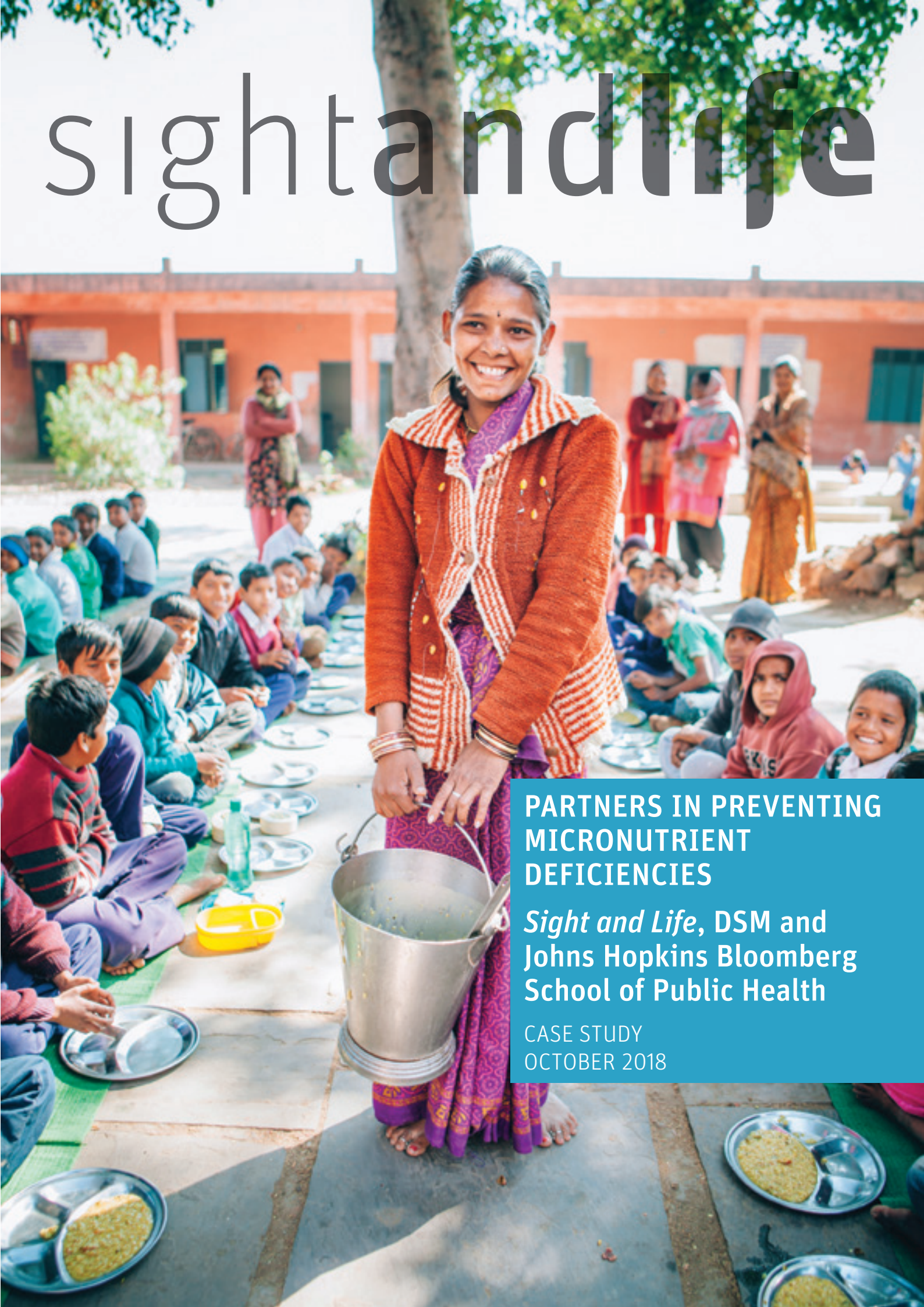
sightandlife



PARTNERS IN PREVENTING MICRONUTRIENT DEFICIENCIES

Sight and Life, DSM and Johns Hopkins Bloomberg School of Public Health

CASE STUDY
OCTOBER 2018

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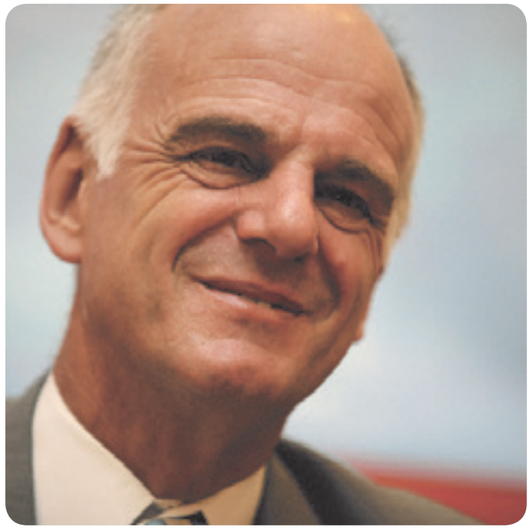
Prof. Alfred Sommer examining the eyes of a young child with xerophthalmia in Indonesia in 1976, during the first year of a three-year large-scale study that was to change the world.

1. Foreword



Dr David Nabarro, Inaugural Coordinator of the Movement to Scale up Nutrition (SUN), recipient of the first *Sight and Life* Nutrition Leadership Award (together with the Scaling Up Nutrition Movement and joint recipient (together with Dr Lawrence Haddad) of the 2018 World Food Prize.

I first appreciated the significance of vitamin A deficiency in young children during the late 1980s, when I was a young doctor working in East Nepal. The health workers in our team were encountering high levels of eye damage and – sometimes – blindness in the local population. These were attributed to a combination of diet and illness, and caused enormous suffering. It was here that I became aware of the work of the Nepalese team that collaborated with Al Sommer and Keith West on the relationship between vitamin A deficiency and xerophthalmia. Inspired by the efforts and insights of their colleagues from Johns Hopkins, the Nepalese colleagues established a Vitamin A Administration Center in Nepal. This involved local communities in the provision of vitamin A in capsule form, whose effects seemed miraculous, saving the sight of thousands of children. At the time, it was an innovative public health intervention, and I sense that it paved the way for others.

In the years since then, the global nutrition community has come to understand that public ill health is a response to systems challenges and that solutions are inevitably complex. Major advances are occurring in biomedical science. Diets are changing rapidly. Populations continue to grow, and increasing numbers of people have moved out of poverty. These factors combine to create conditions for new public health and nutrition challenges. They are compounded by the effects of climate change and inequity that affect people throughout the world.

If many things have changed in the past few decades, however, much remains the same. We know that inadequate nutrition undermines the body's capacity to defend itself, making it vulnerable to a range of non-communicable as well as communicable diseases. We know that reversing the situation by means of nutrition-specific and nutrition-sensitive interventions is inexpensive and highly cost-effective, helping to build societies that are healthier, stronger and better placed to make a positive contribution to the world at large. And we know that the implementation of tried and tested, evidence-based nutrition programming is dependent for its success on the engagement and mobilization of local actors and local communities.

"This case study documents a partnership which was called into life to have an immediate impact on the world. It did that, and it has continued to do this over the course of four decades and more."

This case study documents a partnership which was called into life to have an immediate impact on the world. It did that, and it has continued to do this over the course of four decades and more. Putting people at the center of public health interventions and supporting them through multidisciplinary partnerships backed up by individual and collective accountability is key to achieving positive change. The partnership between *Sight and Life*, DSM and Johns Hopkins Bloomberg School of Public Health has always done this. It is my hope that it will continue to do so in the decades to come, and that its example will shine as a bright beacon for us all.

