention and treatment of malnutrition

A parallel symposium that formed part of the theme "Nutrition and Management of Diseases" was chaired by Ricardo Uauy (past president of IUNS) and the current IUNS President, Anna Lartey. David Nabarro, who leads the SUN Movement, gave the Waterloo Lecture and shared how SUN is a country-led movement in support of actions for improving people's nutrition. Other contributions centered on scaling up prevention of stunting and the challenges relating to scaling up the treatment of severe malnutrition. Experiences were drawn from Tanzania on how to get a country moving. Also key in this symposium were highlights on galvanizing the windows of opportunity provided by SUN, and after the symposium a lively post-discussion was held at a break-out room.

Panelists from the Alive and Thrive symposium at the 20th ICN.

International Malnutrition Taskforce and the SUN Movement

Various high-level discussions centered on the effectiveness of achieving set goals for the SUN Movement and its medium- and long-term sustainability. One of the central themes focused on the involvement of academia and the potential critical role these professionals could play within SUN. The discussions highlighted four key areas for the academics to consider:

1. Training at all levels, including at "grass roots", and ensuring high standards of training at all levels;
2. Generating evidence through scientific research/information to mobilize community action around SUN;
3. Monitoring and evaluation of SUN interventions by promoting multidisciplinary and intersectoral collaboration; strengthening civil society organizations and other forms of partnership at the country level; and
4. Ensuring that all SUN activities are embedded in education so as to ensure that future generations see the actions and aspirations of SUN as an integral part of normal behavior, local and national ambitions for improved life, and well-being for all.

Bill and Melinda Gates Foundation-funded projects

In line with the objectives of the SUN, two satellite symposia were organized by Gates-funded projects, Alive and Thrive and the International Lipid-Based Nutrient Supplements (iLiNS). The Alive and Thrive symposium was entitled "Testing innovations to improve infant and young child feeding practices in low-income populations: research findings from the Alive & Thrive Grants Program." This shared the innovative approaches used to improve infant and young child nutrition by increasing rates of exclusive breastfeeding and improving complementary feeding practices through new innovations. In addition, policy development and support for scaling up national nutrition programs were discussed. The summary of the findings has been published in a Food and Nutrition Bulletin supplement – "Designing large-scale programs to improve infant and young child feeding in Asia and Africa: Methods and lessons of Alive & Thrive."

The iLiNS project aims to evaluate the efficacy of new and less costly formulations, study the impact of providing lipid-based nutrient supplements (LNS) to infants and to pregnant and lactating women, and explore the economic dimensions of LNS used to prevent malnutrition. Some preliminary results from the project were shared at the meeting. Also discussed was a model for estimating LNS production cost. This was a very informative session and shows that focused interventions can, and do, deliver results.

Africa comes to Granada: delegates from the continent gather in the Granada Conference Center.

Take-home message …

The take-home message from this year's Congress was for nutritionists and professions allied to nutrition to collectively unite across cultures and other disciplines to deliver a high-level global and country-level nutrition agenda. It was clearly evident at the Congress that nutrition was now perceived by various countries as being central and that it has been placed at the top of the global agenda. As nutritionists, we have to 'grab' this opportunity and work actively with other players to scale up nutrition interventions. It is an opportunity that is unlikely to be repeated.

"Nutritionists and professions allied to nutrition must unite across cultures to deliver a global and country-level nutrition agenda"

Acknowledgements

The authors are grateful to *Sight and Life* for contributing towards travel support to make it possible to attend this important congress.

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"Tomorrow belongs to the people who prepare for it today" (African proverb)

Understanding the Role of Nutrition in Growth

Sight and Life Symposium Biomarkers In Growth (BIG) at the 20th International Congress on Nutrition, Granada

Daniel J Raiten and Ramkripa Raghavan
Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, USA

Klaus Kraemer
Sight and Life, Basel, Switzerland

The Biomarkers of Nutrition for Development (BOND) project is designed to translate existing evidence and develop new data with regard to strategies to assess nutritional status, function and effect.[1] The first phase of the BOND project which began in 2009 includes an evaluation of six sentinel nutrients (iron, zinc, iodine, vitamin A, folate and vitamin B_{12}). As a result of the evidence review and deliberations of expert panels, comprehensive reviews have been developed for each of these original nutrients and will be used as the basis of an interactive web-based resource designed to support the efforts of researchers, clinicians, program developers/managers and policy-makers (www.nichd.nih.gov/global_nutrition/programs/bond/pages/index.aspx).

"One-size-fits-all" approach is problematic

In addition to the input collected during this first phase of the BOND, emerging evidence and input from the global nutrition and health community make it clear that the "one-size-fits-all" single-nutrient approach to public health nutrition is problematic. Examples of the issues include:

- the complex health context, including the collision of infection, non-communicable diseases and food insecurity in many low- and middle-income (LMIC) settings;
- the negative impact of single nutrients in the context of specific conditions, e.g., iron and malaria, that are endemic in many LMIC that are traditional targets of micronutrient interventions; and
- a growing impression that there may be common features that link many of these conditions and nutrition, e.g., inflammation, gastrointestinal integrity, the microbiome and neurological function.

In response to this changing landscape, the BOND program is moving to adapt a biological systems approach that includes an appreciation of multiple nutrients (i.e., "clusters") within the context of relevant systems. Towards that end, the BOND program has explored several candidates of function/systems that could be adapted. Discussions with BOND partners, most prominently *Sight and Life* and the Bill and Melinda Gates Foundation (BMGF), were initiated. As a result of these discussions, the first candidate priority was identified and became the focus of a session co-sponsored by *Sight and Life* at the recent International Congress of Nutrition (ICN) in Granada, Spain. The target is growth and the initiative is called Biomarkers in Growth (BIG).

> "The "one-size-fits-all" single-nutrient approach is problematic"

Stunting and wasting

Although great strides have been made to reduce the impact of undernutrition in children under five,[2] stunting and growth faltering remain significant concomitants of childhood undernutrition and continue to present complex global health challenges.[3] While poor nutrition, including such contributory factors as inadequate breastfeeding and improper complementary feeding, remains a prime risk factor, frequent bouts of diarrhea and other recurrent infections compound the risk of undernutrition. Maternal nutri-

The Alhambra Palace provided an unforgettable backdrop to the Biomarkers In Growth symposium.

tional status/intrauterine growth restriction are of high predictive value of poor nutrition and related outcomes in children.[4,5]

Despite our appreciation of the magnitude and potential causes of childhood undernutrition and its outcomes, our ability to ascertain mechanisms to explain the impact of poor nutrition on stunting, or anything other than crude measures of remediation, remains elusive. Further, the biology that distinguishes stunting (a chronic restriction of growth in height indicated by short stature [reduced height/age]) from wasting (an acute weight loss indicated by a low weight-for-height) and the role of nutrition in either have not been clearly delineated.

> "Our ability to ascertain mechanisms to explain the impact of poor nutrition on stunting remains elusive"

The session at ICN was designed to:

- discuss current approaches to evaluating growth and related outcomes;
- outline the current understanding of the role of nutrition and specific nutrients in linear growth, body composition and long-term health outcomes;
- explore these relationships from a "systems biology" perspective including endocrinology, immunology and neurophysiology; and
- discuss growth within the context of other high-priority public health concerns, e.g., non-communicable diseases and long-term health.

Dr Daniel Raiten, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, Bethesda, USA, speaking during the Biomarkers In Growth symposium.

Prof. Gretel Pelto makes a point during the Q&A session which followed the presentation on Biomarkers In Growth.

Panel discussion at the Biomarkers In Growth symposium with Lindsay Allen, Rosalind Gibson and André Briend.

Session outcomes

Four presentations were delivered focusing on endocrinology; role of specific nutrients; current evidence with regard to the dual burden (over- and undernutrition) on body composition / linear growth; and new paradigms in systems biology. The results of the session included:

- endorsement of a concerted effort to address the myriad issues related to an improvement in our understanding of the role of nutrition in growth and its concomitants;
- suggestions to the BOND Secretariat about best approaches for addressing these issues;
- the need for the BIG project to be conducted within the context of the BOND mission of translation, service and research; and
- a strong endorsement of a systems biology approach. As a consequence, nutrients to be considered in the BIG will be addressed as clusters within relevant systems, e.g., the "vitamin D cluster" including vitamin D, calcium, magnesium, and phosphorus, relevant essential and "non-essential" amino acids involved in growth.

As a next step, the BOND Secretariat will work with its partners and the BOND Steering Committee to begin forming the requisite expert panels to address the issues raised and the nutrients to be covered.

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Launch of Groundbreaking *The Road to Good Nutrition* at ICN 2013

David Nabarro, SUN Coordinator and Special Representative of the UN Secretary General for Food Security and Nutrition, holding a copy of The Road to Good Nutrition, flanked by Manfred Eggersdorfer, Director Nutrition Science and Advocacy at DSM (right) and Klaus Kraemer, Director *Sight and Life* (left).

"In our world of plenty, no one should live in hunger. No child should have his growth stunted by malnutrition. No child should have her opportunity for a better life curtailed even before she is born, because her mother was undernourished."

So said UN Secretary General Ban Ki-moon at the World Food Prize laureate award ceremony, 2012. His sentiments are echoed by Dr David Nabarro, Special Representative of the UN Secretary-General for Food Security and Nutrition and SUN Coordinator, writing in his Foreword to a unique new publication, *The Road to Good Nutrition*.

Dr Nabarro writes: "Approximately a third of the world's children face lifelong economic and social disadvantage because of poor nutrition during pregnancy and in the first two years of life. A significant proportion of these children are disadvantaged because of unbalanced diets that lead to obesity and its associated health challenges. Malnutrition is a phenomenon with many aspects, not all of them immediately apparent …The Road to Good Nutrition …brings together the experience and insights of globally recognized experts in the field of nutrition to create an in-depth introduction to the subject for the non-expert."

"*The Road to Good Nutrition* brings together the thinking of many world experts"

Since 2008, many governments, civil society organizations, research groups and intergovernmental agencies have sought ways to scale up effective actions for better nutrition. The collective experience to date suggests that such efforts are successful if all the different groups that seek to enable improvements in people's nutrition work together in support of sound national policies, the implementation of effective interventions, and sector programs that are sensitive to the determinants of malnutrition. The Road to Good Nutrition brings together the thinking of many world experts on this subject, each of whom addresses from their specialist perspective the question of how to improve the nutritional status of the world's population as a whole.

The Road to Good Nutrition was launched within the framework of the International Union of Nutritional Science's 20th International Congress of Nutrition in Granada, Spain on September 17, 2013. The book launch formed part of a symposium organized by DSM and entitled "Micronutrient Intake in the Western World – Status and Implications on Public Health".

In a well-attended panel discussion co-moderated by Sean Strain, Professor of Human Nutrition and Co-Director of the Centre for Molecular Biosciences, University of Ulster, and Jonathan Steffen of this magazine, some of the members of the Editorial Board that oversaw the book's development discussed the publication's origins, approach, content and significance. The panel comprised Junshi Chen (Senior Research Professor, Institute of Nutrition and Food Safety, Chinese Center for Disease Control and Prevention, Beijing, China and General Scientific Advisor, National Center for Food Safety Risk Assessment, Beijing, China); Manfred Eggersdorfer (Senior Vice President, DSM Nutritional Products, Kaiseraugst, Switzerland and Professor of Healthy Aging at University of Groningen, Netherlands); Eileen Kennedy (Professor of Nutrition and Former Dean of the Friedman School of Nutrition Science and Policy at Tufts University, Boston, USA); Venkatesh Mannar (President, Micronutrient Initiative, Ottawa, Ontario, Canada); and Marie Ruel (Director, Poverty, Health and Nutrition Division, International Food Policy Research Institute, Washington DC, USA).

