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*Corporate Social
Responsibility Initiative*



Sumitomo Chemical and the Fight Against Malaria Using Bednets A CASE STUDY

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Foreword

Development challenges, such as tackling poverty and unemployment; improving food, water and energy security; increasing access to education, health care and nutrition; and adapting to climate change, are notoriously systemic. They have their roots in public awareness, regulatory and policy frameworks, social and cultural norms, market dynamics, institutional capacity, infrastructure, and many other factors that shape people's incentives and drive their behavior. And behind each of these factors is a set of interconnected, interdependent stakeholders.

Increasingly, the private sector is being recognized by the development community as a crucial partner in helping to address these challenges. New technologies, products and services and more inclusive business models are helping to improve livelihoods and quality of life for millions of low-income households while at the same time improving the efficiency of natural resource use and decreasing environmental degradation. Yet, with a few notable exceptions such as the development of mobile banking, most of these market-based solutions have not achieved business growth and development impact at scale. Many are impeded by a combination of market failures, governance gaps, insufficient financing, and inadequate individual and institutional capacity. There is an enormous need for more collaborative solutions that leverage the combined resources and capabilities of business, government and civil society to overcome these barriers.

In this context, the Corporate Social Responsibility (CSR) Initiative at Harvard Kennedy School has undertaken research on the different strategies and structures that companies are using to strengthen the ecosystems around their inclusive business models. We have looked at three approaches that can help overcome barriers to scaling these business models:

- Private initiative by an individual company along its own value chain;
- Project-based alliances between a company and one or more other organizations; and
- Platforms that are formal networks of potentially

large numbers of players, established for a common purpose.

These structures are complementary, and companies often use them in combination, either sequentially or simultaneously. The following case study looks at a private initiative for providing bednets for use against malaria in Tanzania and the rest of Africa.

Sumitomo Chemical is a leading global chemical company based in Japan. In 1993, the company developed a technology whereby insecticide could be embedded directly in polyethylene fiber. Olyset Net was born. Long-Lasting Insecticide Treated Net (LLIN) remain effective in killing mosquitoes for five years or longer. With this technology, Sumitomo Chemical was confronted with a fascinating opportunity and a new responsibility: it could make a significant contribution to fighting malaria, a disease that kills approximately one million people every year.

Sumitomo Chemical decided to use this opportunity to empower a local ecosystem for net production in Tanzania. As part of a joint venture in 2007, it transferred the technology royalty-free to A to Z Textile Mills Ltd., a local producer already engaged in the manufacturing of bednets. Demand for bednets soared as donors made the fight against malaria a priority. A new factory in Arusha can produce 30 million nets per year and employ 7,500 people. Through awareness-raising campaigns, Sumitomo Chemical also invested in increasing the demand for and use of bednets globally. After donors had achieved their coverage goals and faced budget constraints as a result of the global financial crisis, demand for bednets fell drastically. The company and its local partner A to Z Textile Mills Ltd. are currently at an inflection point. How can they use the production capacities to keep the thousands of people employed? Is there a way to reinvigorate demand from end consumers?

The Olyset case study shows, above all, the complexity of strengthening inclusive business ecosystems. In particular, it shows the limitations of private initiative

in this endeavor. Much of the inclusive business literature is based on an implicit premise that the government is absent in the markets of the poor and that these markets are largely informal. In the market for bednets, however, governments and donors are the most important and influential players. Fighting malaria is a public health concern both locally and globally. Changing policies from governments and donors can rapidly alter the conditions for companies in this market.

The case study raises more questions than it can answer. This is a good thing: it provides food for thought and discussion on the interplay between public and private actors in strengthening inclusive business ecosystems. Sumitomo Chemical, we believe, is a particularly interesting example to advance our understanding of the strengths and limitations of both public and private actors in creating markets and addressing social problems. The joint venture between Sumitomo Chemical and A to Z Textiles Ltd. was hailed as a landmark example for inclusive business when it was created a few years ago. It is also an example for how public procurement can stimulate job creation, capacity building and economic growth in sub-Saharan Africa. We hope that this case study can open up new perspectives on public-private collaboration in inclusive business ecosystems.

Since it was founded in 2003, the CSR Initiative at Harvard Kennedy School has worked to bridge theory and practice in the field of multi-stakeholder partnerships. This case is part of a series focused on collaboration between business and other sectors to drive systemic change. Our goal is to learn in “real time” how a new generation of collaborative initiatives designed for systemic change and scale are mobilized, and how they work. We hope others will benefit from the experiences of these initiatives and be able to accelerate their own progress in developing models that achieve both business benefit and development impact through tackling some of the world’s most pressing development challenges.



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Case Study Background

This case study is part of a Harvard Kennedy School CSR Initiative workstream on systemic approaches to creating business opportunity and development impact at scale.

An initial framing paper, *“Tackling Barriers to Scale: From Inclusive Business Models to Inclusive Business Ecosystems,”* was published in September 2011.

This document is one of three in-depth case studies to generate knowledge and provide practical guidance on what such systemic approaches look like and how to structure and implement them.

Inclusive business includes people living in poverty into the value chain as producers, consumers, employees and business partners. Inclusive business ecosystems are the communities or networks of interconnected, interdependent players whose actions determine whether or not a particular company’s inclusive business model will succeed. These players typically include individuals, companies, governments, intermediaries, NGOs, public and private donors, and others.

Broadening the focus from developing inclusive business models to strengthening inclusive business ecosystems, the research suggests, helps companies deal more efficiently and effectively with the widespread challenges in the slums and villages where the poor reside.

Companies use a variety of strategies to strengthen the ecosystems around their inclusive business models. These include awareness-raising and capacity-building, research, information-sharing, public policy dialogue, and creating new organizations.

Companies execute these strategies using three structures to harness the necessary resources and capabilities and overcome the incentive problems inherent in coordination and cooperation: 1) private initiative by an individual company, 2) project-based alliances and 3) platforms. This case study explores an example of a private initiative.

Private initiative by an individual company is the default structure for firms seeking to strengthen their inclusive business ecosystems, because it enables them to move quickly with fewer transaction costs. It presumes sufficient resources and the necessary capabilities, and typically works best when incentive problems are limited to the

company and its direct customers and suppliers – and can be addressed through payment and certification systems already embedded in the business model.

Sumitomo Chemical and its activities around Long-Lasting Insecticide-Treated Nets (LLINs) was chosen as a case study because it highlights the challenges and limitations of an ecosystem approach. The Japanese chemical company has developed a technology that maintains such nets as effective and intact for more than five years. To enable production of nets in Africa, where the need for them was greatest, Sumitomo Chemical transferred the technology to A to Z Textile Mills Ltd., a manufacturer in Tanzania. The joint venture quickly scaled up to 7,500 employees, producing much of the global supply of mosquito nets for the ongoing Universal Coverage Campaign. But with increasing competition and decreasing donor funding for nets, the joint venture is now struggling to keep employees at work. At the same time, Sumitomo Chemical is engaged on the global level in raising awareness for LLINs. The limitations of private initiative to strengthen inclusive business ecosystems are clearly the boundaries set by the public sector. The challenge confronting Sumitomo Chemical is to navigate the complex ecosystem around LLINs, which is at once global and local, public and private, and stay abreast of changes in the ecosystem.

The research sought to generate insight into the following questions:

- How can private initiatives strengthen inclusive business ecosystems? Where are the limitations?
- How can private initiatives be combined with other structures to strengthen inclusive business ecosystems?

This case study was conducted between June and September 2011, including on-site interviews in Tanzania between August 28 and September 12. Tanzania was selected as a site for field research since several examples of inclusive business ecosystem development had been identified there.

Executive Summary

The case of Sumitomo Chemical and the market for Long-Lasting Insecticide Treated Nets (LLINs) shows the challenges and boundaries of strengthening inclusive business ecosystems. The company acts both on a global and a local level to improve LLIN production capacity and uptake. Yet, on a global level, the continuously changing policy environment has made it hard for the company to stay abreast of developments. After rapid scale-up of production in Africa, it is now confronted with dwindling demand. The case raises questions about how companies should best navigate a highly politicized ecosystem.

The global LLIN ecosystem

Malaria is still a major cause of illness and death in developing countries around the world. Approximately half of the world's population is at risk of malaria, especially children under age 5 and pregnant women. Nearly one million people died of the disease in 2008, mostly children living in Africa. Malaria is caused by parasites that are spread to people through the bites of infected Anopheles mosquitoes, called "malaria vectors", which bite mainly between dusk and dawn.

Malaria is a preventable disease. "Vector control", eliminating or keeping away the mosquitos that transmit the disease, can help prevent infections. Today, the main instruments for vector control are Indoor-Residual Spraying (IRS), where walls are sprayed with insecticide, and the use of Long-Lasting Insecticide Treated Nets (LLINs), a special type of bednet that contains insecticide and does not need to be retreated.

After a failed elimination program in the mid-20th century, malaria came back on the global agenda in the 1990s, after a dramatic increase in malaria mortality and morbidity. In 1998, the WHO, UNICEF, UNDP and the World Bank launched the Roll Back Malaria Partnership (RBM) as a global framework to implement coordinated action against malaria. Subsequently, a series of global goals to reduce the burden of malaria were announced, from halving malaria mortality by 2010 to universal coverage of all beds with nets by 2010 to achieving near-zero mortality from malaria by 2015.

As a result, international funding for malaria control rose steeply. Disbursements reached their highest ever levels in 2009 at US\$ 1.5 billion. The Global Fund to Fight HIV/AIDS, Malaria and Tuberculosis, launched in 2002, is by far the biggest donor, having disbursed almost US\$ 1 billion in 2009 alone. The US President's Malaria Initiative and the World Bank also provide significant funding.

Donors spent much of their budget on procuring and disbursing LLINs. By the end of 2010, approximately 289 million LLINs had been delivered to sub-Saharan Africa, enough to cover 76% of the 765 million persons at risk. All LLINs procured under these schemes have to be certified by the WHO. In 2011, donors had achieved the goals defined by the Universal Coverage Campaign, and funds available reduced drastically, also as a result of the global economic crisis.

The results of the global campaign have been significant: A total of 11 countries in Sub-Sahara Africa showed a reduction of more than 50% in either confirmed malaria cases or malaria admissions and deaths in recent years. The challenge will be to keep up this level of control. Nets will need to be replaced soon. In addition, resistance of mosquitoes against pyrethroids, the only insecticide class currently used for LLINs, is increasing fast.

Sumitomo Chemical's role in the global LLIN ecosystem

Sumitomo Chemical is a leading global chemical company. Its customers are almost exclusively businesses that buy inputs for their production. Sumitomo became involved in the fight against malaria because it had developed a superior technology for Insecticide Treated Nets (ITNs) in 1993. Olyset Net is a LLIN that remains effective in killing mosquitoes for five years or longer.

For Sumitomo Chemical, Olyset Net, though rather small in terms of revenue, is a critical CSR activity. It allows the company to show the social value of its products in a very tangible way. Therefore, Sumitomo Chemical is not just producing the nets, but is investing significant resources in promoting its net technology and malaria prevention in general around the world. Among other initiatives, it supports Malaria No More and, in partnership with the Royal Commonwealth Society (RCS), launched the "Me and My Net" competition. Moreover, dedicated staff represent Sumitomo Chemical in the global discourse around net provision.

Olyset Net was the first net that received WHO Pesticides Evaluation Scheme (PES) certification in October 2001. Consequently, WHO asked Sumitomo Chemical to increase the capacity for producing LLINs to meet the surging demand from international donor agencies and funds. The company found partners in China and Vietnam to produce nets, and others in Kenya, Malawi and Ethiopia to do the stitching.