Dr David Nabarro

2. Executive Summary

Partnership, driven by common goals and shared values, built on trust and complementarity, and sustained by short-term successes and long-term vision, can achieve success, and impact. This case study documents the three-way partnership that has existed for the past four decades between *Sight and Life*, Royal DSM N.V. (and, prior to 2003, Hoffmann-La Roche) and Johns Hopkins Bloomberg School of Public Health – a partnership driven by the common objective of preventing vitamin A and other micronutrient deficiencies in impoverished and undernourished regions of the world. Its aim is to outline how this unique public-private partnership came into being, how it has evolved in response to new scientific insights and changing population needs, and what it is given to the world in the years since it was first established.

The narrative focuses on the main drivers and principal achievements of the partnership. For reasons of space, it is a selective rather than a comprehensive account of a complex and multi-faceted range of initiatives and activities developed and delivered by many individuals in many parts of the world during the period under review. More detailed accounts of the material presented here are available in back issues of *Sight and Life Magazine*, in the history of the first 25 years of Sight and Life (*Micro Nutrients, Macro Impact: The story of vitamins and a hungry World, Sight and Life*, Basel, 2011), and in the volumes listed in the select bibliography on page 29. The websites of DSM and Johns Hopkins Bloomberg School of Public Health also contain much relevant information, as do the websites of the United Nations World Health Organization and World Food Programme.

"This is an account of a comprehensive, complex and multi-faceted range of initiatives and activities developed and delivered by many individuals in many parts of the world."

This analysis is divided into four main sections, preceded by a timeline. The first of these – **Section 4** of this document, starting on page 8 – describes how the relationship between Hoffmann-La Roche and Johns Hopkins Bloomberg School of Public Health gave birth to the 'Task Force SIGHT AND LIFE', as it was initially known, in response to the humanitarian crisis triggered by the Ethiopian Civil War of the mid-1980s. It explains how recent research into the relationship between vitamin A and eye health, in combination with Roche's technical expertise in the industrial production, formulation and distribution of vitamin A, made possible a humanitarian initiative that was to save both the sight and the lives of many displaced and highly vulnerable people.

Section 5 covers the period during which the focus of Sight and Life expanded to embrace the entire range of micronutrients – all 13 recognized vitamins plus the full spectrum dietary minerals essential to health. Important developments in nutrition science and public health programming took part during these years, as the world became increasingly aware of the global scourge of stunting and of the growing problem of hidden hunger – a deficiency of micronutrient intake in combination with adequate caloric intake.

Section 6 continues this story, chronicling evolutions in formulation, programming and policy against the background of the creation of the Scaling Up Nutrition Movement and the formulation of the Sustainable Development Goals. As new needs unfold in diverse ways, the partnership grows and adapts, fueled by discovery, commitment, and successful steps forward.

Finally, **Section 7** canvasses the views of key actors in the partnership over the years and explores the relevance of this partnership to the wider world of nutrition science and public health policymaking and programming. The case study concludes with an infographic describing *Sight and Life's* objectives and modus operandi today.

3. Timeline

1982 Prof. Al Sommer publishes *Nutritional Blindness*, focusing on the ocular complications of vitamin A deficiency.

1984–85 Poor harvests and civil war trigger a humanitarian crisis in Ethiopia and what is today Eritrea.

1986 Hoffman-LaRoche Ltd. launches the SIGHT AND LIFE Task Force in response to the Ethiopian crisis. Its name is spelled thus until the organization's corporate identity is rebranded in 2011, after which it is known as *Sight and Life*.

1987–89 *Sight and Life's* vitamin A intervention programs supports 52 projects in 29 countries, reaching thousands of children.

Sight and Life receives a Spirit of Helen Keller Award.

1996 Prof. Al Sommer and Prof. Keith West publish *Vitamin A Deficiency: Health, Survival and Vision.*

1998 WHO and its major partners launches the Vitamin A Global Initiative.

DSM commences its entry into the nutrition space with the acquisition of Gist-brocades, a company whose core technologies are in fermentation and enzymes.

1990 The Center for Human Nutrition is officially launched at Johns Hopkins, Bloomberg School for Public Health.

1994 *Sight and Life's* first Secretary-General Dr John Gmünder steps down, having seen the organization provide 16 million doses of vitamin A to children and adults in need. He is replaced by Dr Martin Frigg, under whose direction the Xerophthalmia Club Bulletin (published by the Royal Commonwealth Society for the Blind) is incorporated into Sight and Life Magazine.

2000 The Millennium Development Goals (MDGs) for the year 2015 are established following the Millennium Summit of the United Nations.

2003 *Sight and Life* receives the IVACG Award for 15 years of contributions to global vitamin A deficiency and control. The organization transfers to DSM following DSM's acquisition of Roche's Vitamins & Fine Chemicals Division.

2005 Dr Martin Frigg steps down as Secretary-General, and is replaced by Dr Klaus Kraemer.

2007 *Sight and Life* catalyzes the formation of a public-private partnership between the World Food Programme and DSM, and becomes the partnership's nutrition science hub.

The Micronutrient Forum acknowledges *Sight and Life* for its long-standing commitment to the alleviation of micronutrient malnutrition.

Sight and Life's activities in the distribution of vitamin A are devolved to Vitamin Angels.

2008 The UN World Food Programme, DSM and *Sight and Life* jointly receive the UK's Chemical Industry News & Intelligence ICIS Award for Best Innovation, for the MixMe™ Micronutrient Powder Supplement.

2009 *Sight and Life* supports the creation of the Home Fortification Technical Advisory Group (HF-TAG).

2010 *Sight and Life* signs on to and supports the creation of the UN Scaling Up Nutrition Movement (SUN).

DSM's CEO & Chairman of the Managing Board Feike Sijbesma receives the UN Humanitarian of the Year award.

2011 *Sight and Life* celebrates 25 years of service to science and humanity, having donated US$36 million and supported some 3,350 projects in over 80 countries.

Sight and Life Press publishes *Micronutrients, Macro Impact: The story of vitamins and a hungry world.*

DSM marks the successful completion of a major portfolio transformation with the launch of its new corporate brand proposition, *Bright Science. Brighter Living.™*

2012 *Sight and Life* presents its first Nutrition Leadership award to Dr David Nabarro, representing the Sun Movement. The Award is subsequently made to Dr Robert Black (2013), Dr Anna Lartey (2014), Dr Shawn Baker (2015), and and Drs Shilpa Bhatte and Ellen Piwoz jointly (2017).

2013 *Sight and Life* becomes the principal technical partner in the Affordable Nutritious Food for Women (ANF4W) project in Ghana, established by the *Deutsche Gesellschaft for Internationale Zusamenarbeit (GIZ)*.

Sight and Life co-edits *The Road to Good Nutrition*.

DSM is named leader in the Dow Jones Sustainability World Index Materials Sector, having been nominated among the global leaders in each of the last 13 years and number one on seven occasions.

Michael J. Klag, MD, MPH, Dean of JHBSPH, awards the Dean's Medal – the highest honor given by the Johns Hopkins Bloomberg School pf Public Health – to 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.

2014 Johns Hopkins Bloomberg School of Public Health and DSM announce a renewed commitment to prevent micronutrient deficiencies with the launch of the *Sight and Life* Global Nutrition Research Institute at Johns Hopkins University.

Sight and Life broadens its focus as a think tank, to include implementation science, capacity building, and leadership development.

2015 The world's population passes the 7 billion mark.

UN member states agree to develop a set of sustainable Development Goals (SDGs) to build upon the MDGs and converge with the post-2015 development agenda. Food and nutrition security and sustainable agriculture is one of the SDGs.

Sight and Life is reconstituted as a Swiss foundation.