Patrick Webb, Dean for Academic Affairs, Friedman School of Nutrition Science and Policy, Tufts University, Boston, USA, provides an eloquent afterword to this volume. "This book," he writes, "captures the fact that there has not been a time in recent decades when so many people agreed on what needs to be done or why. The momentum has to be maintained. The next decade of the 21st century should be focused squarely on a global effort to get it done well, while documenting how.

"Unless coherent, cost-effective actions with measurable impacts quickly emerge from the current cresting wave of goodwill toward nutrition, the wait for another may be far too long. Now is the time."

The Road to Good Nutrition at a glance

The Road to Good Nutrition presents a coherent set of arguments which may be read in sequential form from cover to cover, starting with an analysis of the hugely damaging effects of stunting and concluding with a call to concerted action in the here and now. Conversely, the book's chapters may be read individually, and in non-sequential order, by the reader wishing to focus on this or that specific aspect of the subject. Each chapter follows approximately the same format, with key messages highlighted at the outset, a personal conclusion from the author, and a list of publications and websites for further study of the chapter topic.

The Road to Good Nutrition will be of interest to all major players in the field of nutrition. It puts the topic of nutrition security on the agenda of policy-makers, academics, private sector organizations and civil society, as well as of organizations dedicated to the nutrition space. It will also be of value to the educated lay reader who is generally well informed in matters of health, nutrition and sustainability.

> Editors: Manfred Eggersdorfer, Klaus Kraemer, Marie Ruel, Marc Van Ameringen, Hans Konrad Biesalski, Martin Bloem, Junshi Chen, Asma Lateef and Venkatesh Mannar.

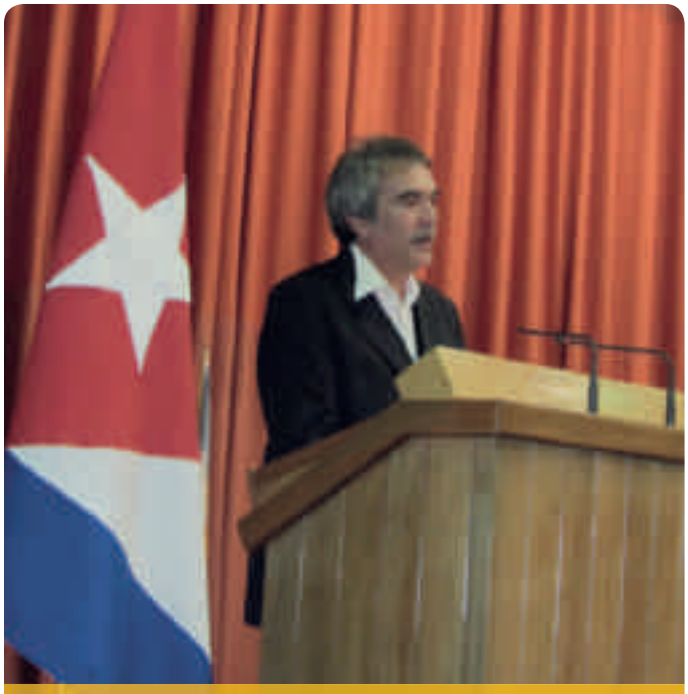
> *The Road to Good Nutrition* – A global perspective is published by KARGER. Copyright 2013 by S. Karger AG, PO Box, CH–4009 Basel (Switzerland).

> The book, along with its executive summary, may be downloaded as a PDF file from www.vitaminsinmotion.com.

Towards a Latin America Free of Malnutrition

Nutrition XVI Latin American Congress

Vivian Sánchez Álvarez, Santa Jiménez Acosta, Beatriz Basabe Tuero, Daysi Zulueta Torres, Yeneisy Lanyau Domínguez, Gisela Pita Rodríguez, Isabel Martín González, Maria del Carmen Quintero Negrín, Vladimir Ruiz Álvarez, Mayttel de la Paz Luna, Héctor Hernández Hernández, Carlos Viera Cosiñol, Zuleimy Guerra Montané, Valentina Rodríguez Flores, Armando Rodríguez Suárez, Alejandrina Cabrera Hernández, Consuelo Macias Matos, Magaly Padron Herrera, Dania Herrera Javier, Disnardo R. Pérez González, Pedro Morejón Martínez, Luis Estruch Rancaño, Miguel O. García Roché, Patricia Varona Pérez, Mariano Bonet Gorbea, Blanca Terry Berro, Ibrahim Elmadfa, Angel Gil Hernández, Ricardo Uauy, Noel Solomons, Eduardo Atalah, Elio Vanucchi, Juan Rivera Dommarco, María Nieves García Casal, Zósima López Ruiz, Manuel Hernández Triana.
Instituto de Nutrición e Higiene de los Alimentos, MINSAP



SLAN President Dr Manuel Hernandez-Triana speaking at the congress.

The Nutrition XVI Latin American Congress organized by the Sociedad Latinoamericana de Nutrición (SLAN) was held from 12 to 16 November 2012 in Havana, Cuba, and attracted 1,601 delegates from 36 countries. The conference was well attended by scientists from universities and research institutions covering the length and breadth of the Americas and from many international organizations too. The greatest number of delegates were from Mexico (26%), Brazil (22%), Cuba (12%), Argentina and Colombia (9%). Representatives from The United Nations Children's Fund (UNICEF) the UN Food and Agriculture Organization (FAO), the International Atomic and Energy Agency (IAEA), the Pan American Health Organization (PAHO), the UN World Food Programme (WFP), the International Union of Nutritional Sciences (IUNS), and the International Agency for Research on Cancer (IARC) were also in attendance.

"Health Promotion and Disease Prevention" was the theme of the conference. There were 52 lectures, 10 round tables, 51 symposia, two workshops, 1,511 posters and 82 free themes on Public Nutrition, Basic Nutrition, Clinical Nutrition, Nutrition and Non-communicable Diseases, Food, Physical Activity, and Nutrition Education for Good Health and Disease Prevention.

"A Latin America Free of Malnutrition"

The opening plenary session began with the keynote address "A Latin America Free of Malnutrition in All Its Forms" by Dr Ricardo Uauy. Professor Uauy emphasized how hypertension, high cholesterol levels, smoking, quality of dietary fat and physical inactivity were major risk factors for premature deaths from cancer and cardiovascular disease. Professor Uauy stressed the importance of prevention at an early age by asserting the princi-

Delegates from Panama fly the flag at the closing reception for the congress.

A well-attended symposium at the SLAN congress.

ples of proper nutrition and physical activity. He also challenged the experts to find innovative ways to prevent non-communicable diseases.

Obesity and diabetes, from both a public health and a clinical nutrition perspective, was a critical topic at the congress. Various scientific lectures highlighted the urgent need for programs aimed at achieving healthy lifestyles that promote healthy body weight, blood pressure, lipid profiles and glucose levels.

Another dominant theme was evidence-based policy-making. There were discussions on public policies for regulating junk food consumption and on urban planning for increasing physical activity. Food security and nutrition were also emphasized, as was the need for SLAN to give urgent attention to this topic, with reference to the successful experiences of countries such as Brazil in reducing food insecurity.

Also discussed were the need for clear nutritional labeling, the promotion of non-processed foods, and reductions in the fat and sugar content of processed foods. The role of trans fats and their impact on health was another hot topic, as were functional foods, the role of dietary antioxidants, and food safety.

There was also a call to address micronutrient deficiencies via supplements and fortified foods, especially for the most vulnerable populations, including the elderly.

The importance of breast milk was emphasized throughout various sessions as one approach both to prevent micronutrient deficiencies and to reduce the risk of non-communicable diseases in the future.

The need for trained professionals

Undoubtedly the wide range of topics on the contemporary nutrition agenda highlighted the need for trained professionals who are able to meet the challenges of today, and to create a Latin American organization that assists with curriculum design for undergraduate and graduate training.

A brief summary of the novel topics presented at various sessions is provided below.

- **"Nutrigenomics and early programming."** Speakers in this session addressed the current results in the field of epigenetics and the impact of lifestyles responsible for metabolic imbalances that affect gene expression and phenotypes. These changes pose threats to the health of the present generation and future generations too.
- **"The Ma-Pi Macrobiotic Diet and non-communicable diseases."** This session showcased encouraging results of the macrobiotic diet in patients with diabetes, obesity, asthma and autoimmune diseases. The presenters discussed how obesity, as an inflammatory process, is associated with altered intestinal microbiota on account of unhealthy diets.
- **"Nuclear Techniques for Nutrition in Latin America"** showed the important contribution of regional nutrition projects that receive financial support from the International Atomic Energy Agency. Eight speakers drawn from Cuba, Argentina, Chile, Mexico, the Dominican Republic and Guatemala presented the results of studies assessing the impact of using stable isotopes not only in stock assessment and validation methodologies, but also in intervention programs to address health problems.

At the Latin Food General Assembly, doctors, nutritionists and food producers discussed the need to unify criteria around food composition data in order to enable adequate dietary assessments.

Awards and prizes

The 6th Kellogg's Latin American Award for Research in Nutrition and Human Nutrition were given out at this SLAN meeting. There were ten finalists: seven were from Mexico, two from Chile, and

one from Argentina. The student prize was awarded to Jacqueline Pimentel Diana Gonzalez from the University of the State of Hidalgo, Mexico, for her project "Protection of Probiotics During Processing and Oaxaca Cheese Melt Through Multiple Emulsions." In the professional category, the award went to Monica Guzman Andrews from the Institute of Nutrition and Food Technology, University of Chile, whose work was the "Association Between Inflammatory Status and Iron Nutrition in Patients with Diabetes Mellitus and Obesity: The Role of Ferritin and Hepcidin."

Other prizes and recognitions included the "Rainer Gross" prize, which was awarded to Manuel Ruz from Chile for his work entitled "Zinc supplementation in vivo and in vitro to evaluate the function of pancreatic β cells in diabetes." Kenneth Brown from the University of Davis, California, was recognized for his contributions to the field of zinc metabolism.

In the closing ceremony, certificates were awarded to 29 winning entries for the Grand Prize XVI Latin American Congress of Nutrition. The Grand Prize was given to Nadia Slimani for her work on "Latin America Dietary Assessment (the LA-Diet project)", a collaborative project of Guatemala with the Cancer Research Institute of France.

The VI Nutrition Leadership Workshop, which normally meets prior to the congress, was held from November 3 to 10, 2012 at the "Las Terrazas" biosphere reserve in the province of Artemisa. It was attended by 23 students from 14 countries in the region. The leadership workshop is a space for the future leaders to meditate on what is missing and how to prepare for the challenges they will face as nutrition professionals.

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Delegates at the Nutrition XVI Latin American Congress, with Manuel Hernandez Triana, second from the right in the front row and Noel Solomons, left in the front row.

Report from Rwanda

Fanta Nutrition International Workshop sets a benchmark for training

Lydia Nyaboigo Nyarunda
Masaba Women Development Group, Kisii, Kenya
Justin Mamwala
Nutrition and Dietetics Student

Dr Susan Kerosi facilitating at the meeting.