Sumitomo Chemical felt that nets should be produced where they were most needed, in Africa. In this way, production would also create jobs and income for local people. In 2003, the company entered into a partnership with A to Z Textile Mills Ltd. to produce Olyset Net in Arusha, Tanzania. It transferred the technology royalty-free and helped with the setup of the production. In 2007, the two companies created

the joint venture "Vector Health International" (VHI). A new factory was built that employs 7,500 people and has the capacity to produce 30 million nets per year.

After some years of quick scale up and enormous sales, the joint venture is now at an inflection point. Today, 10 manufacturers are certified by WHO, and so competition has increased. Because tenders define only a minimum durability of three years and usually take the cost of production as the price criterion, the two competitive advantages of VHI's Olyset Nets – longevity and local production in Africa – are not being considered, which makes it increasingly hard to win tenders. In September 2011, ordering books were empty and machines were standing still, also due to energy scarcity in Tanzania.

In order to use the production capacities, Sumitomo Chemical decided to actively create new markets. It has just launched Olyset Net on the commercial market in Kenya, where the net is now available in all sales channels. It has installed a machine to recycle the nets at VHI. Finally, the company has entered into a new joint venture with A to Z, where both companies are establishing a research site in Arusha. Among other things, the facility will develop new net technology with new insecticides to counter looming resistance.

Global policies and the local LLIN ecosystem in Tanzania

Sumitomo Chemical entered the market in Tanzania with the joint venture with the intention to build local capacity for LLIN production. Tanzania was also the arena for the global debate among proponents of free net distributions and those defending the power of market forces and sales of nets. Tanzania thus provides an interesting case study for how global policies can affect local markets and companies.

From 1998, public health NGO Population Services International (PSI) started a multi-year social marketing

campaign to develop a commercial market for nets. As a result, Tanzania became the biggest producer of insecticide-treated nets (ITNs), the predecessor technology to LLINs, with four local manufacturers. 20,000 retailers sold the nets to customers, who bought them for around US\$ 3. In 2004, 3.3 million nets were sold.

In 2004, the Ministry of Health and Social Welfare under the National Malaria Control Programme initiated the Tanzania National Voucher Scheme (TNVS). The scheme provides a subsidized net to all pregnant women and their infants. This subsidy further stimulated the commercial market. In 2009, the TNVS was readjusted to ensure that women had to pay no more than US\$ 0.3 per net. To implement the complex control system required by this new policy, LLINs had to be produced and distributed by just one manufacturer, VHI. This change effectively left the three other manufacturers without business, since without LLIN technology, they could not compete on the global market. In addition to the TNVS, two campaigns for free distribution of nets were implemented from 2008 to 2011, the Under-five Catch Up Campaign and the Universal Coverage Campaign. In total, 25.3 million free nets were handed out to Tanzanians, a population of 44 million, as part of these campaigns. As a result of these interventions, the commercial market for nets has completely dried up.

VHI has become a very important player in this local ecosystem. It is the sole provider of nets to the national voucher scheme. Some donors even started to worry that its position was too strong for the local market. With 7,500 employees, A to Z Textile Mills Ltd. became one of Tanzania's largest employers. Yet, the success of A to Z Textile Mills Ltd./VHI depends to a great degree on global policies which it is unable to influence. While global, local and corporate priorities seemed to be aligned at one point, this alignment has been lost over time. The global LLIN campaigns resulted in good coverage for the moment, but have been unable to strengthen local ecosystems that would maintain these high levels. As a result, Sumitomo Chemical's effort to build local capacities and thus

strengthen local ecosystems might not reap the social and economic benefits that were intended.

Systemic change approach and limitations

Sumitomo Chemical found itself stretched between the global and the local ecosystem for LLINs. On the global level, donors were keen to scale up production and increase competition for nets. On the local level, the production partnership with A to Z increased market power of A to Z to the degree that global donors were concerned about it. At the same time, local policies drove other competitors out of the market, and the lack of global funds led to local problems when orders did not come any more. What was the role for the chemical company in strengthening this ecosystem?

The case of Sumitomo Chemical shows the limitations for companies in actively shaping inclusive business ecosystems. Most of the unavoidable limits for companies to shape the ecosystem around them are defined by the public sector. By coordinating the multiple players in a sector or around an issue, companies partially take on public responsibilities. This happens when there is a certain public void – when government is either not functional or not interested. This is precisely why ecosystem change is so important for inclusive business, especially business in the context of slums and villages, where government is often rather absent. In a situation where the public sector is stepping up and clearly leading the way, companies can only act on the execution level and provide their inputs to the policy makers.

Even in situations where the public sector is strong, companies can play an important role in strengthening the ecosystem within the boundaries of the political framework. Sumitomo Chemical provided its technology royalty-free to A to Z Textile Mills in order to build local production capacity for the nets that would mainly be used in Africa. It thus helped to bring another player into the picture, which might not have

been able to participate otherwise, and created jobs and income opportunities in Tanzania. Through its project-based alliances, it helps to raise awareness for vector control globally. Finally, its active involvement on the global issue platforms makes sure the private sector's concerns, from tendering policies to resistance and recycling, are heard and influence the public debate.

Sumitomo Chemical maintains an ongoing commitment to strengthening the LLIN ecosystem. However, the company wants to learn how better to navigate the complex LLIN ecosystem. How can the company balance the demands of global and local stakeholders? How can the different interests of Sumitomo Chemical and A to Z Textile Mills be aligned under the joint venture? The case study shows that combining structures for strengthening ecosystems is not without challenges. Though the diverse stakeholders and frameworks may be aligned at one point in time, alignment can be lost over time as framework conditions change.

The case study of Sumitomo Chemical and the LLIN market highlights the challenges as well as the potential of strengthening ecosystems through private initiatives. Technology transfers and the accompanying capacity building can lift local companies in developing countries into the league of global players, creating employment and economic opportunity. By providing evidence of the positive impact of such initiatives, companies can make the case toward public agencies to revise their procurement policies and support similar initiatives. Sumitomo Chemical has only started to get more engaged into discussions with donors about these issues. The example of VHI may well influence donors approach the procurement of LLINs and other goods in the future.

1 The global LLIN ecosystem

Will it be perfect? No. But this is one of the easiest problems I'm trying to solve. It's easy to distribute nets and there's high public awareness of how to use them.

Jeffrey Sachs, Economist, Columbia University, and Policy Advisor¹

1.1 Malaria – A global disease

Malaria is still a major cause of illness and death in developing countries around the world. In 2010, the WHO counted 216 million cases of malaria. 655,000 people died of the disease that year, mostly children living in Africa. In Africa, a child dies every minute of malaria. The disease accounts for 22% of all childhood deaths.²

Malaria also causes significant economic losses. The WHO estimates that gross domestic product (GDP) can decrease by as much as 1.3% in countries with high levels of transmission. The health costs of malaria include both personal and public expenditures on prevention and treatment. In some heavy-burden countries, the disease accounts for up to 40% of public health expenditures, 30% to 50% of inpatient hospital admissions, and up to 60% of outpatient health clinic visits. Malaria disproportionately affects poor people who cannot afford prevention and treatment or have limited access to health care.³

Picture 1. Anopheles mosquito

©James Gathany

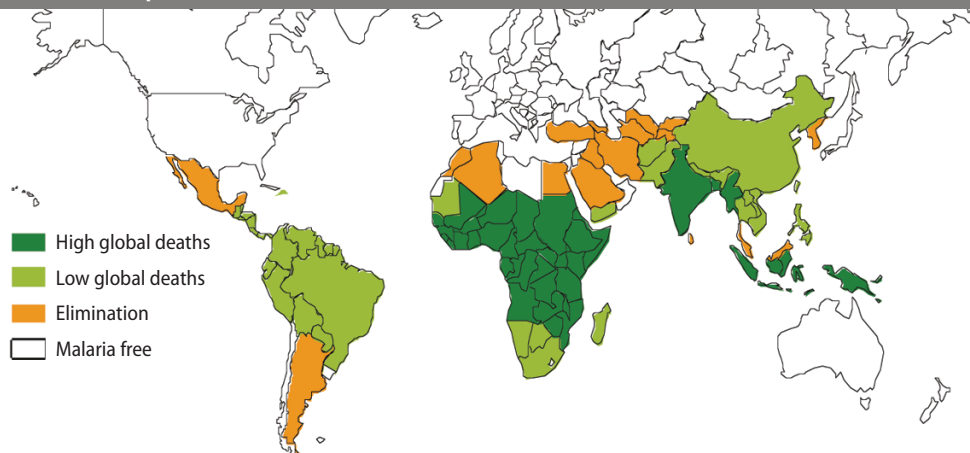


Malaria is caused by Plasmodium parasites. The parasites are spread to people through the bites of infected Anopheles

mosquitoes, called “malaria vectors.” They bite mainly between dusk and dawn. Symptoms appear seven days or more after the infective mosquito bite. The first symptoms – fever, headache, chills and vomiting – may be mild and difficult to recognize as malaria. If not treated within 24 hours, malaria can progress to severe illness, often leading to death.

Approximately half of the world’s population is at risk of malaria. In 2008, malaria was present in 108 countries and territories. Especially at risk are children under age 5 who have not yet developed immunity against the most severe forms of the disease. Malaria infection during pregnancy results in high rates of miscarriage and low birth weight as well as maternal deaths.⁴

Figure 1. Malaria prevalence around the world



Source: World Malaria Report 2008, Geneva: WHO (2006 data)

Table 1. Main malaria interventions

INTERVENTION	EXPLANATION
Vector control	
Insecticide-Treated Nets (ITNs)	In addition to keeping mosquitos away, ITNs kill mosquitos resting on them. Since the mosquitos feed at night, nets mostly hang above the bed and cover it completely. Long-lasting insecticide treated nets (LLINs) already contain and release the insecticide,so they don't have to be treated separately with it.
Indoor Residual Spraying (IRS)	Interior walls of homes in malaria affected areas are sprayed with insecticide. The insecticide kills mosquitos that rest on the wall.
Prevention	
Intermittent preventive treatment for pregnant women (IPTp)	To avoid infection during pregnancy, pregnant women receive at least two preventive treatment doses of an effective antimalarial drug during routine prenatal clinic visits.
Treatment	
Artemisinin-based Combination Treatment (ACT)	Artemisinin is currently the most effective drug against malaria. The WHO recommends using it in combination with other antimalarials, in order to avoid the development of drug resistance against artemisinin.

Source: Author

1.2 A brief history of combating malaria

Malaria is a preventable and treatable disease. “Vector control,” i.e. eliminating or keeping away the mosquitoes who transmit the disease, can help prevent infections. A variety of medicines have been developed over the years to treat those who fall sick.