Formation of the Society for Implementation Science in Nutrition (SISN), which is formally launched the following year.

Together with DSM, *Sight and Life* incubates Sizanani Mzanzi, a micro-franchising-focused business dedicated to bringing affordable, nutritious foods to vulnerable children and reproductive age women in South Africa.

2016 *Sight and Life* collaborates with PATH in Karnataka, India, working with local partners to improve nutrition status and build healthy hygiene habits among schoolchildren.

Sight and Life co-edits *Good Nutrition: Perspectives for the 21st Century*.

2017 *Sight and Life* announces a new partnership together with DSM and UN children's agency UNICEF to deliver better nutrition to at-risk children and mothers in Nigeria.

Sight and Life co-edits *The Biology of the First 1,000 Days*.

4. Birth of the Partnership

"Partnerships are an essential strategy for eliminating malnutrition in all its forms. One long-standing, effective collaboration is the work of Sight and Life, *Johns Hopkins and DSM. This partnership has been motivated by a passion for improving the lives of vulnerable groups globally. The basis of this partnership has been a shared vision and mutual respect for the expertise of each organization."*
Eileen Kennedy, Professor of Nutrition and former Dean of the Tufts University, Friedman School of Nutrition Science and Policy, Medford, MA, USA, and member of the Supervisory Board of DSM

The Ethiopian humanitarian crisis on the mid-1980s

The partnership that was to lead to the creation of *Sight and Life* arose out of a joint response to a humanitarian crisis which generated unprecedented levels of attention worldwide.

In 1984–1985 famine struck the inhabitants of Ethiopia and what is today Eritrea. The effects of poor harvests (the result of record low rainfalls) were exacerbated by the horrors of war, as the Eritrean People's Liberation Front and other Ethiopian rebel groups sought to break away from the Marxist Ethiopian regime, the Dergue. The magnitude of the calamity, which claimed the lives of hundreds of thousands and left millions more destitute, was extensively publicized. It stimulated a powerful response in the form of the multi-venue Live Aid concert of July 13, 1985, in which musicians led by Bob Geldof raised US$100 million of relief funds for the stricken country.

The Basel-based company Hoffmann-La Roche, which was a world leader in the production of vitamins, was also quick to respond. As the pioneer of the chemical synthesis of vitamin A, the company well understood the link between malnutrition and eye disorders, and grasped how quickly hunger might trigger widespread nutrition-related blindness (xerophthalmia) in the populations exposed to the devastation of the war. The company therefore made available free of charge the oily vitamin A solution necessary for the manufacture of 2.5 million vitamin A capsules. Dispensed widely in the famine-stricken region, these capsules saved thousands of children from the immediate threat of nutrition-related blindness.

The creation of *Sight and Life*

The 37th World Health conference decided in that same year on a program to combat xerophthalmia. As a short-term measure, it envisaged the periodic or spontaneous provision of high-dose vitamin A preparations to particularly vulnerable populations. In the medium term, the fortification of suitable staple foods with vitamin A was envisaged, and in the long term the encouragement of farming and of the consumption of foods rich in vitamin A. It was within this conceptual framework that the "task force *Sight and Life*" – as it was initially known, with its name spelled out in full capitals – was called into being.

In announcing this undertaking in its 1985 Annual Report, Roche wrote: "Naturally the solution of the entire problem far exceeds the scope of any individual company. This recognition nevertheless does not take away the obligation not only to provide help in situations of special need but also to try to improve the general situation by means of ideas, support and cooperation. For this reason, the Roche task force *Sight and Life* was created: it will initially systemize and intensify this activity within the framework of a three-year program. This covers the years 1986–1988. The budget will be approved for each year by the company management and then translated into a detailed working program."

A clear purpose

Interviewed for the *Roche Internal Newsletter* in 1986, Dr John Gmünder – the first Secretary General of *Sight and Life* – explained in detail what the task force was attempting to achieve. "The logo that we have created gives a clear indication of our purpose," he said. "The stylized eye with the horizontally positioned A points to the shocking fact that every year hundreds of thousands of small children in developing countries become blind as a consequence of acute lack of vitamin A and die as a result. … Of course there are blind people in our latitudes, but more than three quarters of all blind people live in developing countries. These amount to – taking blind children and adults together – approximately 35 million people, which is to say almost 1% of the population of the Third World. This figure indicates the shocking dimensions of this suffering."

"The frequency of blindness is between 10–40% higher in developing countries than in industrial countries," Dr Gmünder continued. "In our regions of the world, the loss of eyesight is generally related to advancing age or else is the result of injury; in the developing countries by contrast, people become blind above all because they suffer an acute lack of vitamin A, because they develop inflammatory infections as a consequence of inadequate hygiene, or because they are subject to parasitic

© Al Sommer

The young Dr Al Sommer conducting one of his first field clinics when setting up the field study in Indonesia in 1976.

FIGURE 4.1: The original *Sight and Life* logo

diseases, for instance ochoceriasis, which is known as river blindness. The condition of the eye triggered by lack of vitamin A is called xerophthalmia. Approximately 10 million children in the developing world suffer from this affliction. And the World Health Organization puts the figure of children becoming newly blind every year at half a million. Experience shows that more than two thirds of these children with conditions of the eye die within a few weeks of becoming blind. This has to do with the fact that lack of vitamin A is usually associated with a general deficit in nutrition and a lowered resistance to infectious diseases, but it also frequently has to do with the fact that blinded small children are often ostracized by their families. Lack of vitamin A is, however, as we today know, the major cause of the blinding of small children in large areas of Asia, Africa, Latin America, the near East and the West Pacific."

A paradigm shift in the delivery of vitamin A

Dr Gmünder's analysis was confirmed by Dr Alfred Sommer, working at that time at the International Center for Epidemiologic and Preventive Ophthalmology, who was quoted in the same publication as saying: "Increasing the provision of vitamin A should in practical terms be the most effective measure to improve the chances of survival of small children in developing countries."

The association of Dr Sommer – now Dean Emeritus, Johns Hopkins Bloomberg School of Public Health – with Roche went back to the 1970s, and was critical to the founding of *Sight and Life*. In the late 1970s, Roche hosted a meeting of The International Vitamin A Consultative Group (IVACG), which had been established in May 1975.

At this meeting, an expert committee presented a set of recommendations for combating xerophthalmia with water-miscible vitamin A administered by means of injection. Three years later, Dr Sommer, who had attended that IVACG meeting in

Basel, was in Indonesia and found himself trying to treat a child with early-stage xerophthalmia. Not having access to water-miscible vitamin A, he tried squirting vitamin A – an oily, fat-soluble vitamin – direct on the child's tongue. The improvement in the child's condition was striking. At Dr Sommer's request, Roche made both formulations of vitamin A available for use in a randomized control trial. This showed that the therapeutic effects of both formulations were the same. The delivery of vitamin A straight on to the tongue was a far easier process to administer, however. Subsequent incorporation of the vitamin A into capsules would make it far easier to ship and deliver in exactly controlled doses.

How *Sight and Life* got its name

"Roche had decided to make a formal commitment to the battle against vitamin A deficiency, building on the ad hoc interventions it had already been supporting for a number of years," recalls Dr Sommer.

"Dr John Gmünder would drop by from time to time to discuss this undertaking and seek advice as to where Roche should be focusing its efforts. We at Bloomberg were aware at the time that vitamin A had a huge influence on physical and mental well-being. The link had not yet been proven, however, and the rest of the world seemed reluctant to accept the theory.