The workshop, which was held in Kigali, Rwanda on August 22–24, 2013, had the theme "Promoting sustainable human development through improved household nutritional status."

Its aim was to promote appropriate diets, healthy lifestyle measures and protection against HIV that would help reduce malnutrition and inappropriate feeding practices in children, promote good hygiene and sanitation, and contribute towards the eradication of HIV/AIDS.

Strengthening community action

More specifically, its objectives were to:

- Strengthen community action by identifying low-cost sources of nutritious food and helping people prepare and eat such foods;
- Share nutritional knowledge;
- Train key stakeholders, disseminate information and create partnerships for sharing best practice;
- Help to build governments' public health policy on nutrition.

Five target countries – Uganda, Kenya, Rwanda, Burundi and Tanzania – fielded 32 participants, including undergraduates in nutrition; health workers; nutrition experts; scholars from local universities, institutes and organizations; and nutritionists/dieticians. They represented 18 organizations, the Government of Rwanda, and non-governmental organizations (NGOs).

Field sessions to train the trainers

Field sessions were used to practice the training of trainers. Participants also formulated training plans for community-based women to deliver health promotion messages. Lectures, e-learning, dynamic group interactions, assignments and an excursion were used to impart knowledge and skills about food composition.

Three experts facilitated the training course:

- Susan Kerosi, Institute of Nutrition, Makerere University, Uganda;
- Verena Mwanani, Ministry of Health and Sanitation, Rwanda; and
- Makarious Okello, Division of Human Nutrition, Kenyatta University, Kenya.

Day One covered vitamin A and other vitamin deficiencies. This included identifying low-cost sources of nutritious foods, sharing best practice, recognizing people at risk of vitamin A deficiency (VAD) and knowing what can be done about VAD. Day Two topics included: helping people to learn about nutrition; nutrition and the environment; home gardens to boost family nutrition status; food paths; and the way women need support and training. The final day's agenda covered training for nutri-

Delegates in a breakout group.

tion and a display of various foods including staples, legumes, vegetables, fruits and foods from animals.

Our attendance at the workshop was made possible through financial support from *Sight and Life* in Switzerland.

Workshop review

The participants' experience in health, nutrition, HIV/AIDS and health promotion educational messages will strengthen the training of women in the community in the pilot project. Collaborative partners involved in the pilot project (SMOH and UNICEF) have mandated strategies and policies that encourage the involvement of communities in health, nutrition, and the delivery of HIV/AIDS and health promotion messages.

Awareness programs will be advocated to disseminate key health messages, including nutritional values and preparation of food aid, HIV awareness, hygiene promotion, and diarrhea management.

> "High illiteracy among women is a major contributor to poor nutritional status"

Workshop recommendations

- Clear strategies for community training programs for women;
- Training plans for the designated pilot project's locations;
- Training equipment and materials ready before training commences;
- Collaborative partners to develop guidance in planning, communication skills and follow-up before the pilot project starts; and
- Literacy education, as high illiteracy among the women is a major contributor to poor nutritional status.

An end-of-workshop survey showed that 90% of participants found the workshop methods and techniques very appropriate or appropriate, while 83% felt that the subject matter was very well or well covered. The quality of training materials was well received and was seen as robust enough to be replicated easily. Pocket-book type user guides for surveyors were suggested.

Participants' preliminary research on the state of nutrition in their country, the major players and each country's overall experience in nutrition formed the basis of class presentations, including a discussion on the causes of malnutrition. People worked in pairs and groups during the day and during evening there was homework when the three facilitators provided active coaching.

> "The training of trainers was highly satisfying"

Delegates in discussion.

The project was deemed a success by the workshop organizers in Rwanda, their partners and, most importantly, by the 32 participants. The training of trainers was highly satisfying, the facilitators were well suited, the content was relevant, and enough depth was given to the subject matter.

It was agreed that future workshops should be held in member countries by rotation, subject to the availability of funds.

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Report from Congo

My first year studying nutrition and dietetics at the Institute for Medical Techniques in Kidima

Justin Mamwala
BP 111 Boma, Bas Congo,
Democratic Republic of Congo

After taking my baccalaureate in chemistry and biology, I was planning to study medicine. However, I became very interested in the work of Georges Nicks Tsimba – a nutritionist and dietician, ophthalmologist and specialist in ocular surgery – on the screening for and care of malnutrition in children and, especially, the way Tsimba developed, enriched and preserved foods produced locally. I was really very keen and wanted to become like him. I had told him that I wanted to become like him but that my father was dead and my family poor and that I had nobody to pay for my education. He said to me: "I take this to heart."

Finding the money for my studies

Then he told me about an international body which could possibly help us to find the money for my studies: *Sight and Life* in Switzerland. He asked me to make an application for a grant. I did this, and was successful. I was very happy as this provided a guarantee for studies in nutrition and dietetics.

> "Who will help me prepare? How will it go? Will I get through it? A whole heap of questions."

Although I enjoyed studying nutrition and dietetics, I found it hard to leave my mother, my brothers and sisters for a foreign environment. I was very concerned, and full of questions. Who will help me prepare? How will it go? Will I get through it? A whole heap of questions. Luckily for me, Mr Tsimba did nothing but encourage me and he even went with me to the Institute so that he could introduce me to friends and fellow students. I gained a certain confidence with him and he said that he was like this, too, at the beginning: "Go on, be brave."

Entering the adult world

After this, I realized that I was in another world, what I called "the adult world", because you have to get to the Institute at 7:30 in the morning and you get home at 7:00 in the evening. To be honest, it was hard, especially the way the teachers would dictate their lectures, extremely fast. And I even lost some weight. Fortunately, the teachers would give us support materials to ensure our understanding. I tell you, it wasn't easy. If it weren't for Mr Tsimba I should have struggled but, with his advice, I was okay. After a while I got used to the teachers' pace and the student lifestyle. I am very happy about that as I learned that I can live alone, without parents or siblings to support me. And I understand now that beginnings are always hard. They say that practice makes perfect.

Thanks to *Sight and Life*, which gave me financial assistance, I had no money worries.

The problem I did have was that our Institute's library does not have many books. Luckily, though, Mr Tsimba has a laptop with an internet connection so we can carry out research. I can only thank him for putting me in contact with *Sight and Life*.

I have no father, but thanks to *Sight and Life*, through Mr Georges Nicks Tsimba, I will be able to survive after my studies through the work I shall carry out in screening, taking care of and preventing malnutrition, and the cultivation, development, enrichment and preservation of food products within our area.

Once again, thank you very much, and I shall remain grateful to *Sight and Life* and to Mr Georges Nicks Tsimba. Without him, I would not have wanted to study nutrition and dietetics.

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Report from Kenya

Macheo Children's Centre – summary of 2012 Annual Report

Marnix Huis in 't Veld
Director and co-founder, Macheo Children's Centre
Macheo Children's Centre, Thika, Kenya (East Africa)

Macheo's 2012 programs

Our objective is to bring up children in a homely environment with enough space for them to discover and develop their individual talents and to become good, self-sustaining Kenyan citizens. This is the reason that we limit our intake to 56 children aged 0–6 years in a homely setting of seven family houses, run by housemothers supported by social workers.

We consider reintegration before admitting a child to Macheo. Since reintegration is more successful when a child is taken in at a young age, we will place more emphasis on children under the age of three. In 2012, 12 new children were admitted.

Our approach to upbringing is as individual as possible. This means sufficient personal attention and the opportunity for personal development. We have introduced positive parenting, rewarding children's good behavior. This is very different from Kenyan traditions, where there is a strong focus on obeying rules and punishing bad behavior.

Five children were reintegrated with their relatives in 2012, while for the first time two children were adopted.

> "Our mission is to empower and protect vulnerable children so they can lead a bright future"

Education programs

Our Education Program helps make primary education accessible for children from poor families. Despite free primary education in Kenya, many parents cannot afford exam tuition fees, school uniforms and daily lunch. As a result children work or stay at home.

Our education program provides porridge and lunch at schools in the Thika region. For many children, a daily meal is an incentive to go to school. It also has a positive effect on their school results and their general health.

Macheo provides a nurturing environment to help vulnerable children like Gloria have a bright future.

In 2012, 16 public primary schools with 200–1200 pupils each participated in our program. The schools are provided weekly with the ingredients for a lunch composed of beans, sukuma wiki (vegetable) and ugali (based on maize meal). Breakfast consists of porridge.

Most food is purchased locally in large quantities and as cheaply as possible. Some vegetables are grown in our greenhouses and purchased by the program, which makes us less dependent on the highly volatile food prices in Kenya and a step closer to a partially self-sustainable organization.

The meals are prepared by women whose children are in the participating schools. Usually these are single mothers who struggle to maintain their family. In 2012 Macheo employed 54 cooks.

On average, 70% of a school's population takes part, and 60% of the parents contribute a token amount of two shillings per child per day. By involving the parents, we make them aware of the importance of education and good nutrition, simultaneously creating communal support for our program. We aim to remove the obstacles that prevent children attending school.

Children line up for a nutritious lunch on the first day of their school's new lunch program provided by Macheo.

One obstacle is the lack of sanitary pads for girls. We provide girls in higher classes with sanitary pads to prevent absenteeism during their periods.

Efficiency and effectiveness

In 2012 we cut costs by procuring a posho mill, which enables us to grind maize ourselves instead of outsourcing this.

School meals not only influence school attendance but are of great importance to children's mental and physical development. An optimum nutritional composition is required to provide most of the recommended daily amount of nutrients. In 2012 we reviewed our diet, including the use of fortified porridge. This provides many of the required nutrients.

We also examined cooking facilities in all our schools. The jicko is a stove fuelled by charcoal, which consumes 30–50% less fuel. This means less wood is burned to make charcoal, and fewer trees have to be cut down. Jickos not only cut costs but also place less burden on the environment. Although our primary concern is to improve the lives of children, we are also very aware of the environmental impact of our programs.

Health program

Macheo has run the Health Program in the poorest areas of Thika since 2011, in close cooperation with Stichting KOP from The Netherlands. Through the Mother–Child Care Program we provide information on antenatal and postnatal care, and we increase the number of hospital deliveries.

Mothers are generally very young, and often the pregnancy results from sexual abuse and violence. Fathers are often not supportive and the mothers don't have the National Hospital Insurance Fund (NHIF).

Macheo provides group seminars and individual counseling about pregnancy, health and hygiene, nutrition, and the NHIF. Social workers help arrange medical screenings and hospital delivery. For three months after the birth, Macheo supports the mother and monitors the baby's development. All women are informed about vaccinating their children.

Additionally, Macheo provides information and guidance on family planning, a center for malnourished children, a deworming program, individual treatment, and psychological healthcare.

In 2012, ten seminars assisted 491 mothers with prenatal and postnatal care. Ninety babies were born, of which five unfortunately died. Maternal mortality was 0%. We guided 339 women on family planning methods.

Family empowerment

Raising a family in an urban slum brings challenges to security, economy, hygiene and morality. Many parents from slum areas

still want the best for their children. Macheo's family empowerment program assists these parents and improves the lives of vulnerable children.

> "We focus on single women and their families. Their capacity and capability greatly affect the quality of family life"

We focus on single women and their families because they are disadvantaged in Kenyan society. Women have less access to resources, knowledge and funding, while bearing the care of their children. Their capacity and capability greatly affect the quality of family life.