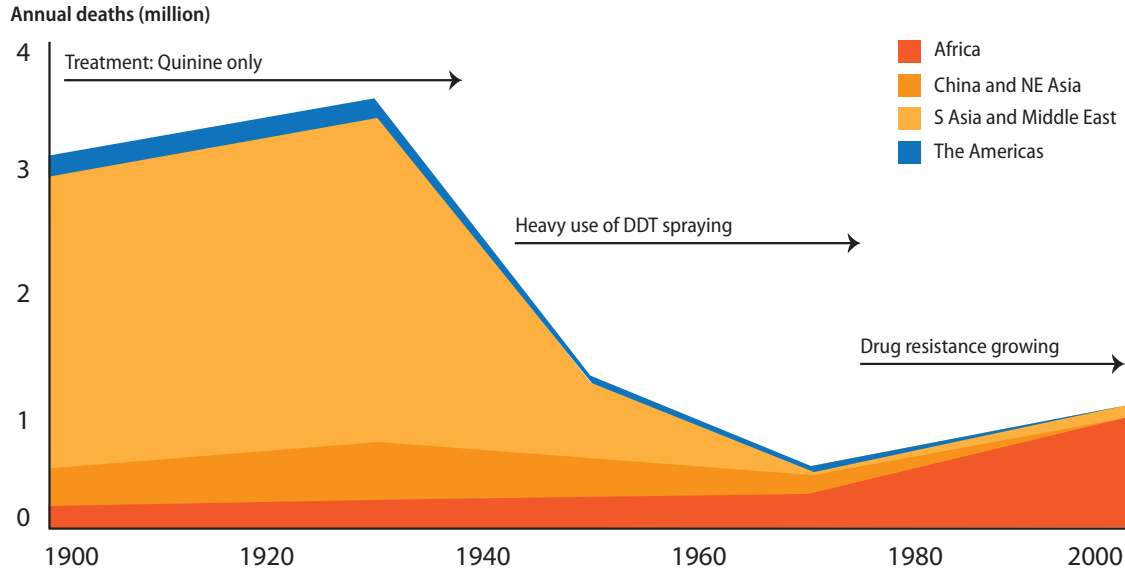
In the mid-19th century, malaria was endemic in most regions of the world, affecting about 90% of the world’s population. After successful efforts to reduce malaria with DDT beginning in 1945, the 8th World Health Assembly launched the Global Malaria Eradication campaign for most malarious countries in 1955. The countries of sub-Saharan Africa were excluded, since eradication did not yet seem in reach. The main approach to malaria eradication was indoor residual spraying (IRS), primarily with DDT. In all, 37 of the 143 countries that were endemic in 1950 were free of malaria by 1978, of which 27 were in Europe or the Americas. The effort helped to reduce malaria in almost all targeted countries. However, some of the countries were unsuccessful in interrupting transmission. Basic health services were not widespread enough, and funding was lacking. By 1973, it was concluded that in some countries a time-limited eradication program was

impracticable, and strategies were shifted into long-term integrated control programs.⁵ The Global Malaria Eradication campaign was abandoned. Little attention was paid to malaria over the subsequent years.⁶

Malaria mortality and morbidity began to increase again in the 1980s. Parasites and vectors had become resistant to the current anti-malarial drugs and insecticides. At the same time, traditional malaria control programs weakened, along with the health systems in which they were embedded. This dramatic increase led to the adoption of the Global Malaria Control Strategy in 1992. In 1998, WHO, UNICEF, UNDP and the World Bank launched the Roll Back Malaria (RBM) Partnership.

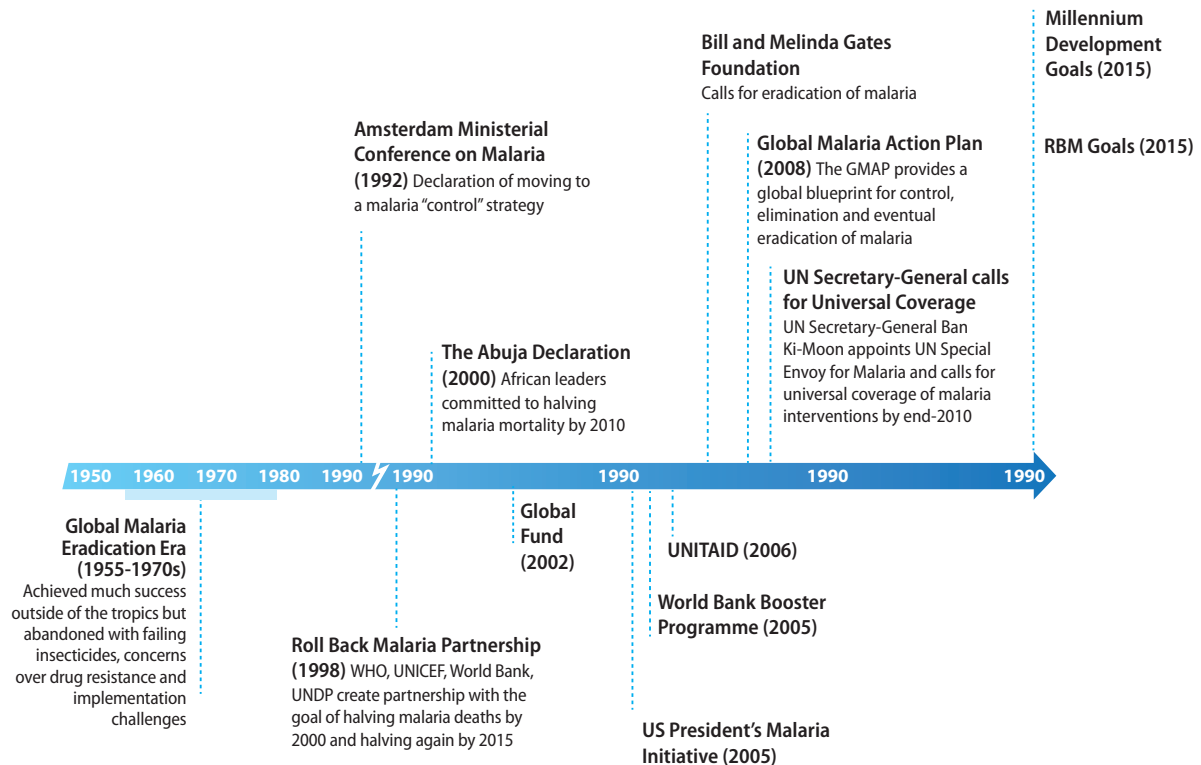
The RBM Partnership is a global framework to implement coordinated action against malaria through resource mobilization and consensus building. It comprises more than 500 partners, including malaria-endemic countries, development partners, the private sector, nongovernmental and community-based organizations, foundations, and research and academic institutions.⁷ It is hosted by WHO. WHO provides general guidance for malaria control and treatment policies and interventions.

Figure 2. Evolution of malaria mortality globally



Source: R. Carter and K. Mendis (2002) Evolutionary and historical aspects of the burden of malaria. Clinical Microbiological Reviews 15 (4), p. 564-594

Figure 3. History of malaria eradication and control programs and targets



Source: Roll Back Malaria Partnership (2011) A Decade of Partnership and Results

Figure 4. Important global actors to fight malaria and their roles

Coordination	WHO Guidance on control and treatment policies and approaches Certification of LLINs through WHOPEs		Roll Back Malaria Partnership (RBM) Resource mobilization and consensus building 500 partners from all sectors
Funding	World Bank US\$ 760 mn 2005-2011	President's Malaria Initiative (PMI) US\$ 1.2 bn 2005-2010	Global Fund to Fight HIV/AIDS, Malaria and Tuberculosis US\$ 1 bn in 2009
Procurement	UNITAID Fostering competition and ensuring funding for ACTs	Affordable Medicines Facility Malaria (AMFm) Negotiating ACT prices	UNICEF (among others) procurement of LLINs
Awareness raising	Malaria No More	Nothing But Nets	United Against Malaria

Source: Author

International attention for malaria increased in subsequent years. The United Nations' Millennium Development Goals call for halting and reversing the incidence of malaria by 2015. In the Abuja Declaration in 2000, African leaders affirmed their commitment to

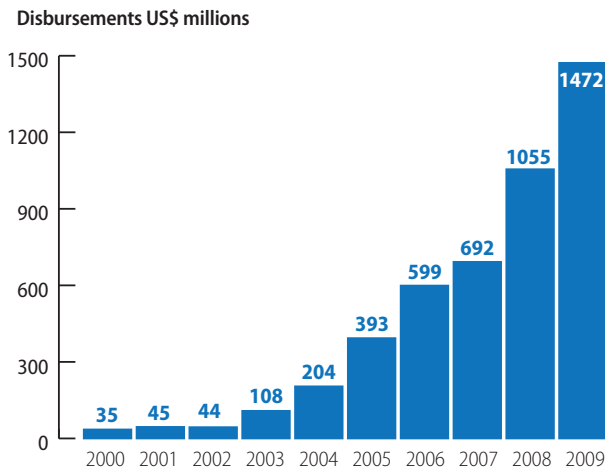
halving malaria mortality by 2010. In April 2008, the UN Secretary General called for universal coverage by the end of 2010 to halt malaria deaths. The table below summarizes the international targets.

Table 2. International goals to control malaria

TARGET YEAR	Vector control methods	Treatment	Intermittent treatment for pregnant women	Burden of disease
2015 (established in the Millennium Declaration)				Halve the spread of malaria
2005 (established at the 2000 Abuja Summit)	> 60%	> 60%	> 60%	Halve malaria mortality between 2000 and 2010
2010 targets (established in the 2005 RBM Partnership Global Strategic Plan 2005-2015)	>80%	>80%	>80%	Halve the malaria burden between 2000 and 2010
Universal coverage target (established in the 2008 RBM Partnership Global Malaria Action Plan)	100%	100%	100%	
2015 (established in 2011 by WHO)				Near zero mortality

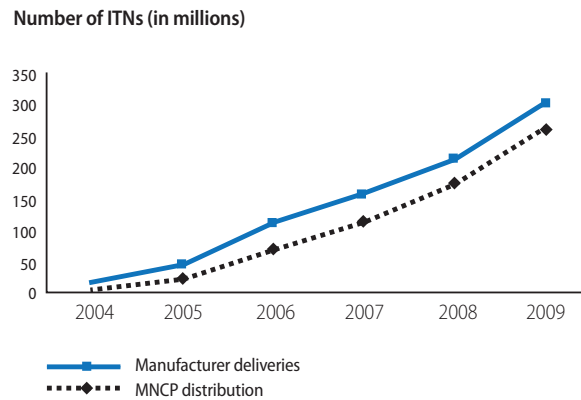
Sources: RBM Partnership, Global Malaria Action Plan, 2008.14 RBM Partnership, Global Strategic Plan 2005-2015, 2005.15 African Summit on Roll Back Malaria, The Abuja Declaration and Plan for Action, 2000.16 UN Statistics Division, 2011.17 Office of the UN Secretary-General's Special Envoy for Malaria, 2009.18.

Figure 5. international donor disbursements to malaria endemic countries, 2000–2009



Source: RBM (2011b)

Figure 6. Cumulative number of ITNs distributed in sub-Saharan Africa, 2000-2009



Source: WHO 2010 World Malaria Report

As a result of the increased attention, international funding for malaria control has risen steeply in the past decade. Disbursements reached their highest ever levels in 2009 at US\$ 1.5 billion, but new commitments for malaria control stagnated in 2010.⁸ The Global Fund to fight HIV/AIDS, Malaria and Tuberculosis was set up in 2002 as an innovative mechanism to pool donor funding. The Global Fund is by far the biggest donor, having disbursed almost US\$ 1 billion in 2009 alone. The US President’s Malaria Initiative ranks second, having committed US\$ 1.2 billion from 2005 to 2010. The third biggest donor is the World Bank, having committed more than US\$ 760 million since 2005. All funding is provided to governments of malaria-endemic countries. The Global Fund alone had procured and delivered over 100 million mosquito nets, and a similar number of ACT malaria treatment courses, by the end of 2010.⁹

The increased financing resulted in significant progress in vector control. By the end of 2010, approximately 289 million ITNs had been delivered to sub-Saharan Africa, enough to cover 76% of the 765 million persons at risk. WHO estimates that 42% of households in Africa owned at least one ITN in mid-2010, and that

35% of children slept under an ITN. IRS programs increased the number of people protected in sub-Saharan Africa from 13 million in 2005 to 75 million in 2009.¹⁰

The health benefits have been considerable. A total of 11 countries in sub-Sahara Africa showed a reduction of more than 50% in either confirmed malaria cases or malaria admissions and deaths in recent years. WHO estimates that the number of cases of malaria rose from 233 million in 2000 to 244 million in 2005 but decreased to 225 million in 2009. The low absolute decrease is explained by the high level of population growth. In Africa, population grew by 28% between 2000 and 2009.¹¹ The number of deaths due to malaria is estimated to have decreased by 20%, from 985,000 in 2000 to 655,000 in 2010.¹²

As the era of ready funding for Universal Coverage Campaigns comes to an end, and budgetary constraints of donor countries as a result of the ongoing global financial crisis, contributions to the Global Fund decreased significantly. As a result, funding round 11 was cancelled. At the moment, it is unclear how funding for malaria programs will continue.