"One day John told me that Roche had decided to sponsor a new organization called Sight or Life – the implication being that if you couldn't see, you weren't living. I felt, however, that this sent too negative a message, and that it might be construed as offensive by people who were blind and lived very full lives. I therefore suggested calling the new organization *Sight and Life*, because vitamin A is important for sites specifically but also for life in general. This little change gave the Task Force a very positive name and one which was intimately associated with vitamin A."

In the years that followed, *Sight and Life* was to have a dramatic effect in combating vitamin A deficiency and its associated effects on health and development in many parts of the globe. Without the pioneering work of Dr Sommer and his colleagues in the field, and without Roche's expertise in manufacturing, formulating and distributing vitamin A capsules, the original Task Force could never have come into being.

Reflecting on those pioneering years in the 1980s, Dr Sommer observed in 2018, "I was fortunate enough to be given the opportunity to make a difference, by making a paradigm-changing discovery about the delivery of vitamin A. Many people don't ever get such an opportunity."

Wit and crisp thinking

"I learn from Al Sommer every day. He brings wit and crisp thinking into interpreting evidence and asking the questions that can really move an agenda. You need to understand the compelling story of the data if you are to bring about change. Al lives by that principle. He continues to inspire us as nutrition professionals, shaping our understanding of how we should view current knowledge, and the potential that is intrinsic in that knowledge."

Keith P. West Jr, Professor of Infant and Child Nutrition and Director of the Program and Center for Human Nutrition, The Johns Hopkins Bloomberg School of Public Health

5. From Vitamin A to Multiple Micronutrients

The value of painstaking research at population level

"When working as a young medical doctor in Nepal during the 1980s, I had encountered high levels of nutrition-related eye damage and blindness in the local population. Through Al Sommer and Keith West, who had been working on the same topic in Indonesia, I became aware of the critical importance of vitamin A for eyesight and, indeed, survival itself. Al Sommer and Keith West showed the value of painstaking research at population level followed by carefully programmed public health interventions. They were both great communicators, and they set a new standard for outcome-focused, community-based public health programming."

Dr David Nabarro, Inaugural Coordinator of the Movement to Scale up Nutrition (SUN), recipient of the first *Sight and Life* Nutrition Leadership Award (together with the Scaling Up Nutrition Movement and joint recipient (together with Dr Lawrence Haddad) of the 2018 World Food Prize

Prof. Keith P. West Jr speaking at a symposium in celebration of the career of Prof. Manfred Eggersdorfer, retiring Senior Vice President DSM Nutrition Science & Advocacy, in 2018: "We must seek to develop regional policies that are sensitive to the needs of individual populations and contexts."

From foundation to a Helen Keller Award

The *Sight and Life* Task Force commenced operations on 1 April 1986. The Task Force's 1986 Annual Report estimated that every year, one million of these children lost their sight as a result of xerophthalmia. Of these, two-thirds died after a short period. Speaking for *Sight and Life* at the time, Dr Fritz Gerber, the then acting chairman of Roche, said: "Roche recognizes its responsibility as part of an open and free society and will contribute to solutions for health and nutrition problems in the Third World."

The initial activities of *Sight and Life* included the provision of scientific and technical advice, free distribution of vitamin A capsules in emergencies, and financial support for selected research programs. Dr John Gmünder, the first Secretary General of *Sight and Life*, recalls the challenges the Task Force had to confront in its fledgling years: "We needed to prove to the vitamin A community that we were a serious partner, offering valuable help in a reliable manner. We never lost sight of that objective." The value of the Task Force's efforts was recognized in 1991 by the presentation of the prestigious Helen Keller International Award at the United Nations in New York.

Unique positions in the vitamin A arena

Dr John Gmünder was succeeded as Secretary General of *Sight and Life* by Dr Martin Frigg in 1994. Under Dr Frigg's direction, the organization continued to evolve. "It was important to ensure that *Sight and Life* occupied positions in the vitamin A arena that were unique," he recollects. "This endeavor was supported by a heightened focus on the *Sight and Life* newsletter, whose format was reworked and whose focus was turned more sharply on activities directly initiated or supported by *Sight and Life* itself. The Xerophthalmia Club Bulletin was incorporated into the newsletter, whose distribution within the vitamin A community was significantly broadened. An important part of my role was to review very efficiently scientific papers and to disseminate their content via the newsletter."

Recalling Dr Frigg's achievements in 2018, Dr Frances Davidson, formerly of USAID and the London School of Hygiene and Tropical Medicine, recollected: "Dr Frigg was that rare kind of person who could 'walk with paupers and princes'. He was very intelligent, completely without prejudices, and he

Vitamin A supplementation in the field

understood that different organizations have their own culture and that they need to find common ground if they are to work successfully together. Through the efforts of *Sight and Life* as a publisher and educator, the invaluable work of researchers in the field was made available to an audience all around the world. Martin was the 'human face' of private-sector public health interventions, and we owe him a great debt of gratitude."

A widening focus

Towards the end of the twentieth century, two new developments were to influence the course of *Sight and Life*. One was the creation of the Millennium Development Goals (MDGs) by the United Nations; the other was a widespread broadening of research and focus to include a more extensive range of micronutrients in programs, and not just vitamin A. Under the aegis of Dr Klaus Kraemer, the focus of *Sight and Life* expanded to cover the full range of micronutrients. In 2007, *Sight and Life's* vitamin A activities were devolved to the California-based NGO Vitamin Angels.

As Dr. Clayton Ajello, Senior Technical Advisor for Vitamin Angels and formerly of the Johns Hopkins Bloomberg School of Public Health, recalls: "In 2007, Howard Schiffer, President and Founder of Vitamin Angels, led an effort to focus and professionalize the activities of the organization. In that year, Dr Alfred Sommer proposed that Vitamin Angels engage his colleague, Dr Keith West. Dr West prepared an assessment of what it might take to eliminate vitamin A deficiency as a public health problem. With that assessment completed, I spent three months developing an initial 3-year strategic plan for Vitamin Angels to operationalize Vitamin Angels' new focus on eliminating vitamin A deficiency. Through this period and with the help of Johns Hopkins faculty members, Vitamin Angels was able to draw on both the technical public health nutrition expertise at Johns Hopkins Bloomberg School of Public Health and to gain access to important manufacturing expertise that resided within DSM to ensure product quality and eventually product availability. Through these initial introductions, Vitamin Angels secured free access to DSM staff responsible for scientific and technical affairs to help Vitamin Angels ensure that the quality of the product it procured met the product quality standards established by Nutritional International. Throughout the early years of implementing its first strategic plan, DSM North America also provided Vitamin Angels with an important array of technical services to identify and secure reliable, cost-effective finished product suppliers able to deliver high quality product for use globally."

Dr Martin Frigg retired as Secretary-General of *Sight and Life* in 2005. He was succeeded by Dr Klaus Kraemer, who, in his initial editorial for the *Sight and Life* Newsletter (2/2005), wrote: "Providing micronutrients to fight malnutrition was ranked number two amongst the factors having the highest impact on solving the world's greatest challenges by a panel of internationally renowned economic experts in the Copenhagen Consensus 2004. This encourages us to be at the forefront when it comes to improving the nutrition and health of children and mothers in developing countries. We cannot accept that one billion children are malnourished and live in poverty, and that more than ten million children under the age of five years still die every year of diarrhea, pneumonia, measles, malaria and AIDS. Many of these fatalities could be prevented by an optimal supply of vitamins and minerals."

The predictability of these tragedies is underlined by Prof. Keith West: "Things have evolved considerably since the early work of Elmer McCollum and the pioneering biochemists of his generation. Their work was essentially correct, and it explains our human biology. Our understanding today builds on that analysis, and has evolved at an accelerated pace due to technological developments which have allowed, for instance, the identification of biomarkers for specific conditions. This means that we can now understand human biology at public-health level, and we can understand how good nutrition can contribute to good public health. And we can actually predict malnutrition before it happens."