We provide seed capital to families who have no prospect of improvement without a financial injection and who are qualified to start a successful business. Several conditions ensure that the children will benefit: the parents must provide education, vaccinations and health insurance for the children.

Where children have never attended school, despite reaching school age, our Education Empowerment project sets an intensive curriculum to enable them to catch up academically with their age group and enroll in regular public schools.

Cooperation with other programs and authorities

The Family Empowerment Program is carried out in close cooperation with our other programs in Kiandutu, where we can easily refer cases to other programs if they are more suitable. This interaction benefits both recipients and Macheo – concentrating the activities continually builds knowledge about the target group and embeds Macheo within the community.

Macheo also actively cooperates with the Kenyan government, referring and guiding beneficiaries to existing facilities. In 2012 this included the re-enrolment of 17 children to public schools through our Education Empowerment project, after an average stay of six months.

We assisted 54 families in 2012, held ten seminars for 488 mothers and provided seed capital to 29 families. Businesses started include the ripening and selling of fruit, sewing clothes and selling charcoal.

Besides the work in Kiandutu, we started a pilot in Ruiru, a suburb of Nairobi with many slums.

Vincent is one of 56 Children in Macheo Children's Home. Macheo strives to provide a stimulating and welcoming home environment for children who come from dire situations.

Child sponsoring

Our Child Scholarship Program is focused on girls. If girls in slums are not at school when they enter puberty, they are likely to become pregnant because they are vulnerable to sexual abuse.

Girls' secondary schools in Kenya are often boarding schools. This takes girls away and gives them a chance to develop and make their own decisions. The age at which girls become sexually active is delayed, leading to fewer teenage mothers, smaller family size, less risk of sexually transmitted diseases and more empowerment for the rest of their lives.

Macheo sponsors girls living in slums, girls from rural areas and physically handicapped girls whose secondary education cannot be financed. By giving girls the opportunity to develop academically, we offer them a way out of poverty and break the vicious cycle.

Each girl has a personal sponsor to ensure a stable source of income long-term. Sponsor parents are actively involved and receive personal reports each school term. The biological parents are expected to make a small financial contribution to the academic development and are urged to stimulate their child's academic development as much as possible.

In 2012 we sponsored 26 students, mostly girls, through their education at levels ranging from vocational training to university.

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Nutrition at the 2013 United Nations General Assembly

Jane Badham
Sight and Life, Africa Office, South Africa

Members of the SUN Lead Group address the global Sun Gathering in New York.

For three years now, on the sidelines of the annual United Nations General Assembly (UNGA) in September in New York, a number of nutrition events have been held – all of them emphasizing that nutrition is on the global agenda and aimed at maintaining momentum as we move the agenda forward. There has been an exciting shift in focus over the three years, from convincing decision-makers of the need for nutrition interventions to giving feedback on how all stakeholders are delivering on their promises and, looking beyond 2015, to how nutrition-specific and nutrition-sensitive interventions must be integrated into the post-MDG development agenda.

> "The clock has been 'restarted' to mark the countdown to the 2016 Summer Olympics"

1,000 more days

The week started with the governments of Ireland and the United States renewing the call for 1,000 days of action for nutrition. In effect, the clock has been "restarted" to mark the 1,000 days between now and the next big global nutrition moment – the 2016 Summer Olympics. Since the launch of the 1,000 Days initiative, the landscape for improving maternal and child nutrition has changed dramatically and there is now greater momentum and resources than ever before to improve global nutrition. So, during this next 1,000 days, it is critical that the world intensifies its focus on the three stages of the 1,000 Days:

"While the sun is shining, bask in it" (Malawi)

- Pregnancy and pre-pregnancy to ensure the world's mothers and future mothers are well nourished;
- Birth to six months to ensure greater numbers of babies are exclusively breastfed for the first six months of their lives, and;
- Six months to two years to ensure children get the right foods at the right time, together with continued breastfeeding to prevent and treat malnutrition.

Redoubling our efforts during these critical parts of the 1,000-day window can help achieve greater and faster progress toward the global nutrition targets, the Millennium Development Goals, and help save the lives of millions of women and children. The 1,000-Day team calls upon everyone to join this next 1,000-Day challenge. Together, we can realize the hope that every child, everywhere, has the right nutrition, right from the start, so as to reach their full potential.

Share with us what you are doing to support the first 1,000 days window in your country by submitting your story to info@sightandlife.org.

Global gathering provides chance to share learnings

There were two full days of SUN activities in New York that were specifically designed to allow SUN country delegates to interact and share experiences, successes and challenges. Participants included SUN government focal points and a small delegation of two additional representatives from their countries. The four SUN Networks (United Nations, Donors, Civil Society and Business) also nominated a small group of representatives to participate in the event. The discussions were lively, the input was broad, and the group left with renewed vigor and commitment – and, perhaps most importantly, with new ideas to take home and implement. For more on the global gathering, go to www.scalingupnutrition.org/sun-movement-global-gathering.

"Moving water makes stagnant water move" (Somalia)

Venkatesh Mannar, Banda Ndiaye and Chris Dendys of the Micronutrient Initiative (from left to right) celebrate Banda's Transform Nutrition Award.

"2013 will be remembered as the year when nutrition came to life"

Release of the latest SUN Progress Report

The annual SUN Progress Report highlights the fact that 2013 will be remembered as the year when nutrition came to life. Governments and their development partners are now taking nutrition seriously and people are holding them to account. The report states that in the last year, the focus has been on mobilizing the resources needed for effective national action and for the achievement of nutritional impact. Over US$23 billion of external resources have been committed to nutrition, networks of supporters are expanding, and consensus is being reached on how best to improve the effectiveness of support to SUN countries. Members of the Movement are applying their expertise and knowledge in ways that are changing the discourse on nutrition, and this is beginning to make lasting transformation in the way we work together for effective action. Efforts are underway to ensure that the concept of 'nutrition justice' is a central feature when discussing development and human rights.

"Nutrition justice is central to human rights"

SUN nutritional indicator facts:

- SUN tracks stunting as an overall indicator of multiple forms of malnutrition, as well as wasting and exclusive breastfeeding.

David Nabarro (SUN Coordinator) with Transform Nutrition awardee Terry Wefwafwa of Kenya.

- Progress is moving in the right direction, although it is uneven and insufficient. The trends show that 15 countries are demonstrating an average annual rate of reduction in stunting prevalence of more than 2% per year.
- Reduction in stunting in Africa stagnated between 1990 and 2010 while decreasing dramatically from 49% to 28% in Asia. Most SUN countries are in Africa, while the highest numbers of stunted children live in Asia. This adds impetus for shared learning between regions and countries.
- Progress to reduce wasting is even more mixed: 11 countries are currently meeting the WHA target of a wasting prevalence below 5%, whereas 9 SUN countries have a wasting prevalence of over 15% (considered to be the emergency threshold).
- The trend for exclusive breastfeeding rates in SUN countries is far short of the WHA target of 50% by 2025: 15 SUN countries meet or exceed this target, but 26 SUN countries are not yet on track.

Nutrition is not a short-term intervention

We need to accept that although key interventions have been identified for scaling up, there is no magic nutrition bullet. The SUN report acknowledges that there is much more to be done if national goals for better nutrition are to be realized and improvements in people's nutritional status accelerated, and suggests that at least a decade of commitment is vital.

The report comprises six in-depth chapters together with a compendium of SUN country fiches, yet it is easy to read and shows the sustained commitment of so many to ensure that this is indeed a Movement, a group of people working together to advance their shared ideas. It ensures that all of this effort and investment results in tangible improvements in the nutrition of women and children.

The report and country fiches are available as a PDF downloads from: www.scalingupnutrition.org/resources-archive/country-resources/progress-in-the-sun-movement.

Welcoming the Republic of Tajikistan

The Scaling Up Nutrition (SUN) Movement continues to shine, and just prior to the global gathering, the Republic of Tajikistan (whose population numbers some 8 million people) became the 42nd country to join the movement. Tajikistan is working closely with development partners to improve food security and nutrition within a multi-sectoral perspective. The movement keeps on growing, and it is still hoped that more countries will be inspired to join this country-led initiative.

Recognizing global nutrition champions

Transform Nutrition is a consortium made up of six organizations (the International Food Policy Research Institute, the Institute of Development Studies, Save the Children, the Department for International Development, the International Centre for Diarrhoeal Disease Research in Bangladesh, the Public Health Foundation of India and the University of Nairobi) whose purpose is to strengthen the evidence base on nutrition and to engage decision-makers and program implementers in dialog about how to tackle the nutrition crisis so as to stimulate more effective action to improve nutrition. At the recent SUN Global Gathering, three individuals (two from Africa and one from Central America) were recognized for their transformative efforts to improve nutrition, health and opportunities for women and children.

Banda Ndiaye hails from Senegal and is the Micronutrient Initiative's Sahel Director. While working on child survival programs at the community level in the 1990s, he recognized that along with most health problems, malnutrition was also an underlying issue. He realized that it would be difficult to improve health status without seriously addressing malnutrition. Banda helps governments formulate evidence-based policies and strengthens their leadership and capacity to implement them. Among many other accomplishments, he has helped to channel resources to governments for micronutrient programs and has raised the production and delivery standards of micronutrients across Senegal, Burkina Faso, Niger and Mali.

Terry Wefwafwa is Head of the Division of Nutrition for the Department of Public Health and Nutrition in Kenya. She remembers when there were few trained nutritionists and the issue of nutrition was low on the government's agenda. Now the Kenyan government has adopted the International Code of Marketing of Breast Milk Substitutes and made fortification of wheat flour, vegetable oil and maize meal mandatory. Terry worked with all stakeholders to conduct Kenya's first ever comprehensive Nutrition Situation Analysis, which gave way to the development of

Luis Monterroso of Guatemala (left) with Hilda Maritza Mendez de Oliva (WFP) after receiving the Transform Nutrition Award.

the Nutrition Action Plan, a coordinated strategy for all nutrition activities in Kenya between 2012 and 2017.

Luis Monterroso, an economist and Secretary of the Food Security and Nutrition Secretariat/SESAN from Guatemala, is one of Central America's most powerful voices for nutrition. He has successfully brought together government authorities (such as the President, Vice President and Head Ministries), as well as development partners, the private sector and civil society, toward the goal of drastically reducing malnutrition and undernutrition in his country through the principles of the Scaling Up Nutrition (SUN) Movement. Luis is open about discussing the political and economic obstacles he has had to overcome to ensure nutrition remains a top priority for his nation, but he has not wavered in his commitment to tackle malnutrition, and is a dynamic and passionate advocate for nutrition.

These champions represent the breadth of action and investment that has helped to raise nutrition on the global agenda and drive progress in nations around the globe. To find out who the 14 shortlisted award candidates were, please visit www.transformnutrition.org.

"I can't think of a more deserving recipient of *Sight and Life's* second Nutrition Leadership Award"

Sight and Life honors the leadership of Robert Black and the Lancet Maternal and Child Nutrition Study Group

As health and development stakeholders gathered in New York to recognize the vital role of strong leadership in improving nutrition, *Sight and Life*, World Vision International, the World Food Programme and DSM co-hosted a networking event, where the keynote remarks were made on behalf of President Jakaya Mrisho Kikwete of the United Republic of Tanzania. The event was also the occasion to recognize the vital role of strong leadership in improving nutrition, a precondition to achieving many of the Millennium Development Goals, by presenting the *Sight and Life* Nutrition Leadership award to Dr Robert Black of Johns Hopkins Bloomberg School of Public Health and the Lancet Maternal and Child Nutrition Study Groups (2008 and 2013).