1.3 The market for bednets

Insecticide treated nets form an essential part of current malaria control efforts. Bed nets have proved effective in reducing the prevalence of the disease. Together with IRS, insecticide treated nets (ITNs) became the main element of global prevention strategies.

In 2000, delegates at the African Summit on Roll Back Malaria in Abuja, Nigeria proposed expanding ITN use. Starting from close to zero, they set a target of 60% ‘coverage’ for all pregnant women and children by 2005. Between 2002 and 2005, there was a 10-fold increase in the coverage of ITNs in more than 14 sub-Saharan countries, largely attributed to the distribution of subsidized or free ITNs to pregnant women and children. Still, by 2005 fewer than 5% of eligible children slept under ITNs.¹³

Distributing nets to people in rural areas of sub-Saharan Africa was a challenge. An even bigger challenge was to provide them with retreatment kits periodically. Since kits were expensive, there was little demand and hence retailers would not stock them. Raising people’s awareness on the need for nets and how to use them was also difficult. Most people did not see malaria as an issue, because they had become (partially) immune to it.

Originally, users had to wash and treat ITNs with insecticide. Nets were made out of polyester and came packaged with an insecticide sachet. ITNs had to be retreated every six months. A sachet for the treatment

cost US\$ 1.20 – very expensive for most people in Africa.¹⁴ The development of LLINs addressed many of the shortcomings of conventional ITNs. LLINs are pre-treated with insecticides, they last for at least three years without retreatment. Today, most of the nets that are being used as part of the global fight against malaria are LLINs.

The market for bed nets, and LLINs specifically, is completely dominated by the public buyers, i.e. governments and donors. At least in sub-Saharan Africa, few nets are bought by private end consumers. Public buyers have to rely on the evaluation of WHO for their purchasing decision. All donors make it a requirement that ITNs comply with WHO specifications. Hence, only LLINs recommended by the WHO Pesticide Evaluation Scheme (WHOPES) can apply for tenders. WHOPES evaluates pesticide-based health commodities intended for public health programs.

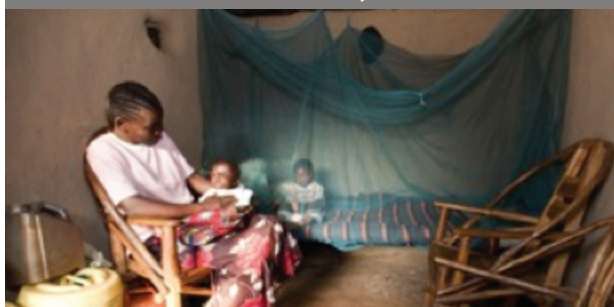
In 2010, seven manufacturers supplied almost all the ITNs in Africa: Vestergaard-Frandsen, Sumitomo/A-Z, Clarke, BASF, Tana Netting, and Yorkool. Almost all ITNs distributed are LLINs.¹⁵ Vestergaard-Frandsen and Sumitomo/A-Z share the greatest part of the market, with Vestergaard-Frandsen clearly in the lead.

1.4 Challenges

The Global Fund sees the goals of the universal coverage campaign as widely achieved. Even though not all sleeping places have been covered with a net, scale up has worked fast.¹⁶ However, in November 2011, round 11 of the Global Fund’s funding cycle was delayed indefinitely due to resource constraints. Experts are debating how best to best keep coverage high.

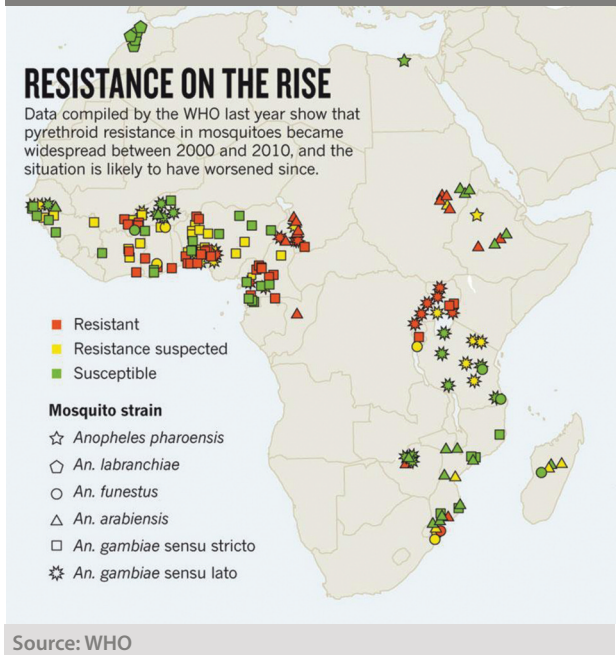
The lifespan of LLIN is currently at least, but not necessarily more than, 3 years. The nets delivered now will soon be due for replacement, and some already are. WHO warns: “Failure to replace these nets could lead to a resurgence of malaria cases and deaths.”¹⁷

Picture 2. Mother with children under an LLIN in Kenya
© M.Hallahan, Sumitomo Chemical-Olyset Net



In addition, resistance looms large for global malaria control efforts. Current methods of vector control are highly dependent on a single class of insecticides. Pyrethroids are most commonly used for IRS and the only insecticide class used for ITNs. This increases the risk that mosquitoes will develop resistance, especially since these interventions have been scaled up massively all over Africa.¹⁸ *Nature* quotes Jo Lines, the former head of vector control at the Global Malaria Programme of WHO: “Data are coming in thick and fast indicating increasing levels of resistance, and also of resistance in new places.”¹⁹ WHO intends to launch a global strategy to tackle the problem by the end of 2011. For now, it recommends rotating insecticides for IRS. But ultimately, entirely new classes of insecticides, in particular for ITNs, are needed.²⁰

Figure 7. Resistance to pyrethroid in Africa



2 Sumitomo Chemical's role in the global LLIN ecosystem

"Africa needs direct foreign investment to build strong economies, and when 90% of the malaria deaths are in Africa, why should we have to import bednets?"

Anuj Shah, CEO of A to Z Textile Mills ²¹

Sumitomo Chemical is a leading global chemical company. Its customers are almost exclusively businesses that buy inputs for their production. Sumitomo became involved in the fight against malaria in 1993, when Dr. Takaaki Ito and Takeshi Okuno (of Sumitomo Chemical) developed Olyset Net. Insecticide was embedded in the polyethylene fiber net, and was slowly released over time. The net remained effective at killing mosquitoes for at least five years. Olyset Nets thus provided a solution to the enormous procurement and distribution challenge that came with the global campaign to fight malaria using bed nets. By using long-lasting nets, these campaigns could be much more effective. In response to global demand Sumitomo Chemical took its responsibility seriously and stepped up production of Olyset Nets. It also became an active contributor to the global campaigns to raise awareness for malaria protection. Moreover, the company created a joint venture with A to Z Textile Mills to produce Olyset Nets in Tanzania. Over the years, Sumitomo Chemical learned to navigate the complex and changing ecosystem of the market for LLINs.

Sumitomo Group is one of the largest industrial groups in Japan. Like the Toyota group or Mitsubishi, it is a *Keiretsu*, a consortium of interlocking businesses, including banking, trading, electronics, cars (Mazda) and many other activities. The group was founded in about 1615 by Masatomo Sumitomo, a former Buddhist priest. Even today, the company management is guided by his "Founder's Precepts."²²

Sumitomo Chemical Company, Limited, was founded in 1913 in order to produce agricultural fertilizer. It has since expanded into many other areas of chemical production, including plastics, pharmaceuticals, and crop protection. It is one of the world's leading companies for insect control, and its chemicals are

ingredients for insect repellents and mosquito coils. In 2010, the company counted sales of approximately US\$ 26 billion and almost 30,000 employees.

2.1 Olyset Net

Sumitomo Chemical developed Olyset Net in 1993. The inventors, Dr. Ito and Mr. Okuna, had already experimented with other applications of fusing resins and insecticides, such as window screens.²³ The mosquito net was a natural next step. The nets are produced out of polyethylene fiber containing the insecticide permethrin, which is slowly released over time. Hence, the nets don't need to be retreated with insecticide and remain effective for at least 5 years, in practice 7 years or more.

The invention of Olyset Net became even more relevant when global efforts to control malaria reawakened with the foundation of Roll Back Malaria in 1998. Olyset Nets had also been used in the Japanese government's vector control initiative in developing countries. When WHO recommended ITNs as a strategy to keep malaria at bay, Sumitomo Chemical submitted the product for certification with WHO. In October 2001, it became the first LLIN recommended by WHOPES.

To meet the surging demand from international donor agencies and funds, WHO subsequently asked Sumitomo Chemical to increase the capacity for producing LLINs. Until then, Sumitomo had produced the net in Japan. In addition to capacity constraints, high labor costs rendered the end product very expensive. Sumitomo was looking for production partners in countries with cheaper labor costs. It found a partner in China, and produced 3 million nets in 2003.

When Hiromasa Yonekura, Chairman of Sumitomo Chemical, attended the World Economic Forum in 2005, Benjamin Mkapa, president of Tanzania at the time, raised awareness of the need for more mosquito nets, and actress Sharon Stone emphatically supported his plea. The presentations made Mr. Yonekura aware of the fact that Olyset Net could play a key role in fighting the disease. Subsequently, he strongly supported expansion of Olyset Net production.

In 2003, the company entered a joint venture with A to Z Textile Mills Ltd. to produce Olyset Net in Tanzania. The next section will explore this partnership more in depth. In addition, the company started production at two new plants in Vietnam and China in 2006. It also initiated business partnerships in Kenya, Malawi and Ethiopia to stitch the nets. These local manufacturers would receive the Olyset textile for cutting and sewing. However, the stitching operations largely failed. Sumitomo Chemical also explored opportunities to enter a joint venture in Nigeria, but operating costs were too high and the company was unable to identify a partner interested within the public health parameters.

For Sumitomo Chemical, Olyset Net, though relatively small in terms of revenue, is a critical CSR activity. It allows the company to show the social value of its products in a very tangible way. Therefore, Sumitomo Chemical is not just producing the nets, but is investing significant resources in promoting its net technology and malaria prevention in general around the world.

- In 2005 and again in 2010, Sumitomo Chemical donated nets for the Millennium Villages in Africa, totalling more than US\$ 4 million worth of bednets.
- Since 2009, Sumitomo Chemical has supported the Malaria No More initiative in a variety of its projects, including support for Senegal's most famous musician Youssou N'Dour with the 'Senegal Surround Sound' campaign.
- In 2010, Sumitomo Chemical collaborated with the United Against Malaria partnership in production

of public service announcements featuring over 20 African football champions from across the malaria-endemic continent.

- The company continues to donate nets to support local awareness raising efforts across Africa. For example, it provided nets to people in Angola on Malaria Day in November 2010. In Madagascar the company distributed locally printed booklets explaining the correct way to use mosquito nets.
- In 2011, Olyset Net entered into a partnership with the Royal Commonwealth Society (RCS) to launch the "Me and My Net" competition. The initiative aims to raise the awareness of teenagers in 54 commonwealth nations on the importance of mosquito nets in malaria prevention.