In widening its focus to embrace the entire spectrum of micronutrients during the first decade of the twenty-first century, *Sight and Life* was mirroring the thinking that was happening in the wider micronutrient arena, and which was to lead in 2007 to the establishment of the Micronutrient Forum. This new forum was created to reflect the recent evolution of science and program development in the field of micronutrient nutrition. Through its formation, the importance of multiple micronutrients for health and development was acknowledged.

Measurement of an infant's Mid-Upper Arm Circumference (MUAC) within the JiVitA Project. MUAC is the circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow, and is used for the assessment of nutritional status.

Mothers and their children participating in the JiVitA Project – one of the largest population health and nutrition intervention research projects in South Asia. Operational since 2001 in northwest rural Bangladesh, the project was established by the Center for Human Nutrition at Johns Hopkins University under the auspices of the Ministry of Health and Family Welfare of the Government of Bangladesh for the purpose of conducting research on interventions to prevent micronutrient deficiencies and their health consequences in mothers, infants and children.

By 2007, *Sight and Life* had refocused its efforts on the benefits of a broad range of micronutrients. It championed the fight against micronutrient deficiency, in particular nutritional anemia, and aimed to ensure that it received the recognition merited by the magnitude of the problem. Indeed, the first meeting of the Micronutrient Forum in Istanbul, Turkey, 2007, saw *Sight and Life* being the first organization to be honored for long-standing commitment to alleviating micronutrient malnutrition around the world.

Micronutrient Malnutrition

Micronutrients, more commonly known as vitamins and minerals, are present in small quantities in food and are an essential component of a healthy diet. Infinitely smaller than macronutrients (including protein, carbohydrates and fat) and required in much smaller amounts by the body, micronutrients are powerful agents in keeping our bodies and minds healthy and helping the body fight against illness and disease. Their availability in the right quantities and the correct combinations can make the difference between a healthy existence and one that is plagued by poor health. Indeed, a lack of micronutrients that results in micronutrient malnutrition, and its severe consequences, can ultimately lead to death.

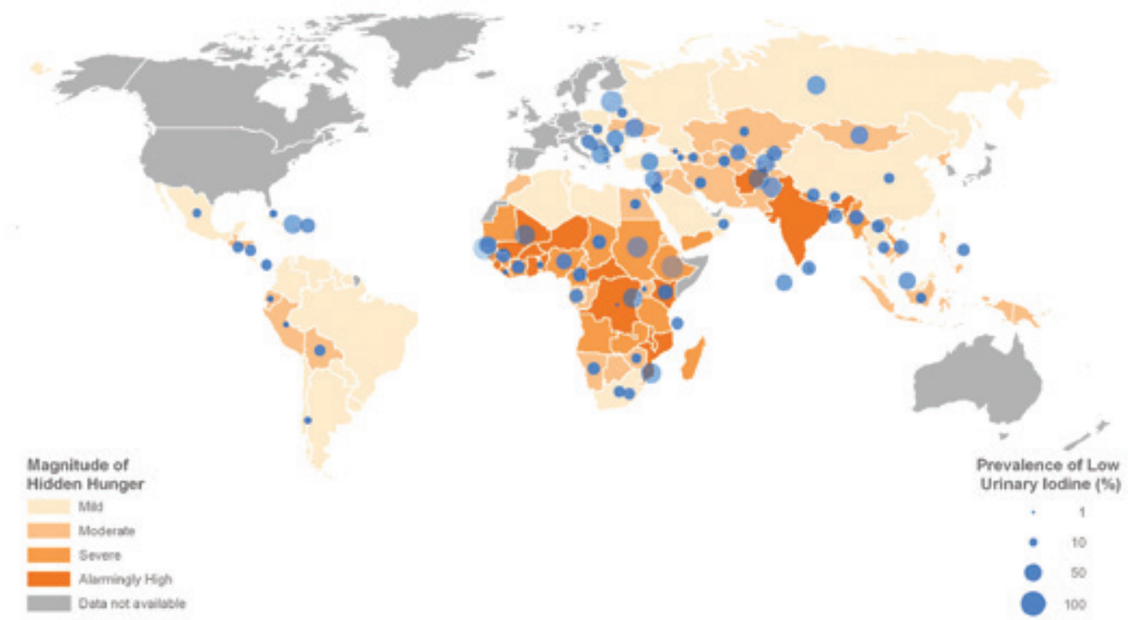
Hidden Hunger

Hidden hunger does not refer to the overt and obvious hunger of individuals who are unable to afford enough to eat. It refers to the deficiencies of micronutrients (vitamins and minerals) in individuals or populations as a consequence of poor dietary quality and losses due to disease, which negatively impact on health, cognition, function, survival and economic development.

Hidden hunger is a growing problem that impacts both the developing and the developed world. Dr. Klaus Kraemer believes that the "missing link" between health and food needs addressing as a matter of urgency: "Micronutrient malnutrition is often a hidden problem where people may have an adequate supply of energy from the food they eat, but the nutritional value is insufficient to meet their needs for optimal growth and development. Hidden hunger is under-recognized, and not enough is done to combat this problem, which not only results in long-term health problems for individuals but also impacts on the health of communities. It eventually has huge economic consequences, especially for developing countries."

One of the important achievements of *Sight and Life* under the direction of Dr. Kraemer has been the creation, with the support of Johns Hopkins Bloomberg School of Public Health, of the first ever global Hidden Hunger Map.

FIGURE 4.2: Hidden Hunger



Formulation expertise

Responsibility for *Sight and Life* passed from Hoffmann-La Roche to DSM in 2003, when Roche's Vitamins & Fine Chemicals Division was acquired by DSM. Both during the founding era and since, the role of the commercial organization in the background has been key to the success of *Sight and Life*.

Dr Manfred Eggersdorfer, Professor of Healthy Ageing at the University Medical Centre Groningen and former Senior Vice President DSM Nutrition Science & Advocacy, explains why. "Vitamins, whether water-based or fat-based, are famously unstable. Considerable expertise is necessary to ensure that they are formulated, packaged and distributed in such a way that they remain stable even in challenging climates, and that they are therefore fully bioavailable when consumed. Roche made available its world-leading expertise in the formulation of vitamin A capsules during the early years of *Sight and Life*. More recently, as the focus of the nutrition community has broadened, a wider spectrum of formulation expertise has been required. DSM has continued to innovate in this area, making the provision of sensitive micronutrients to populations in need a practical possibility for the first time, even in the most difficult of conditions."

Multiple micronutrient supplements used in the JiVitA Project. With 750 project staff distributed across 60 field offices in an area four times the size of Washington DC, the trial covers a population of 600,000.

6. Meeting Global Nutrition Challenges

Dr Klaus Kraemer addresses the 43rd annual meeting of the Committee of Food Security of the UN Food and Agricultural Organization at FAO headquarters in Rome, Italy on 18 October 2016.

"You have to believe in people and give them the chance to succeed if you really want to foster change."
Dr David Nabarro

"I well remember from my days with Roche the terrific impact of the work done on vitamin A supplementation in collaboration with Al Sommer and Keith West during the 1980s and 1990s," Professor Manfred Eggersdorfer remembered in 2018. "These interventions brought about a 30% reduction in child mortality in consequence of vitamin A deficiency. My colleagues and I were immensely proud to be part of this development. We felt that we were changing the lives of women and children for the better, and we hoped to be able to roll out vitamin A supplementation everywhere it was needed. Within a few years, however, we came to realize that there was a pressing need for multiple micronutrient supplementation in many parts of the world. Klaus Kraemer fully understood this and radically changed the focus of *Sight and Life*. He also changed its nature, transforming it from its roots as a task force and turning it into a nutrition think-tank."