"The tireless work of Dr Robert Black and the Lancet Maternal and Child Nutrition Study Groups has given us the strong evidence base we need to move policies and programs forward to improve the lives of the world's most vulnerable populations," said Dr Klaus Kraemer, Director of *Sight and Life*. "I can't think of a more deserving recipient of *Sight and Life's* second Nutrition Leadership Award. *Sight and Life* is pleased to join with leaders across sectors – from civil society to government to business – in turning this evidence into action."

The Lancet Maternal and Child Nutrition Series – led by

"A leader is like a shepherd, he stays behind the flock, letting the most nimble go out ahead, whereupon the others follow, not realizing they are being directed from behind" (Nelson Mandela)

Dr Robert Black (2013 Award recipient), Dr David Nabarro (2012 Award recipient) and Dr Klaus Kraemer at the *Sight and Life* Nutrition Leadership Award event in New York.

Dr Robert Black in 2008, and updated in 2013 – provided the evidence base that sparked the recent wave of commitments to nutrition, including the Scaling Up Nutrition (SUN) Movement. Under Dr Black's leadership, The Lancet Maternal and Child Nutrition Study Group identified that good nutrition during the 1,000-day period between a mother's pregnancy and her child's second birthday is a critical window of opportunity to improve the health and prosperity of individuals, communities and countries.

"The latest findings from the 2013 Lancet Nutrition Series further the evidence base that good nutrition is a fundamental driver of a wide range of development goals," said Dr Black. "On behalf of the Lancet Maternal and Child Nutrition Study Group, I am honored to accept the Nutrition Leadership Award from *Sight and Life*. I look forward to continuing to work with this community to prioritize and address the issue of malnutrition, the cause of 45% (3.1 million) of all under-five child deaths."

The *Sight and Life* Nutrition Leadership Award is presented to an individual, group or entity that has been a catalyst for sustainable change in global nutrition. The previous award was presented to Dr David Nabarro and the Scaling Up Nutrition Movement at the 2012 World Economic Forum in Davos.

Reinforcing momentum to end acute malnutrition

Action Against Hunger (ACF) and UNICEF organized a side event to discuss the challenge and opportunity to end acute malnutrition as well as the key steps stakeholders need to take to significantly reduce acute malnutrition in the near future.

In the first part of the event, a panel of nutrition experts reviewed existing evidence and progress on acute malnutrition and considered where the nutrition community needs to strengthen its current approach. In her introduction to the panel, Laura Caulfield (Professor of Human Nutrition at Johns Hopkins University) highlighted important evidence, published in the Lancet 2013 series, for the effectiveness of combining severe acute malnutrition treatment with exclusive breastfeeding and appropriate complementary feeding, water, sanitation and hygiene and other key nutrition-sensitive interventions.

Félicité Tchibindat (Regional Nutrition Advisor with UNICEF West Africa) noted the trend toward international NGOs supporting governments and local NGOs to provide nutrition services, rather than operating independent vertical programs, helping empower communities and improving sustainability of interventions. Saul Guerrero (Head of Technical Development at ACF UK) added that the benefit of working more closely with governments is ensuring that models to address acute malnutrition are well suited to national needs and health systems.

Melrose Tucker (Health and Nutrition Program Manager at Focus 1000 in Sierra Leone) emphasized a holistic and community-

centered approach to health and nutrition, including pro-active prevention and treatment efforts. The discussion highlighted key next steps including developing a common definition of program integration that includes relevant work across different sectors and gradual scale up of acute malnutrition approaches to address context-specific challenges, gather lessons learned and ensure program quality.

The event was followed by a reception, where Canadian Deputy Minister of International Development, Paul Rochon, and UNICEF Chief of Nutrition, Werner Schultink, reiterated the need for increased cooperation between nutrition partners to ensure that every child has access to treatment and is free from acute malnutrition.

A global research agenda for nutrition science

The Sackler Institute for Nutrition Science, acting in collaboration with the WHO, has led a two-year initiative to identify global research gaps in nutrition science. It was therefore appropriate that The Sackler Institute hosted a call-to-action cocktail event at the end of the UNGA week that emphasized the importance of the research agenda and of harmonized global action to address the identified research gaps in nutrition sciences. A full report of the collaborative process and outcomes is available, and five articles will be published in the Annals of the New York Academy of Sciences that will provide an in-depth analysis of the research needs highlighted across the three focus areas that were identified:

1. Environmental and societal trends affecting food and nutrition among vulnerable groups;
2. Unresolved issues of nutrition in the lifecycle; and
3. Delivery of intervention and operational gaps.

This initiative aims to accelerate global commitment, cooperative work, and funding to uncover scientific solutions to malnutrition. For more information, please visit www.nutritionresearchagenda.org.

Overall, this was a good week for nutrition, keeping it visible and on the UNGA agenda. It also offered a networking opportunity for a wide range of colleagues working in both nutrition-specific and nutrition-sensitive interventions. We are seeing the shift from talk to action. This is exciting, as it is only through moving to implementation that we will truly impact the lives of the most vulnerable.

“Part of being an optimist is keeping one’s head pointed towards the sun and one’s feet moving forward” (Nelson Mandela)

Speech by His Excellency Dr Jakaya Mrisho Kikwete

President of the United Republic of Tanzania and Member of the SUN Lead Group, at the Leadership for Nutrition Event in New York

Unfortunately, due to other commitments that arose, Dr Kikwete was not able to attend the Leadership for Nutrition Event in New York, but Dr Phillip Mpango, Executive Secretary, Planning Commission in the President's Office, delivered the address on behalf of the President. We are delighted to be able to share with you the address in full. There is no doubt that the ancient Tanzanian proverb "Haba Na Haba, Hujaza Kibaba" ["Little by little, a little becomes a lot"] is one of Dr Kikwete's key messages. We all need to get involved and make our contribution if we are to overcome the challenges we face.

I would like to thank the leadership of World Vision International and Royal DSM for inviting me to participate and speak at this auspicious event of the Leadership for Nutrition. It is a privilege I will always cherish.

As we are all aware, food security and nutrition is one of the most basic rights of mankind. But, in reality, this is not the case, as many people across the world are affected by hunger and malnutrition. By comparison, Africa is mostly hit as the number of victims is disturbingly higher than in other regions. The recent estimates indicate that out of nearly 870 million hungry people, almost a quarter are living in Africa. Furthermore, poor nutrition is responsible for at least half of the 10.9 million child deaths each year. In fact, malnutrition is amongst the major stumbling blocks towards achieving almost every Millennium Development Goal, particularly MDGs 1, 3, 4 and 5.

"Addressing malnutrition is about addressing poverty"

You will agree with me that a lot of efforts both at the national and international levels have been made to address the situation. Many countries have embarked on a series of nutrition programs, strategies and policies to fight hunger and malnutrition. At the global level, debates have been held and various resolutions adopted for the same purpose – to fight hunger and poor nutrition. Despite the modest success, the challenge persists mainly because the resources we commit at all levels are not adequate. Addressing hunger and malnutrition goes far beyond the mere provision of routine food assistance to victims of famine or drought. It is about addressing poverty, income inequality, the negative effect of climate change and ensuring equal opportunities for all within communities. It is all about empowering individuals and vulnerable communities. These interventions require adequate human and financial resources of which, unfortunately, poor and developing countries have very little.

I am happy to note that in recent years, there has been a growing consensus on the part of the international community to scale up resources for addressing hunger and malnutrition. As a result, new kinds of partnerships and alliances have been formed across the globe between government, private sector, non-governmental organizations and other stakeholders to address the challenge. The MDG Summit of the year 2000 and subsequent international commitments have contributed to shape the global attitude towards hunger and malnutrition. Indeed, the political will is at its best and resources are forthcoming. We welcome the increasing global momentum and the unity of purpose in addressing the twin challenges of hunger and malnutrition.

In Africa, the Maputo Declaration on Agriculture and Food Security – whereby countries committed to increasing their agricultural spending to 10% of total budgets – was part of that wider commitment. The L'Aquila Pledge and subsequent initiatives sponsored by G8, the United Nations, the European Union and other partners complement the global momentum. The most recent commitment, in which nutrition was given the attention it

Dr Phillip Mpango, Executive Secretary, Planning Commission in the Office of the President of Tanzania, delivering the address on behalf of the President.

deserves, was made in 2011 at the World Health Assembly. The international community resolved to expand nutrition interventions with the aim of saving one million child deaths per year and preventing at least 20 million children from being stunted. The overall progress made so far is encouraging although more efforts are required to consolidate the gains and establish sustainable ways of meeting new challenges.

In Tanzania, we are implementing various national programs which aim at transforming agriculture and raising the income of millions of peasant farmers. In addition we have in place social safety nets for the poor and vulnerable groups which are at risk of facing hunger and malnutrition. The status of food security has improved tremendously and the country has achieved 97% food self-sufficiency.

"Tanzania has achieved 97% food self-sufficiency"

Regarding nutrition, we first conducted nationwide research on nutrition in 1964. Since then, issues of nutrition have been given top priority by successive governments. In 1973, we set up the Tanzania Food and Nutrition Center to coordinate our national response on issues related to nutrition. We have also taken various measures and policy interventions, including the establishment of the National Nutrition strategy, as well as enforcing the National Food Fortification Standards for oil, wheat, and maize flour. These initiatives have led to a decrease in iodine deficiency from 25% in the 1980s to 7% to date, increases in consumption of iodinated salt from 13% in 1991 to 82% in 2010; an increase in the prevalence of exclusive breast feeding; and a reduction in the prevalence of anemia in children.

During the Nutrition for Growth event held in London in June this year (2013), Tanzania renewed its commitment to increase domestic resources in scaling up national nutrition actions. We also signed the Nutrition for Growth Compact because of our conviction that a shared vision, agreed goals and mutual accountability are now critical if we are to end the scourge of malnutrition in our lifetime. The Compact has ambitious goals which we are determined to attain.

"Agreed goals are critical if we are to end the scourge of malnutrition"

In that regard, we have strengthened the national institutional framework by establishing a High-Level Steering Committee for Nutrition composed of representatives from the public

and private sectors, development partners, faith-based organizations, civil society and academia. The mandate of the committee is to work together with various actors and stakeholders towards achieving a common goal of eradicating malnutrition in Tanzania. The government has also taken concrete steps to beef up its monitoring capacity by employing more nutrition officers and deploying them at the district, regional and national levels. We started in areas that are the most affected, and to date 101 Councils and 11 Regions have employed nutrition officers. We are slightly above the halfway mark to achieve the full coverage of nutrition experts in all Councils.

"In the very near future, our efforts will bear more fruit"

I am quite sure that in the very near future, our efforts will bear more fruit, and I want to thank all our partners for their encouragement and support. In a very special way, I want to thank all the partners who have joined the "Call to Action for Nutrition" that I launched in May this year (2013). We have a lot of ground to cover, but I am sure we will make it.