Moreover, dedicated staff represents Sumitomo Chemical in the global discourse around net provision, primarily through participation in the Roll Back Malaria (RBM) Partnership framework. Various staff members provide the company's view to the large international donors and during global meetings on malaria prevention through the RBM framework. Lisa Goldman, the company's representative on the Private Sector Delegation to RBM, states: "Historically, our competitors have been much more directly involved in the political dialogue. As a Japanese company, Sumitomo Chemical emphasized the quality of its product and did not want to get involved to deeply with the political processes. However, over time, the company came to the conclusion that in this heavily donor-driven environment, it is indispensable to present one's arguments directly to the political players, and so we are now engaging more actively in the RBM framework." Vestergaard Frandsen, the company with the biggest share in the LLIN market, has emphasized the engagement on global platforms from the beginning and has represented the private sector on the Executive Committee of RBM for a long time. Given how quickly the political environment around nets can change, Sumitomo Chemical is now also dedicating more resources to this global dialogue. In May 2012,

Lisa Goldman was elected to the Board and Executive Committee of RBM.

2.2 The A to Z – Sumitomo Joint Venture

One challenge for Sumitomo Chemical was to bring down the cost of production of Olyset Nets. It first outsourced production of nets from Japan to China. But since most of the nets were needed in sub-Saharan

Africa, the company wanted to build local production capacity for nets. Local production of nets would have additional benefits, above all jobs and income for local people.

In 2003, Sumitomo transferred the technology royalty-free to A to Z. Production started in 2004 at A to Z's production site in downtown Arusha. Soon, it became clear that production capacity had to increase significantly to meet the rising global demand for nets.

A public-private alliance to facilitate technology transfer

The partnership between Sumitomo Chemical and A to Z Textile Mills was organized by a number of other players in a loose alliance that came together only for this purpose and quickly dissolved when all arrangements had been finalized. The idea to produce nets in Africa was triggered in 2002 by Pierre Guillet, then vector control specialist at WHO's global malaria program in Geneva. Guillet had met the CEO of a Tanzanian producer of nets, A to Z Textile Mills, during a conference of the Multilateral Initiative on Malaria in 2000 in Dar es Salaam. Guillet had presented WHO's perspective that LLINs should be used for vector control activities. A to Z CEO Anuj Shah, who had just invested in increasing production capacity for polyester nets, asked Guillet to facilitate a technology transfer and help the company to remain competitive.

Guillet presented the idea of creating a partnership to produce LLINs in Africa at the fourth meeting of Roll Back Malaria at the World Bank in Washington in April 2002. Sumitomo Chemical and ExxonMobil, who attended the meeting, were both interested in the approach. Guillet introduced both companies to A to Z Textile Mills, and all agreed to pursue the idea further. Thus, the core of the consortium that would organize the technology transfer had been established.

In a next step, Guillet asked the Acumen Fund, a fund for investment in social innovations, for a meeting with the partners. UNICEF, as a major multilateral player in the fight against malaria, also joined the meeting in New York. Both became partners of the consortium. Acumen Fund provided the first interest-free loan of US\$ 325,000 to A to Z in 2003 in order to invest into the new technology. UNICEF was on board mainly to endorse the initiative.



Picture 3. Olyset Net factory © M. Hallahan/Sumitomo Chemical

In the ensuing meetings, the partners developed a common plan of action and blueprint for implementation. ExxonMobil pushed the partners to move quickly to the desired objectives, contributing to the professionalism of the team. As it turned out, the resin ExxonMobil produced was not adequate for production of Olyset Nets. Once the blueprint had been defined, the consortium dissolved. It had only been necessary to provide the impetus and conceptualize the approach. But only A to Z and Sumitomo were required to execute the technology transfer. Initially, there had been plans to go beyond production and collaborate to facilitate the end-user market for nets. But dedication to the initiative dwindled for personal reasons when the setup of the core team of representatives changed. Guillet draws as a lesson from this process: "A good partnership starts with the individuals who can understand and mutually respect each other. Organizations are important to support the process. But the people involved need to have common objectives. The best way to initiate a functional partnership is to create the conditions to meet the right people, and let people come on their own."



Picture 4. Vice President of the United Republic of Tanzania Dr. Ali Mohammed Shein, CEO of A to Z Textile Mills, Ltd. Anuj Shah, and President of Sumitomo Chemical Hiromasa Yonekura visit the newly opened Olyset Net factory in Arusha, Tanzania.
© William Daniels

The partners decided to build a new production facility outside of Arusha. They created a 50/50 joint venture called “Vector Health International” for this purpose. Acumen Fund provided another US\$ 675,000 as both loan and grant for expansion of the production facilities in 2005. The new facility opened in February 2008. It was praised internationally as an example of how public health efforts could help strengthen local economic development. The Vice President of Tanzania attended the opening ceremony, and President George Bush visited the factory soon after.

The new facility brought production capacity of LLINs in Arusha to 30 million nets per year, over 50% of global capacity for Olyset Net production in 2011. It currently employs 7,500 people.

2.3 The future of Vector Health International

In the first few years, Vector Health International (VHI) benefitted enormously from the rising demand for LLINs. Yet, with increasing competition in the market, it became more and more difficult to win tenders. In 2011, there were already nine other companies offering WHOPEs nets. Most of those

companies produce their nets in Asia, facing much lower costs for energy, transportation, and other production variables. Most tenders use “Free on Board” (FOB) as a price criterion rather than “Delivered Duty Unpaid/Paid” (DDU/DDP). This means shipping and delivery costs are not considered in the tender, which effectively neutralizes the cost advantage of local manufacturing. Even though donors had praised VHI and the local production of mosquito nets, tender policies did not recognize the benefits – both in terms of delivery time and price.

In addition, WHOPEs only provides minimum criteria LLINs have to meet. Specifically, it requires nets to last for at least three years. Studies have shown that Olyset Nets last for at least five years. The thick polyethylene fiber make them much sturdier, but also more expensive. The cost of covering a bed for one year is significantly cheaper with Olyset Nets. Yet tenders most often choose by the “FOB” price, which only considers cost of production. Thus, tenders systematically ignored the two main advantages of VHI’s Olyset Nets: durability and location.

In addition, the company’s original success in its home market Tanzania turned into a disadvantage when public buyers started to feel that A to Z was too dominant in the country, and looked to bring in other suppliers. For example, VHI lost a tender to deliver nets to Zanzibar, an island off the coast of Tanzania. Its FOB price was slightly more expensive. Yet, the main reason for choosing another manufacturer according to the buyer was a new criterion, which compared the date when a sample could be collected. The competitor in Asia could provide the sample two days earlier.

The Universal Coverage Campaign had ended in 2010. As a result, demand for nets fell dramatically in 2011. Funds for procurement of nets were almost used up. The future and funding of the Tanzanian voucher scheme was unclear. The commercial market had been completely crushed by the free distribution of nets. In September 2011, machines at VHI stood still for the first time since its opening. The order books were



Picture 5. Empty stitching section at VHI in September 2011
© Christina Gradl

empty and energy prices in Tanzania had reached an all-time high due to dramatic shortages in supply.

Both Sumitomo Chemical and A to Z stood at a critical inflection point. How should they continue with their joint venture, in the face of these insecurities? The two partners are each responsible to sell 50% of the production. Both pursued different strategies to keep machines running and employees at work.

Sumitomo Chemical sees the future in end-consumer markets for nets. The company assumes that now that consumers have experienced the benefits of nets, many of them will pay to replace the net once it is worn out.

Experiences with different nets might also lead people to prefer Olyset Nets, which has proven its robustness and durability. Hence, the company is working to increase sales in the commercial market. The company launched its first consumer sales initiative in October 2011, together with a local distribution partner in Kenya. Kenyan customers have more purchasing power on average, and the country has not seen as much distribution of free nets. Customers in Kenya are now able to buy Olyset Nets in all leading supermarkets and other shopping channels. The company also plans to adjust the net to meet consumer preferences. On the donor market, consumer-friendly product modifications have not been possible, since all such modifications add to the cost per unit, and tenders are

won on lowest cost. Yet, even though the commercial market for nets is likely to grow in the next years, it will not have the same volume as the market during the Universal Coverage Campaign.

Sumitomo Chemical has also installed a new machine to recycle Olyset Nets at VHI. In the coming years, millions of nets will need to be replaced once they are broken or the insecticide has run out. Sumitomo Chemical has developed a technology to recycle the nets that could be used for lamp oil.

A to Z Textile Mills Ltd. is fully betting on a diversification strategy. A new state-of-the-art facility for the production of cement bags was being installed in September 2011. The company also looked into agricultural nettings, textiles and plastic goods. After all, A to Z was already present in other markets, including plasticware and bottled water.

The two companies also created a new joint venture in 2011: the Technical Resource Center Arusha. The research center will have modern technical facilities and dedicated staff. Sumitomo Chemical and A to Z will both use the facility for their joint and individual purposes. A to Z has a high interest in developing nettings and other products for agribusiness, since investment is currently flowing into Africa to increase agricultural productivity. Sumitomo Chemical will focus research on improving its mosquito net technology. Since resistance of mosquitoes to permethrin, the only insecticide currently used, is a real threat, one main goal is to develop nets with other types of pesticide.

3 Global policies and the local LLIN ecosystem in Tanzania

The problem of malaria is not going to be finished today or tomorrow by saying, 'now everybody get under a net.' In three years you need new nets, and if another disease comes along the focus on malaria will be diverted.

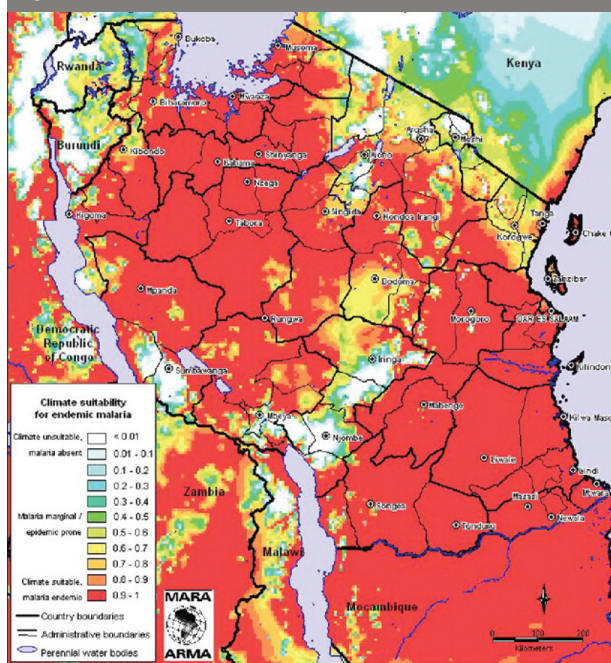
Anuj Shah, CEO of A to Z Textile Mills ²⁴

Sumitomo Chemical entered the market in Tanzania with the joint venture with the intention to build local capacity for LLIN production. It took the opportunity to join forces with A to Z Textile Mills, a dynamic and already dedicated local company. Tanzania already had a very established local bednet ecosystem with local producers and retailers, which had been carefully cultivated over the years with public support. Tanzania was also the arena for the global debate among proponents of free net distributions and those defending the power of market forces and sales of nets. By entering Tanzania, Sumitomo Chemical found itself in the eye of the storm of the rapidly changing ecosystem around LLINs.

Indeed, Tanzania is a case study in the changing approaches to bednet delivery and the global public health landscape that influences it. Over the years, Tanzania went from a market-based approach to a publicly led approach. These changes have resulted in dramatic effects on the national actor ecosystem around bed nets.

Tanzania is a nation of 44 million people in East Africa. Malaria is endemic all over Tanzania (see Figure 8). Malaria is a leading cause of disease and mortality. It accounts for up to 40% of all outpatient attendance.²⁵ The disease kills an average of 80,000 people every year. 60% of these are children under the age of five.²⁶

Figure 8. Distribution of Endemic Malaria in Tanzania



Source: MARA/ARMA 2002

3.1 Beginnings

In the early 1980s, bednets were considered a luxury product and not a basic health necessity. Coverage was close to zero. In 1998, public health NGO Population Services International (PSI) started a multi-year social marketing campaign to develop a commercial market for nets, including producers, a system of wholesalers and retailers, and end customers as the buyers. The campaign was facilitated by tax and duty exemption for nets by the government. International donors, above all DFID, provided funding.