The DSM-WFP partnership

In 2007, two years before the first steps were taken to establish the Scaling Up Nutrition Movement, an influential exercise in public-private partnership was initiated. Responding to the evidence of the global burden of malnutrition, Royal DSM N.V., *Sight and Life* and The United Nations World Food Programme (WFP) entered into a partnership dedicated to "Improving Nutrition, Improving Lives". The overarching goal of this public-private partnership was to increase the micronutrient content and overall quality of WFP's existing food products, drive innovation in new nutritional solutions, and raise awareness among policymakers of the importance of nutrition.

Speaking 11 years later, with the partnership still going strong, DSM's CEO and Chairman, Feike Sijbesma, reflects on the significance of this alliance. "An important evolution that has taken place in the past decade," Mr Sijbemsa observes, "is the realization that food aid is not in itself sufficient to combat the scourge of malnutrition that persists in many parts of the globe. Food aid was originally conceived as a stopgap solution to help people in a state of temporary crisis. The world has been forced to recognize, however, that some refugees may retain their refugee status not for months or even years but for decades. For this reason, the global nutrition community is increasingly focusing on development aid – initiatives for enriching food supplies at a local level worldwide and engineering resilience into local food systems. At the same time, the quality of food made available via pure food aid initiatives by organizations such as WFP and UNICEF has improved. The fortification of a wide range of food vehicles with essential micronutrients has enormously improved the nutritional quality of the 'food basket' available to some of the world's poorest and most vulnerable communities."

Innovations in micronutrient supplementation

Drawing on the epidemiological insights of Johns Hopkins and the formulation expertise of DSM, the partnership took a pioneering role in making a broad range of micronutrients available to enrich the diets of population groups suffering from hidden hunger. DSM and WFP jointly developed a micronutrient supplement in powder form called MixMe™. This innovative approach to 'home fortification' permitted the addition of essential micronutrients to any gruels commonly fed to older infants and young children,

Feike Sijbesma, CEO and Chairman of DSM, and Ertharin Cousin, the then Director, World Food Programme reconfirm the partnership of their respective organizations at the World Economic Forum in Davos, Switzerland, in 2013.

offering beneficiaries of the intervention an easy, safe and practical way to boost with micronutrients the nutritional value of the food available to them.

In 2007 alone, MixMe™ sachets reached more than 250,000 children in Nepal, Kenya and Bangladesh, and the following year, DSM Nutritional Products and WFP were awarded the 2008 ICIS Best Business Innovation Award for jointly developing MixMe™. The coverage area for the MixMe™ program was substantially increased in the following years, reaching millions of people. Meanwhile, other nutrition improvement initiatives were also under development, including lipid nutrient supplements, ready-to-use-therapeutic foods, and new approaches for fortifying rice with micronutrients. At the time of going to press, 39.4 million people in developing countries had received improved nutrition as a direct result of the DSM-WPF partnership.

"Over the past decade," comments Dr Klaus Kraemer, "*Sight and Life* has evolved to become a humanitarian think-tank, working to eliminate all forms of malnutrition worldwide. Together with our partners, we have developed a comprehensive approach to improving the nutritional status of populations in low- and middle-income countries (LMIC), taking a holistic view of local diets and the food systems that support them. We have sought – and are still seeking – to develop new models that are evidence-based, affordable, practicable and also culturally appropriate to their specific context. Making maximum use of the scientific insights and technical possibilities available to us, we are working to scale up tried and tested approaches. We are always learning, always seeking to deliver more effective and sustainable interventions. However much we have achieved together with our partners, we still have a very long way to go."

Sight and Life helped to establish the global network known as the Home Fortification Technical Advisory Group (HF-TAG), becoming one of its members. HF-TAG comprises organizations implementing or supporting the scale-up of home fortification programs. It includes United Nations (UN) agencies, academia, non-governmental organizations (NGOs), and the producers of home fortification products. HF-TAG's mission is to facilitate the implementation of well-designed and effective home fortification interventions at scale. As such, it provides guidance based on the best available evidence and current best practices.

The Scaling Up Nutrition (SUN) Movement

The following year, The Scaling Up Nutrition (SUN) Movement was established to support national leadership and collective action to scale up nutrition. "As I became more aware of the multiple causes of nutrition challenges and of the potential of small interventions based on partnering," recollects Dr David Nabarro, who was to become the SUN Movement's first

Coordinator, "I began to encourage partnership to make low-cost nutrition interventions practicable. In 2009, there was a great deal of debate within the global nutrition community as to how to tackle inadequate nutrition. Several of us had the idea of getting multiple actors together and calling this initiative the Scaling Up Nutrition movement, which came also to be known as SUN. Fundamental to this idea was the involvement of many different actors, and of local people operating within their own contexts. At the time, none of us knew whether this approach would actually work. SUN is now seven years old and it eloquently demonstrates just how much transformation is possible if countries organize themselves and work together collaboratively."

Two years after the launch of SUN, *Sight and Life* presented its inaugural Nutrition Leadership Award to Dr David Nabarro, who received it on behalf of the Scaling Up Nutrition (SUN) Movement during the World Economic Forum (WEF) in Davos. This award was made again on the occasion of the SUN Global Gathering, as documented in the Timeline to this publication. Reflecting on the receipt of the inaugural *Sight and Life* Nutrition Leadership Award in 2018, Dr Nabarro declared: "Of course I love the validation of receiving awards. The presentation of this award was a sign that the early nay-sayers had been silenced. But the most important thing about it for me is to be able to share the joy of receiving this distinction with the tens and even hundreds of thousands of people who believed in the idea of SUN from the start. This was something really beautiful for the nutrition community as a whole."

The year 2013 saw *Sight and Life* becoming a steering partner and co-funder of the Affordable Nutritious Food for Women (ANF4W) project in Ghana. In recognition of the fact that nutrition during a child's first 1,000 days depends to a great extent on the mother's nutritional status, ANF4W was established to encourage voluntary fortification of food products to meet the nutritional needs of Ghanaian women. *Sight and Life* provided technical expertise on formative and food value-chain assessment, business, and social marketing.

The *Sight and Life* Global Nutrition Research Institute at Johns Hopkins

2014 was another important milestone in the life of the DSM-*Sight and Life*-Johns Hopkins partnership. This year saw the opening of the *Sight and Life* Global Nutrition Research Institute at Johns Hopkins. "Since our inception," explains Dr Klaus Kraemer, who is also an Adjunct Professor at Johns Hopkins, "we have run projects with Johns Hopkins University Bloomberg School of Public Health since 2013, as its renowned Dean Emeritus Alfred Sommer was in the original task force that drove establishment and operations of *Sight and Life* 30 years ago. The *Sight and Life* Global Nutrition Research Institute is dedicated to enhancing research in assessing and preventing micronutrient deficiencies through strengthening faculty, doctoral scholarship, and academic activities, and providing professional opportunities for students."

Almost 200 peer-reviewed scientific publications have been published by the Institute, which also offers training opportunities to the school's MSc and PhD students at *Sight and Life's* office in Switzerland. Involvement in *Sight and Life's* field projects, also offers Johns Hopkins students a level of exposure to public health nutrition in action that they would not experience through their academic studies alone. Landmark studies produced by the *Sight and Life* Global Nutrition Research Institute meanwhile, include the JiVitA-3 and JiVitA-4 trials in rural Bangladesh, both dedicated to examining the critical role of micronutrients on mortality, morbidity and growth during the first 1,000 days of life.