At this juncture, allow me to pay tribute to World Vision, whose partnership with Royal DSM has made the difference in Tanzania. They have been instrumental in the early stages of maize flour fortification in the country, targeting 300 small- and medium-scale millers in Tanzania. These categories of millers produce approximately 70% of the maize flour consumed in Tanzania. I also wish to acknowledge World Vision for their noteworthy nutrition programs and excellent collaboration with the governments in 13 regions.

I urge all partners and the wider international community to continue supporting our efforts. The mechanisms outlined in the Nutrition for Growth Compact should form the basis for moving towards mutual accountability on nutrition commitments and results. At the national level, we will continue to scale up resources and to strengthen relevant institutions that monitor implementation of nutrition programs.

In conclusion, let me hasten to say that the momentum that we have set should be maintained. We need to put stronger focus on nutrition, as opposed to just food security, and create new public-private partnerships that combine best practices with science-based innovations from the private sector. I therefore call for the active participation of all stakeholders to solve the problem of hunger through improved nutrition. I am convinced that there is sufficient resource in the world to ensure that no-one, nowhere at no time, should go to bed hungry. Together, we can make the world a better place to live for all humankind.

Nutrition for Growth Compact
Beating hunger through business and science

In June 2013, 94 leaders from 26 governments as well as international organizations, civil society and 27 business and science organizations came together in London and committed to accelerate progress towards achieving the World Health Assembly targets by 2025. This commitment is reflected in the Global Nutrition for Growth Compact.

Commitments

- Fifteen governments committed to increase the domestic resources for scaling up nutrition, and 12 governments announced national stunting-reduction targets.
- Donors have secured new commitments of up to US$4.15 billion to tackle undernutrition up to 2020, US$2.9 billion of which is core funding, with the remainder secured through matched funding.
- An estimated US$19 billion has been committed for improved nutrition outcomes from nutrition-sensitive investments between 2013 and 2020.
- Commitment to develop a new catalytic financing facility for nutrition.
- New commitments to scale up research, knowledge-sharing and South-South partnerships, including the launch of a Global Panel on Agriculture and Food Systems.
- Launch of an annual Global Report on Nutrition from 2014, together with online annual publication of plans, resource spending, and progress updates.
- Holding of annual global nutrition meeting in margins of UN General Assembly.
- Holding a High-Level Nutrition Event, under the leadership of the Government of Brazil, during the 2016 Rio Olympics.

Targets

- Ensure that at least 500 million pregnant women and children under two years of age are reached with effective nutrition interventions.
- Prevent at least 20 million children under five years of age from being stunted.
- Save at least 1.7 million lives by reducing stunting, by increasing breastfeeding, and through the treatment of severe acute malnutrition.

For more information on the exact commitments, and to find out who committed, please visit www.gov.uk/government/uploads/system/uploads/attachment_data/file/207271/nutrition-for-growth-commitments.pdf

Be part of the next big event in nutrition!

Micronutrient Forum 2014 –
Bridging Discovery and Delivery
Addis Ababa, Ethiopia
June 2 – 6, 2014

Micronutrient Forum 2014, which is to be held in Addis Ababa, Ethiopia this coming June, marks the revival of the Micronutrient Forum.

This event will bring together people from a wide array of sectors, including nutrition, health, agriculture, social protection, food security and the private sector. As a united force, these key players will discuss, collaborate, and translate best new research and program practices into on-the-ground action to reduce malnutrition and its consequences. The theme of the Micronutrient Forum 2014 is 'building bridges' – with an emphasis on bridging scientific advances and multi-sectoral programming needs to ensure adequate micronutrient intake and status across the life cycle.

This theme will be implemented across four thematic topics:

Thematic Topic 1:
Measuring and interpreting information on micronutrient intake, status and program coverage.

Thematic Topic 2:
Effects of micronutrient interventions on indicators and functional outcomes.

Thematic Topic 3:
Scaling up micronutrient interventions: Bridging the gaps between evidence and implementation.

Thematic Topic 4:
Stakeholders and Sustainability: Elements of an enabling environment.

About the Micronutrient Forum
The Micronutrient Forum is a consultative group that brings together people from a wide array of sectors who share an interest in reducing micronutrient malnutrition. The Micronutrient Forum facilitates dialog, fosters collaboration, and disseminates up-to-date research to improve the design and implementation of scalable programs, as well as to identify and facilitate the filling of key evidence gaps.

For more information, please visit:
www.micronutrientforum.org.

What's new

Did you know? You can now visit the *Sight and Life* website **www.sightandlife.org** on a regular basis to get the latest news of happenings in the field of nutrition, and you can follow us on **Facebook** and **Twitter @sightandlife**

01

Africa Celebrates Anna Lartey – The First African President of the International Union of Nutrition Sciences (IUNS)

African delegates at the ICN with Anna Lartey, the new IUNS President

How timely that, as this edition of the *Sight and Life* magazine focuses on Africa, Prof. Anna Lartey – or 'Anna from Ghana', as she is widely known – has become the first African, and only the second woman ever (after Barbara Underwood of the United States), to be appointed President of the IUNS. Anna has been a member of the IUNS Council for the past eight years and is an Alumna of the African Nutrition Leadership Programme (ANLP). At the same time as becoming IUNS President, Anna – who was for many years Associate Professor in the Department of Nutrition and Food Science at the University of Ghana – has also joined the FAO (Food and Agriculture Organization of the United Nations) as Director of Nutrition. This combination will ensure that the bridge between nutrition and agriculture that has for so long been talked about as vital will become a reality, and we know that she will be an inspirational and active President. Congratulations from us all!

It is a pleasure and a privilege to reproduce here Anna's acceptance speech.

"Three things a man must know to survive – what is too much for him, what is too little, and what is fitting" (African proverb)

Anna Lartey, the first African President of the IUNS, with her husband Ernest.

Acceptance speech

First of all, I would like to take this opportunity to thank you for the confidence you have shown in me, my Executives and the entire Council in electing us to steer affairs of this distinguished global union – the International Union of Nutritional Sciences (IUNS) – for the next four years. My Council and I accept this responsibility, and we will work together to meet your expectations.

Secondly, I thank the immediate past-President Prof. Ibrahim Elmadfa and the outgoing Council for steering the affairs of IUNS for the past four years through exciting, yet at times challenging moments. It has been an interesting past four years. My Council will aim to build on their achievements.

Fellow Nutrition Scientists and IUNS-adhering bodies, it is no coincidence that a small woman from a small African country (called Ghana), where malnutrition in the form of Kwashiorkor was first described by a British medical doctor (Dr Cecily Williams), should be taking over the helm of affairs of our global organization at this time. You will agree with me that these are exciting times for nutrition, characterized by both global challenges and opportunities.

> "These are exciting times for nutrition"

Since IUNS was founded in 1946, this is only the second time that a woman has become President. The first was Prof. Barbara Underwood, and I salute her and thank her sincerely for her encouragement for me to take up this position. I am aware that I am stepping into her giant shoes, as the second woman. I also thank Prof. Osman Galal for his encouragement and support.

The year 2015 is the deadline we have set ourselves to reach the Millennium Development Goals (MDGs). Soon, we will have the post-2015 development agenda before us. IUNS has a huge role to play in meeting this new agenda, especially when it comes to meeting the nutrition goals. Meeting these goals requires a competent workforce of well-trained nutrition scientists working alongside other professionals. This is a responsibility and a challenge that we cannot, and must not, take lightly.

I wish to reiterate the fact that malnutrition is complex, and no one group can do it alone. We need to build effective partnerships to fight this menace. Building such partnerships also means working across sectors in multidisciplinary and multisectoral teams, and partnering with groups who have common goals.

> "Malnutrition is complex, and no one group can do it alone"

As your President, I am constantly reminded of the IUNS vision that "to live a life without malnutrition is a fundamental human right…"; and I recognize that addressing malnutrition, in all its forms, requires effective partnerships.

As your President, I promise to uphold the ideals and core values of our noble organization and to challenge and encourage all our adhering bodies, affiliates and partners to join with us in working to achieve our common goals.

We have just admitted into our IUNS Academy 14 distinguished Scientists as Fellows and one for his lifetime achievements and significant contribution to nutrition. I congratulate them all, and at the same time, I wish to assure them that my Council will call on them to place their vast experience at the services of IUNS, especially in our capacity-building efforts.

What will my Council hope to achieve in the next 4 years?

Briefly:

1. We will strengthen our Adhering Bodies. We have some strong Adhering Bodies and many weak ones. My Council would like to see the situation where the strong Adhering Bodies hold the hands of the weaker ones and pull them up the ladder.
2. Capacity-building for our young scientists will be a major focus. This will be targeted at the regional level.
3. We will undertake the review of our Statutes and By-Laws, as a priority. We will nominate an independent

working group to examine them for areas of ambiguity and lack of clarity and will propose revised statutes for the consideration of our Adhering Bodies. I consider this very important for the harmonious existence of IUNS, especially in the light of recent developments and the need to maintain a dynamic, rather than static, organization in the 21st century.

4. I want to assure you that under my leadership, the IUNS Council will be open to ideas and suggestions on how we can serve our Adhering Bodies better and contribute to global nutrition problem-solving. Please do not hesitate to contact me or our secretariat with any suggestions you may have.

We have been through a hectic 5–6 days here at this International Congress of Nutrition in Granada and I take this opportunity to thank the Spanish Nutrition Society, the Congress Organizing Committee, especially the Chair of the Congress, Prof. Angel Gill, and his team for such an excellent congress. Professor Angel Gill, you are truly an angel.

Finally, to all the delegates and the entire IUNS family gathered here, I wish you all "Bon voyage" and hope that we will see you again in Buenos Aires, Argentina, in 2017.

Thank you, and may God bless you all.

Anna was part of the first African Nutrition Leadership Programme (ANLP) and responded to the questions we asked the Alumni ...

What is your favorite African book?

Things Fall Apart by Chinua Achebe.

Why do you love Africa?

Africans are warm people and extremely generous with their time! If you ask an African to give you directions, it will go like this: "Go straight until you get to the mango tree, you will see a woman selling roasted plantain by the side (comment: pray that it does not rain that day). Keep going, and you will see a garage with broken-down vehicles. Walk through the garage. Keep going until you see a signpost saying: "Don't Mind Your Wife Chop Bar." Count three houses from the bar. The fourth house will have a white and blue gate. Ask anybody you see to take you to the bread seller's house. Adjoa lives in that house.

"The laughter of a child is the light of a house"
(Uganda)

02

GRET (Groupe de Recherches et d'Echanges Technologiques) Announces New Director

Olivier Bruyeron

During the GRET General Assembly in August 2013, Olivier Bruyeron was appointed General Director and Administrator of the Fund of Innovation for Development for a period of three years. GRET is a French development NGO that for 37 years has been actively fighting poverty and inequalities in developing countries.

Olivier is an agrofood engineer and has an innovation management qualification. He has been working in the field of food and nutrition for 20 years and has experience in NGOs and in the private sector, and also as a consultant to WFP and WHO. He participated in the development of the Nutrimad program, which operates in eight African and Asian countries.
With 680 professionals engaged in some thirty countries, GRET mobilizes the skills of its committed professional teams in a broad range of subjects to provide lasting, innovative solutions for fair development. Under Bruyeron's leadership over the next three years, GRET will continue to strengthen international partnerships and to promote regional exchanges and dynamic thinking in the field of human rights.