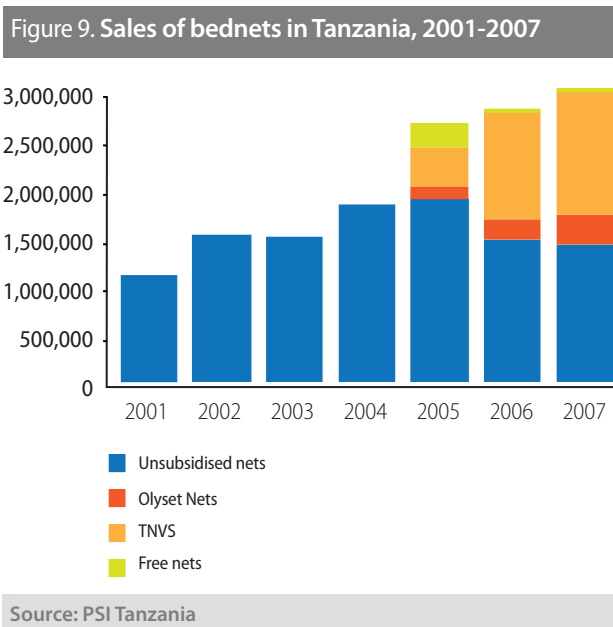
As a luxury product, the government had levied a sales tax of 125% on bednets. In 1994, ITNs were being recognized as important tools for malaria control. As a result, the sales tax was removed on ready-made nets. Suddenly, nets cost half the price. Consequently, sales of the only manufacturer at the time, Sun Flag Ltd, rose.

In order to bring down the price of nets even further, PSI proposed creating competition in the producer market. By promising a market and providing insecticide sachets for free, the NGO convinced Arusha-based textile company A to Z Textile Mills Ltd. to start production in 1998. Two more manufacturers joined the market: TMTL Ltd started manufacturing in 1999, and Moshi Textile Mills Ltd. joined in 2005.²⁷ All of the companies produced simple polyester nets, which had to be manually treated with insecticide. A tendering process ensured that all four could get business, keeping the race for the lowest price going.

Production capacity rose sharply. By 1999, the three manufacturers produced 5 million nets and exported to several countries in Africa. Tanzania was the biggest manufacturer of nets in the region. Stakeholders also convinced the government to waive value-added tax on mosquito nets in 1999, and on netting items in 2004. Prices fell from US\$ 5 per net in 1995 to less than \$3.5 in 2004.²⁸ Nets were also adjusted to consumer tastes, with a diversity of colors and shapes.

SMARTnet, the strategic social marketing for expanding the commercial market for nets, was created as a partnership between the Ministry of Health and PSI in 2002. PSI identified wholesalers in each region and linked them to the manufacturers. It provided subsidies for storage for wholesalers and retailers and for transportation. More than 20,000 outlets sold mosquito nets all over the country, even in remote areas. The campaign provided marketing materials, such as umbrellas and megaphones. A whole sales ecosystem was now in place from the manufacturer to the street vendor at the open air market.

In 2003 and 2004, 3.3 million nets bundled with retreatment kits were sold. In addition, 3.6 million retreatment kits were sold. Household coverage changed from 37% in 2001 to over 50% in 2004. Household surveys showed that children under five were given priority to sleep under nets. Thanks to a far-reaching awareness raising campaign, including demonstrations in the villages, radio messages and



posters, most people understood why to buy and how to use a net.

3.2 The Tanzanian National Voucher Scheme (TNVS)

In 2004, the Ministry of Health and Social Welfare under the National Malaria Control Programme initiated the Tanzania National Voucher Scheme (TNVS). It is also known as “Hati Punguzo” in Kiswahili, or “death-reducing tool.” The scheme aimed at creating access to nets for the highest risk group, pregnant women and infants. A targeted subsidy would address the persisting equity issue, where despite price reductions, poor people were unable to afford nets. TNVS is funded by the Global Fund and the President’s Malaria Initiative (PMI) and implemented by the Mennonite Economic Development Associates (MEDA). PSI is responsible for social marketing.

Phase 1: fixed voucher value

Initially, the voucher provided a subsidy of TShs 2750 (US\$ 2.75 in 2004) to retailers. Women and children could obtain the voucher during examinations at the hospital or with the local doctor. Nets produced for the



Picture 6. Mother with LLIN
© National Malaria Control Program, Tanzania

scheme were specially branded and could not be sold on the open market. Retailers close to hospitals, such as pharmacies, could register as vendors for the program. Depending on how much the retailers thought to gain as profit, women had to spend between US\$ 0.5 and US\$ 1.5 to get a net, including a free insecticide treatment kit.

The voucher scheme intentionally built on and strengthened existing market structures. It provided strong incentives for retailers to stock ITNs. Registered retailers increased from less than 1,000 in 2002 to 10,000 in 2005. The goal was to have at least one retailer in each of Tanzania's 12,500 villages. Sales figures at the retail and wholesale level increased by 50 to 80%. Four national suppliers produced the nets. Market-based implementation also ensured that nets could be delivered quickly through existing wholesale and retail systems to reach the target group. By 2005, approximately 80% of the pregnant women in the TNVS areas were using the voucher to buy an ITN. In addition, more women came to a clinic during pregnancy to obtain a voucher.²⁹

Phase 2: fixed LLIN price

Yet, the leeway provided to retailers in pricing the net still resulted in an equity issue: most of the poorest women did not buy the net. In October 2009, the value of the discount voucher was increased and the top-up price of LLINs fixed at Tshs500 (approximately US \$ 0.3).

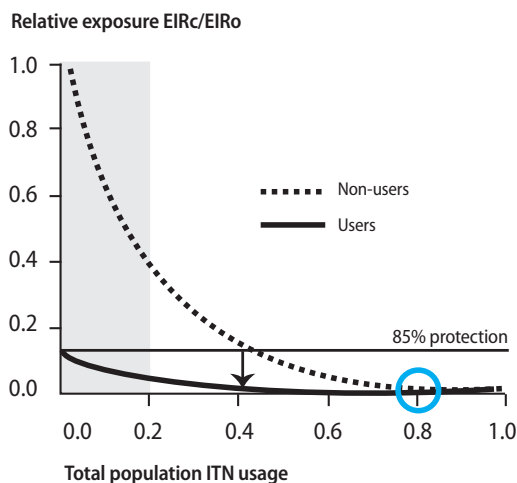
In order to ensure that women did not have to pay more than the fixed top-up to the retailer, a sophisticated logistics system was devised. By means of a unique barcode, each net could be traced along the whole distribution chain. Only upon presentation of the voucher and the barcode from the net could the retailer redeem a new net for free. Retailers just had to pay for the initial stock of nets, and then were provided with free nets to replace sold nets. They could keep the TShs 500. The price was displayed prominently on the package so that women knew that they should not pay more. In order to implement this system, the voucher scheme had to collaborate with just one supplier. The tender went to A to Z, since it was the only local company able to produce LLINs certified by WHOPES and it bid the most competitive price. As a result, the other three producers lost the business of the Tanzanian market, which eventually led them to leave the market or file insolvency.³⁰

A to Z worked closely together with MEDA to develop the delivery system. MEDA kept control of the nets sold through the barcodes. Because nets could not simply be purchased on the market anymore but needed to be exchanged for vouchers and barcodes as proof of nets sold, nets had to be delivered to retailers directly. Therefore, A to Z built up a whole sales force with more than 100 employees across the country and invested in its own fleet of lorries to be able to distribute the nets to even remote areas in Tanzania. It reached 10,200 retailers in January 2011.³¹

3.3 More programs

Over the years, more programs have been added to complement the voucher scheme. As malaria was made a priority of global health policy, more funding became available on the global level. Reaching the vulnerable group of pregnant women and children under five was not seen as sufficient anymore. Led by the success of malaria interventions in reducing all-cause child mortality, in 2008 the objective was changed to aim for universal coverage of LLINs (defined as 80% of the

Figure 10 . *Anopheles gambiae* with no alternative hosts, LLINs



Source: Killeen et al. 2007

entire population), and, ultimately, to eliminate malaria. Researchers had shown that with 80% coverage with LLINs, the *Anopheles gambiae* population decreases to almost zero, unless there are cattle around (see Figure 10). In addition, research suggested that giving away free nets was more effective – both in terms of cost and usage – than selling subsidized nets. A trial showed that greater coverage could be achieved with free nets. Since one net not only benefits the user, but also others in the community, by killing mosquitoes and slowing the spread of the parasite, greater coverage outweighed the added cost.³² Finally, providing nets was ranked as one of the most efficient development interventions available by the Copenhagen Consensus, a panel of renowned economists.³³

No wonder Jeffrey Sachs stated, “We’ll distribute free nets all over Africa, and we’ll do it again and again. There’s no reason why markets should be able to handle this problem.” He flew to Tanzania in July 2008 to persuade President Jakaya Mrisho Kikwete to adopt a new plan for free distribution of nets.³⁴ Apparently, his plea was successful. From 2009, a number of free distribution campaigns have been conducted.

- **The Under-five Catch Up Campaign** was implemented between 2008 and May 2010. It provided a free LLIN to every child under five. Altogether, more than 8.7 million nets have been distributed. The campaign was funded by the Global Fund, the World Bank, the President’s Malaria Initiative (PMI) and the United Nations Children’s Fund, with funding from Malaria No More. Contributions also came from Swiss Agency for Development and Cooperation and from the Government of Tanzania.
- **The Universal Coverage Campaign** provided free LLINs to cover all remaining sleeping spaces not already reached by previous campaigns. The one-time distribution began in August 2010 and was rolled out across all 21 regions of mainland Tanzania. The objective was to cover a minimum of 80% of all sleeping spaces. It is funded by the Global Fund and was completed by November 2011. More than 16.6 million nets have been distributed.

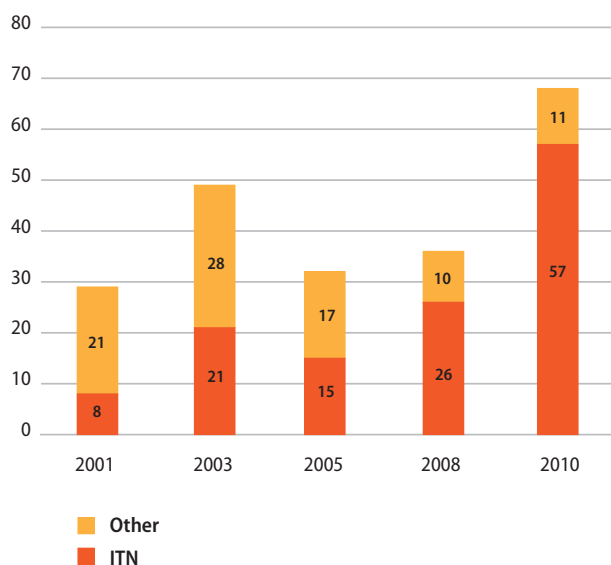
Together, \$160 million were spent on these two campaigns. On average, distributing one net cost \$7. VHI also won tenders to supply these campaigns. Along these distribution campaigns, efforts continue to raise awareness and increase the use of nets. The figure below summarizes the various programs and actors involved in providing ITNs to the Tanzanian population.

3.4 Results

The various campaigns over the years have achieved good results in terms of coverage. The last Tanzania Democratic and Health Survey in 2010 found that 72% of all children under 5 had slept under a net the night before the survey, and so had 68% of pregnant women, as shown in Figures 11 and 12. Most of them used ITNs. In 1999, only 21% of children slept under a net.