"The *Sight and Life* Global Nutrition Research Institute is evolving well," says Prof. Keith West, "but if we are to rise to the global nutrition challenges that confront us on all sides, we need to develop a new generation of biologists who understand public health, who are committed to nutrition advocacy, and who want to work in underserved and obese communities. We want to 'jet-propel' students into careers in nutrition on the understanding that good nutrition is essential for the future of the human race."

Building nutrition capacity

The year 2015 saw the global nutrition community refocus its efforts around the United Nations Sustainable Development Goals (SDGs) to build upon the Millennium Development Goals (MDGs) and converge with the post-2015 development agenda. Food and nutrition security and sustainable agriculture is one of the SDGs, and is recognized as being at the heart of the development. In an initiative exemplifying this approach, *Sight and Life* assisted with the establishment of Sizanani Mzanzi the following year. Sizanani Mzanzi's aim is to improve access to quality, affordable social goods for South Africans. It co-creates income-generating opportunities, and builds capacity in communities that need these most in South Africa. The mission of the organization is to ensure economic sustainability

Students and faculty from the Center for Human Nutrition reception at Experimental Biology 2017 in Chicago, Il, USA.

by generating surpluses from sales, reinvesting these into the business to the ultimate benefit of those it serves. It aspires to increase awareness of the importance of good nutrition by training micro-franchisees on this topic, but also focuses on improving equality by empowering women in communities with high unemployment levels.

In 2016, *Sight and Life* also collaborated with PATH is in Karnataka India, working with local partners to improve nutrition status and build healthy hygiene habits among schoolchildren. The program provides a nutrient-rich meal of fortified rice while promoting good hygiene habits through peer role models, games, and problem-based learning. It aims to encourage positive attitudes towards sanitation and healthy eating in 2,600 schools in the Indian state of Karnataka, with the prospect of including all schools in Karnataka.

The Society for Implementation Science in Nutrition (SISN)

Another milestone for that year was the formal launch of the Society for Implementation Science in Nutrition (SISN), following the society's creation in 2015. Established with support from *Sight and Life*, SISN exists to facilitate the vital collaboration needed between all stakeholders in nutrition implementation and to pool the collective knowledge, experience, resources, and commitments of scientists and practitioners to take on the challenge of scaling up nutrition globally. Its mission is to convene, advocate, disseminate, and promote dialogue among scientists, policy leaders, government officials, funders and practitioners to advance the science and practice of nutrition implementation world-wide. As Klaus Kraemer comments, "Excellent science is only excellent if it is used. It delivers no benefits if it just sits on the shelf. Science is the foundation of everything the DSM-*Sight and Life*-Johns Hopkins partnership does, but it must be translated into action, and developing skills in implementation science is central to that effort."

Partnership with UNICEF

The following year, DSM, UNICEF and *Sight and Life* further explored the potential of the public-private partnership model by announcing a new partnership to deliver better nutrition to at-risk children and mothers in Nigeria. The partners will also advocate on a global scale for micronutrient supplementation. At the same time, the partnership began to pay close attention to the essential role of protein in the diet – a nutritional requirement that had not received adequate attention during the previous decade, in which the importance of the full range of micronutrients was at the forefront of the nutrition community's attention.

Commenting on new research into amino acids – the building blocks of proteins – carried out jointly by Johns Hopkins

(From left to right) UNICEF Executive Director Anthony Lake, Royal DSM Chairman and CEO Feike Sijbesma, and *Sight and Life* Foundation board member Fokko Wientjes smile after signing an agreement to renew their partnership, following a bilateral meeting between UNICEF and Royal DSM at UNICEF House in New York City.

University, the United States National Institute on Aging, the University of Maryland, Washington University in Saint Louis and the *Sight and Life* Foundation, Dr Kraemer observed in 2018: "It is becoming clear that the lack of improvement in growth attributable to mere micronutrient interventions suggests that something essential is missing from the diet of many people in LMICs. That missing element is good-quality protein. Providing protein with sufficient levels of essential amino acids will be a major challenge for the world, and will require substantial investment and innovations in the agriculture sector."

Agents for change

"There are many types of leadership. Here at Sight and Life *we back leaders who are agents for change, who roll up their sleeves and work hard to accomplish their vision, and who serve as role models for the next generation. Shilpa Bhatte and Ellen Piwoz embody these traits and have transformed systems in order to improve nutrition at the national and global level."*
Dr Klaus Kramer, Managing Director, *Sight and Life* Foundation, presenting the 5th *Sight and Life* Nutrition Leadership Award conjointly to Dr Shilpa Bhatte and Dr Ellen Piwoz and in 2017

A child eating food fortified with MixMe™ at Kakuma Refugee Camp, Kenya, 2009

7. New Models for Investment and Partnership

"What binds this partnership together is a common vision and sense of purpose. All three partners want to address the global scourge of malnutrition and to make the world a better place. The partnership would never have survived so long without this common vision and accompanying strong commitment."
Feike Sijbesma, CEO & Chairman, Royal DSM N.V.

In 2013, Prof. Al Sommer released his book entitled *10 Lessons in Public Health: Inspiration for Tomorrow's Leaders*, published by the Johns Hopkins University Press. In his introduction to that volume, he muses: "Many disciplines contribute to the design and conduct of successful global health interventions, but success almost always begins with the classic epidemiologic triangulation of the disease by time, place, and person. Why this person and not the person next door; why now and not last week or next year? Epidemiologic investigations and insights provide the evidence behind good medical practice and global (public) health policy. We epidemiologists have been handed powerful new tools to assist our work, from laboratory tests that identify new infectious agents to powerful computers that can quickly carry out complex analyses. But nothing can replace epidemiology's core underpinnings: the rigorous collection of data and their thoughtful, innovative interrogation. 'Connecting the dots' is what matters most."

The importance of making connections is likewise stressed by Feike Sijbesma. "When trying to bring about change," he stated in 2018, "there is often a tendency to skip over the 'why' and focus immediately on the 'what', 'how' and 'who'. At DSM, we believe it is essential to focus on the 'why' before one starts sketching out action plans. This principle has been consistently applied to the partnership between Johns Hopkins, *Sight and Life* and DSM. Our cultivation of a shared rationale for what we do is so strong that we have always managed to find ways of addressing the 'what', 'how' and 'who' of the many challenges we have faced together. It is synchronicity at work, to use the term first coined by C.G. Jung and popularized by Joseph Jaworski: "A meaningful coincidence of two or more events, where something other than the probability of chance is involved." Jaworksi came to see this as the most subtle territory of leadership, creating the conditions for what he termed 'predictable miracles.' And predictable miracles are what we need today in a world in which, according to the latest data from WHO, some 45% of deaths among children under 5 years of age are linked to undernutrition."

Energy, enthusiasm and commitment

"*Sight and Life* has changed in many ways since it was first set up," says Prof. Manfred Eggersdorfer. "Our understanding of the global nutrition challenges that we face, both at the individual and at the epidemiological level, is far more complex than it was in the 1980s. If the challenges posed by the nutrition transition and the double burden of hidden hunger and obesity appear massive, we can take courage in the fact that we now have far more sophisticated analytical tools and communication platforms at our disposal for tackling these new developments. *Sight and Life* has evolved on many fronts since 1986, but the energy, enthusiasm and commitment which marked its early years have not changed at all with the passage of time."

"As for John Hopkins," continues Prof. Eggersdorfer, "it was always a pioneer in identifying the key role of vitamins in supporting health. This leading public-health school has underpinned its academic excellence over the years by sending people out into the nutrition 'hot spots' of the world to apply innovative nutrition interventions and gather data on changing nutrition requirements. And Hoffmann-La Roche, for its part in the early days, was a pioneer in the synthesis and industrial manufacture of the entire range of 13 vitamins known to science. This pioneering spirit has informed *Sight and Life* since its inception and continues to inspire those who work for the organization today. I believe that *Sight and Life* was and still is a front-runner in its field and that its example has encouraged many other organizations around the world that are today fruitfully exploring the full potential of public-private partnerships."