To learn more about GRET, please visit *www.gret.org.*

Alive and Thrive Provides Valuable Resources

There is no doubt that Alive and Thrive lives up to its name; the dictionary defines thrive as 'To make steady progress; prosper or to grow vigorously; flourish.' You can download a full set of fascinating articles on 'Designing large-scale programs to improve infant and young child feeding in Asia and Africa: Methods and lessons of Alive & Thrive' and the third Case Study Kit on 'What drives behavior?' This kit shows how research with target audience members takes the guesswork out of identifying the key factors that drive the behavior (in this case, promoting hand washing linked to complementary feeding in Bangladesh). Both are available from **www.aliveandthrive.org**. Make sure to subscribe to their excellent Newsletter, too.

03 Helen Keller International Recognizes Hillary Rodham Clinton's Efforts in Support of Food and Nutrition Security

Kathy Spahn, Helen Keller International President and Chief Executive Officer (left), with Mrs Hillary Rodham Clinton.

Helen Keller International (HKI) presented former US Secretary of State Hillary Rodham Clinton with the Helen Keller Humanitarian Award on May 22, 2013, as part of its eighth annual 'Spirit of Helen Keller Gala' in New York City. The award was given in recognition of Secretary Clinton's dedication to the global fight against undernutrition and to improving food and nutrition security around the world.

"The leadership from this organization, rooted in such a remarkable woman, has changed so many lives and so many minds over the last century. I'm proud of the work we've done together," she remarked in her acceptance.

More than 330 supporters and trustees gathered for this special evening to celebrate "The Spirit of a Woman" and recognize the need to empower and support women as mothers, breadwinners and community leaders with a powerful role to play in alleviating poverty.

Gender inequity is an underlying cause of food insecurity and malnutrition. In Bangladesh, for example, a woman's mobility is restricted by the social practice of purdah, which limits access to public spaces, information, income and more. For 25 years, Helen Keller International's Homestead Food Production programs have helped women in Bangladesh – and several other countries in Asia and Africa – to feed their families and grow as decision-makers and leaders.

The 2013 Gala raised more than US$1.1 million in support of HKI's sight- and life-saving efforts around the world.

Did you know?

2013 saw both the adoption of the new WHO Action Plan on the prevention of avoidable blindness and visual impairment 2014–19 and the launch of the report on Universal Eye Health. The report is available on the International Agency for the Prevention of Blindness (IAPB) website, **www.iapb.org.**

04 Johns Hopkins Bloomberg School of Public Health Awards Dean's Medal to Royal DSM and Appoints Dr Klaus Kramer Adjunct Associate Professor

Michael J. Klag, Dean of the Johns Hopkins Bloomberg School of Public Health, has awarded the Dean's Medal – the School's highest honor – to Royal DSM in recognition of its global corporate leadership in efforts to mitigate food insecurity, prevent hidden hunger and promote sustainable development in low-income countries.

The Dean's Medal recognizes significant contributions to the field of public health. This is the first time the medal will honor an organization, rather than an individual. Stephan Tanda, DSM Managing Board member responsible for nutrition, accepted the Dean's Medal on behalf of DSM on December 3, 2013, at the Bloomberg School of Public Health in Baltimore, Md., at a celebration marking the 100th anniversary of the discovery of vitamins.

At the same event, Dr Klaus Kraemer, Director *Sight and Life*, was appointed as Adjunct Associate Professor in the Department of International Health, honoring his academic and scientific contributions to addressing the global public health issue of micronutrient deficiencies in developing countries.

05 Breastfeeding on the Worldwide Agenda

The tragic reality is that an increase in breastfeeding rates could prevent 800,000 under-five child deaths annually. Yet there has been negligible progress to raise the global rate of exclusive breastfeeding since 1990.

In seeking answers to the critical questions of why the strong scientific evidence about the benefits of breastfeeding has not translated into political and donor commitments, and what the global breastfeeding policy community can do to augment attention and commitment to this priority, UNICEF conducted a landscape analysis in 2012 to assess political commitment for breastfeeding globally and in selected countries.

The findings and subsequent discussions are now available from **www.unicef.org/eapro/breastfeeding_on_worldwide_agenda.pdf**. These are critical in contributing to this essential discussion, and serve as a resource for driving debate and action forward.

The document suggests five key action points:

1. Recast the narrative
2. Advocate and influence
3. Ensure a unified voice
4. Provide strong leadership for cohesive action and results
5. Mobilize resources, action and accountability

There is no doubt that without protecting and promoting exclusive and continued breastfeeding, we are doing a disservice to the world's children.

06 Flour Fortification Initiative (FFI) Shares Fortification Successes

As countries continue to join the SUN (Scaling Up Nutrition) Movement and launch initiatives to improve the lives of many, good news comes from three African countries.

Rwanda, with a population of 10 million people, has officially approved standards for the national mandatory fortification of industrially milled wheat and maize flour, cooking oil, sugar and salt. Beginning in 2014, these staple foods produced in Rwanda and imported to Rwanda must contain specific amounts of key nutrients following the East African Community recommendations for fortification.

In Mozambique, the first fortification equipment for wheat and maize flour was delivered in September 2013, and a National Food Fortification Committee is working to ensure quality fortification programs in collaboration with country leaders and international partners.

In South Africa, the results from the South African National Health and Nutrition Examination Survey (SANHANES-1) show improved iron and vitamin A status of women that reflects the impact of food fortification.

For more on these stories and fortification news from other regions, please visit *www.ffinetwork.org*

07 Promoting Healthy Growth and Preventing Childhood Stunting

The World Health Organization (WHO) has worked with various experts to prepare nine papers for a supplement of the Maternal and Child Nutrition Journal. The papers contribute to ongoing reflections on multiple aspects of the challenges presented by a World Health Assembly 2012 target for stunting reduction and ways to address them. In addition to describing the background and rationale for the global goal on stunting reduction, prevalence forecasts and a proposed methodology to adapt the global target at the national level, there is also a great conceptual framework centered on stunted growth and development with special emphasis on the contribution of inadequate complementary feeding to stunting.

Other specific themes covered in the supplement include: the feasibility of upward shifts in adult heights within a generation; the economic rationale for investing in stunting reduction; principles and practices of nutrition advocacy in support of stunting reduction; a set of principles that should be applied in program planning, implementation and evaluation to improve complementary feeding interventions; and a description of tools to help in developing context-specific feeding recommendations. Finally, a case study is presented on the process for integrating infant and young child feeding indicators into national monitoring systems. This is a must-read supplement for anyone working in maternal, infant and young child nutrition.

The full set of papers is available at *onlinelibrary.wiley.com/doi/10.1111/mcn.2013.9.issue-s2/issuetoc*

08 African Leaders Renew Commitment to End Hunger on the Continent

A declaration 'Towards African Renaissance: Renewed Partnership for a Unified Approach to End Hunger in Africa by 2025 under the Framework the Comprehensive Africa Agricultural Development Program (CAADP)' was signed in Addis Ababa in July 2013 at a high-level meeting convened by the African Union, the FAO and the Lula Institute. In this declaration, heads of state and governments of African Union Member States, together with representatives of international organizations, civil society organizations, private sector, cooperatives, farmers, young people, academia and other partners, agreed to explore innovative and actionable measures for putting an end to hunger in Africa by 2025.

The full declaration is available at pages.au.int/endhunger/events/declaration-high-level-meeting, but one of the key themes is the recognition of the need to mobilize citizens, societies and institutions, both public and private, and to strengthen systems for intersectoral collaboration among institutions and for co-operation with non-state actors (farmers' organizations, civil society, academia, and private sector). The agricultural focus is on increasing and reprioritizing public investment in agricultural development, complemented by measures for increased agricultural productivity and the scaling up of best practices for advancing agriculture. Ensuring social protection of the most vulnerable is also essential. Special attention will be paid to removing the barriers experienced by young people and smallholders, especially women, engaged in agriculture.

Financial commitments were made to accelerate implementation of the Maputo Declaration of July 2003 on Agriculture and Food Security in Africa and to increase contributions to the catalytic Africa Solidarity Trust Fund for Food Security. Also essential is the promotion and strengthening of South-South cooperation by public institutions and non-state actors for action and learning, the strengthening of all partnerships, and the establishment of a multi-stakeholder platform, representative of African society, to act as an advisor for the renewed partnership. Issues of accountability, monitoring and assessment, advocacy and communication are also addressed.

The full declaration is available at
pages.au.int/endhunger/events/declaration-high-level-meeting

"A roaring lion kills no game"
(Zimbabwe)

09 State of Food Insecurity in the World 2013 (FAO)

This new publication from the FAO presents updated estimates of undernourishment and progress towards the Millennium Development Goals (MDG) and World Food Summit (WFS) hunger targets.

FACT: While 1 in 8 people on the planet still suffer from chronic hunger, the total number (842 million people) of undernourished has fallen by 17% since 1990–92.

Further progress has been made towards the 2015 MDG, which remains within reach for the developing regions as a whole, although marked differences across regions persist, and considerable and immediate additional efforts will be needed. The 2013 report goes beyond measuring food deprivation. Food security is a complex condition. Its dimensions – availability, access, utilization and stability – are better understood when presented through a range of indicators. As a result, the 2013 report presents a broader suite of indicators, complied for every country, that aim to capture the multidimensional nature of food insecurity, its determinants and outcomes.

This report allows for a more nuanced picture of countries' food security status, and so can be used to guide policy-makers in the design and implementation of targeted and effective policy measures that can contribute to the eradication of hunger, food insecurity and malnutrition.

Most useful is how the report examines the diverse experiences of six countries in more detail, finding a mixed picture of progress and setbacks. Together, these country experiences show the importance of social protection and nutrition-enhancing interventions, policies to increase agricultural productivity and rural development, diverse sources of income, and long-term commitment to mainstreaming food security and nutrition in public policies and programs.

The report can be downloaded from
www.fao.org/publications/sofi/en/

Remittances – Did You Know?

- Remittances (sending of money to someone at a distance), have globally become three times larger than official development assistance. They have had significant impacts on driving down poverty, leading to reduced hunger and better diets, and they have the potential – given appropriate policies – to increase on-farm investment. Many households have chosen international and national migration as a livelihood strategy. From the early 1990s onwards, almost a quarter of a million people migrated abroad every year, generating an income inflow from remittances amounting to some 10% of GDP in 2011–12 (FAO).
- The African continent has over 30 million people in the diaspora (IFAD).
- Of all the world's regions, Africa's predominant migration is the most intraregional (IFAD).
- Remittance flows to and within Africa approach US$40 billion annually (IFAD).
- In East Africa, the annual average remittances per migrant reach almost US$1,200 and on a country-by-country average represent 5% of GDP and 27% of exports (IFAD).

10 Global Hunger Index Launch – What is the Added Value of Resilience?

An examination of the need to build resilience to achieve food and nutrition security

October 2013 saw the publication of the 2013 Global Hunger Index, subtitled 'The Challenge of Hunger: Building Resilience to Achieve Food and Nutrition Security.' The 8th edition of this annual index was prepared by the International Food Policy Research Institute, together with Welthungerhilfe and Concern Worldwide.

The Global Hunger Index is calculated for 120 developing and transition countries using three indicators, including the proportion of undernourished people in the population, the prevalence of underweight in children, and the child mortality rate, with the goal of capturing various aspects of hunger. This year's report finds some improvements, seeing the Global Hunger Index score fall by 34 percent since 1990. According to the report, a few countries, including Vietnam, Thailand, and Cuba, have made dramatic improvements, reducing their scores by more than 50 percent since 1990. Nineteen countries, however, have 'alarming' or 'extremely alarming' hunger levels, with Burundi, Eritrea, and Comoros scoring the worst, suggesting that the need for action is still great.