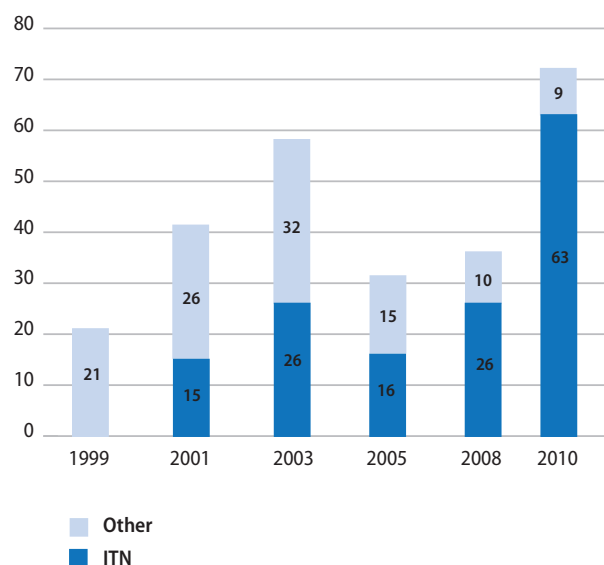
According to data from the National Malaria Control Programme reported by Magesa et al., coverage had already increased sharply in the years after 1999, reaching 58% coverage for children and 49% for

Figure 11 . Percentage of pregnant women sleeping under a bednet in Tanzania, 2001-2010



Source: TDHS 2004-5, TDHS 2007-8, TDHS 2010

Figure 12 . Percentage of children under 5 sleeping under a bednet in Tanzania, 1999-2010



Source: TDHS 2004-5, TDHS 2007-8, TDHS 2010

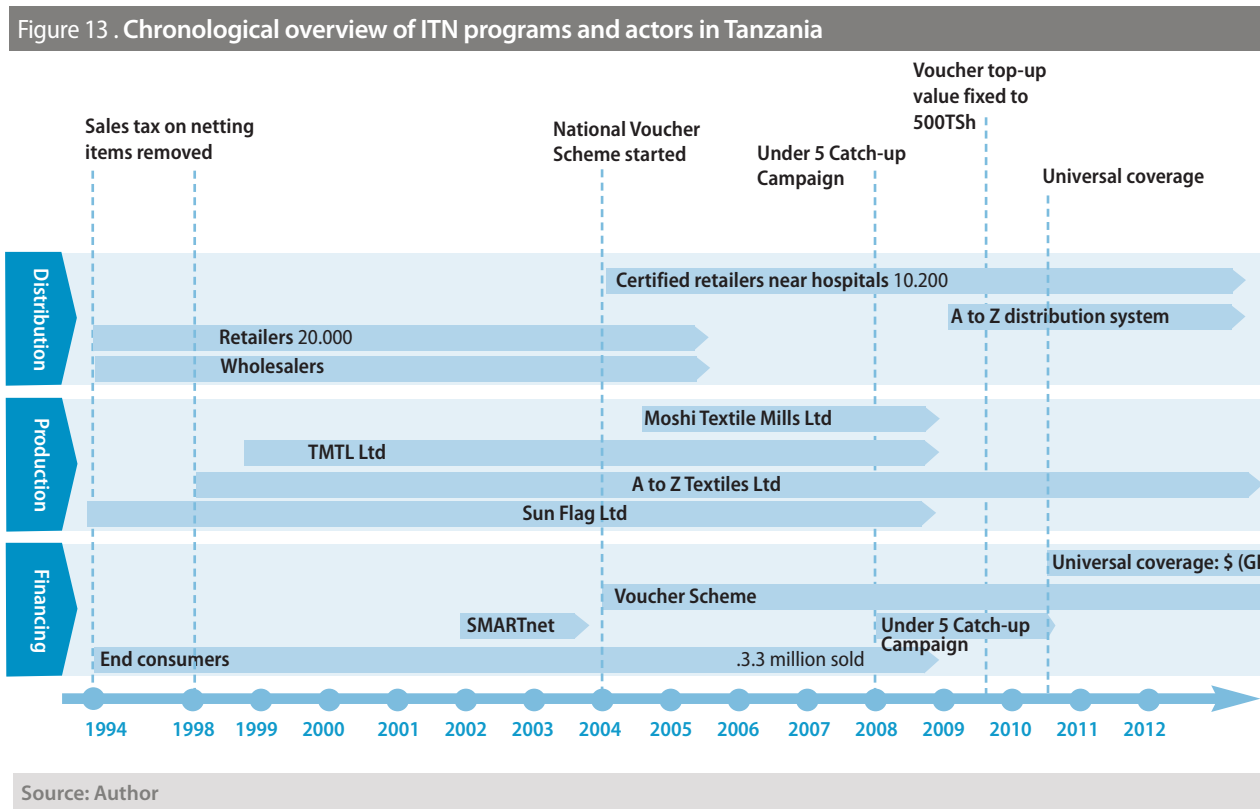
pregnant women by 2003. These nets were sold purely on the commercial market.³⁵ It is interesting to note, even though the two data sets cannot be directly compared, that coverage rates seemed to have decreased by 2005, after introduction of the voucher scheme. This may be due to a variety of reasons, including political insecurity, budget constraints within the social marketing activities, or reduced willingness to buy nets among the population.

Overall, child mortality has decreased in Tanzania. In 2010, 81 children per 1,000 live births died before their fifth birthday, down from 112 deaths per 1,000 live births in 2004-05.³⁶

Back in 2008, when free distribution of nets started, there was a debate about who could better deliver protection for Tanzanians. Jane Miller, then director of malaria initiatives for PSI in Tanzania, said: “We’ve built up a system that gets people to appreciate and buy and look after [bed nets].” She was concerned that the mass distribution campaign could undercut the commercial

sector for nets that PSI had so carefully helped to develop. “We’re trying to think more clearly about [what happens] after the donor money runs out. At the moment, the donors seem to [be] saying that money is no object. But it certainly will be in the future.” Brian Trelstad, chief investment officer for the New York-based Acumen Fund, added: “We think there will be opportunities for complementary public free distribution and stimulation of private channels. People will need to have access to nets even when the wave of free distribution ends.”³⁷

In the end, the free campaigns turned out to be rather devastating for the commercial sector. The dense network of wholesalers and retailers that had evolved by 2008 has all but vanished. Even in the biggest market area of Dar es Salaam, it is hard nowadays to find a net. Logistics for the voucher scheme is now exclusively managed by A to Z. The company delivers nets to 10,000 certified retailers. Free nets are distributed in mass campaigns through NGOs such as MEDA.



Three of the four manufacturers of nets are either out of business or don't produce nets anymore. Thanks to a technology transfer by Sumitomo Chemical, A to Z was able to produce nets that were certified by WHOPEs and could apply for tender to implement the fixed-price voucher scheme. But A to Z also faces difficult times ahead. To respond to global demand, the company has quickly ramped up production capacity to 30 million nets per year and currently employs 7,500 people.³⁸ Yet, by the end of 2011, tenders by the international donors had become rare, competition had increased and the order books were empty. The company is now rapidly diversifying into other activities.

company depends to a great degree on global policies which it is unable to influence. While global, local and corporate priorities seemed to be aligned at one point, this alignment was lost over time. The global LLIN campaigns have resulted in good coverage for the moment, but have been unable to strengthen local ecosystems that would maintain these high levels. As a result, Sumitomo Chemical's effort to build local capacities and thus strengthen local ecosystems might after all not reap the social and economic benefits that were intended.

VHI has become a very important player in this local ecosystem. It is the sole provider of nets to the national voucher scheme. Some donors even started to worry that its position was too strong for the local market. With 7,500 employees, A to Z Textile Mills became one of Tanzania's largest employers. Yet, the success of the

4 Systemic change approach and limitations

Creating a market for mosquito nets is a systemic issue. In countries where malaria is endemic, people develop immunity to the disease over time. They may still fall ill, but then they just feel a slight fever similar to a flu. Yet, they still act as carriers of the parasite, thus helping to spread the disease further. In these areas, only small children and pregnant women generally get severely ill and die from malaria. People in rural areas and slums are often not aware of that risk. As long as people are not aware of the reasons for and risks of malaria, they don't see the need to use mosquito nets. Awareness-raising is thus a precondition for a functional market for nets. This task cannot be accomplished by net producers, since they are not perceived to be objective. NGOs and public institutions need to come in to raise awareness, advocate for behaviour change, and create the necessary incentives on all levels, from the consumer to the retailers and producers, to produce, distribute and use nets.

Moreover, malaria prevention is a public health issue. Even people with very low incomes should be able to afford a net. Equity is not the only reason. The more people are protected by nets, especially ITNs, the more mosquitoes will die from the pesticide. Moreover, fewer people will carry the parasite and pass on the disease. Nets thus reduce the prevalence of malaria overall. These externalities led scientists Cohen and Dupas to conclude that giving away free nets is more cost effective than selling subsidized nets, at least when comparing a one-off distribution of nets.³⁹ Consequently, public subsidies are often used as a tool to reach those who could not afford a net.

Finally, to create access for people even in remote areas, a network of retailers needs to be established. But retailers will only stock nets when there is a demand for them. Hence, production, awareness raising, subsidies and distribution need to go hand in hand. A comprehensive ecosystem of players need to collaborate to bring mosquito nets to all households.

4.1 The boundaries of ecosystems change

Sumitomo Chemical found itself stretched between the global and the local ecosystem for LLINs. On the global level, donors were keen to scale up production and increase competition for nets. On the local level, the production partnership with A to Z increased market power of A to Z to the degree that global donors were concerned about it. At the same time, local policies drove other competitors out of the market. Global lack of funds led to local problems when orders did not come any more. What was the role for the chemical company in strengthening this ecosystem?

The case of Sumitomo Chemical's LLIN activities points out the limitations for companies in advancing inclusive business ecosystems. The main lesson from the developments in the global and Tanzanian market for LLINs is that **the limit of private action to create inclusive business ecosystems is defined by the public sector**. Where the public sector has a strong agenda, and the capacities and resources to implement it, the private sector should not – and need not – take the lead in organizing the actors around this issue. Hence, building inclusive business ecosystems is only required, and will only work, in a 'public void,' where the government is either not functional or not interested in the specific issue. Here, private companies play the role of defining an agenda, and sometimes bring the public sector on board to create the right framework conditions.

In the case of LLINs, the main challenge in creating a sustainable inclusive business ecosystem seems to be the changing political environment. Over the years, the approach of the public donors to combating malaria has been changing, from creating local markets to distributing free nets at a large scale, from malaria prevention for high-risk groups to elimination. As a result, the way national governments intervened in the market has also changed. In the case of Tanzania, the country had established a functional voucher scheme that was supplementing social marketing efforts and the commercial market to reach vulnerable populations.

The initial version of the voucher scheme stimulated rather than stifled the commercial market. Then, the goal to achieve universal coverage called for a quick scale-up of distribution efforts. Instead of building on the already existing voucher scheme, the Tanzanian government opted for free distribution campaigns. Free distribution has apparently crowded the commercial retailers out of the market. In addition, public procurement policies for the free campaigns and the new voucher scheme with a fixed top-up amount have left three out of four local manufacturers without business because they had not developed LLINs and had no WHOPES certification. A to Z, the remaining one, is struggling to keep its 7,500 employees on the payroll. As donor funding is drying up, the problem becomes how to replace nets once they are worn out. In this changing political environment, Sumitomo Chemical could only try to keep up with policy, by staying in touch with the discussion and adjusting the own course of action at each stage. Sumitomo Chemical got its net certified by the WHO, invested for large-scale production in Africa, and is now looking to build sustainable commercial markets.