"Public health may be compared to a jigsaw puzzle containing many pieces," adds Dr Frances Davidson. "The expertise of many different actors is required to transform thought into action, research into programming. The role of the private sector is absolutely essential, as we can see from Roche's strong commitment to *Sight and Life* in the early days. The company's science base and technical know-how were critical to the success of many USAID programs."

Clear priorities and ambitious but attainable targets

"*Sight and Life* started as a humanitarian initiative supported by Hoffmann-La Roche," summarizes Feike Sijbesma. "Since 2003, it has been supported by DSM. In the past decade and a half, *Sight and Life* has considerably broadened its scope, playing a key role in the realization of a number of initiatives that have expanded the focus of DSM itself – our partnerships with the UN World Food Programme and with UNICEF, the creation of the SUN Movement, the establishment of the DSM Nutrition Improvement Programme, and more recently, our support for Africa Improved Foods, along with our recent extension of this concept into India. At the same time, Johns Hopkins Bloomberg School of Public Health, with its world-leading expertise in epidemiology, has provided DSM with vital insights in the battle against malnutrition, helping us to set clear priorities and ambitious but attainable targets that are core to our wider Sustainability agenda."

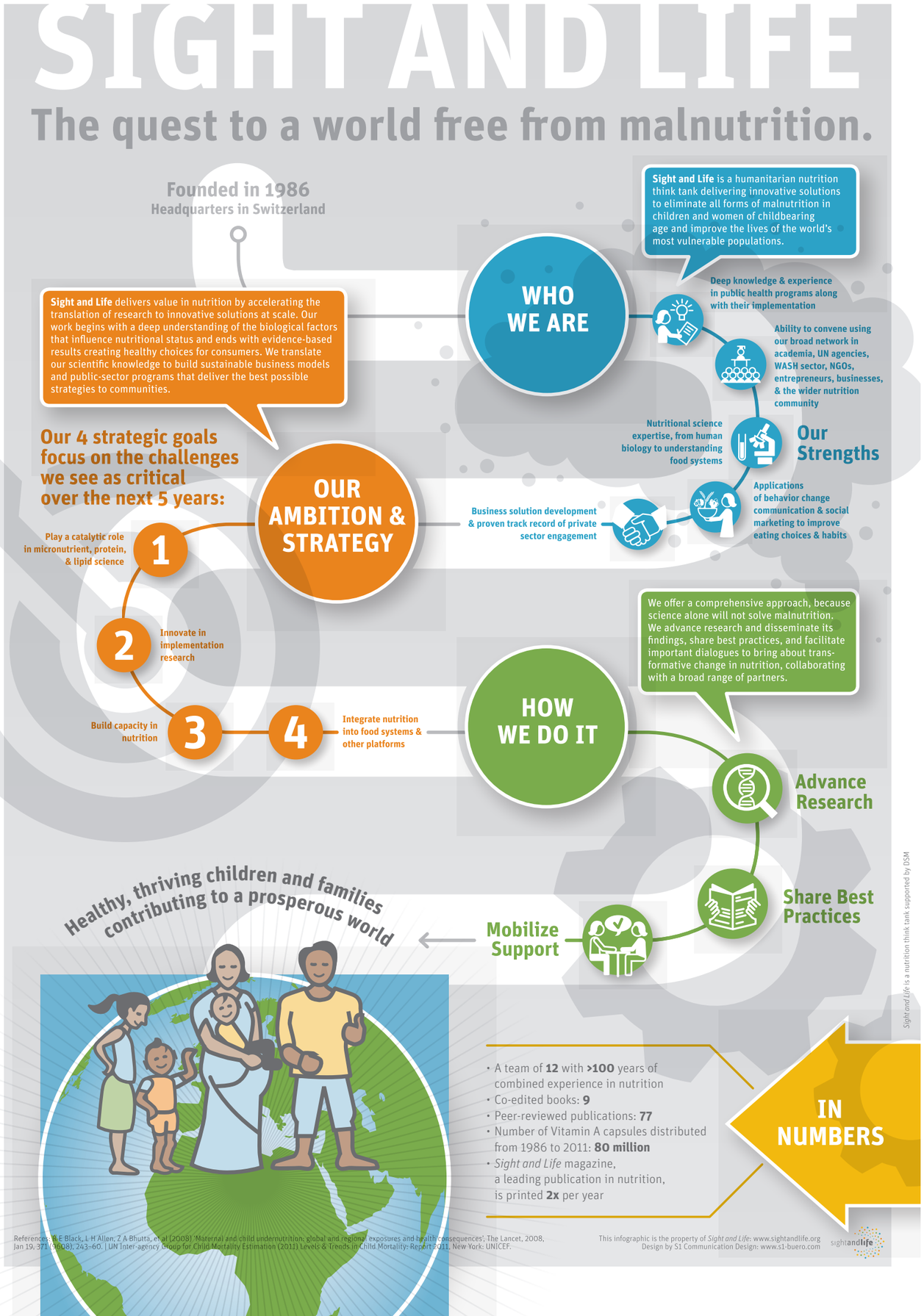
In the view of Dr David Nabarro, an understanding of the individual roles of each partner has been key to the longevity of the triangular relationship. "Johns Hopkins, DSM and *Sight and Life* really believe in partnership," he emphasizes, "and they understand how a committed NGO, a commercial business and an academic institution can bring about positive change. Commerce generates desire for results, science helps ensure that we are on the right path, and governance works for equity and fairness. Critically, Johns Hopkins, DSM and *Sight and Life* understand how sustainable change can be achieved by empowering people at local level." The three-way partnership requires expansion, however: "The inclusion of civil society turns the triangular relationship between commerce, science and NGOs into a 'diamond' with four sides, each of which makes a contribution. The importance of putting people center stage and supporting them by multidisciplinary partnerships in combination with clear accountability is recognized in the 2030 Agenda for Sustainable Development. I am deeply gratified by the fact that this way of working, in which I have always believed, has been accepted by the world's leaders. It's a very simple recipe, but it really works."

Perhaps the very last word should go to Prof. Al Sommer, whose pioneering research made the *Sight and Life* concept possible in the first place.

Doing the right thing

"The various people who have led Sight and Life *to date have all had very different personalities and perspectives," he reflects, "but they have all wanted to do the right thing. More than this, they have always been sensitive and responsive to the issues of the day. So the initiative has evolved to meet the changing needs of the world in which it operates, demonstrating considerable creativity and flexibility along the way. Today Sight and Life is playing an extremely valuable role as a facilitator that brings together the best in the worlds of scientific research, policy-making and program development."*
Prof. Al Sommer, Dean Emeritus, Johns Hopkins Bloomberg School of Public Health

The *Sight and Life* Foundation team photographed on 6 December 2017. From left to right: Jennifer Bladt, Laura Prestel, Klaus Kraemer, Peiman Milani, Breda Gavin-Smith, Nola Martin, Eva Monterrosa, Kesso Van Zutphen, Srujith Lingala, Kalpana Beesabathuni and Madhavika Bajoria.



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Sight and Life
Klaus Kraemer, PO Box 2116
4002 Basel, Switzerland
Phone: +41 61 815 8756
Fax: +41 61 815 8190
Email: info@sightandlife.org
www.sightandlife.org

Sight and Life
PO Box 2116
4002 Basel, Switzerland
Phone: +41 61 815 8756
Fax: +41 61 815 8190
Email: info@sightandlife.org
www.sightandlife.org

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