The 2013 report focuses on resilience in theory and practice. It notes that humanitarian and development communities have long struggled to understand why some people fare better than others when confronting stresses or shocks. It also proposes that resilience-building efforts are much needed to help poor and vulnerable people cope with hunger seasons, droughts, and other natural and man-made disasters, short- and long-term. Proposed actions include: breaking down the institutional, financial, and conceptual walls which separate the worlds of development and humanitarian assistance within donor and UN agencies; directing more development funding to disaster risk reduction and resilience-building interventions, including better-targeted productive safety nets; and investing in real-time, high-frequency data collection to measure resilience at different levels and among different socioeconomic and ethnic groups.

As the authors stress, the index is only as current as the data from which it is drawn. Thus, country-level data on the three component indicators remain subject to significant time lags, alongside an urgent need for more up-to-date data on nutrition and hunger.

The '2013 Global Hunger Index' can be downloaded at
www.ifpri.org/publication/2013-global-hunger-index

11 CEO Study on Sustainability 2013

A recent study undertaken by Accenture that interviewed 1,000 CEOs from across 103 countries and 27 industries gives a unique insight into business leaders' views on the pathway towards a sustainable economy.

Six interesting findings:

1. 93% of CEOs see sustainability as important to the future success of their business
2. 32% of CEOs believe that the global economy is on track to meet the demands of a growing population
3. 33% report that business is making sufficient efforts to address global sustainability challenges and 37% see the lack of a link to business value as a barrier to accelerating progress
4. 64% see the consumer as a key stakeholder in influencing their approach to sustainability
5. 46% believe that sustainability issues will always be secondary to traditional factors of price, quality and availability
6. Only 12% of CEOs regard investor pressure as among their chief motivators on sustainability

For more information, please visit
www.accenture.com/Microsites/ungc-ceo-study

12 Key Recommendations for Improving Nutrition Through Agriculture

What can be done in the agriculture and food sector to improve nutrition? A concise, co-owned statement is now available, representing a broad consensus on how to improve nutrition through agriculture in the current global context. The Key Recommendations for Improving Nutrition Through Agriculture have been formulated primarily within the Agriculture-Nutrition Community of Practice (Ag2Nut CoP), an unaffiliated global network of over 800 professionals working on issues pertaining to the intersection of agriculture and nutrition. They follow an extensive review and synthesis of available guidance on agriculture programming for nutrition, conducted by FAO, and a consultation with a broad range of partners (CSOs, NGOs, government staff, donors and UN agencies).

The Key Recommendations include:

1. **Incorporate explicit nutrition objectives and indicators** into the design of agricultural programs and investments, and track and mitigate potential harms
2. **Assess the context at** the local level, to design appropriate activities to address the types and causes of malnutrition

3. **Target the vulnerable and improve equity** through participation, access to resources and decent employment
4. **Collaborate with other sectors** (health, environment, social protection, labor, water and sanitation, education, energy) and programs
5. **Maintain or improve the natural resource base.** Manage water resources in particular to reduce vector-borne illness and to ensure sustainable, safe household water sources
6. **Empower women,** for example by improving access to productive resources (land, credit), income opportunities and information; by reducing labor and time burdens; and in other ways improving gender equity in decision-making
7. **Facilitate production diversification,** and increase production of nutrient-dense crops and small-scale livestock
8. **Improve processing, storage and preservation** to retain nutritional value and food safety, to reduce seasonality and post-harvest losses, and to make healthy foods convenient
9. **Expand market access for vulnerable groups,** particularly for marketing nutritious foods
10. **Incorporate nutrition promotion and education** that builds on existing local knowledge, attitudes and practices

Policies can support implementation of these recommendations through incentives, monitoring, capacity building, and measures to protect and empower the poor and women.

The complete Key Recommendations are available for download at *www.unscn.org/en/nut-working/agriculture-nutrition-cop.* **More detail is available in the background paper,** *"Synthesis of Guiding Principles on Agriculture Programming for Nutrition" (FAO 2013), at the above link.*

13

FAO Summary Report 2013: Food Wastage Footprint Impacts on Natural Resources

The Food and Agriculture Organization of the United Nations (FAO) has published its summary report, focusing on the food wastage footprint and its impacts on natural resources.

Estimates by the FAO suggest that approximately one-third of all food produced for human consumption is lost or wasted every year, representing missed opportunities to improve global food security and mitigate environmental impacts and resource use from food chains. Despite wide recognition of food production's major environmental implications, however, no study has previously analyzed the impact of global food wastage from an environmental perspective.

The FAO study provides a global account of the environmental footprint of food wastage (including food loss and food waste) along the food supply chain, focusing on impacts on climate, water, land, and biodiversity. With a view to identifying environmental hotspots related to food wastage, a model examines the magnitude of food wastage impacts on the environment and, secondly, the main sources of these impacts, in terms of regions, commodities, and phases of the food supply chain involved.

Dividing the world into seven regions, it considers a wide range of agricultural products representing eight major food commodity groups, and assesses the impact of food wastage along the complete supply chain.

The global volume of food wastage is estimated at 1.6 Gtonnes of "primary product equivalents", while the total wastage for the edible part of food is 1.3 Gtonnes. This is weighed against total agricultural production (for food and non-food uses) of about 6 Gtonnes. Without accounting for greenhouse gas emissions from land use change, the carbon footprint of food produced and not eaten is estimated to be 3.3 Gtonnes of carbon dioxide equivalent, ranking food wastage as the third top emitter after USA and China. Globally, food wastage's blue water footprint is about 250 km^3, equivalent to three times the volume of Lake Geneva. Finally, produced but uneaten food occupies almost 1.4 billion hectares, representing close to 30 percent of the world's agricultural land area. The study also notes that food wastage unduly compounds the negative externalities created on biodiversity loss (including mammals, birds, fish, and amphibians) by mono-cropping and agricultural expansion into wild areas.

The 2013 FAO summary report on the food wastage imprint can be downloaded at:
www.fao.org/docrep/018/i3347e/i3347e.pdf

Books
Reviews & Notices

Editor's note: This section contains reviews of books, publications and websites which, whether brand new or classic, we hope will be of interest to our readers. Notices of relevant new publications that do not actually constitute reviews will from henceforth be published on **www.sightandlife.org.**

Publication Review

Food and Nutrition Bulletin Supplement: Asean – Insights and Considerations Towards Nutrition Programs

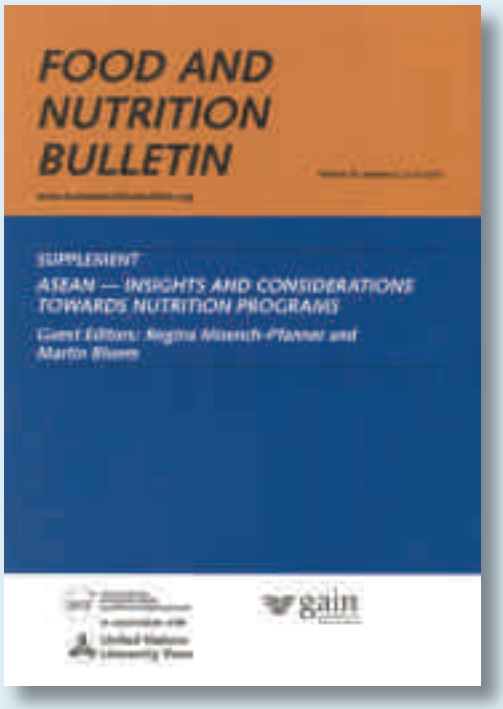
Guest Editors: Regina Moench-Pfanner (GAIN) and Martin Bloem (WFP)

Publication details: *Food and Nutrition Bulletin,* Vol. 34, No. 2 (Supplement) © 2013, The United Nations University

The Food and Nutrition Bulletin published a supplement in June 2013 that was based on a symposium held by the Global Alliance for Improved Nutrition (GAIN) attached to the Asian Congress of Nutrition in 2011 in Singapore. Co-chaired by the World Food Programme (WFP) and with participants ranging from Ministries of Health to local non-governmental organizations, the symposium discussed critical nutrition issues in the Southeast Asian (SEA) region and debated approaches to tackle them, particularly focusing on stunting and micronutrient deficiencies.

"Southeast Asia still faces high rates of stunting"

Although Southeast Asia has been experiencing economic growth in the past decades and has observed a reduction in undernutrition and mortality rates both in women and children under five, it still faces huge problems such as high prevalence rates of stunting and vitamin and mineral deficiencies that are at threshold levels of public health magnitude. Data from micronutrient intake surveys demonstrate that significant portions of the population do not meet recommended daily intakes of some micronutrients. Common micronutrient intake deficits characteristic of the SEA population include vitamin A, iron, riboflavin, iodine, folate and zinc. Also, the special edition discusses evidence of emerging deficiencies such as vitamin D and calcium in the region. It sets in context the issue of inappropriate and inadequate micronutrient intake using the Cost of Diet analysis with regard to the unfavorable cost and availability of high-quality foods such as animal products in a large poverty-stricken proportion of the region. The supplement showcases urban Philippines as an



example of how poverty, defined by indicators of low socio-economic status, brings about suboptimal infant and young child feeding behavior, which consequently contributes to stunting. In addressing this, several studies review the potential impact of large-scale fortification programs that leverage commonly consumed processed foods or constituents of the Asian diet such as condiments (fish sauce and soy sauce) and staples such as rice to increase micronutrient intake in view of the rising obesity rates in the region, drawing examples from Cambodia, Indonesia and Vietnam. Furthermore, the food fortification efforts and legislation mechanisms in Indonesia and Vietnam have demonstrated food fortification on a national scale to be challenging despite its cost-effectiveness and sustainability in combating micronutrient deficiency. Other nutrition-specific strategies explored include improving breastfeeding practices as well as promoting the timely introduction of appropriate complementary foods and the utilization of small-quantity lipid-based nutrient supplements or multiple micronutrient powders.

"Enzymes can increase the bioavailability of minerals"

Iron and zinc deficiency are major public health issues globally, especially in vulnerable groups such as infants and children. Since both iron and zinc are key nutrients for growth, these deficiencies can cause faltering of growth and impaired cognitive and psychomotor development in childhood and reduced work capacity in adulthood. In the developing world, where the diet is plant-based with little or no animal products, the metabolism and assimilation of minerals from the diet are rendered ineffective due to the presence of absorption inhibitors such as phytic acid. The supplement features an insight into the efficient use of enzymes such as phytase to improve bioavailability and utilization of elements such as iron and zinc, which is important in the context of Asia due to the high consumption of phytate-rich foods in the region.

Lastly, with vitamin A intake still requiring improvement among women and the World Health Organisation no longer recommending vitamin A supplementation postpartum as a public intervention, the issue highlights the enormous potential impact of Malaysia and Indonesia – world-leading producers and exporters of vegetable oil – fortifying their export oil with vitamin A to improve vitamin A intake not only within SEA but also beyond the region.

This bulletin is available on the website of the Nevin Scrimshaw International Nutrition Foundation:
www.ingentaconnect.com/content/nsinf/fnb/2013/00000034/a00102s1

"After climbing a great hill, one only finds that there are more hills to climb."

(Nelson Mandela)

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