4.2 Combination of structures

But even in situations where the public sector is strong, companies can play an important role in strengthening the ecosystem, within the boundaries of the political framework. Sumitomo Chemical seeks to advance the ecosystems for LLINs with a variety of models. In fact, it employs all three structures identified in the background paper for strengthening inclusive business ecosystems: private initiative, project-based alliances, and platforms.

Private initiative

The company takes this private initiative above all to position itself as a responsible “corporate citizen” and make its contribution to society tangible. Sumitomo Chemical provided its technology royalty-free to A to Z Textile Mills in order to build local production capacity for the nets that would mainly be used in Africa. It thus

helped to bring another player into the picture that might not have been able to participate otherwise, and created jobs and income opportunities in Tanzania. It continues to invest in research and development around malaria vector control, into state-of-the-art production facilities and into the creation of commercial markets. In Kenya, the company has started an initiative to market Olyset Nets like any other consumer product through supermarkets and other sales channels. The hope is that this pilot project can work because Kenyan consumers are already aware of the benefits of using nets, and have a higher income on average than in other countries in sub-Saharan Africa. Sumitomo Chemical also participates in the global dialogue around vector control, adding its expertise and corporate perspective.

Project-based alliance

Together with A to Z, Sumitomo Chemical has created a new company, VHI, to manufacture nets in Tanzania. In the contract to set up this joint venture, the partners agreed on clear objectives and tasks. Day-to-day business is managed by A to Z. A representative of Sumitomo Chemical visits the Arusha site for several weeks every 4 months to control quality and supervise the implementation of new projects, like the new recycling machine. Strategic decisions are being taken jointly. The collaboration has not been without frictions, since the modus operandi of a Japanese global player and an Indian family business in Africa differ significantly. Still, the partners have expanded their collaboration recently with a new technical research facility.

The partnership was initially facilitated by a consortium of partners. While Acumen Fund provided grants and loans to set up the new technology and expand the factory, ExxonMobil, UNICEF, and WHO had no ownership stakes in the project. Their role was to conceptualize the partnership, create a vision for it, and drive it towards implementation by creating a blueprint. They stepped out once the concept for the local manufacturing was clear. Project-based alliances can be very short term, informal and immaterial. They can simply serve as spaces to catalyze new ideas and reorganize the player landscape.⁴⁰

Sumitomo Chemical also works in other project based-alliances, such as with Malaria No More or the Royal Commonwealth Society, to raise awareness for malaria protection. In these classic public-private partnerships, partners implement a clearly structured, time-limited project with clear responsibilities.

Platform

Finally, Sumitomo Chemical is involved in the global issue platforms, such as the Global Fund. There, it articulates its concerns, from tendering policies to resistance and recycling, and influences the public debate. For example, in 2011 the company flagged the issue of longevity of nets to the UN Special Envoy for Malaria, the RBM Executive Director and the WHO Global Malaria Program leadership: WHOPEs is a minimum standard and assumes that all nets last only 3 years. Polyethylene and polypropylene nets have been proven to last much longer, but this difference is not acknowledged in common tendering practices. As a result, the issue of value for money in the bednet market' has become a focus within the community. A series of technical meetings is underway, and recommendations are being prepared for the Global Fund Market Dynamics Advisory Group (MDAG) to address durability issues in 2012. Finally, Sumitomo Chemical used the existing global platforms around malaria to participate in the ongoing discourse in effective approaches to malaria prevention.

4.3 Lessons learned

Sumitomo Chemical maintains an ongoing commitment to strengthening the LLIN ecosystem. However, the company still suggests that it needs to learn how to navigate the complex LLIN ecosystem better. Signing up to the global framework of RBM and the commitment to the local project-based alliance VHI in Tanzania sometimes created friction. How can the company balance the demands of global and local stakeholders? The company has scaled up production in Tanzania responding to urgent donor needs for more nets. Now, as demand is dwindling, it feels a

responsibility towards the 7,500 employees at VHI. While Sumitomo Chemical is purely dedicated to vector control efforts with VHI, A to Z Textile Mills sees itself primarily as a plastics producer, and is diversifying into many other sectors. How can the different interests of partners be aligned under the joint venture?

The case study shows that combining structures for strengthening ecosystems is not without challenges. Though the diverse stakeholders and frameworks may be aligned at one point in time, alignment can be lost over time as framework conditions change. In particular where public policy changes rapidly, it can be tough for private companies to keep track and change structures and activities as quickly. Insecurity in the political environment makes it hard for companies to invest in inclusive business ecosystems, since policy changes can render these investments worthless.

The case poses questions for companies. To what degree is private initiative for strengthening inclusive business ecosystems dependent on public policy and the frameworks created by global issue platforms? And if there are strong dependencies, how reliable are these broader frameworks and how is the private initiative affected when these frameworks change?

The case study also poses questions to players from development organizations. For example, it may be worth reconsidering the process of supporting individual companies through grants or technology transfers. Would it be preferable to organize such support through competitive processes that provide access to such benefits to more than one company? Moreover, it seems that donor programs that rely on the procurement of large amounts of goods can have a significant positive impact on local economic development. A to Z Textile Mills became the biggest private employer in the Arusha region. On the other hand, halting procurement processes can have a detrimental impact on such local companies. Revising procurement policies to support local economic development is now best practice among donor

agencies. The World Food Programme bought 80% of the US\$ 1.25 billion worth of food commodities it procured in developing countries. Procuring other goods and services locally may require donors to join forces with the private sector to build capacities and transfer technologies, as has happened in the example of VHI. Companies can help to strengthen these local inclusive business ecosystems by making donors aware of the benefits of local production and by collaborating with companies in developing countries, as Sumitomo Chemical has been doing.

The case study of Sumitomo Chemical and the LLIN market highlights the challenges of strengthening ecosystems through private initiative, but also shows its potential. Technology transfers and the accompanying capacity building can lift local companies in developing countries into the league of global players, creating employment and economic opportunity. By providing evidence of the positive impact of such initiatives, companies can make the case to public agencies to revise their procurement policies and support similar initiatives. Sumitomo Chemical has now started to get more engaged in discussions with donors about these issues. The example of VHI may well influence donors approach the procurement of LLINs and other goods in the future.

Appendix A: Interviews

In alphabetical order by surname:

Lisa Goldman, Sumitomo Chemical
Pierre Guillet, VHI
Godfrey Kalagho, Ministry of Health and Social Welfare
Scott Mitchell, Sumitomo Chemical
Tatsuo Mizuno, Sumitomo Chemical
Nathan Rawe, PSI
Dr. Romanus Mtunge, PSI
Ken Nakanishi, Sumitomo Chemical
Divyesh Ramanandi, A to Z Textile Mills Ltd.
Kalpesh Shah, A to Z Textile Mills Ltd.

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Appendix C: List of abbreviations

ACT	Artemisinin-based Combination Therapy
CEO	Chief Executive Officer
DDT	Dichlorodiphenyltrichloroethane (insecticide)
DDP/DDU	Duty Paid/Unpaid
FOB	Free off board
Global Fund	Global Fund to Fight AIDS, Malaria and Tuberculosis
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated Net
LLIN	Long-Lasting Insecticide-Treated Net
NGO	Non-governmental organization
PMI	President's Malaria Initiative
RBM	Roll Back Malaria Partnership
UNDP	United Nations Development Programme
UNICEF	United Nation's Childrens Fund
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

Appendix D: Endnotes

1. Quoted in Barclay 2008
2. WHO 2011
3. WHO 2011
4. WHI Malaria Factsheet
(<http://www.who.int/mediacentre/factsheets/fs094/en/index.html>)
5. WHO 1974
6. This brief history is based on Rodriguez, William and Kileken ole-MoiYoi 2011
7. Roll Back Malaria website
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8. WHO 2011
9. APPGMNTD 2011
10. WHO 2011
11. RBM 2011
12. WHO 2011
13. Rodriguez 2011
14. Rodriguez 2011
15. WHO 2011
16. The exact definition of the target measure for “universal coverage” has been adjusted over the year 2010, from “sleeping places covered” to “resources identified”.
17. WHO 2011
18. WHO 2011
19. Butler 2001
20. Butler 2001
21. Olyset Net website
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22. Encyclopedia Britannica website
(<http://www.britannica.com/EBchecked/topic/573265/Sumitomo-Group>, <http://www.sumitomo.gr.jp/english/history/history/index.html>)
23. Ito and Okuno 2006
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25. NBS 2011
26. John 2010
27. Magesa et al. 2005
28. Magesa et al. 2005
29. Magesa et al 2005
30. The question arises: why none of the other producers in Tanzania acquired the capacity to produce LLINs? Did they not have the capacities to step up production? Did the support A to Z received by Acumen and Sumitomo Chemical create an unfair advantage that competitors were not able to emulate?

Likewise, it would be interesting to understand why the donor community did not build on the example of the Sumitomo Chemical / A to Z joint venture, which received international acclaim, to support other companies in Africa in taking up LLIN production. By creating competition among local producers, donors could have escaped the dilemma of being unable to support local procurement and not create an unfair advantage. These questions deserve further inquiry.
31. Natnets website
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32. Cohen and Dupas 2010
33. Copenhagen Consensus website
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34. Barclay 2008
35. Magesa et al 2005
36. TDHS 2010
37. Barclay 2008
38. Jennings 2011
39. Cohen and Dupas 2010
40. For more detailed accounts of the partnership between Sumitomo Chemical and A to Z Textiles, see, for example, Karugu and Mwendwa 2008 and Rodriguez and ole-MoiYoi 2011.

About the Author

Christina Gradl has spent more than ten years researching and advising companies on CSR, sustainable development, and inclusive business. She is a fellow of the Corporate Social Responsibility Initiative at the Harvard Kennedy School and a strategic advisor to the UNDP Growing Inclusive Markets Initiative. She is also a founder and managing director of Endeava, an independent research and consulting institute working towards enterprise solutions for development.

Christina has co-authored more than ten publications on inclusive business. With Beth Jenkins, she wrote the UNDP report "Creating Value for All: Strategies for Doing Business with the Poor." In collaboration with the German Federal Ministry for Economic Cooperation and Development and GIZ, she developed, inter alia, the "Inclusive Business Guide." Besides a focus on the energy, insurance, and agribusiness sectors, Christina is particularly interested in the ecosystems of various players, their individual contributions and their collaboration, that make inclusive businesses work.

Currently, Christina completes a PhD in economics and business strategy on the business model concept. She holds an MSc in Philosophy of Public Policy from London School of Economics and a Masters degree in International Business and Regional Studies from the University of Passau, Germany. She was the Kofi-Annan-Fellow on Global Governance 2006/07 and an associate with McKinsey & Company.

About the CSR Initiative at the Harvard Kennedy School

The Corporate Social Responsibility Initiative (CSRI) at the Harvard Kennedy School's Mossavar-Rahmani Center for Business and Government (M-RCBG) is a multi-disciplinary and multi-stakeholder program that seeks to study and enhance the public contributions of private enterprise. The initiative explores the intersection of corporate responsibility, corporate governance, and public policy, with a focus on analyzing institutional innovations that enhance governance and accountability and help to achieve key international development goals. It bridges theory and practice, builds leadership skills, and supports constructive dialogue and collaboration among business, government, civil society and academics. Founded in 2004, the CSR Initiative works with a small Corporate Leadership Group consisting of global companies that are leaders in the fields of corporate responsibility, sustainability or creating shared value. The group currently consists of the following companies: Abbott Laboratories; AbbVie; Chevron; The Coca-Cola Company; ExxonMobil; Intercontinental Hotels Group; Microsoft; Nestlé; SAP; Unilever; and Yara. The Initiative also works with other leading CSR and sustainability organizations, government bodies, nongovernmental organizations and companies to leverage innovative policy research and examples of good practice in this field.

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